UNIT 7 ATTITUDE MEASUREMENT & SCALING

Objectives

After going through this unit you should be able to:

- define attitude.

- distinguish between various types of measurement scales.

- discuss how the method of analysis of data is dependent on the levels of measurements used in collection of data.

- explain different formats of rating scales.

- differentiate between single item and multiple-items scales.

- construct various types of multiple-items scales.

- describe criteria for good measurement.

Structure

7.1   INTRODUCTION

Marketing research generally deals with the behaviour of the consumers. .A company which is able to sell its product/services must be viewed by customers as pocessing a favourable attitude towards it. It is therefore very important for the organization to understand and measure the attitudes of its customers towards its products and services. This is because if the customers have an unfavourable attitude or/a poor image about the company, it will not be able to sustain for a long time. It is not only essential for the company to ensure that consumers have a favourable attitude towards its product, but also to anticipate their future preferences. The question therefore arises how to measure attitude towards the products of the company. Measuring attitude is 'a very difficult task because we cannot measure product or customers but we can measures the opinion! perceptions of the customers towards the product. In other words, attitude is inferred and not directly observed. A study of consumer behaviour and likes and dislikes of the customers play a very important role in understanding their perceptions and thereby inferring their attitudes towards the product. This may be of help in estimating how much of the product a company will be able to sell in future,

7.2   ATTITUDE

Attitude may be defined as the degree of positive or negative affect associated with some psychological object. It is a pre-disposition of the individuals to evaluate some

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object or symbol or aspect of his world in a favourable or unfavourable manner. Attitude comprises of three components.

1. **A cognitive component** - a person's belief or information about the object.

2. **An affective component** - a person's feeling about the object such as "like" or "dislike", "good" or "bad"

3. **A behavioural component** - a person's readiness to respond behaviourally to the object.

The study and measurement of attitudes is important since it is assumed that there is a relationship between attitude and behaviour. The research, however, indicates that such a relationship hold more at aggregate level than at the individual level. Attitude may only be one of the factors influencing behaviour - there could be other factors beside attitude which may be more powerful in influencing behaviour. For example, an individual having a favourable attitude towards a product may not buy it because of economic considerations. For the purpose of marketing decision the attitude behaviour relationship relates to measuring of cognitive and affective components and being able to predict future behaviour.

7.3 LEVELS OF MEASUREMENT

Measurement means the assignments of numbers to objects or persons to represent quantities of their attributes. The assignment of numbers is done according to some rule. The attribute of person could include his income, preference, religion, social class, attitude etc. Similarly we measure a product's speed, colour, size, flavour etc. It is the characteristic of the buyer or the product which is measured and not, the person or product itself. There are four types of scales used in marketing research to measure attitude towards a particular product/service. These are as follows:

1. Nominal Scale
2. Ordinal Scale
3. Interval Scale
4. Ratio Scale

1 **Nominal Scale :** In this type of measurement numbers are used to label persons, objects or events. For example, the variable sex may be categorized as male or female. One may assign a number 1 to male and 0 to female. It only helps us to identify that whenever number 1 is used we are talking about males and 0 in case of females. Similarly if the units in the population is to be classified according to religion viz. Hindu, Muslin, Sikh and Christian; one may label Hindu as 101, Muslim as 102, Sikh as 103 and Christian as 104. The numbers, here, have no meaning in the sense that the category which is assigned a higher number is in no way more important (or bigger) than the category which is assigned a lower number.

The classification to identify objects, events and person is also done on the basis of the letters of english alphabets. Using the example mentioned in the preceding paragraph one could have labeled males as A and females as B. Similar procedure may be used for another type of classification. However, the classification should be done in such a way that groups are mutually exclusive and collectively exhaustive.

The only mathematical operation performed on nominally measured data is the count in each category. Numbers assigned to represent categories (e.g. 1 for male and 0 for female) cannot be added, subtracted, multiplied or divided. We can only say (if sample comprises of 100 respondents) that there are 70 males and 30 females. Also we can say that the sample comprises of say 40% Hindus, 20% Sikhs, 30% Muslims and 10% Christians. The statistical procedures applicable for nominal scale measurement are Mode and Chi-Square.

2. **Ordinal Scale**: A significant amount of consumer oriented research relies on ordinal measurement. Here numbers, letters or any other symbols are used to rank items. Ordinal scale tells us whether an object or event has more or less of a characteristic than some other object or event. Unfortunately this scale doesnot indicate how much more and how much less we have of the characteristics the objects or events pocess. For example, we may be examining the marks in Marketing for 60 students in a class. Assume that the highest score in the class is 92, the second highest 63 and the third highest 60. We rank the person getting 92 marks as 1, 63 marks as 2 and 60 marks as 3. However the difference between the marks of first and second rank is not the same as the difference in the marks of students obtaining second and third rank.

The common mathematical operations like addition, subtraction, multiplication and division cannot be used with ranked data. However, statistical procedure based on interpretation of "greater than" or "less than" are permissible: The statistical methods applicable with ordinal data are percentiles, median and rank order correlation.

The ordinal scale measurement is of higher level than the nominal scale measurement. i.e. to say the ordinal scale data can also be converted into nominal scale data and thus will pocess all the properties of nominal scale data. As an example assume that 107 consumers are divided according to their income and the classification is as given below:

Monthly Income (Rs.)	No. of Consumers (Rs.)
Less than 5000	20
5001 - 8000	30
8001 - 11000	25
11001 - 13000	20
13001 and above	12
TOTAL	107

A consumer having an income of Rs. 7500 will be ranked higher than the one having income of less than Rs. 5000 (Ordinal scale data). However, the sample of 107 consumers can be classified into 5 income categories to be labeled as A for less than Rs.5000, B for 5001-8000, C for 8001-11,000, D for 11001-13,000 and B for 13001 and above (nominal scale data). A consumer having a monthly income of Rs.12,000 will belong to category D.

3. **Interval Scale :** Interval scale responses are more powerful than ordinal scale responses. They not only pocess the properties of ordinal and nominal scale measurement but also ,he strength of the equality of differences between ranks. For example, the consumers may be asked the following question.

How important is price to you while buying furniture?

Very important	Important	Neither important nor unimportant	Unimportant	Very unimportant
(1)	(2)	(3)	(4)	(5)
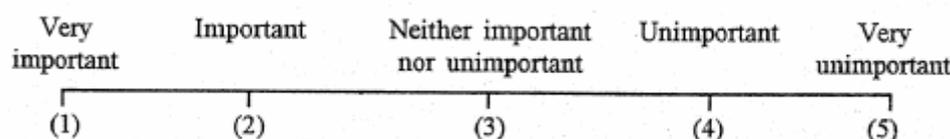
One may note that very important is assigned a number (1), important as (2) and so on and lastly very unimportant is assigned a number (5). What is assumed here is that the respondent is able to reply on a continuum scale and the difference between any two responses can be meaningfully interpreted,

The general mathematical form of interval scale is given by the equation.

$$Y = a + bX$$

Here we are considering an arbitrary zero point or starting point and therefore the division of two responses have no meaningful interpretation. Instead of giving number 1 to very important and 5 to very unimportant in the above example, if the numbering starts from 0 to 4 the picture would look like as shown below in Scales A and B.

	Very important	Important	Neither important nor unimportant	Unimportant	Very unimportant
Scale A	(1)	(2)	(3)	(4)	(5)
Scale B	(0)	(1)	(2)	(3)	(4)

We may assume the first respondent ticks unimportant and the second respondent ticks important while answering the question. Therefore the ratio of the scale values in the first case is $\frac{4}{2} = 2$ and if we use Scale B, the ratio is $\frac{3}{1} = 3$

Although the differences in the both cases is same and equals two, the ratios are different in both cases and have no meaningful interpretation. The statistical procedure applicable in this case are range, mean, standard deviation and product moment correlation. However, all the statistical procedures applicable for ordinal and nominal scale measurements can also be used in this case.

4 Ratio Scale : Ratio scale measurements are the most powerful measurement discussed so far as they pocess all the properties of the measurement scales which we have discussed .Ratios of the numbers on these scales have meaningful interpretation. They possess an unambiguous starting point. The mathematical form of the measurement is written as

$$Y=bX$$

The examples of ratio scale measurement are Income, Distance travelled from home to workplace, Height, Weight, Density etc. The statistical methods applicable for this type of measurement are geometric mean, harmonic mean, coefficient of variation etc. Also all the statistical procedures ,described for the remaining type of measurements are also applicable under this case.

As mentioned in the preceding paragraphs, the methods of analysis for data depends upon the type of measurements used to measure it. The table below gives the permissible statistics to be used under different types of measurement.

Table 1: Scales Of Measurement

Scale	Permissible Statistics
Nominal	Mode
Ordinal	Median
	Percentile
	Rank Order Correlation
Interval	Mean
	Average deviation
	Standard deviation
Ratio	Geometric Mean
	Harmonic mean

Activity 1

What measurement scale is used to determine each of the following?

a)   Do you own a washing machine?

_____

b)   What is your marital status?

_____

c)   How many books are there in your university's library?

_____

d)   How satisfied are you with the service of your bank?

_____

e)   What is your preference for various brands of toothpaste?

_____

f)   Were you present in the last marketing class?

_____

g)   How many members of your family would like to watch DD-1 during the prime time?

_____

Activity 2

A survey was conducted to determine the perception about residential carpets in two towns. A sample of 200 respondents was selected from each of the two towns. One of the questions asked to the respondent was the following:

How important is price to you while buying a carpet for your home?

Very important	Important	Neither important nor unimportant	Unimportant	Very unimportant
(1)	(2)	(3)	(4)	(5)
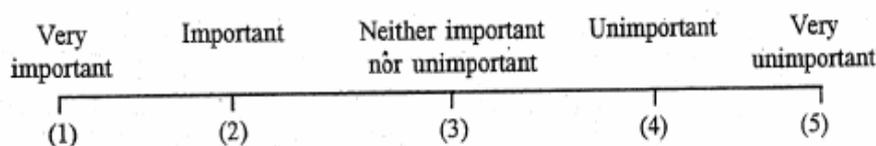
The results of the survey are as follows:

Response category	Percent of respondents checking that category	
	Town 1	Town 2
1	10	05
2	30	20
3	20	10
4	25	40
5	15	25

a)   Name the measurement scale being used.

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b)   Find the mode and median for the two samples.

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c)   Find the samples means for both the towns . Can we meaningfully interpret
        the ratios of two means in this case? If yes , why, if not, why not?

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7.4   FORMATS OF RATING SCALES

The rating scales can take a number of physical forms. Suppose the management of a
bank A wants to assess the overall customers attitude towards the bank. A number of
alternative rating scales can be used by bank. This is exhibited in Table 2 below:

Table - 2 : Different Types Of Rating Scales

1. Please put a ✓ mark at an appropriate place on the line below to express your
   opinion about Bank A.

   Very Bad _____ Very good

2. Please put a ✓ mark at the category which expresses your overall opinion about
   Bank A.

   Very   Very
   bad   good

   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16   17   18   19   20

3. Please check one of the following category to express your overall opinion about
   Bank A.

   Very bad   Bad   Neither bad   Good   Very good
                                  nor good
   [1]   [2]   [3]   [4]   [5]   [6]   [7]   [8]   [9]

4. Indicate which of the following summarizes your overall opinion of Bank A?

      Terrible   Poor   Fair   Good   Very good   Excellent
        [ ]   [ ]   [ ]   [ ]   [ ]   [ ]

5.   How do you overall rate Bank A in comparison to other banks in your town?

      Much worse   Worse   About the Same   Better   Much better
        [ ]   [ ]   [ ]   [ ]   [ ]

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6. Rank the following by placing a 1 beside the bank you think is best overall, a 2 beside the bank you think is second best, and so on:

Bank A _____   Bank B _____

Bank C _____   Bank D _____

Bank E_____

7. In each of the following pairs, which bank in your opinion is overall better? (Please check one bank within each pair.)

_____ Bank A or _____ Bank B   _____ Bank A or _____ Bank C

_____ Bank A or _____ Bank D   _____ Bank A or _____ Bank E

_____ Bank B or _____ Bank C   _____ Bank B or _____ Bank D

_____ Bank B or _____ Bank E   _____ Bank C or _____ Bank D

_____ Bank C or _____ Bank E   _____ Bank D or _____ Bank E

8. Allocate a total of 100 points among the following Banks, depending on how favorable you feel toward each; the more highly you think of each Bank, the more points you should allocate to it. (Please check that the allocated points add to 100.)

Bank A   _____ points

Bank B   _____ points

Bank C   _____ points

Bank D   _____ points

Bank E   _____ points

100

The type of different formats are given as under:

1) **Graphic & Itemized Formats:** Let us look at question number one and two in the above table. They represent a graphing rating scale which presents a continuum in the form of a straight line. There are infinitely large number of ratings that are possible. The assumption in this rating scale is that it enables the respondent to detect fine shades of differences in attitudes. To measure how favourable the respondent has an attitude towards the bank, one measures the physical distance from the left extreme to the position indicated by him in questions numbering 1 & 2. Higher the distance, more favourable the respondent has attitude towards the bank. Graphic rating scale in question number 1 has ratio-scale properties.

The disadvantages of using a graphing rating scales are as follows:

a) Coding and analysis of data will not only be difficult but also require a substantial amount of time as the researcher firstly has to measure the physical distance on scale for each respondent.

b) Respondents may not be capable of perceiving fine differences in the attitudes on a straight line.

Look at question numbers three, four & five. They represents Itemized Rating Scale where there are a set of distinct response categories and the respondent is to choose one among them. The advantages of itemized rating scale are as follows:

Coding and analysis of raw data is easier as compared to the graphic rating scale.

It is easy for a respondent to answer questions listed under itemized rating scale. Further, they are more meaningful from the point of view of the respondent.

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2) **Comparative & Non-comparative Formats:** Let us compare first four questions given in table two with the last four questions. Questions numbering five to eight come under the umbrella of comparative rating scale. They provide the respondent with a common frame of reference for answering the questions. It is assumed that the respondents are answering the same question with a standard frame of reference. However, question numbers one to four represent non-comparative rating scale which permits the respondent to use any or even no frame of reference while answering the questions.

3) **Forced & Non-forced Response Formats:** Compare question numbers three & five with question numbers two, four & seven. In the case of question numbers three and five the respondent is given the choice of being neutral. Such scales are called non-forced choice scales. They have odd number of response categories. The advantage of using this type is that in case the, respondent wants to be neutral, one can exercise this option. The problem in this case is that if the respondent has not made up his mind or is not sure about the answer he will tend to tick the middle category thereby preferring to be, neutral.

In question numbers two, four & seven; the respondent is forced to take a stand either way. He has no option of remaining neutral. Such types of scales are called forced choice scale. The question which may arise in our mind is that which of the two format is better - the one with odd number or even number of response categories. There is no definite answer. However, the scale representing odd number of response categories are widely used in marketing research because of their advantage of giving respondent the choice of being neutral.

4) **Balanced & Un-balanced Formats:** A balanced scale has an equal number of positive (favourable) & negative (unfavourable) response choices. Questions numbering three and five represent such a scale.

However, if you look at question number four which doesnot have equal number of positive & negative response categories and therefore is biased. This type of scale is called un-balanced scale. The scale in question is biased towards positive (favourable) side. If a respondent did not have favourable opinion about the bank, he is not given many options to express his opinion.

5) **Constant Sum Rating Scale Format:** Let us look at question number eight. In this question the respondent is asked to allocate points depending upon how favourable he feels towards each bank. The minimum points can be 0 and the sum total of point, have got to be 100. Suppose a respondent gives 40 and 10 points to Bank A & B respectively. We can say that for the concerned respondent's opinion of bank A is four times favourable than the opinion of bank B. This type of measurement is called ratio scale measurement which has been discussed before. This scale is widely used in MR studies to know the weightage a respondent gives to various parameters of the service.

6) **Paired Comparison Rating Format:** Let us look at question number seven. There are five banks. We have chosen two banks at a time and the respondent is forced to choose one alternative in each of the ten cases listed there. For example the respondent has to choose between A & B, A & C, A & D and so on. Since there are five banks (items) the number of paired comparison possible are ten. To generalize, if there are n attributes of a product then the maximum number of paired comparison would equal.

$$\left[n \times \frac{(n-1)}{2} \right]$$

Suppose we have a 'set of five brands (A, B, C, D, E) of a product. Under this method researcher will form all possible pairs of brands. (i.e. ten combinations like Ali, AC, AD, AE; etc,) Then each respondent is asked to judge the various combinations of brands on some basis. Finally, the responses are cumulated. Suppose the study shows that 80% consumers say brand A is preferred to brand B.

Further suppose, when brand C was compared with brand A, only 55% of the consumers preferred brand A to brand C. This will tend to imply that the distance between brand A and brand B is much larger than the distance between brand A and brand C. Secondly, if 50% people prefer one brand to another, this will mean that the these two brands are having the same position in terms of the consumers perception.

After cumulating the various responses one may obtain the picture as shown in table 3.

Table 3 : Observed Proportions Saying Brand-I (Column Of Table) is Preferred To Brand (Row of Table) Brand - i					
Brand-j	**A**	**B**	**C**	**D**	**E**
A	0.50	0.35	0.25	0.69	0.82
B	0.65.	0.50	0.73	0.85	0.93
C	0.75	0.27	0.50	0.16	0.59
D	0.31	0.15	0.84	0.50	0.25
E	0.18	0.07	0.41	0.75	0.50

Note the table shows 65% of the consumers prefer brand A to brand B. That is, the remainder 35% had said brand B is preferred to brand A. Here the diagonal entries have been intentionally filled up with a figure of 0.50 (meaning that there is no difference between these brands).

It can be shown that under assumptions of Normality, these proportions can be interpreted as indicating the distance between those two brands. Using these proportions as probabilities, ordinates from any Normal distribution table for each proportion may be obtained. These ordinates are symbolically represented as Z values. In general, Z values have a symmetric pattern, around Zero. If the proportion is less than 0.5, the corresponding Z value has a negative sign, and conversely, if the proportion is greater than 0.5, the Z value is positive. The Z values for the above mentioned data are as follows.

Table 4 : Z Values Corresponding Top Earlier					
		Preference Data			
		Brand - i			
Brand-j	**A**	**B**	**C**	**D**	**E**
A	0	-0.39	-0.67	0.50	0.92
B	0.39	0	. 0.61	1.04	1.48
C	0.67	-0.61	0	-0.99	0.23
D	-0.50	-1.04	0.99	0	-0.67
E	-0.92	-1.48	-0.23	0.67	0
Total	-0.36	-3.52	0.7	1.22	1.96
Mean (Z)	-0.072	-0.704	0.14	0.244	0.392
R	0.632	0	0.844	0.948	1.096
Brand	B	A	C	D	E
Interval					
Seale Value	0	0.63	0.84	0.95	1.096

In this manner one can obtain an interval scale for the positions of different brands from the original data which were ordinal in nature.

7) Rank Order Scale Format: Let us look at question 6. The data generated by this question has ordinal scale measurement. The rank order, technique is comparative in nature in the sense that respondents are asked to rank comparatively the items listed.

The advantage of using rank-order scale lies in its easiness to tabulate the results. Moreover, it is easy and less time consuming to administer than paired comparison test which is also a comparative rating technique. Further, it forces the respondents to discriminate among products in realistic manner.

This technique has several limitations. The data obtained could be misleading if all the alternatives which form respondent preference are listed out. Also, if the respondent "dislikes" all the attributes listed, the one ranked first is the least "disliked" attribute. The researcher therefore must ensure that a realistic set of objects are being evaluated and should be sensitive to the attitudinal position of the respondent. Finally, ranked-order scale do not reveal how far apart the attributes stand in the perception of respondents and why were they ranked that way.

Activity 3

Construct a constant sum rating scale to indicate the factors which prospective management students choose while selecting a management institute for pursuing a management programme.

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Activity 4

Why is that balanced response format preferred to unbalanced response format?
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Activity 5

Take any four brands of toilet soap and adminster a paired comparison rating scale on a set of 100 respondents. Show how would you obtain an interval scale for the positions of different brands from the original data.

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7.5 SINGLE ITEM VS. MULTIPLE ITEMS SCALES

Single Item Scale: A single item measures the opinions of the respondents through just one rating scale. For example, questions numbers 1 -5 in table 2 are single item rating scale.

Multiple Item Scale: In the multiple item scale a number of statements are used pertaining to attitude towards an object. Each statement contains a rating scale attached to it. The disadvantage of single item rating scale is that it is a crude measure of the feelings/opinions of the respondent, whereas, this is not the case with multiple item scales. Below we mention the following widely used multiple item scale.

1. Thurston Equal Appearing Interval Scale

2. Likert Scale

3. Semmantic Differential Scale (Bi-polar Scale)

4. Fishbein's Scale

1) **Thurston Equal Appearing Interval Scale:** This scale of attitude measurement was first described by Thurstone and Chave. To construct the scale one needs to follow the steps outlined below:

    *   A large number of statements pertaining to the subject of enquiry are collected. This is done through exploratory research by using existing literature on the subject, discussion with knowledgeable persons, personal experience & through focus-group interviews.

    *   The statements range from one extreme of favourable attitude to other extreme of unfavourable attitude.

    *   The number of statements should be large.

    *   Each statement is written on a separate card and subjects are asked to sort these statements into a number of intervals.

    *   The number of intervals could be eleven put on cards labelled A to K where A corresponds to most unfavourable attitude, K corresponds to most favourable attitude and F represents neutral attitude.

    *   The piles bearing letter from A to K could be regarded as having numbers from 1 to 11 indicating that the respondent has rated each statement on a 11-point rating scale. Therefore 11-point rating scale becomes the psychological continuum on which statements have been judged.

    *   An average value is calculated in respect of each statement. This value is treated as the scale value (median value for the example to follow) of the statement. Let us consider the data given in the table 5.

Statement		Sorting Categories											Scale Value	Q Value
		A 1	B 2	C 3	D 4	E 5	F 6	G 7	H 8	I 9	J 10	K 11		
1	f	2	2	6	2	6	62	64	26	18	8	4	6.8	1.7
	p	.01	.01	.03	.01	.03	.31	.32	.13	.09	.04	.02		
	cp	.01	.02	.05	.06	.09	.40	.72	.85	.94	.98	1.00		
2	f	0	0	0	10	40	28	50	26	28	14	4	6.9	2.8
	p	.00	.00	.00	.05	.20	.14	.25	.13	.14	.07	.02		
	cp	.00	.00	.00	.05	.25	.39	.64	.77	.91	.98	1.00		
3	f	0	0	0	2	8	6	26	44	56	44	14	8.7	2.0
	p	.00	.00	.00	.01	.04	.03	.13	.22	.28	.22	.07		
	cp	.00	.00	.00	.01	.05	.08	.21	.43	.71	.93	1.00		

Table 5 : Summary Table For Judgements Obtained By The Method Of Equal - Appearing Intervals

Source: Edwards, Allen L., Bombay, Vaklis, Feffer and Simons Pvt. Ltd., 1969 (Indian Reprint), p.87.

- The table 5 gives data in respect of three statements administered for 200 respondents. Corresponding to each statement there are three rows; the first row indicates the number of respondents placing the statement in respective categories (f), the second row shows the probability of occurrence computed as the ratio of frequency for that category to the total number of respondents (p), the third row indicates the cumulative frequencies given by (cp).

Scale value or Median-value $S = 1 + \left[\dfrac{.50 - \sum P_b}{P_w} \right] \times i$

1 = lower limit of the interval in which the median lies

$\sum P_b$ = the sum of proportion below the interval in which the median lies

P_w = the proportion within the interval in which the median lies.

i = the width of the interval

The above formula can be applied to statement number 1 to get the scale value (S) as follows:

Similarly the scale value corresponding to statement number 2 and 3 can be computed as 6.9 and 8.7 respectively. To find the interquartile range, one needs to compute the first and third quartile of the distribution. The interquartile range denoted by $Q = Q_3 - Q_1$ where Q_3 = third quartile and Q_1 =first quartile. The third and the first quartile of the distribution corresponding to statement number l is given below:

$C^o = \dfrac{5}{9}(f^o - 32)$

Therefore interquartile range Q is given by

$Q_3 - Q_1 = 7.7 - 6.0 = 1.7$

- A small value of Q indicates that there is agreement among the respondents in judging the degree of favourableness or unfavourableness of a statement. Similarly, using the same argument we can infer that a large value of Q indicates disagreement among the respondents in judging the degree favourableness or

unfavourableness of a statement. Thurstone & Chave treated the statements with large value of Q as ambiguous.

● This way about 20 to 30 statements are selected. When two or more statements have the same Q value and only one is to be retained, the one having the lowest value of scale is selected.

● After having selected 20 to 30 statements, they are embodied in the form of a questionnaire to be administered to the respondents. The statements are arranged in a random sequence. Each respondent is asked to select those statements which best reflect his or her feelings towards the attitude object. The average of the score values of all statements which the respondent endorses becomes his scale score. Assuming that the respondent endorses statement numbers 1, 2 & 3 (Table 5), his score will be

$$\frac{6.8 + 6.9 + 8.7}{3} = \frac{22.4}{3} = 7.5$$

As we know that the neutral attitude has a score value of 6 on a 11-point scale, a score of 7.5 indicates that the respondent has a favourable attitude towards the object.

Limitations of Thurstone Scale: Thurstone scale uses a two-stage procedure and therefore it is both time consuming and expensive to construct. As there is no explicit response to each item, it does not have much diagnostic value. The scale has also been criticized on account of a method of scoring. Respondents are merely asked to select those statements with which they agree. Therefore, there is a possibility of two or more respondents having the same attitude score. For example, if. the respondent A agrees with statements having a score value of 5, 7, 10 and another respondent B agrees with statements having scale values of 8, 8 & 6, both of them will have the same attitude towards the object which may infact not be true.

2) **Likert Scale:** This scale comprises of a series of evaluative statements/items concerning an attitude object. Each statement has 'a five point agree disagree scale. The number of statements/items could vary from study to study. However a typical likert scale has generally 25 to 30 items. The scores on the individual items are summed to produce a total score for the respondent. For this reason it is also called a summated scale. The assumption made here is that each of the items/ statements measures some aspect of a single common factor otherwise the items cannot be legitimately summed.

Let us recall the problem we discussed while talking about formats of different types of scale. Assuming the management of the Bank A wants to know the opinion about the bank from its customer. The table 6 below gives a set of six statements from a likert scale that may be used to measure customers attitude towards bank.

Table 6 : Likert Scale Items		Strongly disagree	Dis-agree	Neither or	Agree	Strongly agree
1.	Counter clerks at the bank are friendly.	-		-	-	-
2.	Lines at the counter move	-	-	-	-	-
3.	The bank keeps confi-dentiality of the transactions.	-	-	-	-	-
4.	The bank offers a variety of products.	-	-	-	-	-
5.	The bank's operating hours are inconvenient.	-	-	-	-	-
6.	The ATM facilities of the bank break down frequently.	-	-	-		-

To constrict a liken scale we proceed as follows:

1) Generate a number of statements relevant to the attitude. They should be either clearly favourable or unfavourable. There are no rules for generating initial set of statements. It may be done through exploratory research by talking to knowledgeable people and having focus group interviews. Knowledgeable people may include the employees and the customers of the company. Managerial judgement could help in generating a broad range of items. A lot of care needs to be taken in choosing statements. In order to capture all relevant aspects of attitude object, it is essential to include sufficiently varied statements.

2) Once items are written, they are administered on a sample which is representative of the population being studied.

3) It may be noted that the response categories have verbal and no-numerical labels. This is usual format adopted in -which Liken scale statements are presented to respondents. However, after the scale is administered, the numbers are assigned to responses in order to generate a quantified measure of attitudes. The numbers one through five are normally used for this purpose. Other sets of numbers like +2, +1, 0, -1, -2, can also be employed.

By examining the items in table 6, one may note that statement numbers 1, 3, and 4 are favourable towards the bank while the remaining are unfavourable. It is essential that a good Likert scale must have equal number of favourable and unfavourable statements. The ¯strongly agree" category attached to favourable statements and the "strongly disagree" category attached to the unfavourable statements must both be assigned the same number (e.g., the number 5, if a I-through 5 numbering scheme is used).

As discussed before, to design a good Likert scale one must first of all generate a large pool of statements relevant to the measurement of an attitude. Then statements that are vague and/or non-discriminating should be eliminated.

Suppose management of bank wants to develop a 20-item scale to measure customer attitude towards bank. To start with, a large number of items say 100, similar to the six statements shown in table 6 are developed. The following procedure may, be used in reducing the set of initial 100-items to a final 20-item instrument.

A questionnaire with initial 100-items with 5 possible response categories ranging from strongly disagree to strongly agree is administered on a set of selected representative respondents. The respondents are asked to rate the _bank on each statement by ticking one of the five response categories. The categories are numbered from I to 5 with higher number showing the more favourable attitude towards the bank. As there are 100-items the minimum and maximum score for a respondent would vary from 100 to 500. This is possible as one can sum up the scores of individual items to produce a total score for the respondent under the assumption that each item/statement measures

some aspect of a single common factor. Therefore higher the score for a respondent, the more favourable attitude he has towards the bank in question. This shows the total score plays a very important role in reducing the initial set of 100-items to an appropriate scale comprising of 25 to 3() items.

To illustrate, consider the following total score of two respondents, A and B, as well as their scores on two individual items, i and j.

Respondent	Score on item i	Score on item j	Total Score
A	3	5	480
B	3	1	170

From the above table we may conclude that respondent A has a more favourable attitude towards the object than respondent B. Further by examining at their scores on item i and j we find that item i is a poor discriminator while item j is a good discriminator between two respondents. In other words if we compute the correlation coefficient between the scores on item i with total score and score on item j with total score, we will find that the later will have a high degree of correlation. This logic may be extended across all the statements. Therefore those items on which respondent scores correlate highly with the respondents total score are better for inclusion in the final scale than other items.

It is important to understand the difference between Likert scale & Thurstone scale. In Thurston scale a respondent is expected to endorse those statements which best reflect his or her feelings towards the attitude object. However, in Likert scale a respondent is to answer every item/statement and a high total score indicates a high favourable attitude towards the object.

Likert scale is less time-consuming and less laborius than the Thurston scale. It is seen that the reliability coefficient (to be discussed in 7.6) is more for Likert scale than for Thurston scale.

3) **Semantic Differential Scale:** This is also called bi-polar scale. The scale may be used in cases such as comparison of brands, comparison of companies images and to determine the effectiveness of advertising on attitude change etc. The scale is similar to Likert scales as it consists of a series of items to be rated by respondents. However, there are differences between Likert scale and Semantic differential scale.

The Semantic differential scale comprises of a series of bi-polar adjectives or phrases that pertain to the attitude towards the object. (Likert scale had complete statements.) Each pair of opposite adjectives is separated by a seven category scale (at times with five category or nine category scale). No numerical labels or verbal labels other than anchor labels are used for representing various categories. Some of individual scales have favourable descriptors on the right-hand side while the others have it on the left-hand side. The rational for having this sort of an arrangement is similar to that of Liken scale.

Respondents are asked to put a cross on one of the seven category that best describes his/her views about the attitude object along the continuum implied by bi-polar adjectives. Going back to the example of bank where the management is interested in finding the customer's opinion about bank A, adjectives representing the same dimensions as described by Likert scale in table 6 is given below.

Table 7 : Semantic Differential Scale Items								
1.	Counter clerks friendly	❑	❑	❑❑	❑	❑	❑	Unfriendly counter clerks
2.	Slow moving lines at counter	❑	❑	❑❑	❑	❑	❑	Fast moving lines at counter
3.	Confidentiality of transactions	❑	❑	❑❑	❑	❑	❑	Nonconfidentiality of transactions
4.	Wide product assortment	❑	❑	❑❑	❑	❑	❑	Narrow product assortment
5.	Inconvenient bank hours	❑	❑	❑❑	❑	❑	❑	Convenient bank hours
6.	Frequent break down of ATM facility	❑	❑	❑❑	❑	❑	❑	Rare breakdown of ATM facility

The scale is administered to a set of respondents and corresponding to each respondent his total score is computed. This is possible as the categories can be numerically coded from I to 7, 7 being the highest value given to the favourable adjective. One should make sure to reverse the code items that are reversed as was done in Likert scale. Also the overall attitude score can be computed by summing the coded responses on the individual items and this also has the same interpretation as was the case of Likert scale.

Semantic differential scale helps us to develop a pictorial profile of the attitude objects based on the mean ratings on the individual items. This is shown below in. table 8 for two banks namely bank A and bank B. To facilitate comparison, it is customary to place all favourable descriptors on the same side of the diagram.

Table 8 : Pictorial Profile Based On Semantic Differential Ratings
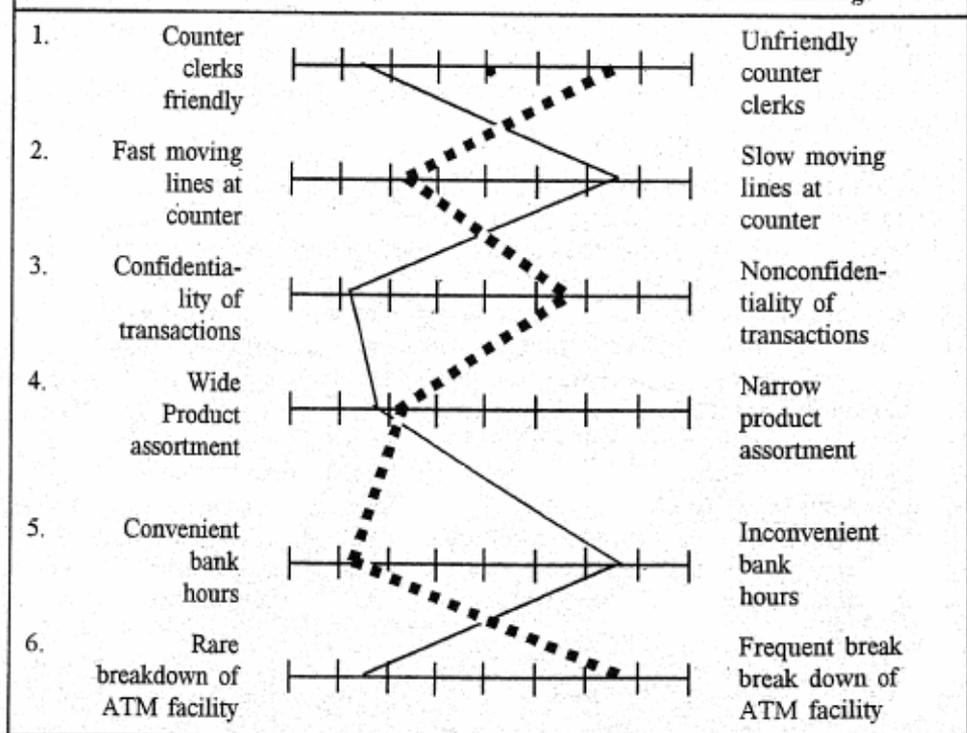
_____ Bank A   ▪▪▪▪▪▪ Bank B

We note from above table that Bank A has a significant edge over Bank B with respect to friendly nature of counter clerks, confidentiality of transcations and smooth functions of ATM facility. Bank B is, however, preceived better than bank A in terms of convenient working hours and speed at the counter. Bank A is perceived to be better than B in terms of product assortment; however advantage to Bank A does not seem to be significant. These results can pinpoint a particular bank's relative strength and weakness as perceived by customers.

4) **Fishbein's Scale:** This scale uses a combination of constant sum and semantic differential scale. To assess how consumers perceive a set of alternative offerings, this type of scale is used. Here the respondent is first asked to assign a weightage to a set of given attributes. Afterwards the respondent is given some specific choice alternatives. He/she is asked to judge these alternatives on those specified list of choice criteria. Ultimately one can compute a composite score for each alternative. For example. suppose a research study was assessing consumers' attitude toward five leading brands of decorative paints in terms of the attributes like Durability, Washability, Finish, Range of package size, Range of colour, Price, Ease of availability etc.

Here the respondent is first of all asked to evaluate the important of the given attribute in the paint choice decision.

Secondly, he is asked how strongly do you rate the brand X on the given attribute?

Ultimately, each consumer's attitudinal score for brand X (AX) is found by the following formula.

$$Ax=\sum_i W_i R_i x$$

Where W_i = Consumer's ratings of the ith attribute.

$R_i x$ = Consumer's judgement of brand X on the ith attribute.

Similarly, one can compute the consumer's attitudinal score for other brands of paint examined. Ultimately, by pooling the scores of different groups of consumers one can assess the consumer's perception about various paints.

Fishbein scale is found useful in problems such as comparing brand image and advertising designs. In general, it provides a convenient way of assessing consumer attitudes.

Activity 6

Construct a Semmantic differential scale to measure the perception of a brand of coffee from a set of consumers.

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Activity 7

The choice of a PC is taken on the evaluation of different considerations , prepare a list of features that could be rated on Likert Scale.

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Activity 8

List out the merles of Likert scale over Thurston equal appearing interval .scale.

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7.6 CRITERIA FOR GOOD MEASUREMENT

The adequacy of scale is judged in a way as to have measurement of acceptable quality, The overall usefulness or the scale depends upon its validity, reliability and sensitivity. These are discussed below:

1) Validity: A- scale is said to be valid if it measures correctly what it is expected to measure. As we know attitudes are multifaceted, therefore single item scales are usually deficient on this criterion. In other words an attitude scale is valid only when it is real -and correct: There are several different. types of validity as discussed below.

   a) **Content Validity :** This is also known as face validity. Here the contents of an attitude scale should cover all relevant facets of an issue which influence respondent's attitude. Suppose we have a -scale to measure job satisfaction of employees in, an organization. The scale, -covers various dimensions like nature of work, pay, security and superior. The scale, however, lacks in content validity as it does not cover an important dimension like company policies and practices. This could happen because what dimensions to be included in a scale would depend on the judgement of the researcher which is likely to vary from individual to individual. Therefore, in order to avoid this,, it would be better to approach a group of knowledgeable persons rather than leaving to one person.

   b) **Construct Validity:** It is known that it is not possible to measure attitude directly. It is inferred indirectly from the responses given by the respondents. Construct validity involves understanding the theoretical rationale underlying the obtained measurements. The content validity of an attitude can be assessed quantitatively by finding its correlation with measures of other constructs that one would expect to be strongly associated with the attitude and measures of constructs that would not be correlated to the attitude. Strong correlation of attitude with the construct is an example of convergent validity whereas low correlation of attitude with the construct is an example of discriminating validity. A scale with construct validity should have both convergent and discriminating validity.

c) **Predictive Validity:** It involves the ability of a measured market phenomenon at one point of time to predict successfully another market phenomenon at another point of time. If the correlation between two is high, the initial measure is said to have a high predictive, validity. An opinion questionnaire which forms the basis for correctly forecasting, the demand for product has high predictive validity.

2) **Reliability:** A scale is said to be reliable. When it gives the same measurement under similar condition. If a scale makes equal error every time, it would be reliable. However such a scale can not be valid as we know that the validity depends upon correct measurement. Reliability is achieved when the scale is free from erratic measurements. The following two methods are used for testing reliability.

a) Test-Retest Reliability: It is concerned with how stable the ratings are when the scale is administered to the same group of persons at two _different points of time. If there is a high correlation between two sets of scores (consistency), the test - retest reliability is very high.

One should be cautious while using this method to test reliability. If the time difference between two sets of observations is long, it is likely that the attitude may undergo a change. Further if the time difference is too small, the respondents are likely to remember their earlier responses and therefore memory effect may distort the reliability test. There are no guidelines in determining what should be the ideal time interval between two observations so as to take care of these problems. A rule of thumb is to use the time interval between two to four weeks.

b) Split-Halt Reliability : It can be assessed only for multiple-item scales. Here the scale items are split randomly into two equal parts. At times splitting may be done by putting even number of items on one side and odd number on the other side.

The correlation coefficient between respondents' total score derived from two sets of items is computed. A high degree of correlation indicates a high split-half reliability of the scale.

3) **Sensitivity:** The sensitivity of a scale is closely related to its reliability. It is the ability of a scale to be able to discriminate between respondents who differ even slightly in terms of their attitude toward something. An essential of a rating scale is that it should have a sufficient range of numbers to help detection of fine variations in attitude.

Activity 9

Give an example to show that a scale could be reliable yet it may lack validity.

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Activity 10

List out the limitations of test-retest reliability.

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Activity 11

What precautions a research should take to ensure that the scale developed by him/her does not lack in content validity?

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7.7   SUMMARY

Measurement involves the use of numbers to represent the marketing phenomenon under investigation. The direct measurement of attitude is a very difficult task. It can only be inferred indirectly from the responses of the respondent. Attitude comprises of three components viz a cognitive component, an affective component and a behavioural component. For marketing decisions the attitude behaviour relationship relates to measuring of cognitive and affective components so as to be able to predict future behaviour.

There are four types of scales used in marketing research to infer attitude towards a particular product /service. There are Nominal, Ordinal, Interval and Ratio scale. The most powerful among them is ratio scale measurement. A study of these scales is important in the sense that the method of analysis for data depends upon the type of measurement used to measure it.

The rating scale may take various physical forms. They could be presented in graphic and itemized formats, comparative and non-comparative formats, forced and non-forced response formats, balanced and tin-balanced formats, constant sum rating format, paired comparison rating format and ordinal scale format.

Furtherthe attitude scale could be single item or multiple item scale. A single item measures the opinion of the respondents through just one rating scale whereas for multiple items a number of statements pertaining to attitude towards objects are used. The limitation of the single item scale is that it is a. crude measure of the feelings/ opinion of the respondent. A number of widely used multiple item scales namely Thurston Equal Appearing Interval Scale, Likert Scale, Senmmantic Differential Scale and Fishbein's Scales with their limitations and uses are discussed.

The unit is concluded by discussing the criteria of a good measurement scale. Three criterion namely validity, reliability and sensitivity are used for the purpose.

7.8   SELF-ASSESSMENT QUESTIONS

1)   The centigrate fahrenheit relationship is given by

$$C^\circ = \frac{5}{9}(f^\circ - 32)$$

show that in this scale the ratio of two scale values have no meaningful interpretation.

2)   Suppose management of an insurance company wants to ascertain the perception of its customers towards the company. Construct a 7-item scale to measure the perceived perception of the company using Likert Scale and Semmantic Differential Scale. Make sure that the 7-items under each of the two scales correspond to the same seven dimensions.

3) What are the four different levels of measurement? Discuss the mathematical operations which may or may not be used under each level of measurement.

4) Explain the three criterion of measuring the usefulness of an attitude scale.

5) Distinguish between graphic and itemised rating scale What are the advantages of itemised scale over graphic rating scales? Name the level of measurement which corresponds to the data collected by graphic rating scale.

6) Distinguish between the following:

   a) Forced & Non-forced response formats

   b) Comparitive & Non-comparitve formats

   c) Balanced & Un-balanced formats

7) Show with the help of an example how you can convert ordinal scale measurement to nominal scale measurement.

8) The method of analysis of data depends upon the level of its measurement". Discuss.

9) Indicate giving reasons the scale of measurements for the following variables:

   i) Geographical area

   ii) Costs

   iii) Index numbers

   iv) Preferences

   v) Cast in a society.

10) Distinguish between the validity and reliability of a measure. How may the reliability of a measure be evaluated?

11) Explain how ordinal and interval scale can be derived from paired comparison data. What advantages and limitations exist for the paired-comparison technique?

7.9 FURTHER READINGS

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