



key lessons

- Exploratory charts are for your eyes only
- Words help but aren't always enough
- Design explanatory visuals for your audience

design for insight or action

alex

There are many purposes for data visualization, but in business, the most common are discovering insights and communicating those findings to drive action. These represent two high-level categories of analysis: exploratory and explanatory.

Exploratory analysis is the process of understanding your data. This may involve merging datasets, cleaning and organizing the information, experimenting with different views, or applying statistical methods to uncover patterns and insights. The visuals created at this stage tend to be complex, unpolished, and designed for the analyst—not the audience.

At *storytelling with data*, we specialize in **explanatory analysis**, which becomes important when you're ready to share your findings. Here, the focus shifts from exploring to clearly communicating insights in a way that engages your audience. This involves planning a compelling narrative, refining your presentation, and designing clean, effective visuals that make your message easy to grasp.

Too often, people blur the lines between these two approaches, attempting to communicate with exploratory visuals. The result? Confusion, frustration, and missed opportunities. To illustrate, let's look at an example.

Mindful Eats is a health and wellness company with a mobile app designed to encourage users to make healthier choices. The app includes quizzes, videos, community spaces, and tracking logs, with logs being the most popular feature. Users record their daily food intake to increase awareness of their consumption. For the app to be effective, account holders must track their meals regularly. Therefore, Mindful Eats wants to prevent users from skipping a day of tracking (internally referred to as “skip days”). A controlled study tested whether mobile notifications would effectively remind users who skip to restart their daily tracking. The results of the study will be shared with leadership to inform the features of the next release.

Let's begin with the exploratory part of the process.

Exploratory charts are for your eyes only

When I'm exploring data, I don't care how my graphs look—I rely on my tool's default settings because the goal is to quickly uncover patterns, trends, and insights. At this stage, the objective is to understand the story, not to perfect the presentation.

Figure 1.1 shows an example exploratory graph from the Mindful Eats skip day study. It is a **survival curve**, which visualizes the probability that a group will not experience an event over a given period of time. In this case, each line illustrates the likelihood that individuals in the given group will continue daily tracking for a specific number of days without skipping. The two treatment groups received a mobile reminder to track their intake, while the Control group did not.

Notice how raw this survival curve looks. There is plenty of visual noise from the gray background, black borders, white gridlines, multi-colored error bars, and legend. The graph title isn't particularly helpful, either. The axis titles and labels are small and confusing. Speaking of unclear labels, without background information on the study, it's impossible to know what Treatments 1 and 2 represent.

None of these challenges are concerning. The only person who needs to understand Figure 1.1 is the analyst, so I wouldn't recommend spending time

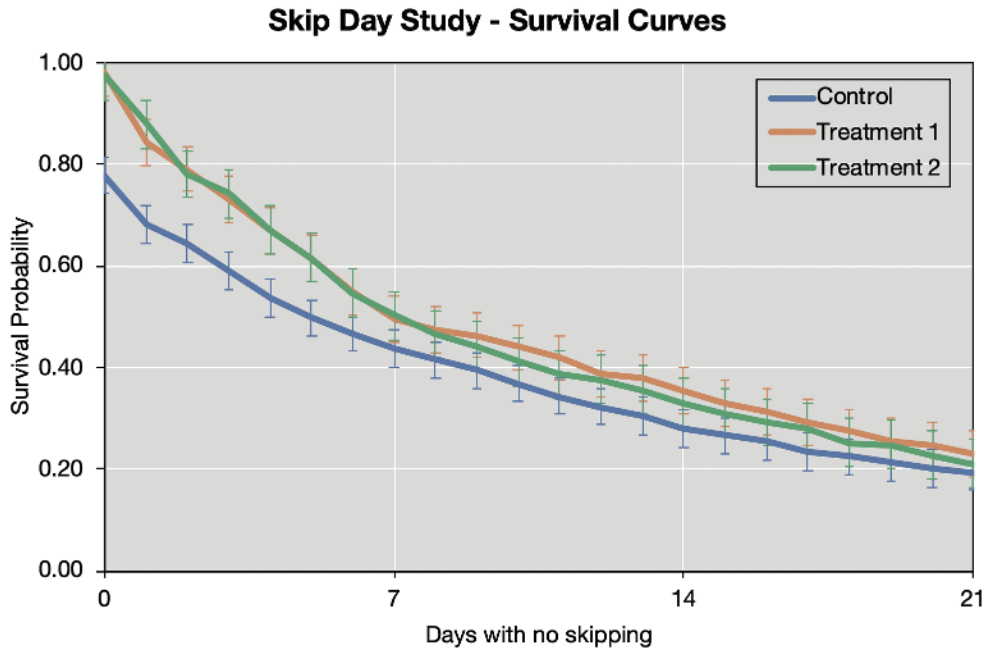


FIGURE 1.1 Original exploratory survival curve

refining the visual. In this scenario, let's assume I am the one responsible for interpreting the survival curve.

In the first few days of the experiment, I identified some valuable takeaways. Skip days were lower for the treatment groups (orange and green) compared to the Control (blue), suggesting that the text alerts initially helped reduce skipping. This is evident (to me) because the blue line is markedly below the orange and green lines, indicating that fewer users in the Control group continuously tracked their meals. Over time, though, the three lines converge, showing that there isn't any meaningful difference between the groups. This suggests that while the one-time mobile notification reduced skipping in the short term, it wasn't sufficient to prevent it in the long run. This is an insight worth sharing with leadership. The graph, however, is not—at least not in its current form.

Exploratory graphs are niche, designed to display large datasets and explore relationships between variables. They include graphs commonly used in statistics (survival curves, histograms, correlation plots, and boxplots) as well as multi-dimensional visualizations like bubble charts and matrices.

On the topic of boxplots, Figure 1.2 shows another graph from the exploratory analysis. This one plots the average change in Skip Score for each group in the study. Skip Score is a weighted metric that indicates how likely a user is to skip daily tracking. The higher the score, the more probable it is that a user will skip, and vice versa. If the notifications were effective in reducing skipping, I would expect the treatment boxes to be centered around a negative number, signaling a reduction in skips. Before you view Figure 1.2, keep in mind that it may look chaotic—boxplots aren’t exactly intuitive!

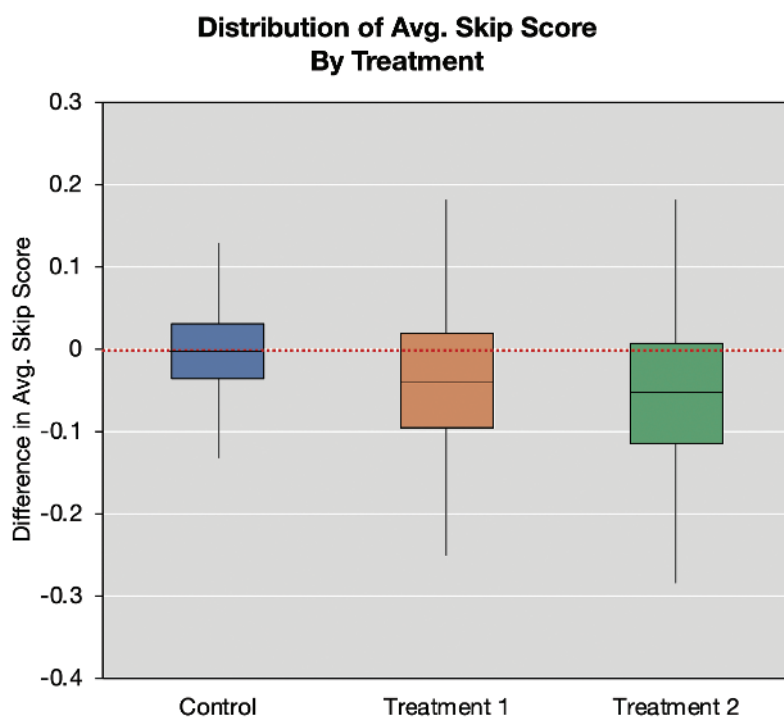


FIGURE 1.2 Original exploratory box plot

These two visuals are just a sample of the exploratory outputs. Assume I’ve thoroughly analyzed my data and identified the important insights. Now, I’m ready to convey my findings to others.

First, let’s touch on a common issue. There’s an understandable desire to share *all* the data and graphs you create with your audience. These charts help you

make sense of the data, so it's logical to think others might appreciate them, too. Plus, analyzing them took a lot of time and effort—sometimes you want to show off that hard work! However, challenges arise when we try to communicate with exploratory materials.

Words help but aren't always enough

Let's start by combining the exploratory graphs into a single slide and adding the takeaways identified during the exploratory analysis (Figure 1.3).

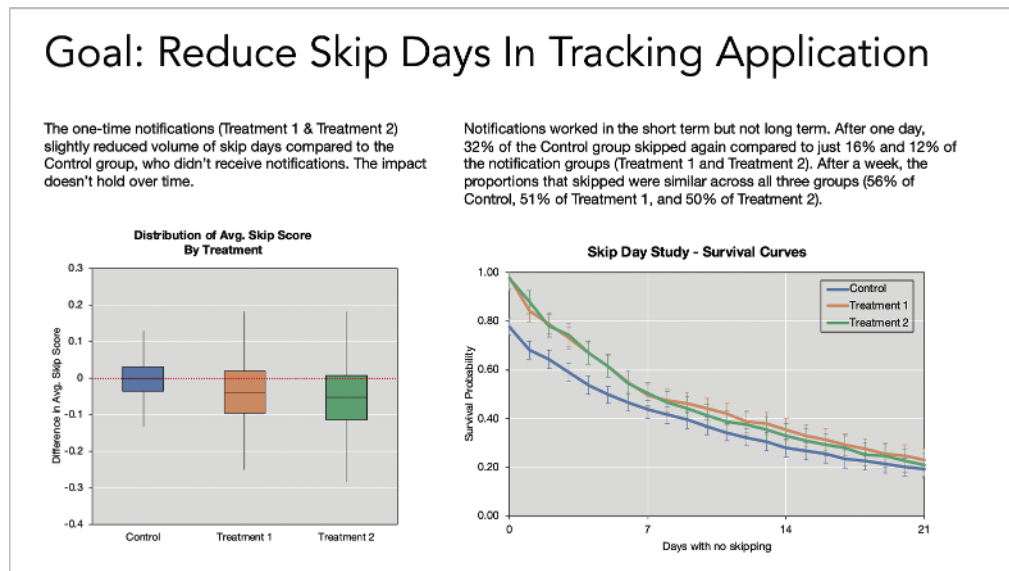


FIGURE 1.3 Communicating the exploratory analysis

Imagine you receive a slide like this. How would you feel? It takes a lot of mental effort to decipher. Depending on the day, I could see myself ignoring this slide in favor of an easier task.

When we communicate without considering our audience, we risk losing their attention. If they don't understand what we're saying, they may tune us out or request more data, hoping that something will finally make sense. This is the start of the death by data trap—where excess information slows decision mak-

ing and erodes trust in the numbers. It all stems from failing to consider who you are presenting to and sharing graphs that haven't been refined with them in mind.

Instead, do your best to recognize that exploratory materials—no matter how simple—don't automatically translate to effective explanatory visuals. If you have to use complex survival curves and boxplots to communicate, use clear descriptions and strategically focused elements to make them accessible.

Let's adjust the slide title, graph titles, and labels to make them more transparent. Adding footnotes that define the treatment groups and explain the Skip Score metric might be helpful, too. I'll format the takeaway text by adding headers; bolding important words; and using blue, green, and orange to visually connect key phrases to the corresponding parts of the visuals. Finally, I'll highlight where to look within each graph using black circles and lines. These changes are reflected in Figure 1.4.

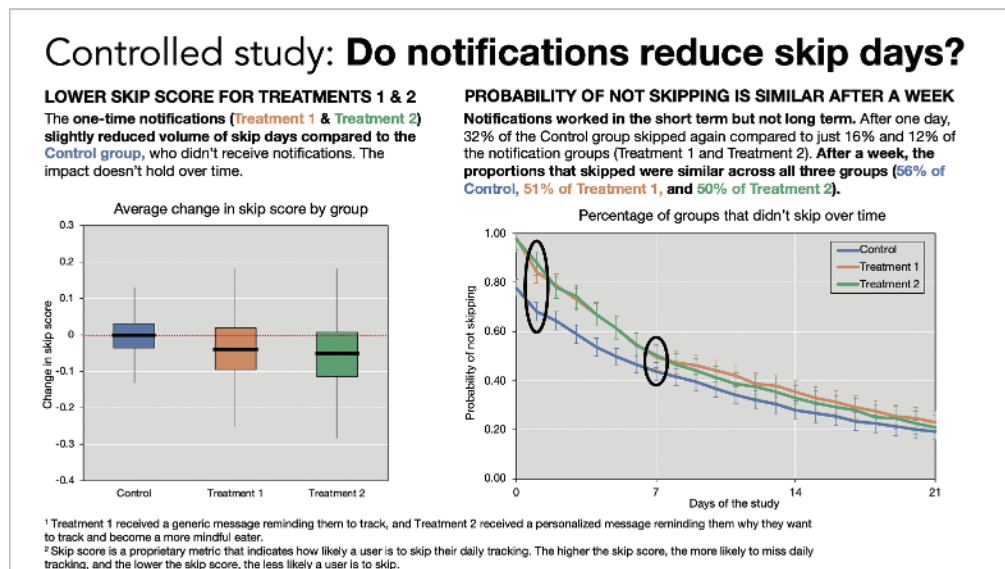


FIGURE 1.4 Use simple language and sparing focus

While this slide is more digestible than the original attempt (Figure 1.3), it's still intimidating. I also question whether an audience like the leadership team would be willing to process such a technical slide.

Let's reframe this visual with the needs of our decision makers in mind. In other words, let's transform this slide into something truly explanatory.

Design explanatory visuals for your audience

In the exploratory stage of the analytical process, being selfish with your creative choices is fine—even advisable. You're the one tasked with finding the insights, after all. What graphs help *you* understand the data? What tests and questions are *you* curious to explore?

When we transition to the explanatory phase and need to create a communication for someone else, everything changes. That's the time to prioritize the needs and wants of those on the receiving end. How does your audience like to be communicated with? Do they favor emails, written reports, or live discussions in meetings? Are they data literate? How much background information do they have about the controlled study? Will they recall the specifics by the time you communicate? Do they need to see all the data you explored or just the big-picture numbers? These are a handful of questions to consider so you can get to know your audience (check out Chapter 8 for more).

In my experience, most executives prefer meetings where they can engage in open discussions. They typically don't want you to monopolize the conversation by walking them through every aspect of your exploratory analysis. These busy leaders want you to get to the point quickly and provide just enough information for them to make a decision.

In addition, many people—even executives—feel uncomfortable interpreting an analysis on the spot, especially in front of their peers. They may hesitate to speak up for fear of being wrong if their understanding differs significantly from others' perceptions.

As the analyst, you can often start the conversation by offering your perspective. While we call it a recommendation, it is really more of a suggestion—something for others to react to. From there, leadership or peers can agree, build upon, redirect, or iterate on that idea. It's a much lower-stakes way for leaders to begin the discussion.

With these considerations in mind, let's create a set of slides we'll use to present our Mindful Eats study results at an upcoming meeting.

First, it will be helpful to remind the executive team of the research design. There were three groups: the Control and the two treatments. It might be beneficial to use more friendly and memorable names. Instead of Treatment 1, let's refer to it as the Awareness Group, which received a generic notice to keep logging their daily intake. We can call Treatment 2 the Goal-Oriented Group, as they received a message reminding them of their motivation to become mindful eaters and prompting them to continue tracking.

I could even incorporate an image of the push notifications for further clarity (Figure 1.5).

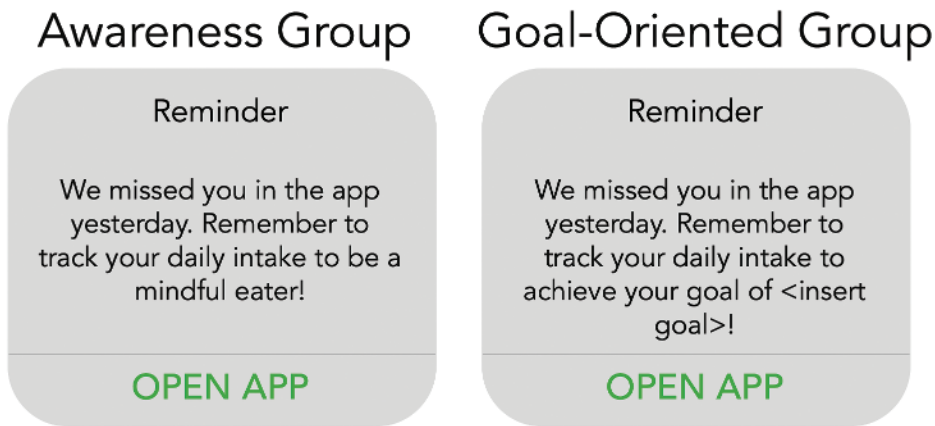


FIGURE 1.5 Example push notifications for each treatment group

I can also reconsider how I present the data. While the boxplots in Figure 1.4 are insightful for an analyst, it's worth questioning whether sharing them is necessary to convey my message. The survival curves alone demonstrate that the notifications have an impact early in the study but not for long. Recall the graph with black circles highlighting Day 1 in the study versus after a week (Figure 1.6).

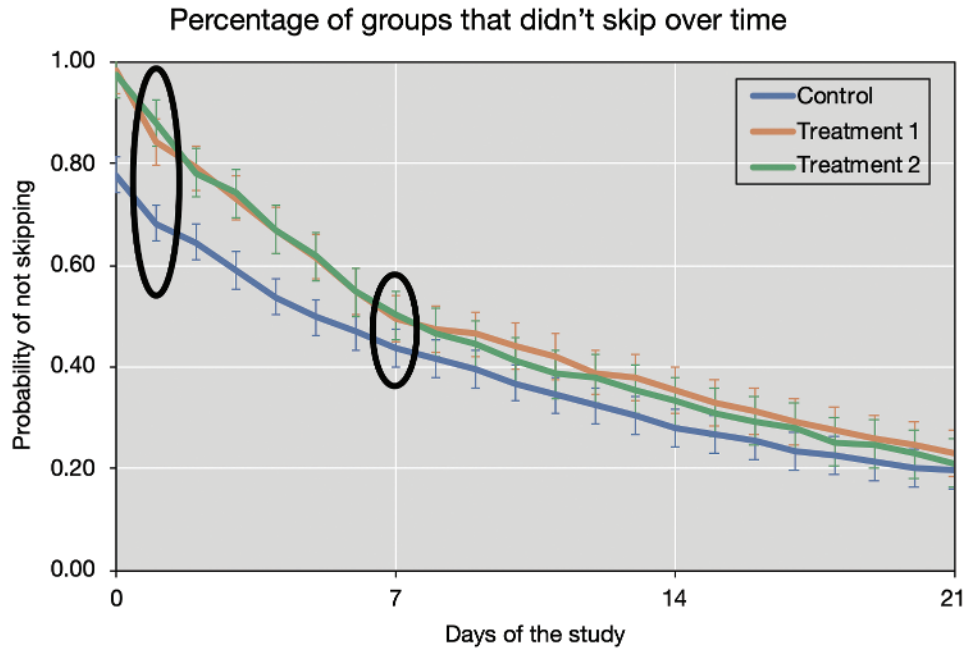


FIGURE 1.6 The proportions of each group that didn't skip on Day 1 and Day 7

If I communicate only a subset of data points (those circled in Figure 1.6), I can experiment with simpler visuals that won't overwhelm my audience. For instance, I could use a set of pie charts with a clear title and category names (Figure 1.7).

Within the first 24 hours...



FIGURE 1.7 Pie charts compare users who skipped tracking in each group

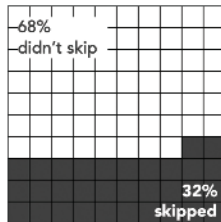
The pies are undoubtedly easier to process compared to the exploratory survival curves. As we've discussed, explanatory analysis focuses on the audience, aiming to make information clearer and more accessible. While Figure 1.7 is an improvement, one executive at Mindful Eats has a known aversion to pie charts. These graphs likely won't be well received.

Let's iterate again and try a cousin of the pie chart: a **square area chart**. Square area charts show part-to-whole relationships like pies but use a grid format instead of a circle. Each square in the grid represents a unit or percentage. With ten rows and ten columns, the entire grid adds up to 100%. My square area charts for the skip day study are shown in Figure 1.8.

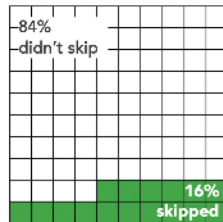
Within the first **24 hours**...

1 Control Group

Out of 100 users in each group...



2 Awareness Group



3 Goal-Oriented Group

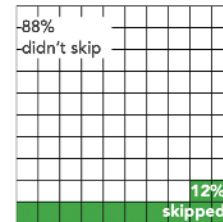


FIGURE 1.8 Let's try a square area graph

Now that I've considered my audience's preferences, narrowed down the information to include, and decided how to display my data, I can finally build the explanatory communication for them.

In a moment, I'll share my final slides. As you review them, notice the differences between the exploratory graphs we discussed earlier and the explanatory ones. These are distinct yet equally important parts of the analytical process, each requiring its own set of skills and outputs. Exploratory analysis involves

preparing data, discovering patterns, and analyzing statistics, whereas explanatory analysis focuses on designing visuals, communicating findings, and presenting them clearly. It's important to recognize and differentiate between the two. To drive action from our exploratory insights, we must explain them with the same attention and care we used to discover them.

I'll conclude by sharing the full presentation, along with speaking notes—your complete guide to seeing the lessons from this chapter put into action.

"The analytical team completed a robust analysis to see if push notifications can reduce the number of days users skip tracking their daily food intake. Before sharing the results, let me provide some background information." (Figure 1.9)

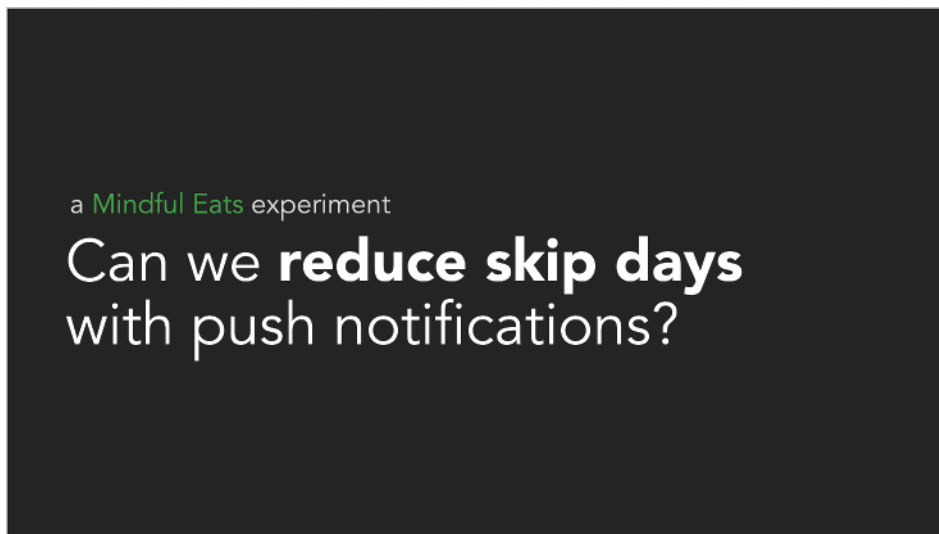


FIGURE 1.9 Introduce the study

"The study took a sample of our users and randomly assigned them to three distinct groups. The first group is our Control group. We monitored their behavior over time, without any intervention. Consider this our baseline for comparison." (Figure 1.10)

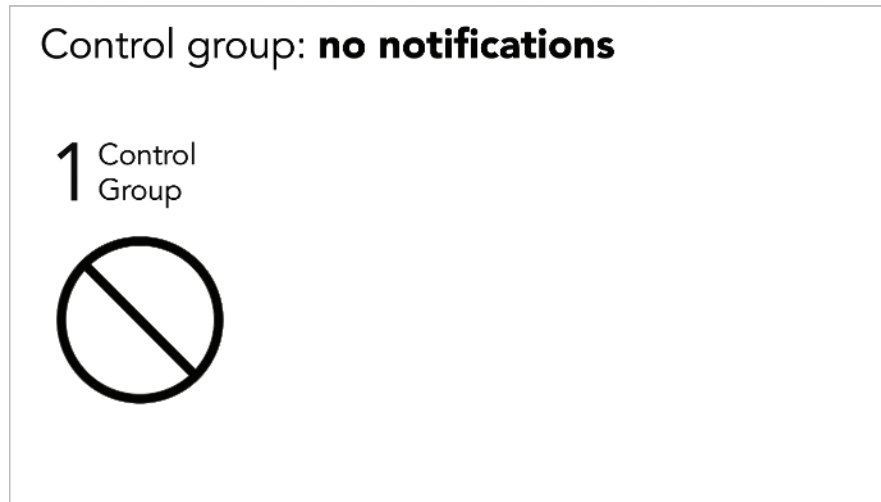


FIGURE 1.10 Describe the Control group

“The second group is our Awareness Group. Users in this group received a push notification that informed them of the skipped day and encouraged them to continue tracking.” (Figure 1.11)

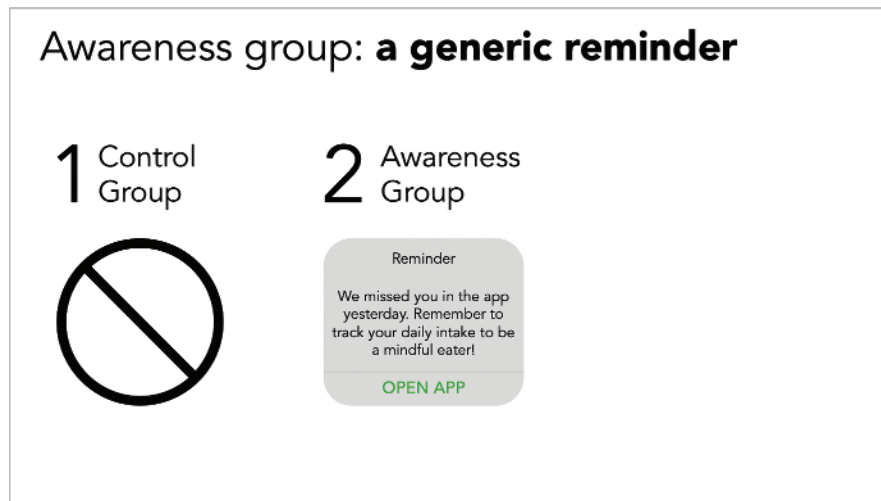


FIGURE 1.11 Describe the Awareness Group

“The third group, which we’ll call Goal-Oriented, received a personalized push notification. When users set up their accounts, they were asked to share their

reasons for wanting to be mindful eaters. We used these personal goals to frame the reminder and encourage continued tracking. Let's see how each group fared over time." (Figure 1.12)

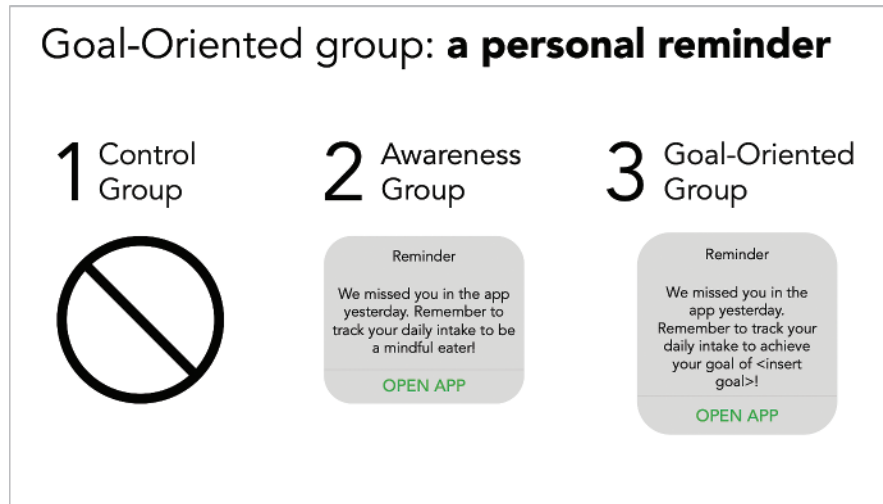


FIGURE 1.12 Describe the Goal-Oriented Group

"One day into the study, the results looked promising. Consider the following grids, which represent 100% of each study group." (Figure 1.13)

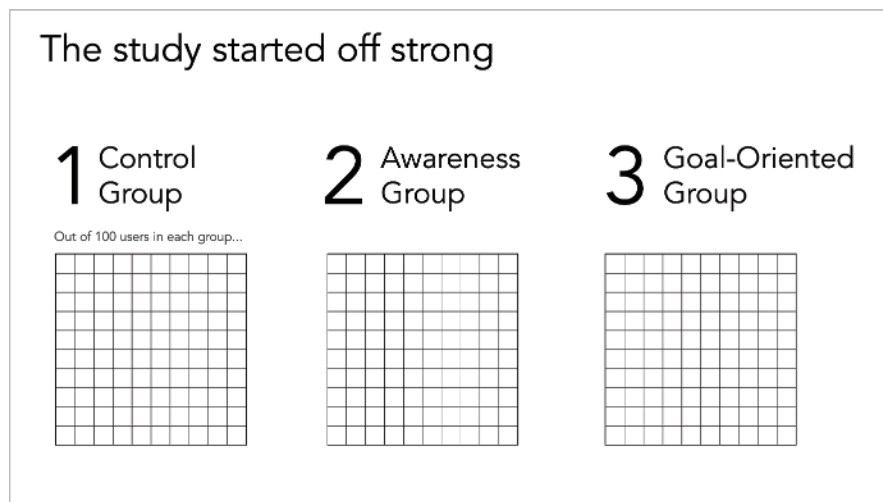


FIGURE 1.13 Set up the square area charts

“Within the first 24 hours, there was a clear difference in skip behavior between the Control group and the two groups that received notifications. It appeared that the notifications were working to prevent additional skip days.” (Figure 1.14)

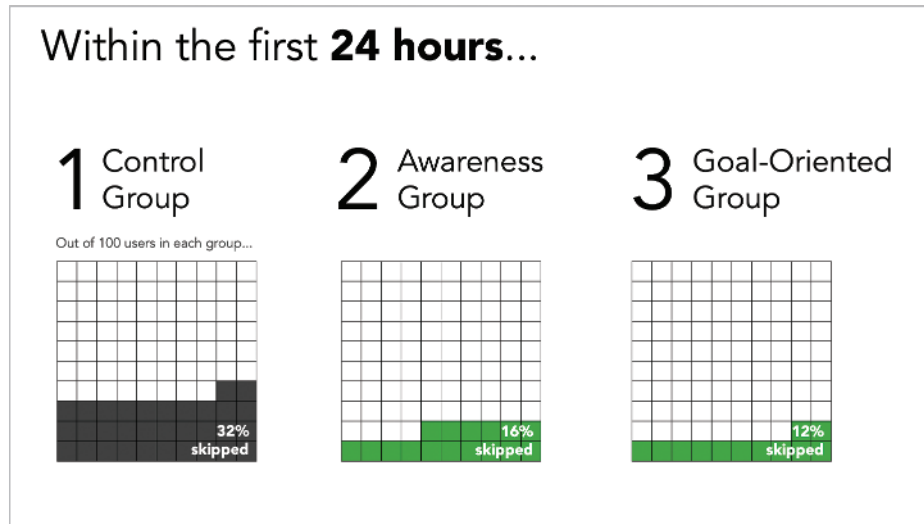


FIGURE 1.14 Layer in the data for the first 24 hours

“Unfortunately, this difference between the three groups was short-lived. After a week of monitoring behavior, all three groups showed similar proportions of users who continued skipping tracking. This suggests that while notifications may be effective in the short term, they aren’t enough to prevent skip days in the long run.” (Figure 1.15)

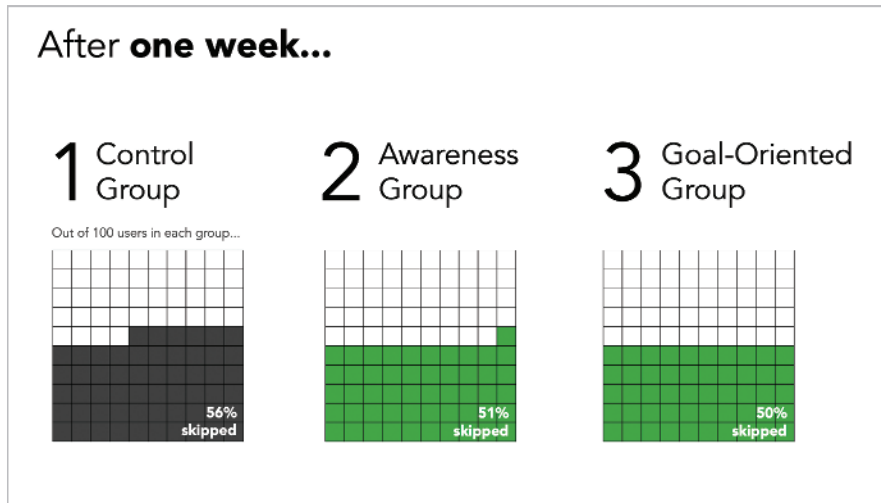


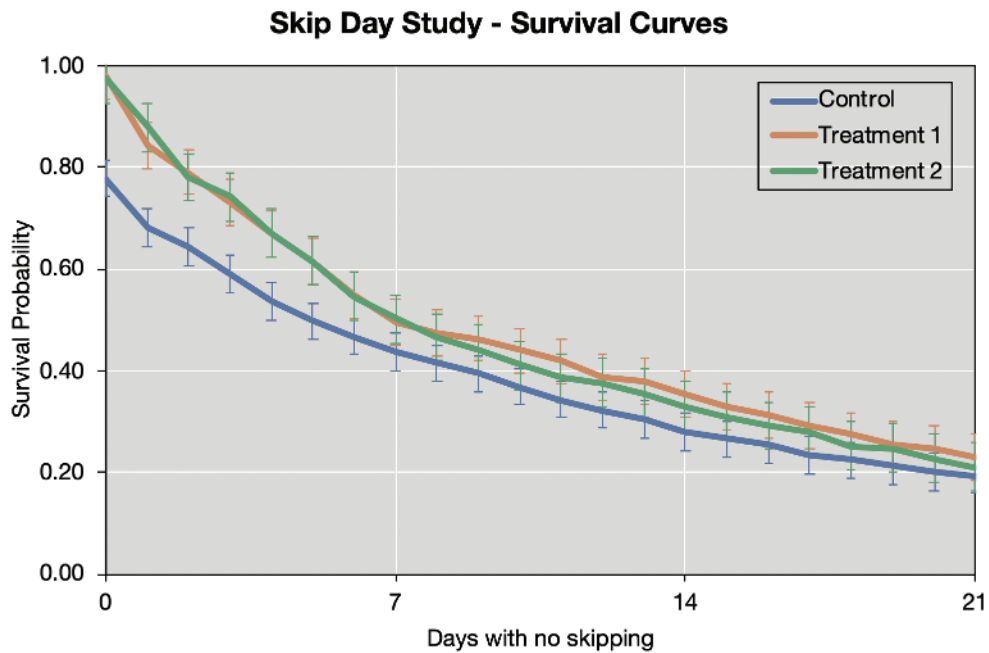
FIGURE 1.15 Layer in the results after one week

“In light of this finding, let’s spend the rest of the time brainstorming ideas to influence skip behavior. Are there other strategies, beyond standard notifications, that we should test? Perhaps instead of simply encouraging users to stop skipping, we could focus on preventing it by integrating tracking into their daily routine. What do you think?” (Figure 1.16)

LET’S DISCUSS...

- 1** Are there **additional inducements** beyond standard notifications?
- 2** How do we make tracking part of **users’ daily routines**?

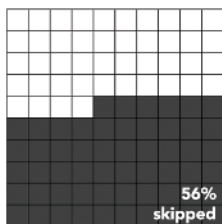
FIGURE 1.16 Frame a discussion on what we should test next



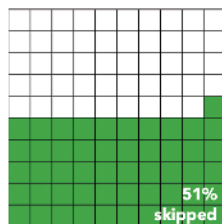
After **one week**...

1 Control Group

Out of 100 users in each group...



2 Awareness Group



3 Goal-Oriented Group

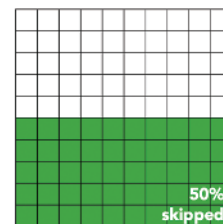


FIGURE 1.17 Before & after: design for insight or action

design for insight or action

- **Exploratory charts are for your eyes only.** Visuals used to explore help you analyze data and uncover insights, but they're often too specialized or unnecessarily complicated to communicate to others.
- **Words help but aren't always enough.** Data alone isn't sufficient—you must add clarifying words to ensure the numbers make sense. In many cases, words make data more accessible, but complex views may require greater attention to the design of your supporting charts.
- **Design explanatory visuals for your audience.** Tailor your communication to your audience's needs. Use familiar visuals that guide interpretation and make insights easy to understand.