The Micro-Randomized Trial for Developing Mobile Health Interventions

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Mobile Health (mHealth) technologies provide opportunities to capture aspects of behavior in everyday contexts, and extend the ability to provide interventions anytime and anywhere. The micro-randomized trial (MRT) provides data that can be used to collect evidence concerning when and in which contexts mHealth intervention components are most effective, and whether the effects deteriorate with time or past dosage. We use three completed MRTs to review the elements of an MRT, considerations important to designing an MRT, and discuss future directions.

WHAT IS AN MRT?

• MRTs can be used to decide which intervention components to retain for future study or inclusion in the mobile health intervention package.
• In classical factorial designs participants are randomized to one of the intervention options at baseline, and receive that same intervention option for the duration of the trial.
• An MRT uses sequential randomization in that participants are repeatedly randomized to receive different intervention options hundreds or even thousands of times over the course of the experiment.
• This repeated randomization facilitates the collection of empirical evidence regarding whether time-varying information about an individual’s current context and day of the study moderates the effects of a given component.
• mHealth intervention components that interrupt individuals as they go about their daily routines have substantial time-varying effects. Therefore it is critical to understand whether a particular component is effective, and in which contexts, when constructing an mHealth intervention.

ELEME NTS OF AN MRT

1. Intervention Component
2. Intervention Options
3. Distal Outcome
4. Proximal Outcome
5. Decision Points
6. Availability

HEARTSTEPS

LE G N D

1. Does
2. Push reminder notification
3. No availability
4. MRT component
5.טוב availability
6. Randomization

HEARTSTEPS - A mHealth System to Promote Physical Activity

HEARTSTEPS is a mobile health system that was developed to collect data about the correlates of substance use and other health-related behaviors. HeartSteps was developed to collect data about the correlates of substance use and other health-related behaviors. HeartSteps was developed to collect data about the correlates of substance use and other health-related behaviors.

INTERVENTION COMPONENTS

1. Contiguously related activity suggestion
2. Daily activity planning
3. Push notification
4. Survey reinforcement
5. Points

INTERVENTION OPTIONS

1. Structured planning
2. Unstructured planning
3. No planning
4. Post survey reinforcement
5. Survey

DISTAL OUTCOME

1. Telerehabilitation
2. No telerehabilitation

PROXIMAL OUTCOME

1. Survey participation
2. No survey participation

DECISION POINTS

1. Randomization
2. Availability

AVAILABILITY

1. Always available
2. Availability

Randomization

1. Randomized with a 0.5 probability to receive structured planning, 0.5 probability to receive unstructured planning, and 0.5 probability to receive no planning.

Randomization

1. Randomly assigned to one of the intervention options at the first decision point.

Survey reinforcement

1. Participants were assigned to receive survey reinforcement, or no survey reinforcement.

Points

1. Participants were assigned to receive points for completing an activity, or no points.

MRT component

1. Component the participant is assigned to as part of the MRT.

Component

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Availabilty

1. Always available
2. Availability

Randomization

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Survey reinforcement

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Points

1. Participants were assigned to receive points for completing an activity, or no points.

Components

1. Component the participant is assigned to as part of the MRT.

Component

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Availability

1. Always available
2. Availability

Randomization

1. Randomized with a 0.5 probability to receive structured planning, 0.5 probability to receive unstructured planning, and 0.5 probability to receive no planning.

Survey reinforcement

1. Participants were assigned to receive survey reinforcement, or no survey reinforcement.

Points

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