Branford and Johnson (1972) carried out studies to establish that relevant contextual knowledge is needed for properly understanding and remembering prose text. *[Read the paper only after you have attempted the exercise.]*

In the experiment (popularly called the Romeo and Juliet experiement) subjects were divided into four groups. Details are given below. All groups listened to the following passage read out by the experimenters.

> If the balloons popped, the sound would not be able to carry since everything would be too far away from the correct floor. A closed window would also prevent the sound from carrying since most buildings tend to be well insulated. Since the whole operation depends on a steady flow of electricity, a break in the middle of the wire would also cause problems. Of course the fellow could shout, but the human voice is not loud enough to carry that far. An additional problem is that a string could break on the instrument. Then there could be no accompaniment to the message. It is clear that the best situation would involve less distance. Then there would be fewer potential problems. With face to face contact, the least number of things could go wrong.

Context was modelled by two drawings (see below). Subjects' comprehension and recall were tested - again the details are given later below. The four groups were:

1) No context condition: subjects just listened to the passage and tried to understand and remember it.

2) Appropriate context before condition: subjects saw the drawing in figure 1 and then heard the passage.

3) Appropriate context after condition: subjects heard the text first and then saw the appropriate drawing (figure 1).

4) Parial context condition: Subjects saw the drawing in figure 2 and then listened to the text.

Comprehension and memory were measured using two dependent variables i) each subject gave a comprehension rating on scale from 0 (no comprehension) to 7 (perfect comprehension) ii) subjects were asked to recall the distinct ideas present in the text. The authors analysis was that the text had 14 distinct ideas and for each subject they evaluated how many of the 14 distinct ideas the subjects recalled. There is an obvious measurement problem here both in the initial analysis that the text has 14 distinct ideas and in the experimenter's judgement of how many of those 14 a subject actually recalled.

Below is a pseudo-replication of the experiment but only for the second dependent variable. Twenty subjects were randomly assigned to each of the four conditions (5 subjects for each condition). The table gives the number of ideas recalled.

No context(1)	Context before(2)	Context after(3)	Partial context(4)
3	5	2	5
3	9	4	4
2	8	5	3
4	4	4	5
5	9	1	4

Compute/find the following:

a) The distinct ideas in the text. How many do you get?

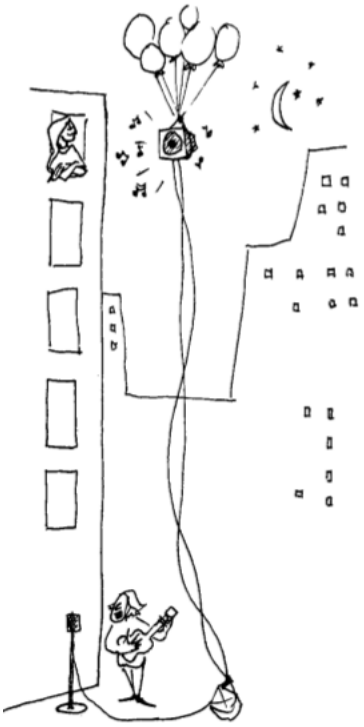

Figure 1: Appropriate context for the text.

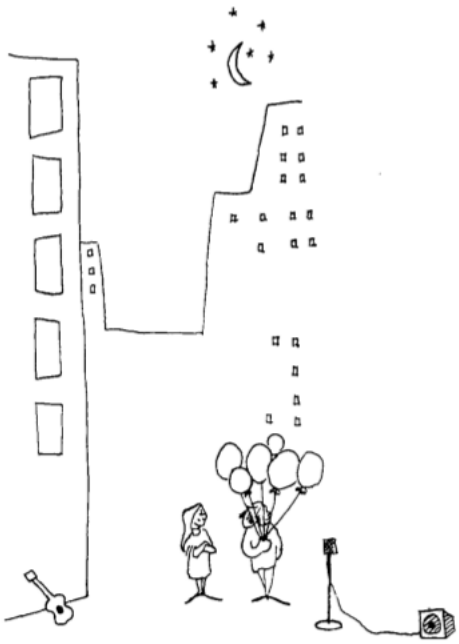

Figure 2: Partial context for the text.

b) The sum-of-squares for total, withingroups and betweengroups.

c) df_{total}, $df_{\text{betweengroups}}$, $df_{\text{withingroups}}$.

d) The mean square values in each case.

e) Find F-ratio and check whether or not H_a can be rejected at $\alpha = 0.05$ and $\alpha = 0.01$.

f) What is the purpose of conditions 3) and 4)?

BRANSFORD J.D., JOHNSON M.K., Contextual prerequisites for understanding: some investigations of comprehension and recall. Journal of Verbal Learning and Verbal Behavior, 11, 717726, 1972.