Below is a research problem. Go through the list of threats to construct validity, and discuss which of the threats are and which are not of major concern here.

General idea behind the research scenario (a quotation from our researcher): “I feel that plyometric strength training is more effective for gaining strength than isometric strength training. I’ve done plyometrics for years, and it has worked wonders.”

- An undergrad class taught by the researcher is split into 3 groups of 30. One third is assigned to a plyometric strength-training program, 1/3 to an isometric program, and 1/3 do nothing. Before assigning them, the researcher makes sure to tell the entire class about the purpose of the research, and explains we are doing it to see if the researcher’s suspicions about plyometrics are correct.

- Before and at the end of the programs, all students are tested on a measure of strength - a grip dynamometer. This test is supervised by the researcher to make sure proper procedures are followed.

- It is expected that the plyometric group will make the greater strength gains.

First, these are the constructs: 1. Strength training program(s). 2. Strength test. Each construct will be discussed separately within each “laundry list” item (A-J) below.

A. Inadequate preoperational explication of construct:
   1. Strength training program: We don’t know to what extent the researcher understands the nuances of individual strength training programs, but in a full methodology we would expect clear definitions of each, together with precise statements about how the programs diverge. But just setting one program against the other does suggest a certain naivety, I think.
   2. Strength test: Well, it does seem a very simple strength test, doesn’t it? Could well be the researcher hasn’t looked carefully enough at how strength testing can be done.

B. Mono-operation bias
   1. Strength training program: there’s only one example of each program, right? Clearly could be a problem, but this is very common. Should at least evaluate how common these versions of the program are, and whether these renditions could skew the results in any way. (You would expect, if there was only one version of the program, that it was at least recognizably “typical” — otherwise it really is biasing the results). Even then, though, one version of each poses real problems.
   2. Strength test: N/A (this one is about the independent, not the dependent variable).

C. Mono-method bias
1. **Strength training program**: N/A (this one is about the dependent, not the independent variable).

2. **Strength test**: Again, clearly a problem. You can test strength in so many ways, and here only a simple isometric test is given. Surely this can skew results. Should at least offer both isometric and plyometric tests, and should target different muscle groups too (remember we’re only critiquing the number of tests here though).

**D. Interaction of different treatments**

1. **Strength training program**: Is anything else present other than the programs themselves? Influences of social pressure in the two training groups (that is absent in the control group)? Are there peculiar elements of either program that might themselves be causing the difference in strength? How about the feeling that one is trendier than the other, more exciting?

2. **Strength test**: This construct will be biased to the extent that the other factors discussed in (1) above are relevant, as it’s the outcome variable. But can the score itself change because of things other than strength gain? Familiarity? Maybe not – there’s only a pre and post-test.

**E. Interaction of testing and treatment**

1. **Strength training program**: could others things have crept into the program as a consequence of testing? Well, the testing was the grip strength measure. Could that have affected the programs much? Unlikely.

2. **Strength test**: This item on the laundry list refers to how testing (a dependent measure) may influence treatment (an independent measure). So it can’t then be relevant to the dependent measure itself, right?

**F. Restricted generalizability across constructs (and unintended consequences)**

1. **Strength training program**: other possible effects of the programs? Plyometrics causing injury?

2. **Strength test**: What if the effect is restricted to this form of strength test? Or to this muscle group? Need lots of measures...similar to laundry list A, but this invites speculation about all the ways in which program differences may come out.

**G. Confounding constructs and levels of constructs**

1. **Strength training program**: Would need to be very careful about the relative effort expended in each of the programs...might plyometrics be more effective just because it invokes greater effort (do people typically use plyometrics at a greater % of their maximum voluntary contractile strength than they do other programs?). Is this care taken here? If not, could is alter the results found?

2. **Strength test**: This one is about programs rather measures, because it is about the choice of levels of an independent variable. So, no to this one.

**Social Threats:**

**H. Hypothesis guessing**

1. **Strength training program**: Not guessing exactly. They are told about the idea that plyometrics is thought to be better by the experimenter! But the idea is
certainly the same. Do (or could) people do better simply because they are under the impression they ought to right from the start?

2. **Strength test**: Could people’s performance on the strength test (rather than in the programs) change because they felt it ought to? Possibly...

I. **Evaluation apprehension**

   1. **Strength training program**: Might people behave differently throughout either program due to self-consciousness? And therefore change their score on the dv? And is this distinct from the normal effect of the program?

   2. **Strength test**: Are people going to score differently on the strength test because of either fear or excitement of being evaluated (and might this be a systematic bias that in some way alters the results of the experiment)?

J. **Experimenter expectancies**

   1. **Strength training program**: Well, this is the obvious one, I suppose. Clearly here there is a bias from the experimenter. It is often a lot more subtle than it is here.

   2. **Strength test**: Again, this is usually something that influences the IV rather than the DV, but it could certainly be seen to influence both. (people may try harder because of the expectation to succeed, or try less as they are not expected to do well).