Exercising to Lose Weight

We all know that regular exercise (combined with a sensible diet) is a key to shedding those extra pounds. Experience shows that overweight people find it tough to keep exercising. Perhaps they will do better with several short sessions each day rather than one longer session. Perhaps having exercise equipment at home will help.

An experiment looked at these issues. The subjects were women aged 25 to 45 whose weights were 20% to 75% higher than ideal. The study report says:

Subjects were randomly assigned to 1 of 3 groups. All groups were prescribed a similar volume of exercise. The 3 groups differed in the way the exercise was prescribed.

Short-Bout Exercise Group
Fifty-one subjects were instructed to exercise 5 days/wk . . . However, rather than exercising continuously for the prescribed duration, subjects were instructed to divide the exercise into multiple 10-minute bouts that were performed at convenient times throughout the day.

Short-Bout plus Exercise Equipment Group
The exercise prescription was identical to the exercise prescribed for the short-bout group. The 48 subjects in this group were also provided with motorized home treadmills.

Long-Bout Exercise Group Forty-nine subjects were instructed to exercise 5 days/wk; duration progressed from 20 min/day to 40 min/day. Participants performed the exercise in one long bout.

The researchers recorded weight, fitness, and whether the subject continued the exercise program.

PROBLEM:
1. Use a diagram to outline the design of this experiment.
2. How many subjects are there in all?
   Use Table D, starting at line 114, to assign the first 10 subjects for the long-bout group.
3. Could this study have been conducted in a double-blind manner? Explain your answer.

Here is a small part of the summary of the results:
There was no significant difference between the LB and SB groups for mean [SD] weight loss at 18 months (LB, – 5.8 [7.1] kg; SB, – 3.7 [6.6] kg).

That’s pretty terse, but it gives the mean and standard deviation of the weight loss (in kilograms) for the long-bout (LB) and short-bout (SB) groups. The data come from the 37 LB subjects and 36 SB subjects who completed the study.

4. Do an appropriate test to confirm the report that there is not a significant difference in the mean weight loss in the two groups.
5. Construct and interpret a 95% confidence interval for the difference in mean weight loss for similar subjects using these two treatments. Does the confidence interval confirm that there is no significant difference in mean weight loss?
6. In many studies, subjects drop out before the study is complete. Suppose that no one dropped out of the long-bout or short-bout groups and that the means and standard deviations for both groups remained the same. Would this change your decision from question 4? Explain.