J-PAL
ABDUL LATIF JAMEEL POVERTY ACTION LAB

Promoting Economic Inclusion and Resilience in Niger

Randomization Design

Photo: Andrea Borgarello (courtesy of Catherine Thomas on Twitter)

This case study is based on: Bossuroy, Thomas, Markus Goldstein, Bassirou Karimou, Dean Karlan, Harounan Kazianga, William Parienté, Patrick Premand, Catherine C. Thomas, Christopher Udry, Julia Vaillant, and Kelsey A. Wright. 2022. "Tackling psychosocial and capital constraints to alleviate poverty." *Nature* 605, 291–297. https://doi.org/10.1038/s41586-022-04647-8

J-PAL thanks the authors for allowing us to use their paper as a teaching tool.

Key Vocabulary	
Unit of randomization	The level of observation (e.g., individual, household, school, village) at which treatment and comparison groups are randomly assigned.
Random sampling	Selecting units from a population of interest in a randomized manner to create a sample that is representative of the population.
Random assignment	Taking a pool of eligible units—persons, schools, villages, firms—and allocating those units to treatment and comparison groups by means of a random process such as a toss of a coin, a random number generator, or a lottery.
Treatment assignment	A unit or individual's treatment assignment is the group they were randomly assigned to: the treatment group or the comparison group. Note that whether a unit/individual actually receives the treatment will depend on compliance with their treatment assignment.
Balance	Randomization creates two groups that on average are very similar across both observable and unobservable characteristics. Even when randomization is done correctly, average values of some characteristics may differ across the two groups due to random chance. We say the comparison and treatment groups are balanced if they have similar average values for important baseline characteristics.
Stratification	Dividing units in your sample into different subgroups based on specific characteristics (e.g., gender, urban/rural) and then randomizing within those groups to ensure balance on these characteristics.
Factorial design	An evaluation design that tests different treatments in different combinations to determine how they work separately vs. in combination (also known as a cross-cutting design). *E.g., An agricultural evaluation might include four treatment arms, where one group receives price subsidies for a new seed variety, one group receives training on the new seed variety, one group receives both the price subsidy and training in combination, and one group serves as the comparison group.*
Temporal effects	The effect of time on a program's impact. Some treatment effects may strengthen, wane, or stay the same over a period of time, and this may differ between treatment groups.
Cost-effectiveness	The ratio of the aggregate impact of the program on a particular outcome to the aggregate cost of implementing the program (e.g., additional years of education per $100 spent).

Learning Objectives

This case study explores how to determine an appropriate randomization strategy to answer multiple research questions and how to design an experiment to measure the persistence of effects across time.

Subjects Covered

Evaluation design, randomization design, level of randomization, balance, multiple treatments, temporal effects

Background on Productive Inclusion Programs

Low-income households face a range of challenges that limit their ability to cope with and build resilience against unpredictable shocks such as drought or illnesses. Social safety net programs provide support services (e.g., consumption support to help purchase food and other household needs) to the poorest and most vulnerable households. Productive inclusion programs build on social safety nets to combine this support with training and other components to increase household earnings while also helping households withstand and recover from shocks.

As a growing number of countries seek to implement packages of productive inclusion measures for safety net beneficiaries, little is known about the impact of these multifaceted interventions when implemented at scale. There is also little evidence about the optimal combination of productive measures to effectively lift households out of poverty. This case study will draw on an evaluation of a multifaceted productive inclusion program in Niger to illustrate the concept of randomization design.[1]

Study Context

Households in the Sahel region of West Africa are among the most vulnerable in Sub-Saharan Africa to external shocks, with extreme poverty rates higher than forty percent in Niger in 2021.[2] The Sahel region of West Africa is particularly exposed to increasing climate shocks, making it difficult for low-income households to escape poverty.[3] In response to climate shocks and food insecurity, the Government of Niger established a national unconditional cash transfer (UCT) program targeting rural households in areas with the highest poverty rates. The program provided

[1] The evaluation in Niger is part of a four country study being conducted in Burkina Faso, Mauritania, Niger, and Senegal in partnership with national governments and the World Bank.
[2] See World Bank (2021).
[3] For more on the climate risks faced in the Sahel region, see Climatelinks (2017).

monthly payments of 10,000 West African CFA Francs (XOF) to eligible households in select villages.[4]

The Productive Inclusion Randomized Evaluation in Niger

The government and research team were interested in understanding the effectiveness of layering different program components on top of the existing UCT program in Niger to lift households out of poverty. They were particularly interested in the effects of capital and psychosocial support on household consumption and food security when delivered with other productive inclusion program components.[5] The researchers were also interested in assessing variation in the effects of these components over time and how that informs cost-effectiveness.

Productive inclusion program components such as coaching and savings groups can support the development of basic financial skills and address constraints to income-generating activities. While additional capital support in the form of a one time lump-sum cash grant could target barriers to productive investments, psychosocial interventions such as life-skills training and community workshops could encourage economic aspirations, build interpersonal skills, and address restrictive social norms.

Villages with households receiving the national UCT program were stratified by geographic area and randomly assigned to treatment and control groups. All eligible households across treatment and control villages received the UCT program.[6] Eligible households in treatment group villages were randomly assigned to receive a combination of the interventions below.

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[4] The cash transfer represented about 16 US Dollars (USD) at the time of the study, or roughly 11 percent of annual household consumption for targeted rural households.
[5] In addition to household consumption and food security, the researchers were also interested in outcomes related to household and beneficiary revenues, mental health, self-efficacy, social and community cohesion, and women's empowerment.
[6] The Nigerien government's unconditional cash transfer program was rolled out in three phases from 2012 to 2019, reaching around 100,000 beneficiary households. This study built upon the third phase of the program which was implemented from 2016 to 2019.

Intervention	Components
All treatment groups receive the productive inclusion core program	
Productive inclusion core program	• Group coaching to provide mentorship and advice on income-generating activities • Formation of savings groups to allow participants to pool savings and access additional funds • Microentrepreneurship training to cover basic business skills • Access to markets through the provision of information on where to buy and sell certain goods
Some treatment groups also receive capital support and/or psychosocial support	
Capital support	• One-time lump-sum cash grant of 80,000 XOF
Psychosocial support	• Community-level sensitization workshops on aspirations and social norms • Life-skills training to promote socio-emotional skills

Although some components (such as community sensitization through the psychosocial support intervention) were delivered at the village level, the researchers measured outcomes at the household level by randomly selecting a sample of about 15 households per village for data collection (4,712 households in total).[7] The experiment was designed to include two follow up surveys at six and 18 months after the interventions to study temporal effects.

[7] Although all eligible households in a village assigned to a treatment arm received that treatment, the researchers only selected a subsample of households for data collection.

Addressing Multiple Research Questions through Experimental Design

Discussion Topic 1: Selecting the Sample and Unit of Randomization

1. The researchers randomized at the village level. Explain why this would be an appropriate unit of randomization, and consider whether there are any reasons why you might want to randomize at a different level.

2. Why do you think that the researchers chose to stratify villages by geographic area?

3. The researchers measured outcomes at the household level. Why do you think the researchers chose to collect data only for a randomly selected subset of eligible households in each treatment and comparison village?

Discussion Topic 2: Randomization Design

To understand the impacts of the different treatment interventions, we want to randomize in a way that creates treatment and comparison groups where the only systematic difference between groups is the intervention of interest. In this discussion topic, we start by considering separate research designs and randomization strategies to answer specific research questions.

For each research question below—some similar to those asked in the actual study and some different—consider what treatment and comparison groups we could use to answer the research question.[8] Assume that the study sample is identical to that in the research study: all eligible households in villages receiving the government's UCT program.

1. Is a lump-sum cash grant or psychosocial support more effective at increasing household consumption and food security for productive inclusion program recipients?

Treatment Group(s):	**Comparison Group:**

2. What is the added value of providing a lump-sum cash grant as a component of a multifaceted productive inclusion program to increase household consumption and food security?

Treatment Group(s):	**Comparison Group:**

[8] Note that the research questions in this section might differ from the research questions in the original study. The exercise is thus not to identify the study design of the original study, but to consider relevant study designs for different possible research questions.

Discussion Topic 3: Factorial Design

The study in Niger answered several research questions simultaneously using a single randomized evaluation that tested multiple interventions in different combinations.

1. What study design could do this? Draw a diagram to illustrate the randomization design and which groups you would compare to answer each research question below:

    - Research Question 1: Is a lump-sum cash grant or psychosocial support more effective at increasing household consumption and food security for productive inclusion program recipients?
    - Research Question 2: What is the added value of providing a lump-sum grant as a component of a multifaceted productive inclusion program to increase household consumption and food security?
    - Research Question 3: What is the added value of providing psychosocial support as a component of a multifaceted productive inclusion program to increase household consumption and food security?

Discussion Topic 4: Balance Between Groups

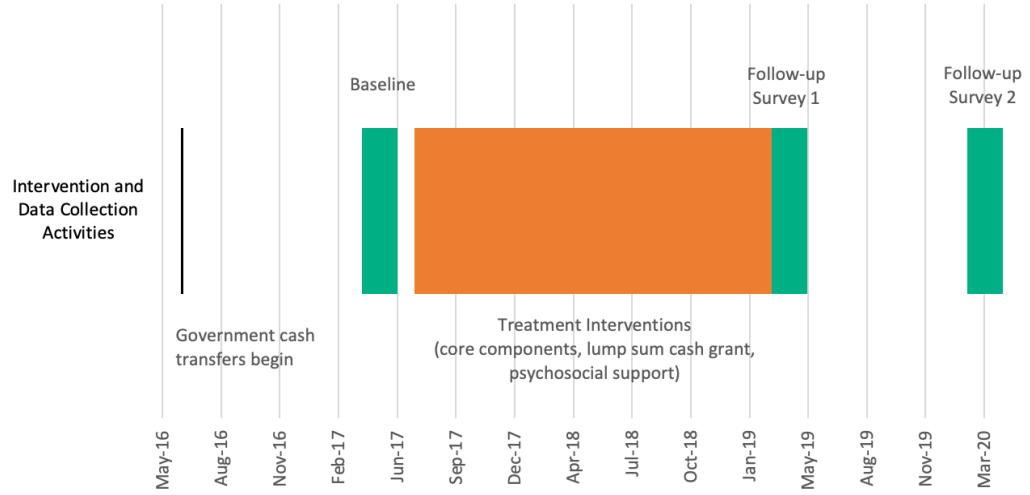
Randomization creates groups that are, on average, "balanced," meaning they are very similar in terms of their characteristics, such as average age, gender composition, and education levels. However, even when randomization is done correctly, meaningful differences can occur by chance. These differences can bias your results if not accounted for in your analysis. Moreover, as the experiment unfolds, external influences can cause groups to become unbalanced by the end of the program–people may migrate or we may find it harder to track and survey respondents in one of the treatment or comparison groups. These and other events can potentially reintroduce selection bias, diminishing the validity of the impact estimates.

1. How can you check if households assigned to each of the treatment and comparison groups are balanced at the start of a program?

2. (Optional - time allowing) When would it be important to conduct a baseline balance test? What are the tradeoffs to doing so?

Discussion Topic 5: Temporal Effects

Figure: Timeline of Intervention and Data Collection Activities

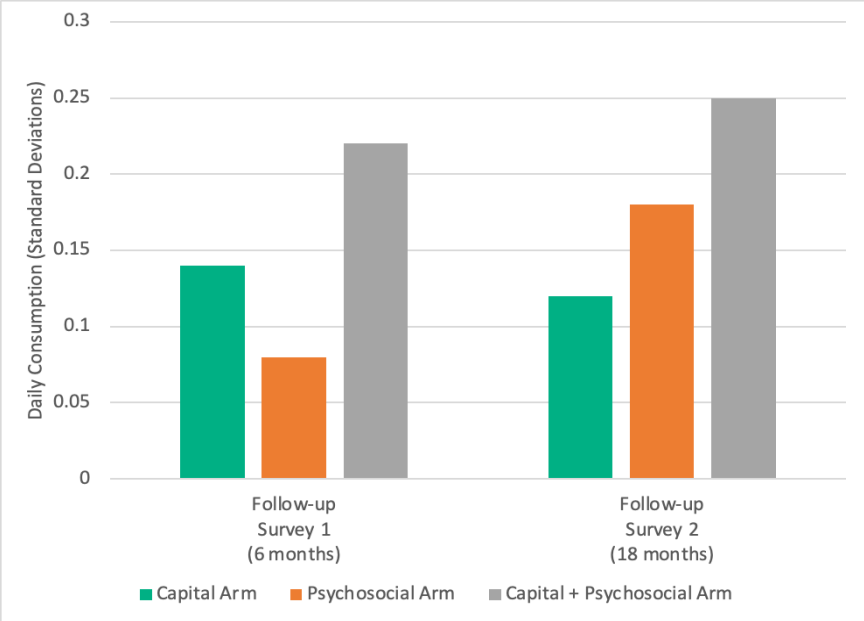


Note: Follow-up survey 1 was conducted at a median of six months post-intervention; follow-up survey 2 was conducted at a median of 18 months post-intervention.

Treatment effects can fade, strengthen, or persist over time and may differ by treatment group. One way to measure these temporal effects is to collect data on study participants at intervals over longer periods. This can allow researchers to compare the short- and long-term effects of an intervention within and between treatment groups.

The figure below shows how interventions may differ in their impact on a specific outcome over time. In this study, researchers were interested in understanding the impacts of capital support compared with psychosocial support on household consumption and food security over time and designed the study to measure these temporal effects. The original study had four study groups, one arm that received capital support plus core productive inclusion components, one that received psychosocial support plus core productive inclusion components, one that received both capital and psychosocial support plus core productive inclusion components, and a control group.

FIGURE: CONSUMPTION BY TREATMENT ARM OVER TIME RELATIVE TO THE COMPARISON GROUP



Note: Daily consumption per adult for each arm is measured in terms of standard deviations from the comparison group.

1. Why do you think it would be beneficial to understand whether treatment effects vary over time?

2. Why might we expect outcomes to differ temporally between treatment arms?

Applications to Other Contexts

While we focus on a specific example from Niger in this case study, both the evaluation design and its findings have relevance to broader contexts. The Niger study was itself part of a larger four country experiment aimed at evaluating complementary interventions to traditional cash transfer programs (J-PAL 2021). While results from the other three countries' studies are forthcoming, there is a growing body of evidence that supports combining interventions to tackle extreme poverty.

Multipronged interventions, such as the integrated resilience program pioneered by the NGO BRAC in 2002, have been proven to increase income and consumption in ultra-poor households across a number of study contexts including Ethiopia, Ghana, Honduras, India, Pakistan, and Peru (Banerjee et al. 2015). This approach combines consumption support with productive asset transfers, coaching, and financial training to lift and keep households out of extreme poverty. The effects of these interventions when combined with social safety net programs also seem to be more persistent in the long-run compared to less multifaceted approaches. A meta-analysis looking at long-term impacts (10 years or more) of various interventions observed that the effects of integrated programming tended to persist over time as compared to programs that focused mainly on relaxing liquidity constraints (Bougen et al. 2019).

This study also addresses the importance of and need for psychosocial support for those experiencing poverty. Mental health can directly affect economic decision-making by taxing mental bandwidth and distorting beliefs about one's abilities. Advances in research on the mechanisms linking mental health and poverty can inform the development of poverty alleviation interventions to include psychosocial components (Ridley et al. 2020).

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> J-PAL. 2023. "Case Study: Promoting Economic Inclusion and Resilience in Niger: How to Randomize." Abdul Latif Jameel Poverty Action Lab. Cambridge, MA.

To reference the original study by Bossuroy et al., please cite as:

> Bossuroy, Thomas, Markus Goldstein, Bassirou Karimou, Dean Karlan, Harounan Kazianga, William Parienté, Patrick Premand, Catherine C. Thomas, Christopher Udry, Julia Vaillant and Kelsey A. Wright. 2022. "Tackling psychosocial and capital constraints to alleviate poverty." *Nature* 605 (April): 291–297.