Multiple Group Designs

- Limits of 2 condition designs
- Kinds of Treatment Conditions
- Kinds of Control Conditions
- 2 Kinds of Causal Research Hypotheses

Limitations of 2-cond Designs

- 2-cond designs work well to conduct basic treatment evaluations
  - they allow us to investigate whether or not a specific treatment has "an effect"
  - usually by comparing it to a "no treatment" control
  - e.g., does a new treatment program work to help socially anxious clients (compared to no treatment)?
- However as research questions/hypotheses become more sophisticated and specific, we often require designs that have multiple IV conditions

"Kinds" of Conditions to Include in Research Designs
Tx Conditions

- Ways treatment conditions differ
  - amount of treatment
    - receiving therapy once vs. twice each week
    - getting 0, 1, 5 or 10 practice trials before testing
  - kind of treatment
    - receiving Cognitive vs. Gestalt clinical therapy
    - whether or not there is feedback on practice trials
  - combinations of treatment components
    - Receiving"drug" vs. "talk" therapy vs. "combined drug & talk" therapy
    - receiving "10 practices without feedback" vs.   "2 practices with feedback"

  The "Secret" is to be sure the selection of conditions matches the research hypotheses you started with !!!

Different Kinds of "Control" Conditions

- ■ "No Treatment" control
  - – Asks if the Tx works "better than nothing"
- ■ "Standard Tx" control
  - – Asks if the Tx works "better than usual"
- ■ "Best Practice" Control
  - – Asks if the Tx works "better than the best known"
- ■ "Pseudo Tx" Control
  - – Asks if TX works "without a specific component"

The "Secret" is to be sure the selection of conditions matches the research hypotheses you started with !!!

Of course …

Any multiple conditions design could be "reproduced" by the right combination of 2-conditions studies…

TX_1 TX_2 C

TX_1 C TX_2 C TX_1 TX_2
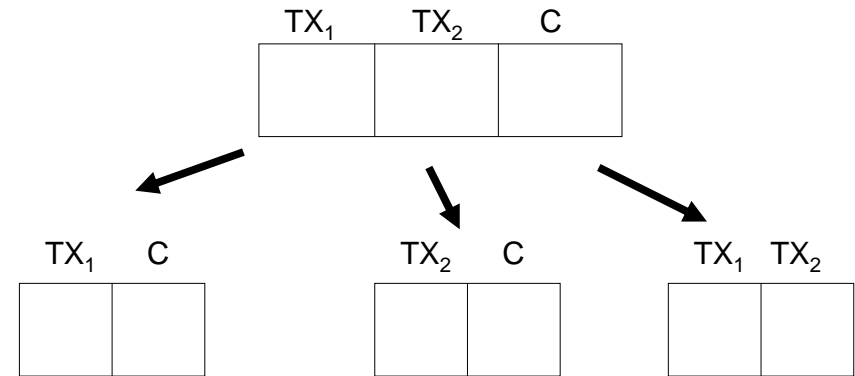
While more expensive and time-consuming than running multipe-conditions studies this "pairwise approach" **does** provide more replications.

An important point to remember...

Not every design needs a "no treatment control" group !!!!

Remember, a design needs to provide "an comparison of ap-propriate conditions" to provide a test of the research hypothesis !!!

What would be the appropriate "control group" to answer each of the following ?

My new Tx works better than the currently used behavioral therapy technique

My new Tx works better than "no treatment"

My new Tx works because of the combo of the usual and new behavioral components

My new TX works better when given by a Ph.D. than by a Masters-level clinician

The "Secret" is to be sure the selection of conditions matches the research hypotheses you started with !!!

Causal Hypotheses for Multiple Condition Designs

Sometimes there is more than one component to a "treatment," and so, there are multiple differences between the IV conditions.

When this happens, you must distinguish..

Causal Hypotheses about "treatment comparisons"
      -- hypothesis that the difference between the DV
        means of the IV conditions is caused by the
          combination of treatment component differences

Causal Hypotheses about "identification of causal elements"
      -- hypothesis that the difference between the DV
        means of the IV conditions is caused by a specific
        (out of two or more) treatment component difference

The "Secret" is to be sure the condition comparison matches
the specific type of causal research hypotheses !!!!

For example… I created a new treatment for social anxiety that uses a combination of group therapy (requiring clients to get used to talking with other folks) and cognitive self-appraisal (getting clients to notice when they are and are not socially anxious). Volunteer participants were randomly assigned to the treatment condition or a no-treatment control. I personally conducted all the treatment conditions to assure treatment integrity. Here are my results using a DV that measures "social context tolerance" (larger scores are better).

$F(1,38) = 9.28, p = .001, Mse = 17.3$

Which of the following statements will these results support?

Group therapy & self-appraisal	Cx
52	25

"Here is evidence that the combination of group therapy & cognitive self-appraisal increases social context tolerance." ???

" You can see that the treatment works because of the cognitive self-appraisal; the group therapy doesn't really contribute anything."

Same story... I created a new treatment for social anxiety that uses a combination of group therapy (requiring clients to get used to talking with other folks) and cognitive self-appraisal (getting clients to notice when they are and are not socially anxious). Volunteer participants were randomly assigned to the treatment condition or a no-treatment control. I personally conducted all the treatment conditions to assure treatment integrity.

What conditions would we need to add
to the design to directly test the second
of these causal hypotheses...

The treatment works because of the cognitive self-appraisal; the group therapy doesn't really contribute anything."

Group therapy & self-appraisal	Group therapy	Self-appraisal	No-treatment control

Let's keep going …

Here's the design we decided upon. Assuming the results from the earlier study replicate, we'd expect to get the means shown below.

Group therapy & self-appraisal	Group therapy	Self-appraisal	No-treatment control
52			25

What means for the other two conditions would provide support for the RH:

The treatment works because of the cognitive self-appraisal; the group therapy doesn't really contribute anything."

Another example… The new on-line homework I've been using provides immediate feedback for a set of 20 problems. To assess this new homework I compared it with the online homework I used last semester which 10 problems but no feedback. I randomly assigned who received which homework and made sure each did the correct type. The DV was the % score on a quiz given the day the homework was due. Here are the results ...

$F(1,42) = 6.54, p = .001, Mse = 11.12$

Old Hw	New Hw
72	91

Which of the following statements will these results support?

"Here is evidence that the new homework is more effective because it provides immediate feedback!"

"The new homework seems to produce better learning!"

Same story... The new on-line homework I've been using provides immediate feedback for a set of 20 problems. To assess this new homework I compared it with the online homework I used last semester which 10 problems but no feedback. I randomly assigned who received which homework and made sure each did the correct type.

What conditions would we need to add to the design to directly test the second of these causal hypotheses...

"Here is evidence that the new homework is more effective because it provides immediate feedback!"

Hint: Start by asking what are the "differences" between the "new" and "old" homeworks -- what are the "components" of each treatment???

"New Hw" 20 problems w/ feedback	20 problems w/o feedback	10 problems w/ feedback	"Old Hw" 10 problems w/o feedback

Let's keep going …

Here's the design we decided upon. Assuming the results from the earlier study replicate, we'd expect to get the means shown below.

"New Hw" 20 problems w/ feedback	20 problems w/o feedback	10 problems w/ feedback	"Old Hw" 10 problems w/o feedback
91			72

What means for the other two conditions would provide support for the RH:

"Here is evidence that the new homework is more effective because it provides immediate feedback!"