

HOW TO APPLY THE MULTIPHASE OPTIMIZATION STRATEGY (MOST) IN YOUR INTERVENTION DEVELOPMENT RESEARCH

Module 3 Introduction to the optimization trial

Lesson 6: Experimental control in a factorial design



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Intervention Optimization Initiative

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In the previous lesson you learned how to:

- Explain why increasing the number of levels of a factor to three or more—for even one factor—requires a substantial increase in the number of participants to maintain power.



In this lesson you will learn how to:

- Explain the concept of experimental control in a factorial design.

In an RCT there is usually a condition designated as the control



Referred to as THE control condition

In Condition 1
all the factors
are set to No

But is
Condition 1
THE control
condition?

Experimental condition	<i>MI</i>	<i>PEER</i>	<i>TEXT</i>	<i>MIND</i>	<i>Outcome</i>
1	No	No	No	No	\bar{Y}_1
2	No	No	No	Yes	\bar{Y}_2
3	No	No	Yes	No	\bar{Y}_3
4	No	No	Yes	Yes	\bar{Y}_4
5	No	Yes	No	No	\bar{Y}_5
6	No	Yes	No	Yes	\bar{Y}_6
7	No	Yes	Yes	No	\bar{Y}_7
8	No	Yes	Yes	Yes	\bar{Y}_8
9	Yes	No	No	No	\bar{Y}_9
10	Yes	No	No	Yes	\bar{Y}_{10}
11	Yes	No	Yes	No	\bar{Y}_{11}
12	Yes	No	Yes	Yes	\bar{Y}_{12}
13	Yes	Yes	No	No	\bar{Y}_{13}
14	Yes	Yes	No	Yes	\bar{Y}_{14}
15	Yes	Yes	Yes	No	\bar{Y}_{15}
16	Yes	Yes	Yes	Yes	\bar{Y}_{16}

Each factor
has its **own**
control

One level of
each factor
serves as its
control

Experimental condition	<i>MI</i>	<i>PEER</i>	<i>TEXT</i>	<i>MIND</i>	<i>Outcome</i>
1	No	No	No	No	\bar{Y}_1
2	No	No	No	Yes	\bar{Y}_2
3	No	No	Yes	No	\bar{Y}_3
4	No	No	Yes	Yes	\bar{Y}_4
5	No	Yes	No	No	\bar{Y}_5
6	No	Yes	No	Yes	\bar{Y}_6
7	No	Yes	Yes	No	\bar{Y}_7
8	No	Yes	Yes	Yes	\bar{Y}_8
9	Yes	No	No	No	\bar{Y}_9
10	Yes	No	No	Yes	\bar{Y}_{10}
11	Yes	No	Yes	No	\bar{Y}_{11}
12	Yes	No	Yes	Yes	\bar{Y}_{12}
13	Yes	Yes	No	No	\bar{Y}_{13}
14	Yes	Yes	No	Yes	\bar{Y}_{14}
15	Yes	Yes	Yes	No	\bar{Y}_{15}
16	Yes	Yes	Yes	Yes	\bar{Y}_{16}

What if different factors require different types of control? Suppose:

- An attention placebo is to be used as a control for Motivational Interviewing
- Texts containing information about diet are to be used as a control for Text Message Support
- A peaceful nature video is to be used as a control for Mindfulness Meditation

Each factor
has its own
approach to
control

They can be
very
different!

Experimental condition	<i>MI</i>	<i>PEER</i>	<i>TEXT</i>	<i>MIND</i>	<i>Outcome</i>
1	Attention placebo	No	Info about diet	Nature video	\bar{Y}_1
2	Attention placebo	No	Info about diet	Yes	\bar{Y}_2
3	Attention placebo	No	Yes	Nature video	\bar{Y}_3
4	Attention placebo	No	Yes	Yes	\bar{Y}_4
5	Attention placebo	Yes	Info about diet	Nature video	\bar{Y}_5
6	Attention placebo	Yes	Info about diet	Yes	\bar{Y}_6
7	Attention placebo	Yes	Yes	Nature video	\bar{Y}_7
8	Attention placebo	Yes	Yes	Yes	\bar{Y}_8
9	Yes	No	Info about diet	Nature video	\bar{Y}_9
10	Yes	No	Info about diet	Yes	\bar{Y}_{10}
11	Yes	No	Yes	Nature video	\bar{Y}_{11}
12	Yes	No	Yes	Yes	\bar{Y}_{12}
13	Yes	Yes	Info about diet	Nature video	\bar{Y}_{13}
14	Yes	Yes	Info about diet	Yes	\bar{Y}_{14}
15	Yes	Yes	Yes	Nature video	\bar{Y}_{15}
16	Yes	Yes	Yes	Yes	\bar{Y}_{16}

Which participants are in a “control condition?”

ALL, except for those in Condition 16

Experimental condition	<i>MI</i>	<i>PEER</i>	<i>TEXT</i>	<i>MIND</i>	<i>Outcome</i>
1	Attention placebo	No	Info about diet	Nature video	\bar{Y}_1
2	Attention placebo	No	Info about diet	Yes	\bar{Y}_2
3	Attention placebo	No	Yes	Nature video	\bar{Y}_3
4	Attention placebo	No	Yes	Yes	\bar{Y}_4
5	Attention placebo	Yes	Info about diet	Nature video	\bar{Y}_5
6	Attention placebo	Yes	Info about diet	Yes	\bar{Y}_6
7	Attention placebo	Yes	Yes	Nature video	\bar{Y}_7
8	Attention placebo	Yes	Yes	Yes	\bar{Y}_8
9	Yes	No	Info about diet	Nature video	\bar{Y}_9
10	Yes	No	Info about diet	Yes	\bar{Y}_{10}
11	Yes	No	Yes	Nature video	\bar{Y}_{11}
12	Yes	No	Yes	Yes	\bar{Y}_{12}
13	Yes	Yes	Info about diet	Nature video	\bar{Y}_{13}
14	Yes	Yes	Info about diet	Yes	\bar{Y}_{14}
15	Yes	Yes	Yes	Nature video	\bar{Y}_{15}
16	Yes	Yes	Yes	Yes	\bar{Y}_{16}

In this lesson you learned how to:

- Explain the concept of experimental control in a factorial design.



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In the next lesson you will learn how to:

- Distinguish: (1) between fixed and adaptive interventions; (2) among adaptive interventions with different intensities of adaptation

