## WEB PAGE FOR CHAPTER 18

## MULTIPLE CHOICE QUESTIONS

1 A factor can be considered to be an underlying latent variable:
(a) on which people differ
(b) that is explained by unknown variables
(c) that cannot be defined
(d) that is influenced by observed variables
(e) none of these

2 Variables that are orthogonal are:
(a) moderately correlated with each other
(b) perfectly related to each other
(c) rotated
(d) totally unrelated to each other
(e) none of these

3 Factor analysis is concerned with:
(a) analysis of correlation matrices
(b) correlating mean values
(c) frequency counts
(d) abstract concepts
(e) none of the above

4 Factor analysis requires that variables:
(a) Are measured at nominal level
(b) Are abstract concepts
(c) Are not related to each other
(d) Are related to each other
(e) Are standardized

5 The decision about how many factors to retain is based on:
(a) personal choice
(b) Kaiser's rule
(c) Scree test
(d) Both (a) and (c)
(e) Both (b) and (c)

6 The unrotated matrix is rotated because:
(a) the calculations are easier
(b) more factors are extracted
(c) rotated factors are significant
(d) interpretation is easier
(e) all of these

Kaiser's rule says:
(a) select all factors where $\mathrm{p}<.5$
(b) select factors with eigenvalues that add up to 1
(c) select factors with eigenvalues 1 and above
(d) select the factor with the biggest eigenvalue
(e) none of the above

8 It is possible to extract:
(a) more variables than factors
(b) more factors than variables
(c) as many factors as there are intercorrelations
(d) only factors with eigenvalues above 1
(e) none of the above

9 Look at the following table and state:
(a) how many factors would you keep: $1,4,6$, or 8 ?
(b) how much variance is accounted for in a four factor solution: 5.930, 48.410, 46.193, or 1.305?
(c) how many variables were included in this study: $2,4,6$, or 8 ?

| Component | Eigenvalues | \% of <br> variance | Cumulative <br> \% | Rotation <br> sums of <br> squared <br> loadings | \% of <br> variance | Cumulative <br> \% |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 1 | 5.804 | 26.38 | 26.380 | 5.235 | 23.795 | 23.795 |
| 2 | 2.030 | 9.227 | 35.611 | 2.438 | 11.081 | 34.877 |
| 3 | 1.511 | 6.869 | 42.480 | 1.673 | 7.603 | 42.480 |
| 4 | 1.305 | 5.930 | 48.410 | 1.324 | 5.713 | 46.193 |
| 5 | 1.176 | 5.344 | 53.754 | 0.991 | 3.478 | 49.671 |
| 6 | 1.139 | 5.177 | 58.931 | 0.951 | 3.113 | 52.784 |
| 7 | 0.902 | 4.420 | 63.351 | 0.915 | 2.512 | 55.296 |
| 8 | 0.863 | 3.925 | 67.276 | 0.876 | 1.978 | 57.274 |

## SPSS ACTIVITIES

1 Access SPSS Chapter 18 Data File C and conduct a Factor Analysis on the attitude questionnaire items to determine the factor structure of the attitude scale. There are 10 items equally divided between attitudes to two brands of a product responded to by 104 persons. Write an interpretation of the printout and discuss the results in class.

## DISCUSSION QUESTIONS

1 Discuss in groups: 'Factor analysis has the spurious aura of objectivity but close inspection reveals a number of crucial subjective elements'. Critically evaluate this statement.

2 Work in groups and carefully inspect the two tables below and answer the questions.
(a) How many factors are important? What cumulative percentage of variance is not explained by their loadings when rotated?
(b) Is a strong general factor apparent? Give reasons for your answer.
(c) Could you provide a distinctive name with reasons for each of the extracted rotated factors?

Total Variance Explained

| Component | Initial Eigenvalues |  |  | Extraction Sums of Squared Loadings |  |  | Rotation Sums of Squared Loadings |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Total | $\%$ of Variance | $\begin{array}{\|c} \hline \text { Cumulative } \\ \% \end{array}$ | Total | $\%$ of Variance | $\begin{gathered} \text { Cumulative } \\ \% \end{gathered}$ | Total | \% of Variance | $\begin{gathered} \text { Cumulative } \\ \% \end{gathered}$ |
| 1 | 5.161 | 39.702 | 39.702 | 5.161 | 39.702 | 39.702 | 3.675 | 28.272 | 28.272 |
| 2 | 1.875 | 14.425 | 54.128 | 1.875 | 14.425 | 54.128 | 2.633 | 20.251 | 48.523 |
| 3 | 1.057 | 8.128 | 62.256 | 1.057 | 8.128 | 62.256 | 1.785 | 13.733 | 62.256 |
| 4 | . 932 | 7.170 | 69.426 |  |  |  |  |  |  |
| 5 | . 772 | 5.935 | 75.362 |  |  |  |  |  |  |
| 6 | . 675 | 5.191 | 80.552 |  |  |  |  |  |  |
| 7 | . 585 | 4.501 | 85.053 |  |  |  |  |  |  |
| 8 | . 473 | 3.637 | 88.690 |  |  |  |  |  |  |
| 9 | . 427 | 3.281 | 91.971 |  |  |  |  |  |  |
| 10 | . 364 | 2.797 | 94.768 |  |  |  |  |  |  |
| 11 | . 263 | 2.024 | 96.793 |  |  |  |  |  |  |
| 12 | . 246 | 1.890 | 98.682 |  |  |  |  |  |  |
| 13 | . 171 | 1.318 | 100.000 |  |  |  |  |  |  |

Extraction Method: Principal Component Analysis.

Rotated Component Matrix(a)

|  | Component |  |  |
| :---: | :---: | :---: | :---: |
|  | 1 | 2 | 3 |
| Employees here do not get on with each other |  | -. 401 | . 573 |
| Work interferes with my social life | . 328 |  | . 729 |
| I spend too much time travelling to work |  |  | . 823 |
| I can always manage to solve difficult problems if I try hard enough |  | . 752 |  |
| If someone opposes me, I can find the ways and means to get what I want |  | . 678 |  |
| I am certain that I can accomplish my goals | . 363 | . 682 |  |
| I am confident that I could deal efficiently with unexpected events | . 589 | . 552 |  |
| Thanks to my resourcefulness, I can handle unforeseen situations | . 644 | . 492 |  |
| I can solve most problems if I invest the necessary effort | . 465 | . 544 |  |
| I can remain calm when facing difficulties bce I can rely on my coping abilities | . 776 |  |  |
| When I am confronted with a problem, I can find several solutions | . 829 |  |  |
| If I am in trouble, I can think of a good solution | . 768 |  |  |
| I can handle whatever comes my way | . 703 |  |  |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 6 iterations.

## ANSWERS TO MULTIPLE CHOICE QUESTIONS

[^0]
[^0]:    1
    2 (d)
    3 (a)
    4 (d)
    5 (e)
    6 (d)
    7 (c)
    8 (e)
    9 4; 46.193; 8.

