# Chapter 2-Basic Concepts

2.1 Nominal: names of students in the class; Ordinal: the order in which students hand in their first exam; Interval: the student's grade on that first exam; Ratio: the amount of time that the student spent studying for that exam.

2.3 If the rat lies down to sleep in the maze, after performing successfully for several trials, this probably says little about what the animal has learned in the task.

2.5 We have to assume the following at the very least (and I am sure I left out some)

1. Mice are adequate models for human behavior.
2. Morphine tolerance effects in mice are like heroin tolerance effects in humans,
3. Time on a warm surface is in some way analogous to a human response to heroin.
4. A context shift for mice is analogous to a context shift for humans.
5. A drug overdose is analogous to pain tolerance.

2.7 The independent variables are the sex of the subject and the sex of the other person.

2.9 The experimenter expected to find that women would eat less in the presence of a male partner than in the presence of a female partner. Men, on the other hand, were not expected to vary the amount that they ate as a function of sex of their partner.

2.11 When I drew 50 numbers 3 times I obtained 29, 26, and 19 even numbers, respectively. For my third drawing only 38 percent of my numbers were even, which is probably less than I might have expected—especially if I didn't have a fair amount of experience with similar exercises.

2.13 Continuous variables: The grams of food that the subjects ate in the previous experiment; the number of seconds it takes a mouse to lick its paws; the time that a rat spends getting from one end of the maze to another.

2.15 Eyes level condition:

a) $X_3 = 2.03$; $X_5 = 1.05$; $X_8 = 1.86$
b) $\sum X = 14.82$
c) $\sum_{i=1}^{10} X_i = 14.82$

2.17 Eyes level condition:

a) $(\sum X)^2 = 14.82^2 = 219.6324$; $\sum X^2 = 1.65^2 + ... + 1.73^2 = 23.22$
b) $\sum X/N = 14.82/10 = 1.482$
c) This is the mean, a type of average.

2.19 Putting the two sets of data together:

a) Multiply pairwise
b) $\sum XY = 22.27496$
c) $\sum X \sum Y = 14.82 * 14.63 = 216.82$
d) $\Sigma XY \neq \Sigma X \Sigma Y$. They do differ, as you would expect.
e) $$\frac{\sum XY - \frac{\sum X \sum Y}{N}}{N-1} = \frac{22.7496 - \frac{14.82 * 14.63}{10}}{9} = \frac{1.0679}{9} = .1187$$

2.21

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|---|---|---|---|---|---|---|
| $X$ | 5 | 7 | 3 | 6 | 3 | $\sum X = 24$ |
| $X + 4$ | 9 | 11 | 7 | 10 | 7 | $\sum(X + 4) = 44 = (24 + 5*4)$ |

2.23 In the text I spoke about room temperature as an ordinal scale of comfort (at least up to some point). Room temperature is a continuous measure, even though with respect to comfort it only measures at an ordinal level.

2.25 The Beth Perez story:

a) The dependent variable is the weekly allowance, measured in dollars and cents, and the independent variable is the sex of the child.
b) We are dealing with a selected sample—the children in her class.
c) The age of the students would influence the overall mean. The fact that these children are classmates could easily lead to socially appropriate responses—or what the children deem to be socially appropriate in their setting.
d) At least within her school, Beth could randomly sample by taking a student roster, assigning each student a number, and matching those up with numbers drawn from a random number table. Random assignment to Sex would obviously be impossible.
e) I don't see negative aspects of the lack of random assignment here because that is the nature of the variable under consideration. It would be better if we could randomly assign a child to a sex and see the result, but we clearly can't.
f) The outcome of the study could be influenced by the desire of some children to exaggerate their allowance, or to minimize it so as not to appear too different from their peers. I would suspect that boys would be likely to exaggerate.
g) The descriptive features of the study are her statements that the boys in her class received $3.18 per week in allowance, on average, while the girls received an average of $2.63. The inferential aspects are the inferences to the population of all children, concluding that "boys" get more than "girls."

2.27 I created this exercise to help the students understand the kinds of things that go into producing random behavior. I also wanted them to see that even a completely random process produces data that don't correspond to our intuitive ideas of randomness.