10 Approaches to Quantitative Data Analysis and Evaluation

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To understand data and present findings appropriately, researchers need awareness of statistical techniques. This chapter discusses the statistical tools used to analyse data. It focuses on two sets of the most widely used statistical tools, as shown in the 'Deductive' section in the data analysis area of the Methods Map (see Chapter 4): (1) exploring relationships and (2) comparing groups. In addition, we briefly explain 'Big Data'.

Data preparation

Real-life data are generally unorganised and filled with problems and errors that impede analysis. We discuss two pre-processing steps that prepare data for further analysis: data entry and data cleaning.

■ Data entry

Data is commonly organised using tables, with *records* as rows and *attributes* as columns. A record is an identifiable piece of information which contains a set of attributes. For example, one may organise questionnaire data so that each record corresponds to all the answers from a respondent and each attribute is answer to one question.

It is difficult to ensure complete accuracy when entering data. *Double data entry* reduces data entry errors by having two individuals enter the same content and compare their inputs; when discrepancies are found, the correct copy is verified and maintained. Another accuracy-improving method is to use encoding to avoid entering text data directly. For example, when entering gender information such as 'male' or 'female' in text form, typographic errors, such as 'mael' could be introduced and inconsistent capitalisation (e.g. 'Female' versus 'female') could cause the same words to be interpreted as different. Numerical encoding (e.g. 'male' as 0 and 'female' as 1) eliminates these problems. Encoding functions are provided in many data analysis software packages, including SPSS (IBM Corporation). Figure 10.1 illustrates a snapshot of variable view and data value in SPSS. Table 10.1 explains information required for each variable.
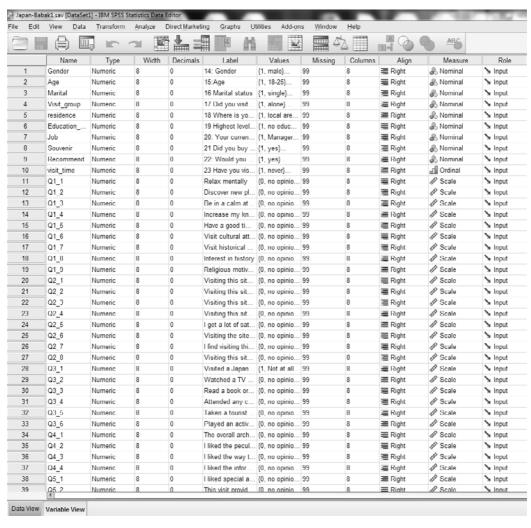

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Gender	Numeric	8	0	14: Gender	{1, male}...	99	8	Right	Nominal	Input
2	Age	Numeric	8	0	15:Age	{1, 18-25}...	99	8	Right	Nominal	Input
3	Marital	Numeric	8	0	16 Marital status	{1, single}...	99	8	Right	Nominal	Input
4	Visit_group	Numeric	8	0	17 Did you visit	{1, alone}	99	8	Right	Nominal	Input
5	residence	Numeric	8	0	18 Where is yo...	{1, local are...	99	8	Right	Nominal	Input
6	Education_...	Numeric	8	0	19 Highest level...	{1, no educ...	99	8	Right	Nominal	Input
7	Job	Numeric	8	0	20. Your curren...	{1, Manager...	99	8	Right	Nominal	Input
8	Souvenir	Numeric	8	0	21 Did you buy ...	{1, yes}...	99	8	Right	Nominal	Input
9	Recommend	Numeric	8	0	22: Would you ...	{1, yes}	99	8	Right	Nominal	Input
10	visit_time	Numeric	8	0	23 Have you vis...	{1, never}...	99	8	Right	Ordinal	Input
11	Q1_1	Numeric	8	0	Relax mentally	{0, no opinio...	99	8	Right	Scale	Input
12	Q1_2	Numeric	8	0	Discover new pl...	{0, no opinio...	99	8	Right	Scale	Input
13	Q1_3	Numeric	8	0	Be in a calm at...	{0, no opinio...	99	8	Right	Scale	Input
14	Q1_4	Numeric	8	0	Increase my kn...	{0, no opinio...	99	8	Right	Scale	Input
15	Q1_5	Numeric	8	0	Have a good ti...	{0, no opinio...	99	8	Right	Scale	Input
16	Q1_6	Numeric	8	0	Visit cultural att...	{0, no opinio...	99	8	Right	Scale	Input
17	Q1_7	Numeric	8	0	Visit historical ...	{0, no opinio...	99	8	Right	Scale	Input
18	Q1_8	Numeric	8	0	Interest in history	{0, no opinio...	99	8	Right	Scale	Input
19	Q1_9	Numeric	8	0	Religious motiv...	{0, no opinio...	99	8	Right	Scale	Input
20	Q2_1	Numeric	8	0	Visiting this sit...	{0, no opinio...	99	8	Right	Scale	Input
21	Q2_2	Numeric	8	0	Visiting this sit...	{0, no opinio...	99	8	Right	Scale	Input
22	Q2_3	Numeric	8	0	Visiting this sit...	{0, no opinio...	99	8	Right	Scale	Input
23	Q2_4	Numeric	8	0	Visiting this sit	{0, no opinio...	99	8	Right	Scale	Input
24	Q2_5	Numeric	8	0	I got a lot of sat...	{0, no opinio...	99	8	Right	Scale	Input
25	Q2_6	Numeric	8	0	Visiting the site...	{0, no opinio...	99	8	Right	Scale	Input
26	Q2_7	Numeric	8	0	I find visiting thi...	{0, no opinio...	99	8	Right	Scale	Input
27	Q2_8	Numeric	8	0	Visiting this sit...	{0, no opinio...	99	8	Right	Scale	Input
28	Q3_1	Numeric	8	0	Visited a Japan...	{1, Not at all	99	8	Right	Scale	Input
29	Q3_2	Numeric	8	0	Watched a TV ...	{0, no opinio...	99	8	Right	Scale	Input
30	Q3_3	Numeric	8	0	Read a book or...	{0, no opinio...	99	8	Right	Scale	Input
31	Q3_4	Numeric	8	0	Attended any c...	{0, no opinio...	99	8	Right	Scale	Input
32	Q3_5	Numeric	8	0	Taken a tourist ...	{0, no opinio...	99	8	Right	Scale	Input
33	Q3_6	Numeric	8	0	Played an activ...	{0, no opinio...	99	8	Right	Scale	Input
34	Q4_1	Numeric	8	0	The overall arch...	{0, no opinio...	99	8	Right	Scale	Input
35	Q4_2	Numeric	8	0	I liked the pecul...	{0, no opinio...	99	8	Right	Scale	Input
36	Q4_3	Numeric	8	0	I liked the way t...	{0, no opinio...	99	8	Right	Scale	Input
37	Q4_4	Numeric	8	0	I liked the infor...	{0, no opinio...	99	8	Right	Scale	Input
38	Q5_1	Numeric	8	0	I liked special a...	{0, no opinio...	99	8	Right	Scale	Input
39	Q5_2	Numeric	8	0	This visit provid...	{0, no opinio...	99	8	Right	Scale	Input

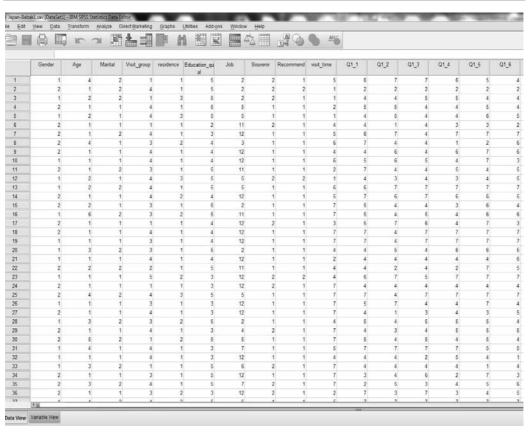**Figure 10.1(a):** Example of variable view in SPSS software

Figure 10.1(b): Example of data view in SPSS software

Table 10.1: Information required for each variable in variable view in SPSS

Variable Label	Short Description
Name	Up to 8 characters (no spaces), starting with a letter Not allowed: ALL, AND, BY, EQ, GT, LE, LT, NE, NOT, WITH, OR, TO Can be: short version of item description e.g., var01, Q1a
Width	Max. no. of characters
Decimal places	Decimal places for numbers
Label	Longer version of name
Values	Values for coded variables
Missing	Blanks, no answer, etc
Columns	No. of columns in data view screen
Alignment	Left, right, centre
Types of measure	Nominal, ordinal, scales

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