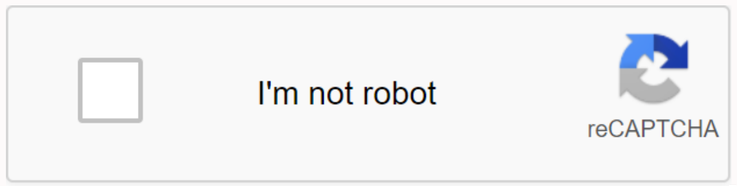

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Scaling techniques in research methodology pdf

Chapter Case Structure Of chapter measurement levels Nominal scales Dimensions scales Comparative scales Noncomparative scales Chapter Summary Key terms Review Questions Chapter References A common feature of marketing research is the attempt to get respondents to communicate their feelings, attitudes, opinions and evaluations in any measurable form. To this end, marketing researchers have developed a range of scales. Each of these has unique characteristics. What is important for the market analyst to realize is that they have wildely different measurement characteristics. Some scales are at their very best, limited in their mathematical properties to the extent that they can only establish an association between variables. Other scales have more extensive mathematical properties and some, hold out the ability to determine cause-and-effect relationships between variables. Chapter ObjectiveThis chapter will give the reader: · An understanding of the four measurement levels that can be made by researchers· The ability to distinguish between comparative and non-comparative measuring scales, and· A basic tool kit of scales that can be used for marketing research. Chapter structure All measurements must take place one of four forms and these are described in the opening section of the chapter. After the characteristics of the four shell categories have been explained, different forms of comparative and non-comparative scales are illustrated. Some of these scales are numerical, others are semantic and even others take a graphic form. The marketing researcher familiar with the complete scale measurement toolkit is better equipped to understand markets. Measurement levels Most marketing research texts explain the four measurement levels: nominal, ordinal, range and ratio, and the treatment given to them here will be concise. However, it is an important substance because the type of scale used to make measurements directly impinges on the statistical techniques that can legitimately be used in the analysis. Nominal scales This, the crudest of measuring scales, classifies individuals, companies, products, brands or other entities into categories where no order is implied. In the very spirit, it is often referred to as a categorical scale. It is a classification system and does not place the device along a continuum. That means a simple count of the frequency of the cases assigned to the different categories, and if desired numbers can be nominally assigned to label each category as in the example below: Figure 3.1 An example on a nominal scale Which of the following food items do you usually buy at least once a month? (Please tick) Okra Palm Oil Milled Rice Peppers Shrimp Pasteurized Milk Figures have no arithmetic properties and only serve as labels. The only measure of the average that can be used is the mode because this is simply a set of frequency counts. Hypothesis tests can be performed on data collected in nominal form. The most likely would be the Chi-square test. However, it should be noted that Chi Square is a test to determine whether two or more variables are associated and the strength of this relationship. It can not tell anything about the shape of that relationship, where there is, i.e. Scales Ordinala scales involve the ranking of individuals, attitudes or objects along the continuum of the characteristic scaled. For example, if a researcher asked farmers to rank 5 brands of pesticides in order of priority he/she might get answers like those in Table 3.2 below. Figure 3.2 An example of a scale of order used to determine farmers' preferences among 5 brands of pesticides. Order of Preference Fire 1 Rambo 2 R.I.P. 3 Killalot 4 D.O.A. 5 Bugdeath From such a table the researcher knows the order of preference but nothing about how much more a brand is preferable to another, there is no information on the interval between two brands. All information that a nominal scale would have provided is available from an order scale. In addition, position statistics such as median, quartile, and percentile can be determined. It is possible to test for order correlation with ranked data. The two main methods are Spearman's ranked correlation coefficient and Kendall's coefficient of Concordance. For example, either procedure can determine the degree to which two or more survey participants agree in their ranking of a set of items. Think again the ranking of pesticide examples in Figure 3.2. The researcher may want to measure similarities and differences in the rankings of pesticide brands depending on whether the respondents' farm companies were classified as arable or mixed (a combination of crops and livestock). The resulting coefficient takes a value in the range 0 to 1. A zero would mean that there was no agreement between the two groups, and 1 would indicate total agreement. It is more likely that an answer somewhere between these two extremes would be found. The only other permitted hypothesis testing procedures are the driving test and plate test. The runs test (also known as Walden-Wolfowitz). Testing is used to determine whether a sequence of binomial data - which means that it can take only one of two possible values e.g. Character tests are used when the goal is to determine whether there is a significant difference between matched data pairs. The sign test tells the analyst if the number of positive differences in the ranking is roughly equal to the number of negative rankings, in which case the distribution of the rankings is random, i.e. obvious differences are not significant. The test only takes into account the direction of differences and ignores their size and therefore it is consistent with the order data. Interval scales It is with a range, data is scaled that researchers can justify the use of the arithmetic mean as a measure of the average. The range or cardinal scale has equal units of measure, which makes it possible to interpret not only the order of the shell score, but also the distance between them. However, it must be recognised that the zero point on a range scale is arbitrary and is not a real zero. This obviously has implications for the type of data manipulation and analysis we can perform on data collected in this form. It is possible to add or subtract a constant to all scale values without affecting the shape of the scale, but you cannot multiply or divide the values. It can be said that two respondents with a scale position of 1 and 2 are as far apart as two respondents with a scale position of 4 and 5, but not that a person with a score of 10 feels twice as strong as one with a score of 5. The temperature is interval-scaled, measured either in Centigrade or Fahrenheit. We can not talk about 50 ° F is twice as hot as 25 ° F because the corresponding temperatures on the centigrade scale, 10 ° C and -3.9 ° C, are not in the ratio 2:1. Interval scales can be either numeric or semantic. Study the examples below in Figure 3.3. Figure 3.3 Examples of range scales in numerical and semantic format Enter your views on Balkan Oliver by scoring on them on a scale from 5 down to 1 (i.e. 5 = Excellent; = Bad) on each of the criteria listed Balkan Oliver is: Circle appropriate score on each row Succulence 5 4 3 2 1 Fresh tasting 5 4 3 2 1 Free from skin stain 5 4 3 2 1 Good value 5 4 3 2 1 Attractively packaged 5 4 3 2 1 (a) Enter your views on Balkan Olives by ticking the appropriate answers below: Excellent Very good good fair poor succulent freshness Freedom from skin stain Value for money Attractiveness of packaging (b) Most of the usual statistical methods of analysis require only range scales in order that they can be used. These are not retold here because they are so common and are found in virtually all basic texts on statistics. Relationship scales The highest measurement level is a relationship scale. This has the properties of a range scale along with a fixed origin or zero point. Examples of variables that are ratio scaled include weights, lengths, and times. Ratio scales allow the researcher to compare both differences in scores and the relative size of the score. For example, the difference between 5 and 10

minutes is the same as between 10 and 15 minutes, and 10 minutes is twice as long as 5 minutes. Given that sociological and management research rarely strives to get beyond the range of measurements, it is not suggested that special attention be paid to this level of analysis. Suffice it to say that virtually all statistical operations can be performed on ratio scales. Measuring scales The different types of scales used in marketing research fall into two broad categories: comparative non-comparative. I I scaling, the respondent is asked to compare one brand or product to another. With noncomparative scaling respondents only need to evaluate a single product or brand. Their evaluation is independent of the other product and/or brands that the marketing researcher is studying. Noncomparative scaling is often referred to as monadic scaling and this is the more widely used type of scale in commercial marketing research studies.Comparative scales Parat comparison2: It is sometimes the case that marketing researchers want to find out what are the most important factors in determining the demand for a product. Conversely, they may want to know which are the main factors that act to prevent the general introduction of a product. Take, for example, the very poor farmer's response to the initial design of an animal-drawn mold on board plow. A combination of investigative research and cunning observation suggested that the following factors played a role in shaping the attitudes of those farmers who feel negatively towards the design: · Not the donkey. Does not work for inter-origin· Far too expensive· New technology for risky· Too hard to carry. Suppose the responsible organization wants to know which factors are primarily in the farmer's mind. It may well be that if the factors that are most important to the farmer than the others, which are of a relatively minor nature, will cease to prevent widespread adoption. The options are to abandon the product's redevelopment or to completely redesign it which is not only expensive and time-consuming, but may well be subject to a new set of objections. The process of ranking the objections from most to least important is best approached by interrogation technique called paired comparison. Each of the objections is paired by the researcher so that with 5 factors, as in this example, there are 10 pairs- In paired comparisons each factor must be paired with all other factors in turn. But only a couple ever put to the farmer at once. The question can be asked as follows: Which of the following was the most important to make you decide not to buy the plow? · The plow was too expensive · It turned out to be too difficult to transport In most cases, the question, and the alternatives, would be put to the farmer verbally. He/she then indicates which of the two was most important and the researcher ticks the box on his/her questionnaire. The query is repeated with a second set of factors and the appropriate box checked again. This process continues until all possible combinations are exhausted, in this case 10 pairs. It is good practice to mix the pairs of factors so that there is no systematic bias. The researcher should try to ensure that some particular factor is sometimes the first of the pair to be mentioned and sometimes the second. For example, the researcher would never take the first factor (on this occasion 'Not ridges)) and compare it to each of the others in succession. It is likely to cause systematic bias. Below, the labels have been given to the factors so that the worked example is easier to understand. The letters A - E have been distributed as follows: A = Do not ridge B = Far too expensive C = New technique for risky D = Does not work for inter-pruning E = Too difficult to carry. The data is then set up in an array. Suppose that 200 farmers have been interviewed and their answers are arranged in the network below. Furthermore, suppose that the matrix is so orderly that we read from top to page. This means, for example, that 164 out of 200 farmers said that the fact that the plough was too expensive was a greater deterrent than the fact that it was not capable of getting rid of. Similarly, 174 farmers said that the plow's inability to inter-crop was more important than the inability to ridge when deciding not to buy the plow. Figure 3.4 A preference matrix A B C D E A 100 164 120 174 180 B 36 100 160 176 166 C 80 40 100 168 124 D 26 2 4 32 100 102 E 20 34 76 98 100 If the power grid is read carefully, it can be seen that the ranking of factors is - Most importantly E Too difficult to carry D Not inter crop C New technology/high risk B Too expensive Least important A Not ridge. One can see that it is more important for designers to concentrate on improving transportability and, if possible, give it an inter-cropping ability rather than focusing on its ridging capabilities (remember that the example is entirely hypothetical). A major advantage of this type of questioning is that while it is possible to get a measure of the order of weight of five or more factors from the defendant, he is never asked to think about more than two factors at once. This is especially useful when dealing with illiterate farmers. That said, the researcher must be careful not to present too many pairs of factors to the farmer during the interview. If he does, he will find that the farmer will quickly get tired and/or bored. It is just as well to remember the formula for n(n - 1)/2. For ten factors, brands or product attributes this would provide 45 pairs. The farmer should clearly not be asked to expose himself to having the same question that was asked to him 45 times. For practical purposes, six factors are possibly the limit, giving 15 pairs. It should be advanced by the procedures described in these notes that the paired comparison scale provides order data. Dollar Metric Comparisons3: This type of scale is an extension of the paired comparison method in that it requires respondents to indicate both their preferences and how much they are willing to pay for their preferences. This scaling technique gives the marketing researcher a range - scaled measurement. An example is given in figure 3.5. Figure 3.5 An example of a dollar metric scale Which of the following types of fish do you prefer? How much more, in cents, would you be willing to pay for your preferred Fresh Fresh (Gutted) $0.70 Fresh (Gutted) Smoked 0.50 Frozen Smoked 0.60 Frozen Fresh 0.70 Smoked Fresh 0.20 Frozen(gutted) Frozen From the data above the preferences shown below can be calculated as follows: Fresh fish: 0.70 + 0.70 + 0.20 =1.60 Smoked fish: 0.60 + (-0.20) + (-0.0.0.50) =(-1.10) Fresh fish(gutted): (-0.70) + 0.30 + 0.50 =0.10 Frozen fish: (-0.60) + (-0.70) + (-0.30) =(-1.60) The Unity-sum-gain technology : A common problem with launching new products is one of reaching a decision on which options , and how many options you offer. Although a company may be keen to meet the needs of as many market segments as possible, it must ensure that the segment is large enough to enable him to make a profit. It is always easier to add products to the product line, but much more difficult to decide which models to delete. One technique for evaluating the options that are likely to prove successful is the device-sum-gain approach. The procedure is to start with a list of features that may possibly be offered as options on the product, and along with each one you list their retail cost. A third column is constructed and this forms an index of the relative prices of each of the items. The table below will help clarify the procedure. For this example the basic grim reaper is priced at $20,000 and some possible extras are listed along with their prices. The total value of these hypothetical extras is $7,460 but the researcher tells the farmer he has an equally hypothetical $3,950 or similar sum. The important thing is that he should have significantly less hypothetical money to spend than the total value of the alternative product features. In this way the farmer is encouraged to reveal his preferences by allowing scientists to observe how he trades another advantage against another. For example, would he prefer a side rake attachment to a 3 meter head rather than having a conveyor wagon on either a standard or 2.5m wide head? The farmer needs to know that all unused money cannot be kept by him so he should seek the best value for money he can get. In cases where the researcher believes that mentioning specific prices may introduce some kind of bias into the results, then the index can be used instead. This is constructed by bringing the price of each item above the total $7,460 and multiplying by 100. Respondents can then get a maximum of 60 points and then, as before, get the question how they would spend these 60 points. In this raw example the index figures are not too easy to work with for most respondents, so one would round them as has been done in the adjusted column. It is the relative and not the absolute value of the items that are important so the precision of rounding need not overly concern us. Figure 3.6 The unit-sum-gain technology Article Additional cost ($s) Index index 2.5 wide rather than standard 2m 2,000 27 30 Self-lubricating chain rather than belt 200 47 50 Side rake rake 350 5 10 Polymer heads rather than steel 250 3 5 Double instead of single-edged cutters 210 2.5 5 Conveyor trolley for lie bilage 650 9 10 Automatic leveling of Table 300 4 5 The unit sum-gain technology is useful for determining which product functions are more important for farmers. The design of the final market version of the product may then reflect the needs and preferences of farmers. Practitioners treat data collected using this method as ordinal numbers. Non-composing scales Continuous rating scales: Respondents are asked to give a rating by placing a mark at the appropriate position on a continuous line. The scale can be written on short and shown to the respondent during the interview. Two versions of a continuous grading scale are depicted in Figure 3.7. Figure 3.7 Continuous grading scales When using version B, the respondent's scoring is determined either by dividing the line into as many categories as desired and assigning the respondent a score based on the category in which his/her mark falls, or by measuring the distance, in millimeters or inches, from either end of the scale. Regardless of which of these forms of the continuous scale is used, the results are normally analyzed as interval-scaled. Line selection scale: The line-marked scale is typically used to measure perceived similarity differences between products, brands, or other objects. Technically, such a scale is a form of what is called a semantic differentiation scale because each end of the scale is marked with a word/phrase (or semantic) that is the opposite of the other. Figure 3.8 gives an illustrative example of such a scale. Consider the products below that can be used when frying food. In the case of each pair, indicate how equal or different they are in the flavor they give to the food. Figure 3.8 An example of a line selection scale For some types of respondent, the line scale is a simpler format because they do not find discrete numbers (e.g. 5, 4, 3, 2, 1) best reflect their attitudes/feelings. The line selection scale is a continuous scale. Specified grading scales: With a specified scale, respondents are provided with a scale that has numbers and/or short descriptions associated with each category and are asked to select one of the restricted categories, ordered in scale, that best describes the product, brand, company or product attribute being studied. Examples of the specified grading scale are illustrated in Figure 3.9. Figure 3.9 Specified grading scales Specified grade scales can take a variety of innovative shapes such as the two illustrated by Figure 3.9, which are graphic. Figure 3.10 Graphical specified scales Regardless of the specified scale applied, the researchers usually treat the data as range level. Semantic scales: This type of scale makes extensive use of words rather than numbers. Respondents describe their feelings about the products or brands on scales with Labels. When using bipolar adjectives, the end points of the scales, these are called semantic differential scales. The semantic scale and the semantic differential scale are illustrated in Figure 3.11. Figure 3.11 Semantic and semantic differential scales Likert scales: A Likert scale is what is called a summed instrument scale. This means that the items that make up a corpsescale are summed to produce a total score. In fact, a Likert scale is a composite of specified scales. Typically, each scale object will have 5 categories, with scale values ranging from -2 to +2 with 0 as a neutral response. This explanation may be clearer with the example in Figure 3.12. Figure 3.12 The Likert scale strongly agrees that none of them agree at all if the price of raw materials fell companies would lower the price of their food products. 1 2 3 4 5 Without state regulation, companies would benefit from the consumer. 1 2 3 4 5 Most food companies are so worried about making profits that they do not care about quality. 1 2 3 4 5 The food industry spends a great deal of money on ensuring that production is hygienic. 1 2 3 4 5 Food companies should charge the same price for their products nationwide 1 2 3 4 5 Likert scales are treated that provide interval data by the majority of marketing researchers. The scales that have been described in this chapter are among the most common in marketing research. Although there are many more forms that scales can take, if students are familiar with those described in this chapter they will be well equipped to deal with most types of survey problems. Chapter Summary There are four measurement levels: nominal, orderly, range, and ratio. These constitute a hierarchy where the lowest measurement scale, nominal, has significantly fewer mathematical properties than those further up in this wave hierarchy. Nominal scales provide information on categories; sequence scales give sequences; interval scales begin to reveal the magnitude between points on the scale and ratio scales explaining both the order and the absputiable distance between two points on the scale. The measurement scales, commonly used in marketing research, can be divided into two groups; comparative and non-comparative scales. Comparative scales involve the respondent in signaling where there is a difference between two or more producers, services, brands or other stimuli. Examples of such scales are; paired comparison, dollar metric, unity-sum-profit and line marking scales. Non-comparative scales, as described in the textbook, are; continuous rating scales, specified rating scales, semantic differential scales and Likert scales. Keyterms Comparative ScalesInterval ActionsFacial Delorate Line ScalesMonadic ScaleNominal DimensionsUnderstandingsParad comparisonRatio actionsSemantic differenceUnity-sum-gainReview Queries 1. With what kind of scale would Kendall's Concordance be used? 2. What is the more common name given to the order scale? 3. Why should marketing researchers employ a one metric scale? 4. A researcher wants to measure consumer preference between 9 brands of vegetable oil and has decided to use the paired comparison method. How many pairs of brands will the researcher present to respondents? 5. Explain what is meant by a semantic differential scale. 6. Two graphic scales are described in the textbook. What types of scale are these? 7. See back to figure 3.5. What form of fish is the most and least preferred? 8. What are the main statistical limitations of nominal scaled data? Chapter References 1. Coombs, C. H. (1953).. Theory and methods for social measurement, in Research methods in the behavioral sciences, eds. Feslinger, L. and Ratz, D., Holt, Rinehart and Winston. 2. Thurstone, L. L., (1927), A Law of Comparative Judgment, Psychological Review 34, p. 273-86. 3. Dillon, W. R., Madden, T. S and Firtle, N. H. (1994), Marketing Research in a Marketing Environment, 3rd edition, Irwin, p. 298. 298.