**Threats to Internal validity**

Decide which specific threats are reducing the internal validity of the following studies:

1. Researchers are implementing a health education program in public schools to create awareness about teenage pregnancy. During the program, one of the students becomes pregnant. She drops out of school and commits suicide during the study. At the end of the program, researchers find a significant increase in students’ awareness of teenage pregnancy. Can we conclude that the program was effective?

History – The suicide of a fellow student is likely to have a profound influence on students’ awareness. Researchers would not be able to determine if the change in awareness was due to the program or the extreme event.

Sometimes student think this is an example of experimental mortality (i.e., attrition) because a student has left the study. Experimental mortality might be a concern is many students dropped out of the study, but that is not the case in this example.

1. As part of a course, an instructor has his students take the GREs. The students do not do well. The instructor decides to offer a one-hour session to help his students prepare for the GRE. Afterwards, he has the students take the GRE a second time and finds that their scores have improved. Can we conclude that the one hour prep-session was effective?

Testing effects – Just by virtue of having had the experience of taking the GRE once, without any additional preparation, students are likely to improve their scores on a re-take. There could be practice effects influencing students’ performances.

1. Researchers want to evaluate a pre-school readiness program for 3- to 4-year olds. To determine the effectiveness of the program, the researchers randomly assign children either to participate in the readiness program or to participate in a daycare program. During the course of the study several parents notice that their children are performing poorly in the readiness program. These parents decide that their children are not developmentally ready to participate and take them out of the readiness program. Can the researchers conclude that the program is effective if they find more positive results among those in the readiness program versus those in the daycare program?

Experimental Mortality (i.e., attrition) – The low scorers have dropped out. The loss of low end scorers may artificially raise the overall mean for those in the readiness program creating the impression of a program effect when in fact there may be none.

1. Over a period of approximately three years, a group of 20 teachers are observed closely by external evaluators as they undergo a series of workshops aimed at improving their quality of instruction. At the end of the 3-year period, the evaluators observe the same 20 teachers, systematically, as they teach. Their quality of teaching has improved according to criteria for improvement (agreed-upon definitions and behavior). Perhaps the instruction produced the gain, but perhaps the gain was caused in large part by?

Instrumentation – the observers may have begun to drift away from their criteria. That is over a 3-year period it is possible that the observers are not evaluating or using the criteria in quite the same way as they initially had.

Maturation – the teachers, regardless of the workshop, may have made improvements anyway. That is, as a result of trial and error (i.e., their experiences) teachers may improve over time rather than due to the workshops. We can’t be sure without a control group.

1. Researchers were interested in examining the effectiveness of a cognitive-behavioral treatment on students’ stress levels. The researchers made contact with several university counseling centers and recruited participants with extremely high stress levels. Any post-treatment improvement could have been due to the treatment, but it could also have been due to what?

Regression to the mean – it can occur when participants have been selected on the basis of extreme scores, because extreme (low and high) scores in a distribution tend to move closer to the mean (i.e., regress) in repeated testing. It is possible the student might have gotten better without any treatment. A control group would be helpful in reducing this threat.

1. Researchers were interested in examining how music influences people’s abilities to memorize information. The researchers gave extra credit to students in their classes for participating in the study. The first 20 students to show up were assigned to the music condition. The next 20 to show up were assigned to the non-music condition. Researchers found that those in the non-music condition performed worse on the memory test than those in the music condition. Can we conclude that listening to music improves memory?

Assignment bias – because random assignment was not used, the groups may not be equivalent at the beginning of the study. That is, there may be differences between those who show up first versus those who show up last. These differences are now confounded with the levels of the independent variable.

1. Researchers are interested in examining how mindfulness influences motivation to exercise. College students are randomly assigned either to the treatment condition (e.g., weekly lectures plus journaling on mindfulness) or to the control condition (e.g., no information or activities). Some students, who are assigned to the treatment condition, begin feeling overwhelmed with the requirements of both school and the study. Many of them stop going to the lectures and journaling, and evenly drop out of the study. At the end of the study, researchers find those in the treatment condition had significantly more motivation to exercise than those in the control condition. Can we conclude that the treatment is effective?

Although it possible that the treatment is effective, it is also possible experimental mortality (i.e., attrition) can explain the results. That is, a number of students in the treatment condition dropped out of the study. Perhaps only those students who more dedication and motivation stayed in the study, which is why there were greater levels of motivation among those in the treatment condition.