Internal Validity

RENEE CASADY PT MS HPCS

Internal validity in a research study is what gives researchers the confidence to conclude that what they did in the study caused what they observed to happen, i.e. the outcome is the result of the treatment. Internal validity is only relevant when researchers are trying to link a cause with an effect. It is not relevant in observation or descriptive studies that merely report findings. Internal validity is a prime consideration for any research study that assesses the effects of a treatment intervention. With this in mind, hippotherapy research needs to be considered valid and therefore it must be based on fact or evidence or the conclusions must be capable of being justified.

Validity is determined from both internal and external approaches. Both approaches are obviously important although they are frequently at odds because occasionally research design features that increase internal validity may jeopardize external validity. Choosing a research design that satisfies both types of validity is the ideal experimental condition. Good sampling strategies and accurate measurements will determine how valid a research study is when it is all over. These are choices faced by researchers in the early stage of planning a project or study.

Internal validity is the extent to which a study's results can be interpreted accurately. For example, how can a researcher accurately conclude that the observed change in sitting balance can be attributed to being on the horse following four hippotherapy sessions? The answer is that every effort must have been made to ensure consistency across subjects in measurement as well as satisfying criticism or threats to internal validity. This can sound very intimidating, but good research will face these threats head on before recruiting subjects, applying for grants to fund the study and obviously before collecting data. It is the researcher's responsibility to design a "real-life" study that satisfies as many threats to internal validity as possible. In this way the results can be accurately attributed to the intervention. A study with perfect internal validity (if possible) may include random assignment of subjects to the test conditions as well as the use of the exact same measurement conditions for all the subjects. However since the key issue in internal validity is whether or not a researcher has established cause and effect, let's consider what conditions need to be met in order to do this in a research project. Researchers establish cause and effect by satisfying the different threats to internal validity. These variables can be controlled to limit their effect on the experimental conditions.

1. **History** - A specific event or chain of events occurs between measurements in addition to the independent variable. For example, a subject acquires an inner ear infection which negatively affects movement tolerance.

2. **Maturation** - The passing of time alone could have caused the change observed in the independent variable. The individuals in the study will grow older, get tired, get better or learn in spite of the intervention

3. **Mortality** - Loss of respondents or participants in the study. "Drop outs".

4. **Testing** - In a pretest-posttest design, taking the pretest can influence how a subject performs on the posttest. Subjects may do better on the posttest because they learn how to take the test or perform better by taking the pretest.

5. **Instrumentation** - In a pretest-posttest design, changes in the calibration or use of the outcome measure or change in the actual observers who score the subjects could create the difference from test to test. For example, observers could get tired or bored between score dates. Or the observers could improve in their ability to give the test so the subjects perform better because of the way the test is given.

6. **Statistical Regression** - The "you can only go up from here" phenomenon. Such as when the subject sample consists of low pretest scorers who will affect the group pretest mean score. Improvement or gain on the posttest may have occurred even without intervention due to the nonrandom sample.

Internal Validity

RENEE CASADY PT MS HPCS

These six threats to internal validity are found in single group studies. One of the ways to minimize these threats is to add a control group which would change the design to two groups, for example one group receives hippotherapy and one does not receive hippotherapy. The only difference between groups should be the intervention. The control group should experience the same maturation and history effects, have the same testing and instrumentation effects, as well as have similar mortality and regression to the mean. A good control group will most likely eliminate the internal validity threats to the single group design. However there are still threats to internal validity in multiple group designs. If you cannot add a control group and need to keep a single group research study design, there are ways to minimize the threats to internal validity. Commit to use sound instrumentation, train the observers, eliminate bias, standardize protocols for measurement, record and report history threats or add measurement dates such as a time-series quasi-experimental design.

REFERENCES:

D.T. Campbell & J.C. Stanley. Experimental and Quasi-experimental Designs for Research. Houghton Mifflin Co., Boston:1963.

Trochim, William M. The Research Methods Knowledge Base, 2nd Edition. Internet WWW page, at URL: http://trochim.human.cornell.edu/kb/index.htm (version current as of August 2004).

Cowan, Geni. Educational Research: validity and reliability. Internet WWW page, at URL: http://imet.csus.edu/imet_250/module4/reliability1.htm

One-Group Pretest Posttest Design		
O_1	X	O_2

Pretest Posttest Control Group Design			
R	O_1	X	O_2
R	O_3	X	O_4