

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

## **Module 3 Introduction to the optimization trial**

### **Lesson 7: Brief introduction to adaptive interventions**



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# In the previous lesson you learned how to:

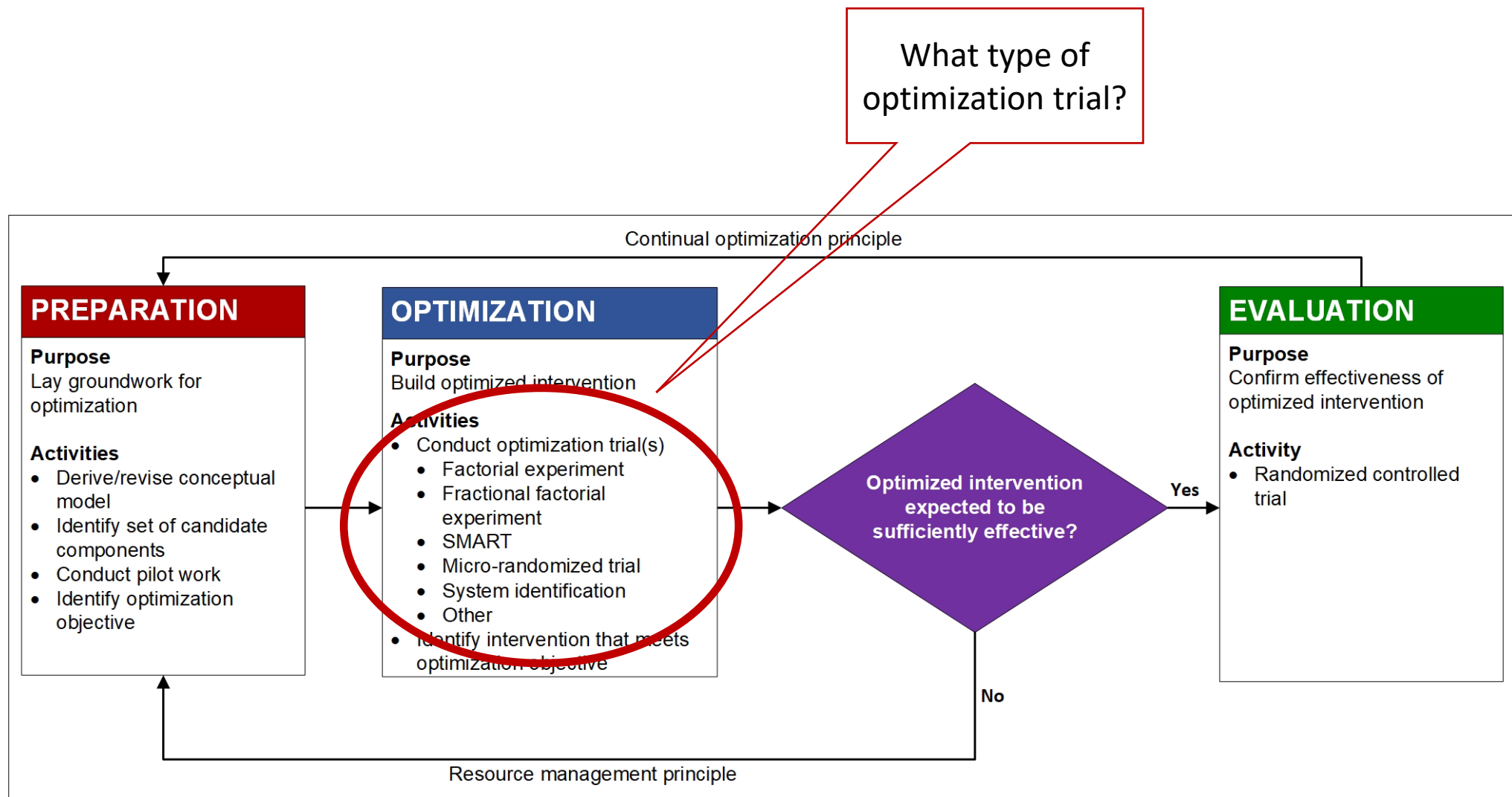
- Explain the concept of experimental control in a factorial design



# In this lesson you will learn how to:

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





**Flow chart of the three phases of the multiphase optimization strategy (MOST). Rectangle = action. Diamond = decision.**

Figure adapted from Collins, L.M. (2018)

# Why discuss adaptive interventions now?

- These are important considerations when selecting an optimization trial design:
  - Type of intervention – fixed vs. adaptive
  - Intensity of adaptation



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# **An important distinction: Experimental design vs. intervention design**

- Experimental design: The design of an experiment to gather information needed to develop, optimize, or evaluate an intervention

Collins (2018), p. 291

# **An important distinction: Experimental design vs. intervention design**

- Intervention design: The specific details of the approach taken by an intervention, including the intervention components, the settings of the components, any eligibility requirements for participants, etc.

Collins (2018), p. 291



# Two types of intervention designs: fixed and adaptive

- Fixed: All participants are offered the same treatment.
  - Note: they may not all *receive* the same treatment.

**Our example intervention (aimed at reducing viral load among HIV+ individuals who drink heavily) is fixed**

Candidate components:

1. Motivational interviewing (no, yes)
2. Peer mentoring (no, yes)
3. Text message support (no, yes)
4. Mindfulness meditation (no, yes)
5. Behavioral skills training (low intensity, high intensity)

# **Two types of intervention designs: fixed and adaptive**

- Adaptive: Intervention components and component levels are varied strategically across participants

# What does “varied strategically” mean?

- Premise: Different people may have better outcomes with different amounts or types of intervention
- An adaptive intervention is designed to give each individual the amount and type of intervention needed to achieve the desired outcome AND NO MORE.

# An adaptive intervention to encourage adherence to HIV treatment

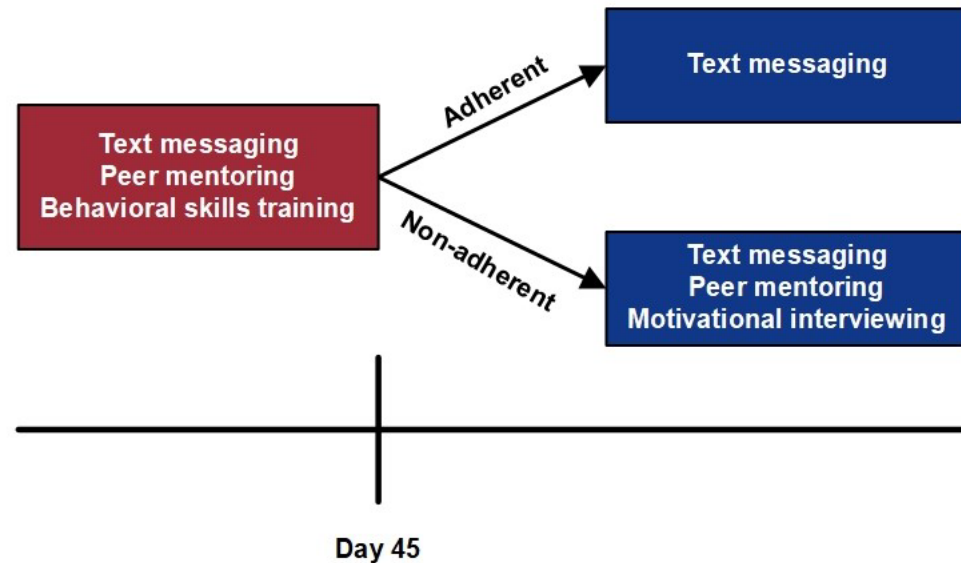


Figure reprinted from Collins (2018)

# Definition of adaptive intervention

- *An adaptive intervention is a sequence of pre-specified decision rules that can be used to guide whether, how, or when—and based on which measures—to alter an intervention or intervention component (e.g., treatment type, duration, frequency or amount) at critical decision points during the course of care.*

Almirall, Nahum-Shani, Wang, & Kasari (2018)

# An adaptive intervention to encourage adherence to HIV treatment

## *Pre-specified decision rules*

**At the outset**, all participants are provided with text messaging indefinitely, and behavioral skills training and peer mentoring **for 45 days**.

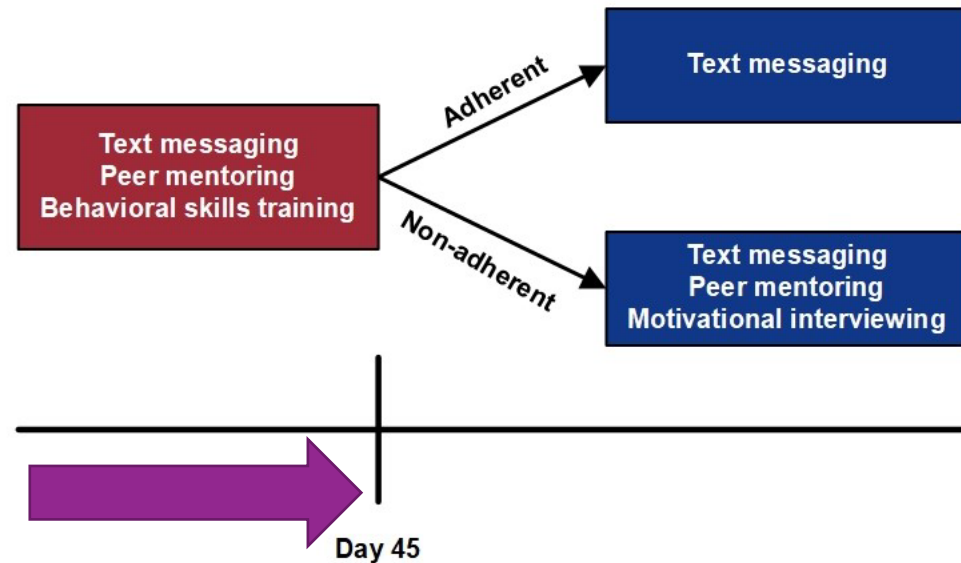


Figure reprinted from Collins (2018)

# An adaptive intervention to encourage adherence to HIV treatment

## *Pre-specified decision rules*

On Day 45, behavioral skills training ceases. The **tailoring variable**, adherence to the HIV treatment protocol, is assessed.

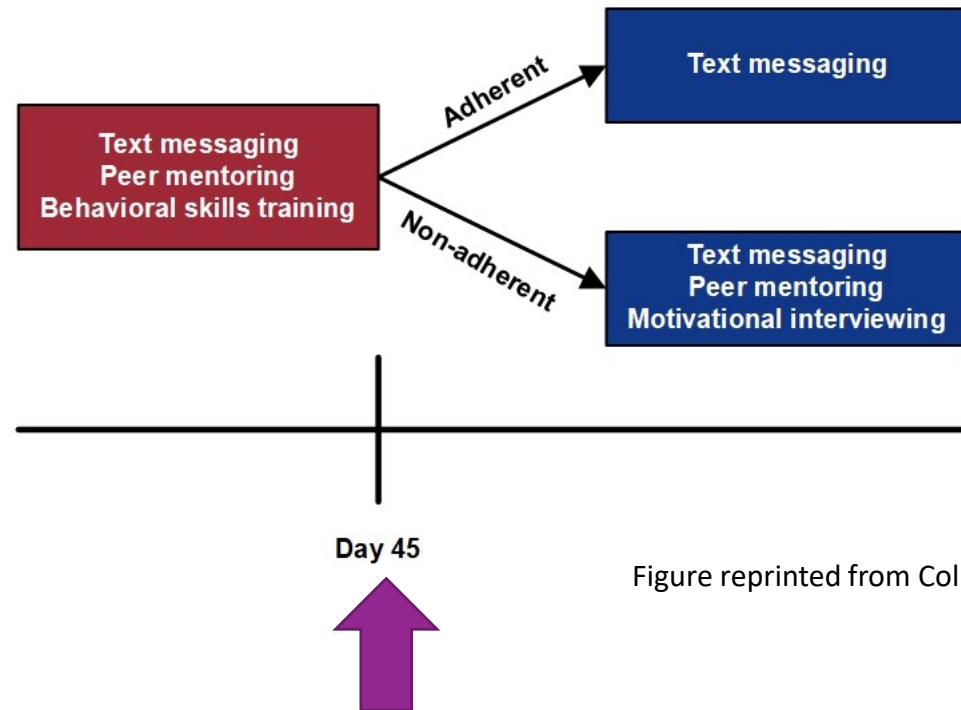


Figure reprinted from Collins (2018)



# An adaptive intervention to encourage adherence to HIV treatment

## *Pre-specified decision rules*

**Starting with Day 45:**

**Adherent participants** continue to be provided with text messaging.

**Non-adherent participants** continue to be provided with text messaging and peer mentoring, and in addition begin to be offered motivational interviewing.

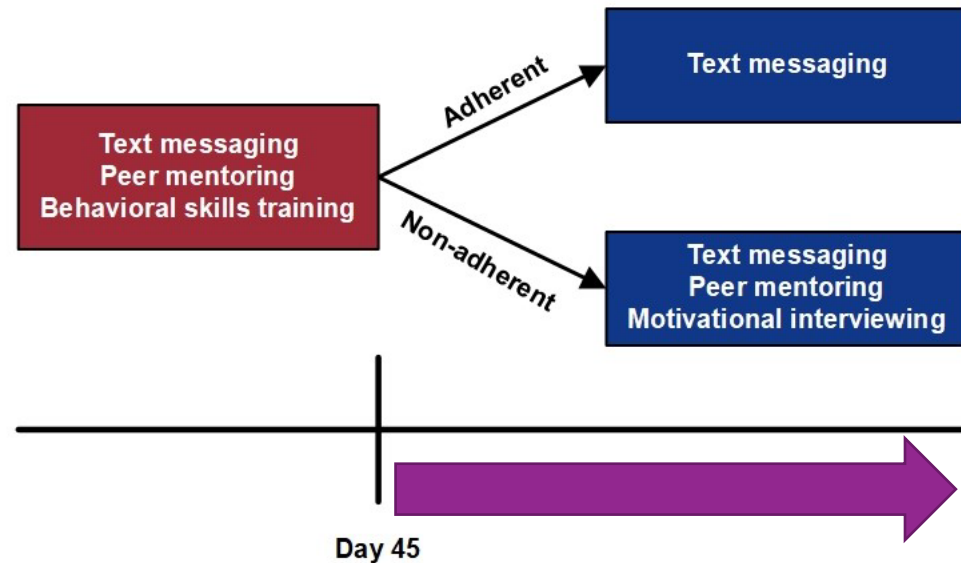


Figure reprinted from Collins (2018)

# **Adaptive intervention designs vary in intensity of adaptation**

- Intensity of adaptation: The degree to which an adaptive intervention has many decision points and/or short review intervals

# **Adaptive intervention designs vary in intensity of adaptation**

- Our example has very low intensity of adaptation
  - Only one decision point
- Example of higher intensity of adaptation:
  - Weekly decision point

# **Adaptive intervention designs vary in intensity of adaptation**

- This is DIFFERENT FROM intensity of dosage
- An intervention can employ a high intensity of adaptation to deliver a low dose or light touch intervention
- Interventions delivered via devices (e.g. smartphones) often have high intensity of adaptation, and a light-touch treatment
  - There may be several decision points/day

# In this lesson you learned how to:

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



# In the next lesson you will learn how to:

- Recognize that optimization of different types of interventions may require different types of optimization trials



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# References Cited

- Almirall, D., Nahum-Shani, I., Wang, L., & Kasari, C. (2018). Experimental designs for research on adaptive interventions: Singly and sequentially randomized trials. In *Optimization of behavioral, biobehavioral, and biomedical interventions: Advanced topics*. New York: Springer.
- Collins, L. M. (2018). *Optimization of behavioral, biobehavioral, and biomedical interventions: The multiphase optimization strategy (MOST)*. New York: Springer.

