USER RETENTION PLAYBOOK

Mastering Customer Retention Strategy

Amplitude

In this playbook

A NOTE ON REAL-LIFE EXAMPLES

Although this playbook draws on real-life examples from companies we work with, we've altered examples to prevent disclosing specific companies and their real data. However, we've tried to preserve the lessons and principles behind the examples as much as possible.
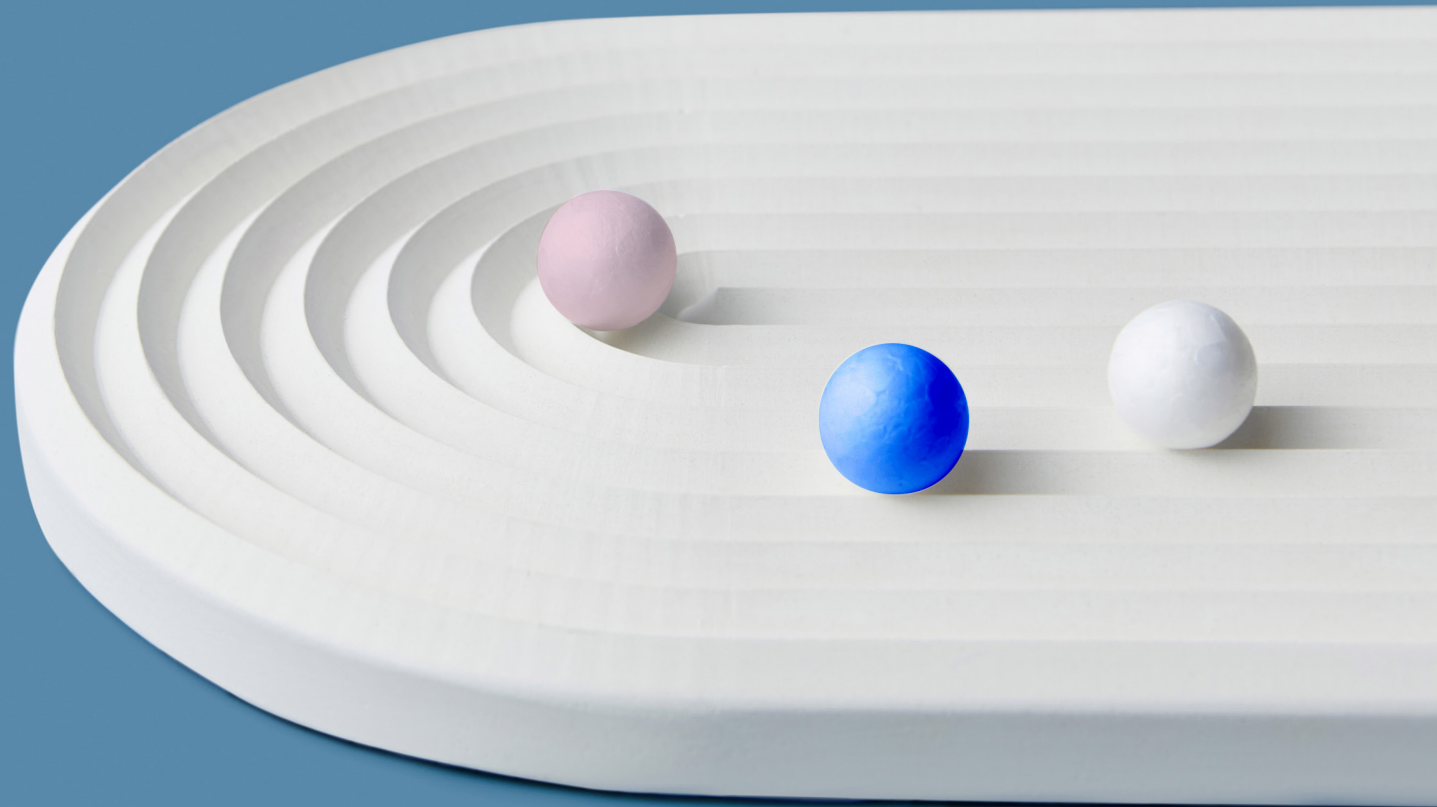
Why should you read this playbook?

## If you care about growth, then you should care about user retention.

Without retention, your user base is like a leaky bucket. Despite a solid [go to market strategy](#) and heavy investments in marketing, advertising, and other means of customer acquisition, you'll still wind up with no long-term users—which means unsustainable growth and an inability to generate revenue.

And although the internet is rife with "growth hacks" for increasing retention—from social media tactics and drip campaigns to targeted ads and push notifications—these are just short-term, unspecific tactics that lead to a temporary uptick in active users. To date, there hasn't been a broadly applicable framework for improving user retention at various stages of the user lifecycle—until now.

With this playbook, you will learn:

- How to gauge your business's real growth.
- The importance of analyzing retention at different stages of a user's lifecycle.
- How to identify user behaviors and actions correlated with retention.
- How to convert newly acquired users into ongoing users.
- How to turn current users into more engaged power users.
- How to reactivate dormant users.

This framework is an adaptable, repeatable strategy that individuals can apply for products at all stages of growth and in all verticals. The team at Amplitude is confident this playbook will quickly become your go-to guide for leveraging user behavior to understand and improve retention.
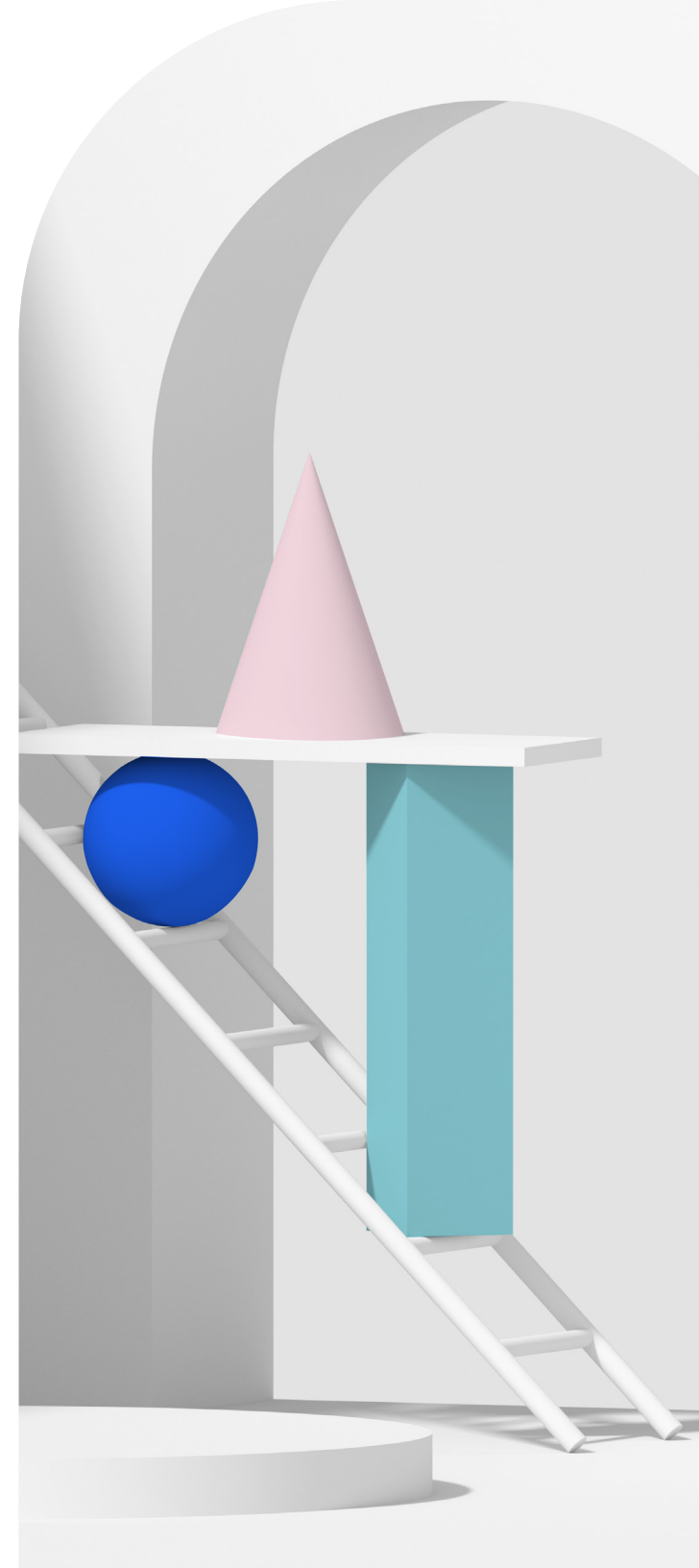
Why you should care about user retention

The internet now [has over 5 billion global users](#) and counting, increasing steadily year over year.[1] Today's consumers use digital products across devices more than ever. And although digital adoption is positive for software companies, it's also increased market competition for acquiring and keeping users.

Although this trend affects all software products and digital services, it significantly impacts the mobile app industry.

And although the average mobile user has over 40 apps installed, they typically only access nine to 10 daily.[3] Many apps are considered "dead on arrival."

FACT
More than [8 million apps now exist](#) on ioS and Android app stores.[2]

So how do you build a mobile app product that can acquire and keep users to sustain real growth? It starts with understanding why retention is so critical to growth.

Acquisition isn't the whole answer

Pour enough dollars into user acquisition, and your app might temporarily land on an App Store top chart. But attracting users is not enough. Our analysis of over 500 million mobile devices has shown that, on average, 80% of new users stop using an app just three days after downloading.[4]

On average, 80% of new users stop using an app just three days after downloading.

This behavior extends beyond mobile. If your product—mobile or otherwise—doesn't bring value to users early and often and turn them into habitual users, your product will struggle.

Filling the top of your funnel doesn't matter if you're leaking users; **the long-term growth of a product and the health of a business depends on how well you retain users.** Your retention demonstrates your product's real value.
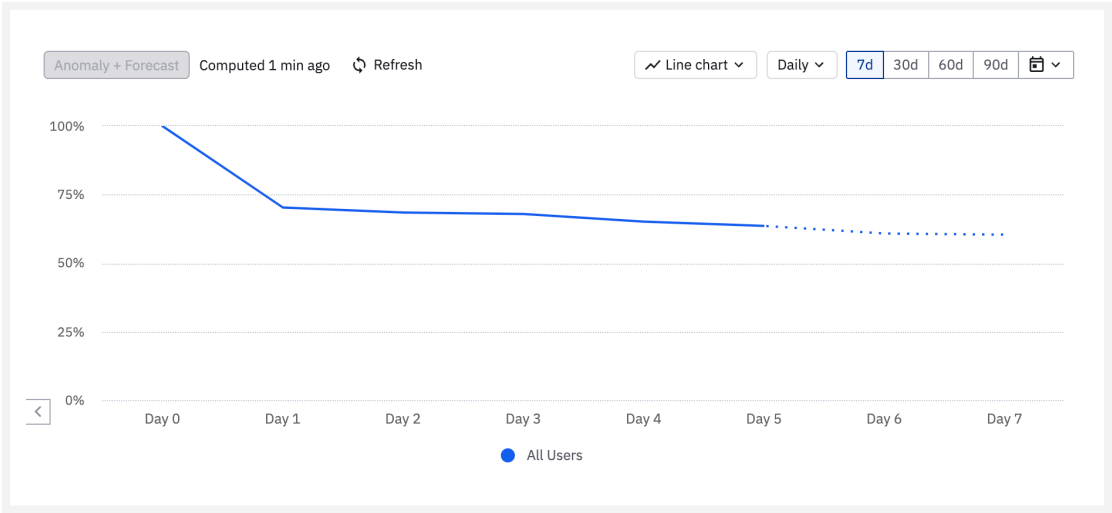
"Return on" retention shows how many users return after a number of days. In this example, users return on day 2 and again on day 5 and 6, but the downward trajectory doesn't level out, indicating an issue with product-market fit.

Shifting focus to user retention

At a high level, retention measures how many users return to your product over time. Even the best products lose most users in just a few days. But if you make retention your primary growth metric, you can change the trajectory of your company from one that stalls or gradually loses users to one that sustains actual growth.

Increasing user retention and minimizing churn is the key to building a base of loyal, engaged users and driving sustainable growth.

A business that retains its users increases its revenue and becomes profitable faster than one that does not. Retention impacts every critical business metric you and your investors care about—active user count, engagement, customer lifetime value, payback period, and more.

When measuring "Return On" Retention, Day 0 typically refers to the first day a new user uses the product. First-day use can include anything from downloading and opening a mobile app to completing a specific action. Following that, retention on Day N is the percentage of users who started on Day 0 and returned and remained active N days later.

A good way of visualizing your retention rate is by plotting a retention curve, as shown below. Let's say this is a retention curve for an app, and we're looking at users who started using this app for the first time.

According to this retention curve, of all of the users who first used the product on Day 0, 13% returned and were active on Day 7. You can also quickly visualize the drop-off from Day 0 to Day 1.

TERMS TO KNOW

Return On
The percentage of users who return on the "Nth" day after first use.

Retention Curve
A line graph depicting the average percentage of active users for each day within a specified timeframe.

> Every improvement you make to retention also improves all of these other things: virality, LTV, payback period, etc. It is literally the foundation to all of growth, and that's really why retention is king.
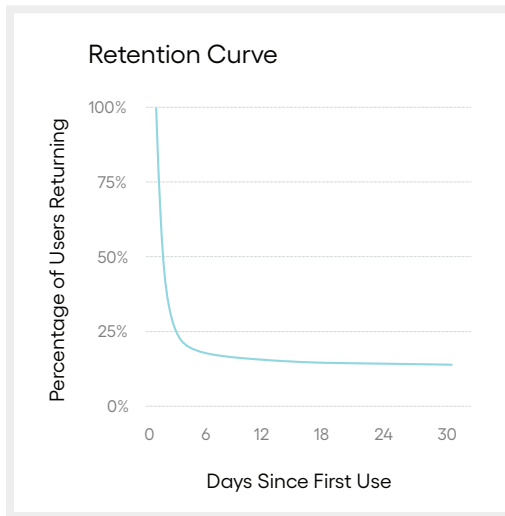
BRIAN BALFOUR
former VP of Growth, HubSpot and Co-founder, Reforge

When should you start thinking about retention?

A common misconception is that retention only matters once your company reaches a

Retention Curve

particular growth stage. Once some users return to your product regularly, you have enough information to optimize retention.

Remember that how you approach your retention may change over time. What doesn't change is the need to continuously improve retention rates to grow and become consistently profitable.

Let's look at how retention analysis can benefit companies at all stages of growth.

Before product-market fit

Retention can indicate if you have a product-market fit problem;[5] if you plot out your retention numbers as a percentage of active users over time, and you have a flat line that reaches zero instead of a curve that stabilizes at a percentage of retained users. This indicates no user base regularly uses this

Retention Curve

Product A has product/market fit

Product A does not have product/market fit
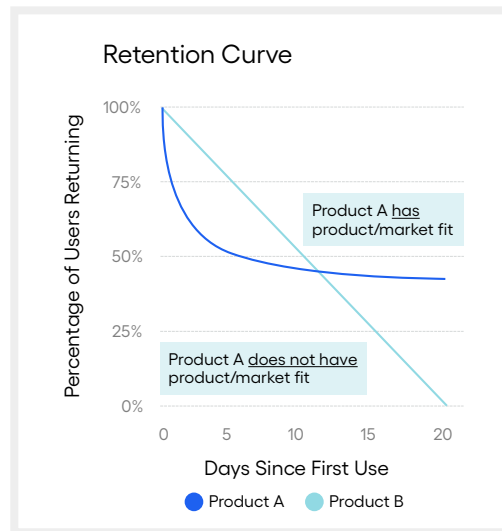
product, which indicates you need to solve for product-market fit.

Building a habit-forming product

How do you think about retention when you don't have users? At the early product development stage, you should consider what retention ultimately boils down to: Why will users get hooked on your product? Building a habit-forming product is the crux of retaining users long-term.[6]

Getting a baseline of users

Once you have early users, it's time to start optimizing retention. Test out and resolve factors affecting app performance and clean up bugs—users have little patience for apps that crash. Then start understanding what value your users derive from your product. Figure out what your power users are doing and try influencing your user base to adopt those behaviors. Get your retention to a healthy baseline before spending on acquisition.

Ongoing product iteration

Diagnosing and improving your retention should be an ongoing process. As you iterate on your product experience—to develop a more habit-forming, sticky product—you also have to measure retention. You may hypothesize why some users churn, and others retain, but you must continuously assess your retention

metrics to understand how users experience your product. Making retention the central focus of growth might sound daunting, but it doesn't have to be. This playbook can help.
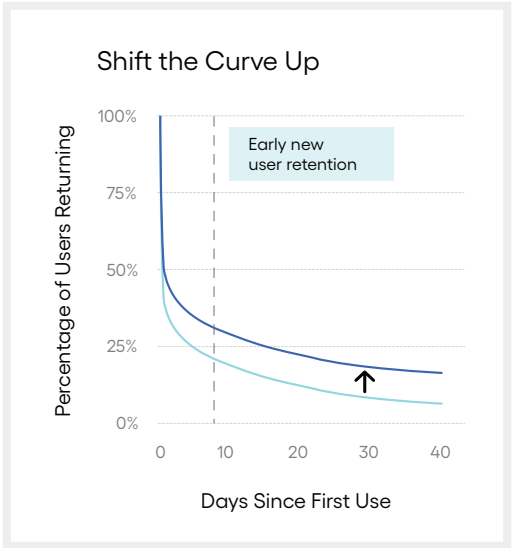
How this playbook will help

Although there is no magic formula to improve your retention, this playbook provides a framework to diagnose your product's retention and develop strategies to improve it. Returning to the retention curve, Brian Balfour describes two "levers" that can improve retention.[7] At a very high level, these are:

1. Shifting the retention curve up

Optimize your first-time user experience and immediately demonstrate your product's core value to encourage users to stay around longer instead of churning in the first few days.

2. Flattening the curve

Shift the Curve Up

Early new user retention

Percentage of Users Returning

Days Since First Use

Flattening the Curve

Long-term user retention

Percentage of Users Returning

Days Since First Use

Increase your baseline level of users by consistently delivering a solid product experience. Following both concepts, this playbook offers a novel framework for diagnosing and systematically improving user retention.
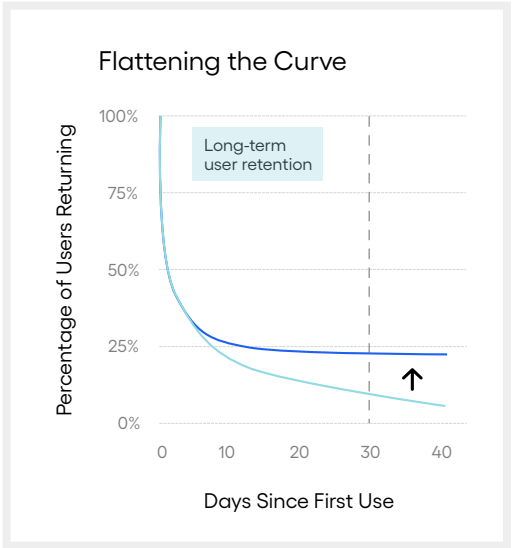
Throughout this playbook, we'll reference six accompanying worksheets, which walk you through various activities to support you mastering retention.

GET WORKSHEETS →
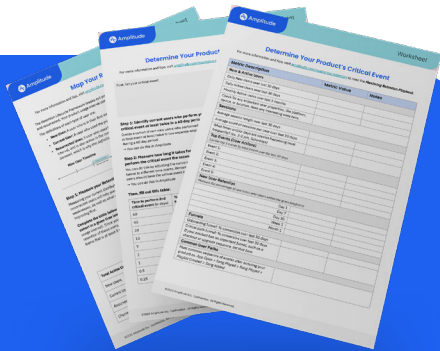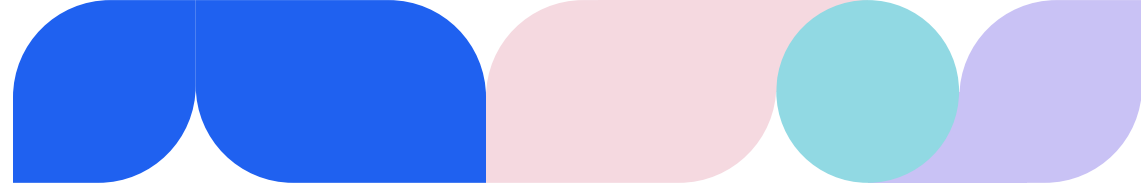
Your critical event and product usage interval

To improve your retention, you first need a solid grasp of how people use your product. This will also help you choose the right time frames for your metrics; for example, whether you should look at daily, monthly, or weekly retention.

What you'll learn in this chapter

In Chapter 3, we'll walk you through the **Retention Lifecycle Framework**, our in-depth approach to improving retention based on how users interact with your product. To fully leverage the Retention Lifecycle Framework, it will first be helpful to understand two concepts related to your product's usage: your critical event and usage interval.

Before diving into this chapter, take a moment to set yourself up for success.

Review instrumentation: Ensure your analytics are firing correctly and that you're tracking the user actions that are important to you. Review your analytical instrumentation, organize the events you're tracking, and validate your data before moving into the product usage sections of this chapter. Read more about how to conduct an instrumentation review in the Appendix.

Measure baseline metrics: Ensure you understand your user profiles and behaviors before implementing the Retention Lifecycle Framework. Capture your baseline standard product usage metrics and record them in the "Baseline Product Diagnostic" worksheet. You can periodically track these metrics to assess the impact of your retention strategies.

See the Product Analysis Toolkit for recommended metrics and methods.

Understanding critical events

Your product's critical event and usage interval will inform how you execute further analyses using the Retention Lifecycle Framework, which we'll cover in Chapter 3, so it's essential to first think through how they apply to you.

What is a critical event?

A critical event is an action users take within your product that aligns closely with your core value proposition. It's the action you want to drive your users to perform—and chances are you already know your critical event. **When measuring retention, the critical event describes the action you want users to perform to qualify as active or retained.**

How many critical events can you have?

A good rule of thumb is to have one critical event per core product offering. For most companies, this means just one.

Though in some cases, it may be appropriate to have multiple critical events. For example, two-sided marketplaces with different product flows—like buying and selling. These products' users tend to fall into either one group or the other, so it makes sense to have two critical events and analyze these users separately. Uber, for example, has two user bases, drivers and riders; Airbnb has hosts and guests; Etsy has buyers and sellers.

HOW TO DETERMINE YOUR CRITICAL EVENT

When determining your critical event, consider the following:

- What is the one action that you want a user to do every time they use your product?

- What metrics do you care about as a company? What number are you ultimately trying to increase? Which user actions can you tie to that metric?

- Do you have different product offerings? What are your success metrics for each?

REAL-LIFE EXAMPLE

Airbnb's critical event

If you were calculating Airbnb's retention, would you want to count a user as retained if they only open the app and browse listings? Simply opening the app doesn't provide business value to Airbnb or align with its objective of generating revenue. Airbnb's critical event is making a booking.[8] The company's growth and success depend on hosts listing accommodations on Airbnb and users booking them.

Here are more examples of critical events from our customers. Note that for each, the critical event closely aligns with the core value the business provides its users.

COMPANY	WHAT THEY DO	CRITICAL EVENT
Mindfulness app	Self-guided meditation	Completing a meditation session
Lifestyle app	Find and book nearby fitness classes	Booking a class
Mobile game publisher	Mobile Multiplayer online battle arena (MOBA)games	Playing a game

TERMS TO KNOW

Product usage interval
The frequency with which you expect people to use your product (daily, weekly, monthly, etc.)

Determining your product's usage interval

You can only draw conclusions from your retention numbers after first understanding your product's usage interval.

Some products are for daily use: social networking, media, casual gaming, or productivity apps. Others are used less frequently, like on-demand, ecommerce, and expense reporting apps.

Why does the product usage interval matter for retention?

Say you have an on-demand restaurant delivery app. Your product intuition tells you that most users place an order about once a week. If you look at the proportion of users who come back daily, you might see something like this:

Daily Retention

Percentage of Users Returning / Days Since First Use
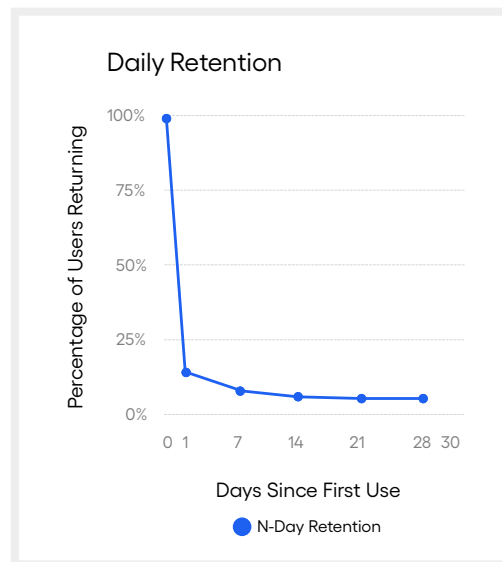
● N-Day Retention

This shows a massive drop-off of users after Day 0 and then a drastically lower proportion returning on any subsequent day.

But that retention curve isn't a good indication of the health of your product. Day N retention

would only give you the percentage of users active on one arbitrary day. These numbers will be small because most of your users won't place an order every single day.

Instead, you should be looking at your retention on a week-by-week basis. That is, the percentage of your users returning any time during Day 1-7, Day 8-14, Day 15-21, etc.

Compared to daily retention, weekly retention would better indicate your product's health because it aligns with the natural frequency users return to the app.

Comparing Daily & Weekly Retention for the Same Product

Percentage of Users Returning / Days Since First Use

● N-Day Retention   ● N-Week Retention

To accurately calculate user retention across all stages of the [Retention Lifecycle](#), you must first determine how often you expect users to return to your product. Not doing so can lead you to avoid misinterpretation of your retention and misinform your improvement strategy.

The usage interval framework

So, how do you determine your app's usage interval? The following four-step framework utilizes your existing user behavior data to help you accurately determine your product's usage interval.

> **PRO TIP**
>
> With the exception of seasonal products and services, like tax prep software, most businesses don't have longer than monthly usage intervals. If you're the exception, adapt this framework to your needs.

1. Identify all users who repeated the critical event at least twice within a specific period. We suggest 60 days.

   Note: You'll want to use a period longer than your usage interval; for most products, 60-90 days is sufficient since usage intervals rarely go beyond one month, and we expect users to perform the critical event at least twice within 60 days.

2. Analyze how long users in step 1 took to return and perform the critical event the second time.

3. Plot the percentage of users who repeated the critical event over different intervals to give you a cumulative distribution function.

4. Identify the time interval at which 80% of users have repeated the critical event—this is your product usage interval.

The steps we outlined will help you calculate your usage interval no matter what analytics platform you're using. Just follow the step-by-step instructions in the "[Determine Your Product Usage Interval](#)" worksheet.

Determining your product usage interval is critical in getting an accurate baseline of your current user base and is foundational to analyzing user retention. Your product's usage interval should inform your retention analysis and strategy.

This framework is great for determining your product usage in an organized, quantitative way. But it's also important to couple it with your own product intuition and solid user research. Qualitative user feedback can be just as valuable as quantitative findings.

> **DO IT IN AMPLITUDE**
> Determine your Usage Interval
>
> If you're using Amplitude, you can use the Usage Interval view in the Retention Analysis chart to find your product's usage interval quickly. Check out [Amplitude Academy](#) for a detailed 30-min tutorial.

Take action

Before we cover in-depth analyses in the rest of the playbook, make sure to work through the necessary pre-work worksheets and groundwork:

- [ ] Check your [analytics instrumentation](#)

- [ ] Organize your event taxonomy

- [ ] Determine your critical event(s)

- [ ] Complete the worksheet "[Baseline Product Diagnostic](#)" to get a baseline of your standard product usage metrics. This will help you measure improvement going forward.

- [ ] Complete the worksheet "[Determining Your Product Usage Interval](#)" to find your product usage interval. We'll refer to your usage interval throughout the rest of the playbook, so completion is strongly encouraged.
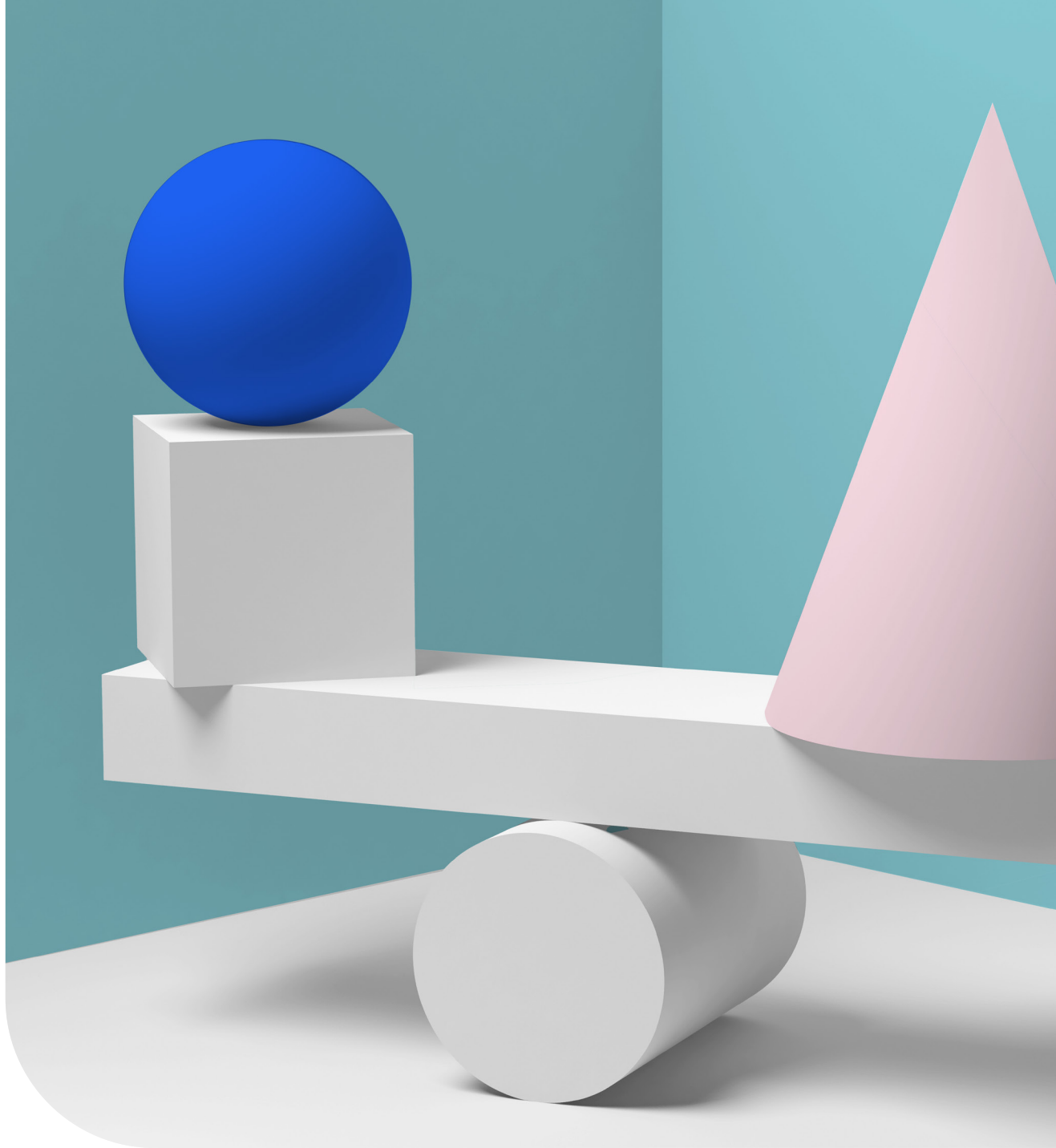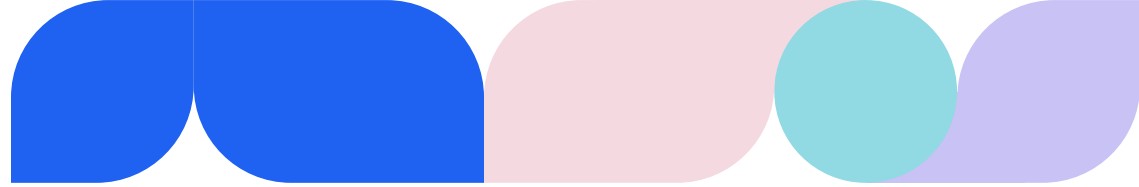
The Retention Lifecycle Framework

Now that you've investigated the state of your analytics, your current metrics, and your product's usage, it's time to explore the **Retention Lifecycle Framework**, our in-depth approach to improving retention based on how users interact with your product.

Coming up with a retention framework

We developed our retention framework by working with eight customers at different stages of growth and across different verticals. By diving into their user behavior analytics, we validated the principles and methods of our framework and found real insights and recommendations for improving their retention.

Across the following chapters, you'll see how different companies—from utility apps to ecommerce products, and mobile games— have used the Retention Lifecycle Framework to understand their users better, implement strategies to improve long-term retention, and accelerate their growth.

Ways to measure user retention

There are different ways to calculate retention, so it's essential to understand how your company or analytics platform defines it and whether it suits your product. If you're unsure how your analytics platform defines retention, get clarity before proceeding further.

The retention calculation you should use depends on your business goals and how users naturally use your product. Your critical event and usage interval should give you a good understanding of this.

Before we help you evaluate which type of retention is right for you, let's define a couple of helpful terms.

N-Day and Day 0 retention

When most people discuss retention metrics, they're talking about N-Day retention.

"Day 0" is the first day a user is active in your product. It could be the day they first download, register, or perform any action within your app—play their first song, add their first friend, etc.

For all the users who first become active on a particular Day 0, you can calculate their Day-N retention over the following days, looking at what proportion of users were active on Day 1, Day 2, Day 7, and so on.

For example:

- Day-1 retention looks at how many users returned exactly one day after they were first active;

- Day-3 retention looks at how many users returned on exactly the third day after they were first active, Day-7 on the seventh day, and so on.

If you were looking at Day-7 retention, it doesn't matter how many times users came back between Day 1 and Day 6 or if they returned on Day 8. If they aren't active on Day 7, they are not considered Day-7 retained.

PRO TIP

What do we mean by an "active" user? In Chapter 2, we introduced the concept of a critical event—an action that you want a user to perform in order to be counted as truly active or retained. We recommend measuring retention based on whether users return to your app and perform your critical event, not just whether they open it. This will give you a more accurate view of how many users are getting value out of your product.

Three types of retention

Now, let's look at each type of retention to determine which is best for your product:

N-Day Retention - Amplitude calls this "Return On"

Unbounded Retention - Amplitude calls this "Return On or After"

Bracketed Retention - Amplitude calls this "Return On (Custom)"

N-Day Retention
Return On

- Measures the percentage of users who are regularly active in your product on a specific day, week or month after first use.

- The most common and typical type of retention calculation.

- Well-suited for any product in which your goal is to get users to exhibit regular, repeat behavior, such as gaming, social apps or weekly exercise app.

- Day 7 retention = percentage of users who came back exactly on Day 7

The Return On retention curve above shows the weighted averages of all the Return On retention numbers in a Day 0 to Day 30 time frame.

What if you expect users to use your product regularly, every week, or every month instead of daily? In this case, '**N-Week retention**' or '**N-Month retention**' would be more appropriate. Conceptually these are the same as Return On retention.

Third-week retention, for example, reflects the proportion of active users during the third week after they were first active (Week 0). Similarly, third-month retention reflects the proportion of users who are active any time during the third month after they were first active (Month 0).
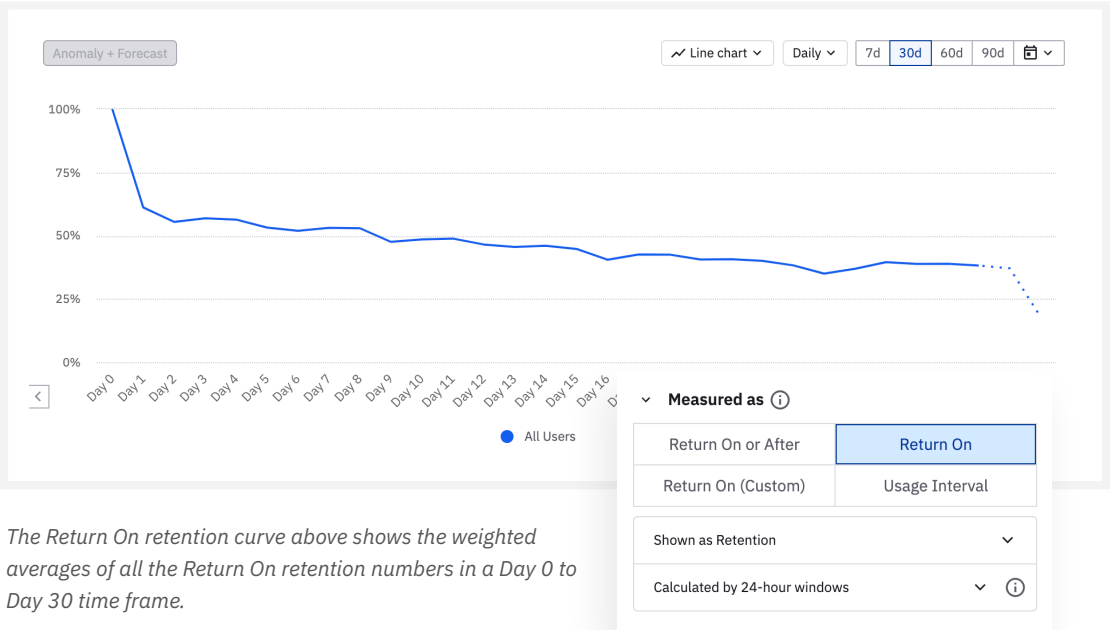
EXAMPLES

Social game

One of the App Store's most popular mobile social gaming apps measures Return On retention because their most engaged users return daily to challenge other players worldwide. In fact, for this app, completing a certain number of games within the first day is a key promoter of long-term retention.

Calm

Another Amplitude customer, a mindfulness app, measures Return On weekly retention. Engaged users of this app come back on a weekly cadence to complete a meditation session, so their retention metric measures how many users continue to stay active week after week from when they first downloaded the app.

Unbounded Retention
Return On or After

- The percentage of users that come back on a specific day or any time after.

- You can think of Return On or After retention as the opposite of churn rate. By measuring the inverse of your Return On or After retention, you can see how many users engaged with your product on Day 0 and never returned.

- Well suited for products where a user doesn't have a consistent usage pattern—for example, a food delivery app where people place orders sporadically. Unbounded retention may provide a more accurate measure of business health.

- Day 7 retention = percentage of users who came back on Day 7 or any subsequent day.
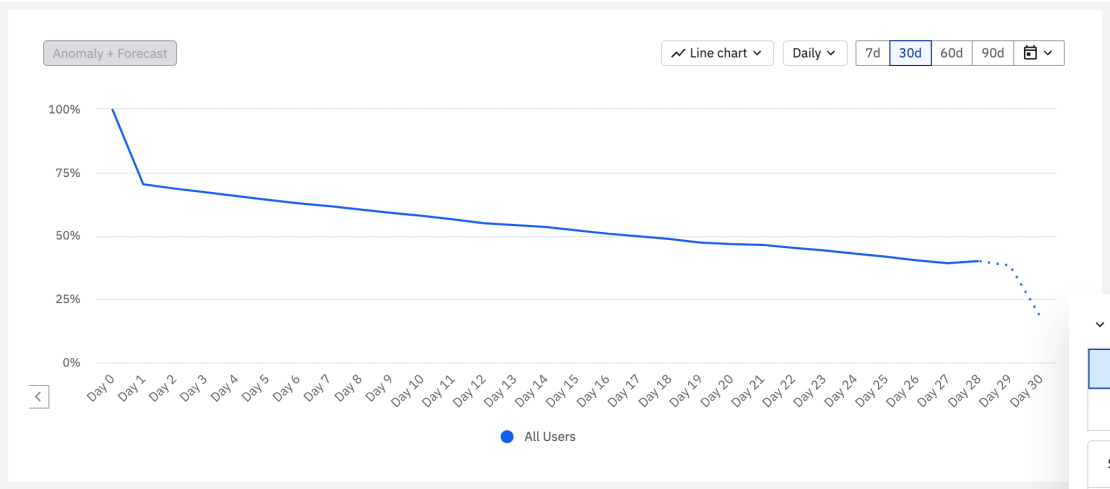
This Return On or After retention curve depicts the same data points as the Return On retention graph above, but in the context of Return On or After numbers. Notice our Return On or After retention rate is 73.5% compared to only 55% for Return On. This indicates 73.5% of new users on Day 0 were active at any time on or after Day 1, as opposed to Return On, which covers only those users who engaged Day 1.

EXAMPLE

On-demand delivery

A grocery delivery service does not expect people to use their product daily; they might not even use their service with a predictable cadence. Instead of looking at whether someone comes back exactly on Day 7 or Day 30, which is what N-Day retention would indicate, this company would get more value out of looking at their unbounded Day 7 retention—that is, how many new users return to buy groceries after their first

Bracketed Retention
Return On (Custom)

- A more nuanced version of Return On retention that enables you to split your retention analysis into custom periods that a user is active instead of limiting it to daily, weekly, or monthly periods. With this retention type, you define time brackets where any time a user is active they are considered retained. These can be from a single day, week, month or to multiple days, weeks, or months based on your user's expected usage patterns.

- Well suited for products where usage isn't clean cut to a week, month or day—for example, a product that people use every three weeks.

- You could set your 1st bracket as Day 0, your second bracket as Day 1-7, and your third bracket as day 8-14, and measure the percentage of users that return during each custom period.

Each multiple-day Return On (Custom) is like a bucket; if a user is active anytime inside that bucket, you consider them retained. You space each bucket in time based on the pattern you want to see your users exhibit.

For example, let's say you sell a product that people use every three weeks to stock up on home goods. You might create buckets that span three weeks, plus or minus a week. In this example, you don't care whether people return on Day 1 or 3 or whether their second order is after two weeks or a month—you just want to see a rhythm that proves they're getting value.

In this scenario, let's define an active user as someone who returns to the app and performs any activity. Then, you could consider a user fully retained by:

1. Registering for the app on Day 0
2. Returning on Day 1, Day 2, or Day 3
3. Returning on Day 4, Day 5, or Day 6
4. Returning on Day 7, Day 8, Day 9, Day 10, or Day 11

EXAMPLE

Pinterest

Pinterest uses one type of retention metric, which they call "1d7," to measure how many of their new users come back and discover value in their product. This metric looks at the proportion of new users who visited Pinterest at any time between Day 1 and Day 7. The growth team also looks at retention of these users in the Day 28-to-Day 35 bracket to understand what percentage of new users are still active one month after signup.

Which retention method suits you?

To summarize the key differences between Return On, Return On or After, and Return On (Custom) retention:

- **Return On retention:** The percentage of users that return on a specific day.

- **Return On or After retention:** The percentage of users who return on a specific day or after.

- **Return On (Custom) retention:** A flexible version of Return On retention using custom timeframes.

Your retention method heavily depends on how frequently you expect people to use your product. You can start by measuring retention using different methods to see which gives you the most meaningful improvement and accurate view of your business health.

The Retention Lifecycle Framework

By now, you're likely used to seeing a typical retention curve like the one at right. The fundamental flaw of this retention approach is that it lumps many different types of active users into a single curve. But not all active

users are created equal. To make meaningful, long-term improvements to retention, you need to understand your active users as they flow through different retention stages.

The Retention Lifecycle Framework can help you do so.
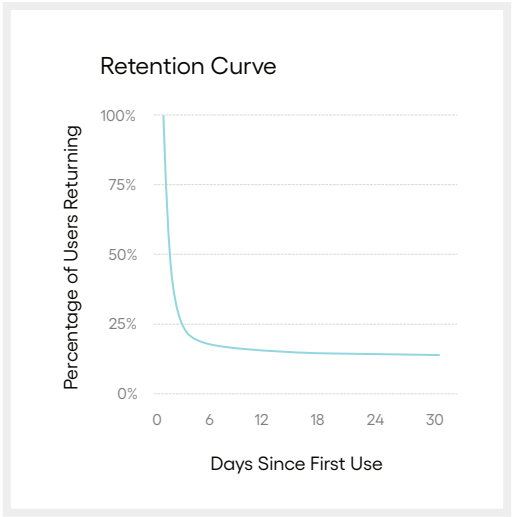
What is the Retention Lifecycle Framework?

Our analysis and approach to improving retention should vary depending on a user's stage in their product journey.

Users undergo four different retention stages:

- **New user retention:** Active users using your product for the first time

- **Current user retention:** Active users who have been engaging with your product consistently for a period of time

- **Resurrected user retention:** Active users who were once actively using your product and then became inactive

- **Dormant users:** Were once actively using your product and then became inactive

The first three groups encompass your total active users at any given time. If you're a daily usage product, this means that on any given day, an active user will be in the new, current, or resurrected user stage.

The image depicts the User Lifecycle flow of users between these different stages:

Power Users

Current Users

New Users

Resurrected Users

Dormant Users

acquisition

activation

reactivation

churn

churn

churn
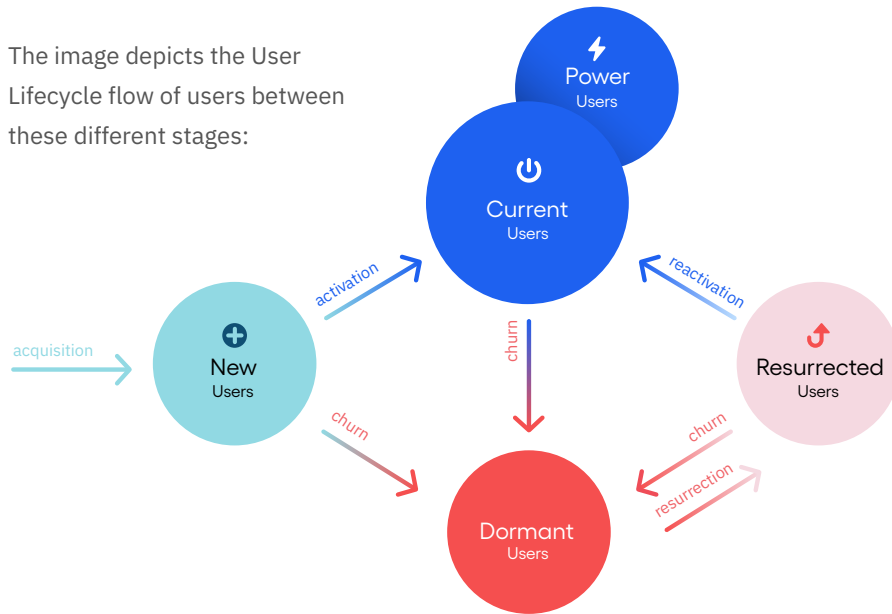
resurrection

To achieve retention that rivals the likes of today's powerhouse products, you have to engage differently with new and current users, implement strategies to resurrect inactive users, and boost overall engagement across users.

Chapters 5-7 will cover each user stage in more detail, but here's a quick high-level overview:

New User Retention

Most content about user retention focuses on retaining new users—with ideas to revamp your onboarding flow or send new user drip campaigns. This makes sense, given so many users churn within the first seven days.

Why it matters: Your new user experience is your product's first impression.

How to improve: Determine which behaviors or features return new users.

Current User Retention

Don't take your current users for granted. Every current user has the opportunity to become a highly-engaged power user. Your goal for current users is continuously providing value and ensuring they keep returning.

Why it matters: Understanding and improving your active user experience is critical for long-term growth.

How to improve: Identify key behaviors of certain groups of current users.

In the next chapter, we'll cover how to group your users into different behavioral personas, which can help you better understand and capitalize on the value current users derive from your product.

Resurrected User Retention

Resurrected users are typically your biggest potential user pool. Many of these users probably use a competitor's product, so they're also high-value. Numerous studies show it's cheaper to resurrect a dormant user than to acquire a new one.

Why it matters: Untapped potential for more active users

How to improve: Analyze why users are returning

When more dormant users return to your product, figuring out why is crucial. Did they respond to a particular win-back campaign or push notification? Have they returned to current user status, or did they drop off again?

PRO TIP

Reminder: Be careful not to over-optimize for just your power users. Understanding power usage is important, but you can't convert everyone into a power user overnight. As you iterate on your product, we recommend you optimize to retain the most number of users, not just the best users.

Why do you need the Retention Lifecycle Framework?

Too many products artificially increase their active user count through new user acquisition. And although the top of the funnel is important, growing your current and resurrected user base drives actual growth.

Here is a bar graph showing the total number of active users for a particular product over 12 weeks. The product grew from having 6 million active users to just over 8 million active users by week 12—things seem to be going great, right?
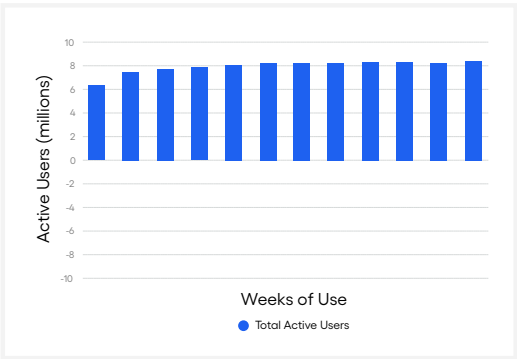
However, it's a different story if you break down these users into new, current, and resurrected users.
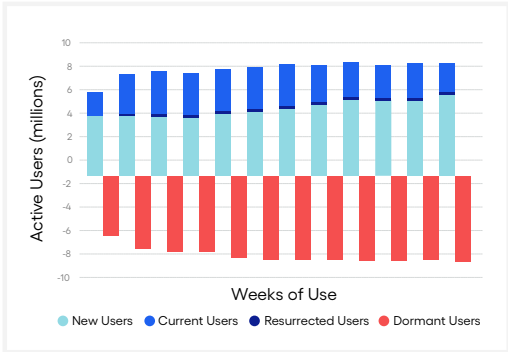
New users (teal) are increasing over time, but current users (blue) are decreasing. If you take this one step further and graph the number of users who become dormant every week (red), you'll see that this population is getting larger and larger over time.

The bottom line? Although you may be gaining more new users, you're not experiencing real growth if many users are churning and you don't have a sustainable, growing base of current users.

Creating your lifecycle cohorts

In product analytics, the broadest definition of a **cohort** is a group of users with common characteristics. You must first create these cohorts to analyze your new, current, and resurrected users in the following chapters.

Depending on your analytics software, you can define these cohorts within the platform or in your raw data.

As we alluded to in [Chapter 2](#), your product's usage interval is vital to accurately measuring retention across all Retention Lifecycle Framework stages. This interval determines how you define your timeframes for new, current, and resurrected users, as well as your dormant users:

New user: In their first interval of using the product.

Current user: Used the product in previous and current intervals.

Resurrected user: Active in the current interval but inactive in the previous interval. Also, they were active before the previous interval (i.e., they are not new). Note that a user can only be "resurrected" once they've become dormant, which is why this definition requires one interval of inactivity.
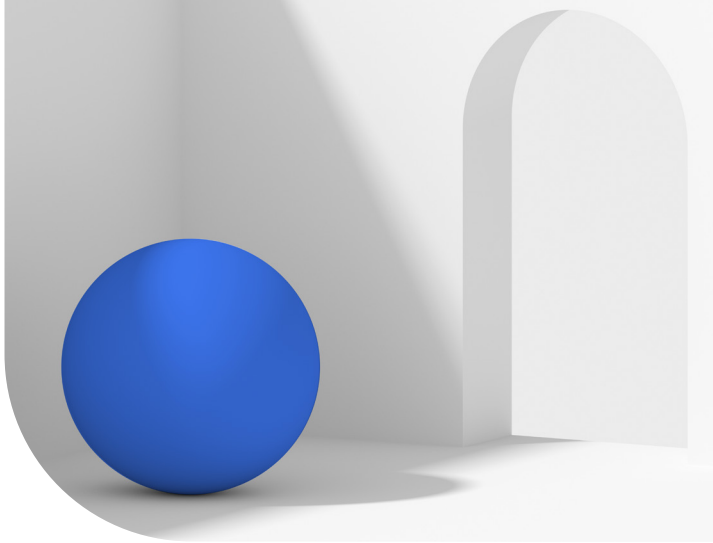
Dormant user: A user who did not use the product in the current interval but was active in the previous interval.

> ### DO IT IN AMPLITUDE
> #### Define new, current, and resurrected user cohorts
>
> In Amplitude, you can use the Lifecycle feature to see your retention lifecycle breakdown and easily create cohorts. Lifecycle breaks out your active users into new, resurrected, and current buckets and shows your churn in each period. In this 5-minute Amplitude Academy video, you can learn how to [track the growth of your user base with Lifecycle](#).

Using lifecycle cohorts to get a pulse on growth

You can calculate a pulse ratio to understand how many active users you gain for each user that churns after splitting your user base into the lifecycle cohorts.

The Pulse ratio is calculated as
(# of new users + # of resurrected users) / (# of dormant users)

Note that since newly acquired users and resurrected users increase the pool of active users, they contribute to your total user influx.

At a high level:

- Pulse ratio > 1 indicates you're gaining more users than you're losing. Your product is experiencing real growth.

- Pulse ratio < 1 indicates you're losing more users than you're gaining. Your product is not experiencing real growth.

New User Timeline

active: 1st time
Current Interval

Current User Timeline

active	active
Previous Interval	Current Interval

Resurrected User Timeline

formerly active	inactive	active
	Previous Interval	Current Interval
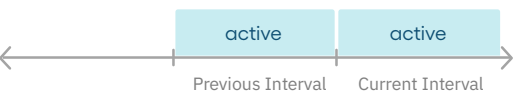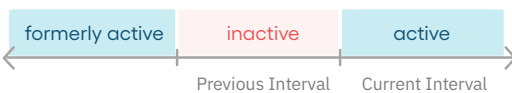
DO IT IN AMPLITUDE
Get a pulse on growth

In Amplitude, Pulse is a chart view in Lifecycle that lets you get a quick pulse on your product growth, automating the calculation above. It depicts the ratio of incoming users to outgoing users for a particular day, week, or month and enables you to see how many active users you gain for each user that churns.

Take action

Whichever retention analysis you choose, the framework remains the same:

- Understand how users retain at each stage of their lifecycle.

- Implement strategies to convert active users into highly engaged current users.

The following chapters will explain the deeper nuances of new, current, and resurrected user retention. To prepare yourself, make sure you:

- [ ] Determine which type of retention analysis makes sense for you (Return On, Return On or After, or Return On (Custom)

- [ ] Complete the worksheet "Your Retention Lifecycle" to define your lifecycle cohorts, measure your retention lifecycle split, and calculate your Pulse ratio.
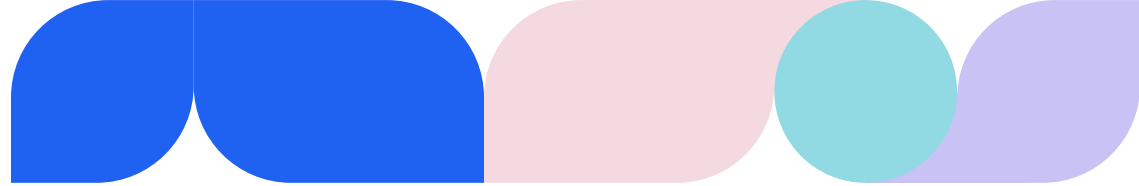
Product analysis toolkit

This chapter will introduce some key concepts and methods you'll use to analyze the behavior of each user group—new, current, and resurrected users. You should use this chapter as a reference as you work through Chapters 5-7.

An introduction to behavioral personas

Although demographic data can be informative, leveraging behavioral analytics to understand user behavior in your product is the best way to understand customer experience. The actions and behaviors of active users point to the value they derive from your product.

It's essential to remember that people can use and experience your product in various ways and may not all derive the same value. This brings us to the concept of behavioral personas, or user groups.

PRO TIP

The concept of buyer and customer personas is common in marketing. A persona is a representation of a key target segment, and can include characteristics like demographics, habits, and goals. This information helps marketers develop the right messaging and marketing channels to reach buyers.

For this playbook, however, we will talk about behavioral personas. Each persona describes a distinct way of using your product. Much like in marketing, understanding these behavioral personas will inform your product design for different types of users. We'll look at behavioral personas for all three stages of the retention lifecycle: current, new, and resurrected.

EXAMPLE

YouTube

To illustrate, these are YouTube's behavioral personas:

Creators: The small percentage of people creating and posting videos.

Viewers: The vast majority of YouTube's traffic watching videos.

Viewers + Commenters: People who view videos and leave comments.

Each of these behavioral personas use YouTube in a distinct way and for a specific reason. Creators use YouTube as a platform to get their content on the web and establish an audience, while Viewers and Commenters use it for entertainment or to follow Creators they like.

Why you need to know your behavioral personas

Understanding the behavior of different user groups and how they derive value from your product helps you:

1. Shape your product to provide the best possible user experience.

2. Get a more nuanced understanding of your retention and identify areas for product improvement. Each persona may have

drastically different retention rates, which you'll overlook if you only focus on retention for all current users lumped together.

If you're an early-stage startup and can only currently focus on one use case, your personas can help determine which user group to focus on based on impact. If you have a larger team

and a more established product, you might identify a new use case and start making changes to improve that experience and broaden your user base.

Either way, defining behavioral personas will help you understand your users, their actions, and the opportunities to improve the overall user experience.

PRO TIP

There's a rule of thumb about online communities, called the "1% rule" or "1/9/90 rule",[8] that taps into this concept of behavioral personas. According to this rule, only 1% of users actively create content in any internet community or social network. Nine percent of users may engage with the content, like commenting, sharing, upvoting, etc. And the remaining 90% only passively consume the content.

If a platform like YouTube only focused on improving the experience for the 1% of users who create content, and neglected the viewing experience, that could have a huge negative impact on their growth.

While these ratios may not hold true for all social networks, and certainly not for all product types, the general takeaway does. You should never assume that all users want the same benefit from your product. Make a conscious decision about what type of user you're optimizing for and their specific use cases.
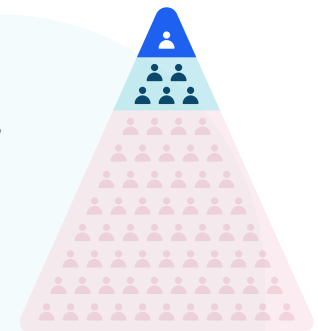
REAL-LIFE EXAMPLE

From Burbn to Instagram

Have you ever heard of Burbn? It was a location-based app, similar to Foursquare, with multiple features for checking in at locations, earning points, and posting pictures. Unfortunately, it wasn't seeing much growth.

When the founders studied their user behavior, they found that individuals weren't using most features. Still, a small group of users consistently used one aspect of the app: posting and sharing photos.

Seeing that data, they scraped everything and focused solely on photo sharing.

They made uploading photos fast and seamless, and in October 2010, they launched Instagram.[9]

We know the rest of the story: Instagram quickly gained tens of millions of users, sold to Facebook for $1 billion in 2012, and continues to grow, now with over 2 billion users.[10,11] Burbn could have been another failed startup. Instead, its founders identified a specific behavioral persona that was using its product and used it to shape it into one of the most popular apps today.

How to identify your behavioral personas

In this section, we'll discuss how to identify your behavioral personas, assess retention differences, and decide which personas to focus on.

Quantitative and qualitative approaches to finding personas

To determine if groups of people use

your product in a specific way or for a certain use case, use both qualitative and quantitative approaches to derive the most complete answer.

Qualitative methods

Start by brainstorming some personas that you think or know exist based on your current knowledge of users. Qualitative data from user interviews and testing can help in determining personas. Ask current users why they use

your product and how it fits into their routine. You can also study user activity timelines to identify salient behavioral patterns. Often, qualitative data provides more context for trends observed in your user data.

Quantitative methods

It's important to supplement qualitative knowledge with quantitative methods, which are more scalable and provide a more accurate picture. Here are a few ways to discover

behavioral personas through your product analytics data:

1. Segment your user base by different user and event properties.

2. Bucket users based on the frequency at which they perform certain key events.

Use a clustering algorithm, like the one that powers Amplitude's Personas feature, to group users based on similarities in behavior automatically.

DO IT IN AMPLITUDE
How to identify behavioral personas in Amplitude

Amplitude has a **Personas** feature that automatically clusters users based on actions they take and how frequently they take them. The **Personas** feature also enables you to compare the behavior of users in each cluster, and you can see tables of events that a given cluster performs more or less often than the other clusters. To investigate groups further, it also enables you to create cohorts directly from the personas. For more details on how to use Personas in Amplitude, we recommend checking out this support article.

Segmenting power, core and passive users

For most products, you can consider bucketing users into power, passive, and core personas. This may not apply to every product, so determine whether it makes sense for you. You can also have multiple personas in each category. For example, two types of core users who have distinct use cases.

- **Power users:** Use product with very high frequency or use a "power" feature that most don't leverage.

- **Core users:** Use app at regular frequency and in the "expected" way.

- **Passive users:** May not be using app in the core manner for which it was designed, but are returning with regular frequency.

We've included real examples of behavioral personas in this chapter to better understand what power, core, and passive users look like.

REAL-LIFE EXAMPLE
How an on-demand delivery company determined behavioral personas

For an on-demand delivery company, personas could be based on factors like how often people place orders or other event properties. This company used its behavioral data to identify a few major personas by segmenting its user base by the event property amount spent per order.

Distribution of Amount Spent Per Order
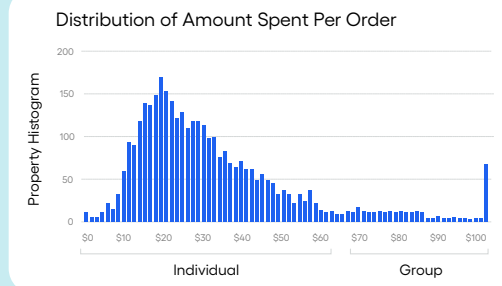
They found the following personas:

- **Individuals:** Typical order size indicates they only order for themselves.

- **Group orders:** Typical order size is above a certain threshold, indicating they regularly order for a larger group, like a family, group of friends, or small company.

They also bucketed users based on the frequency of performing certain events. For this company, placing an order is a critical event.

Stickiness of Checkout Event

This chart measures a metric called stickiness. In a 30-day period, it shows the percentage of users who placed an order on at least X-days out of 30. The chart shows that more than 75% of users place an order on two or more days out of 30, while only about 20% place an order on seven or more days out of 30.

Based on this data, the on-demand company determined these personas for order frequency:

Occasional orderers: Placed an order one-to-three days per month.

Frequent orderers: Placed orders more than four days per month. For these people, using the on-demand service is part of their routine rather than an occasional convenience.

Digging into retention: Your product analysis toolkit

Once you've created your lifecycle cohorts and identified your behavioral personas, you can better measure retention and retention drivers for each cohort. This section covers product analysis methods to help you answer questions like:

- Does a specific persona retain better than others or have a higher lifetime value (LTV)?

- What actions contribute to those metrics?

- How could you get more users into that persona?

You don't need to use all of these methods, but can pick and choose what will be most enlightening for your product and users.

Measure and compare baseline metrics for each cohort and persona

First, plot your current user retention. Remember, you can use Day-N (Return On), unbounded (Return On or After), or Bracketed (Return On (Custom) retention.

Here are the recommended retention metrics based on your usage interval:

Usage Interval	Retention Metric
Daily	Daily Retention for at least 30-days
Weekly or Bi-Weekly	Weekly retention for at least four weeks
Monthly	Monthly retention for at least three months
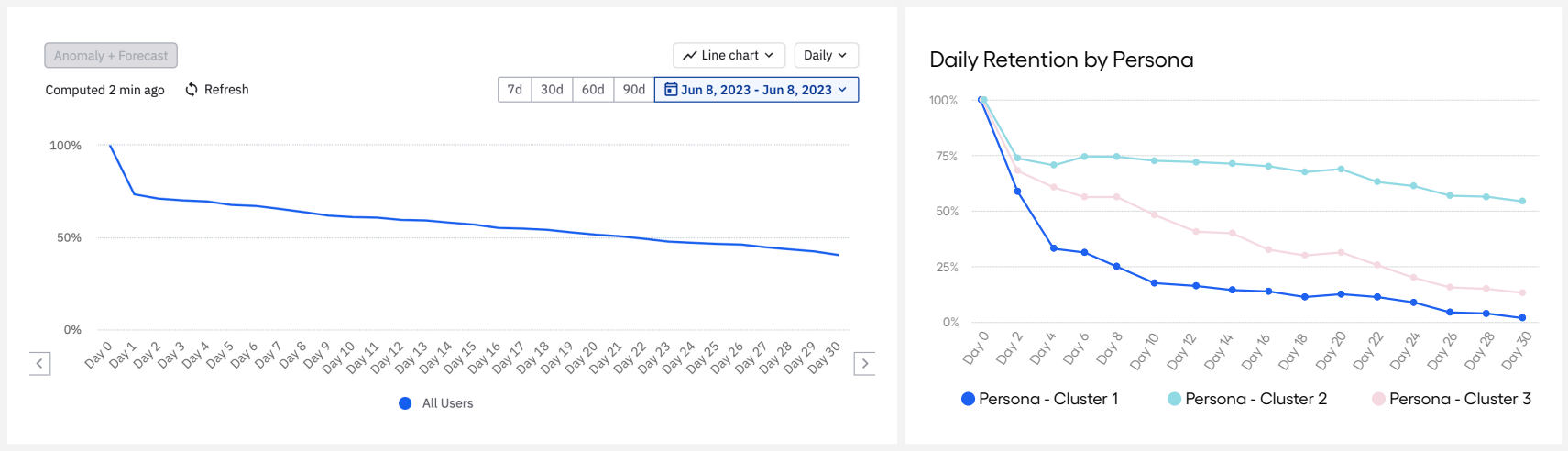
This chart shows the retention curve for current users of a music streaming app. The first and returning events are set to "Play Song," this product's critical event.

Compare the retention curves of behavioral personas

Comparing the retention curves of different behavioral personas helps you decide which personas to focus on:

- If you should you commit resources to convert more users to specific "power" personas

- If some of your core or power personas retain better or worse than others

- How much of a difference a persona has from your overall current user retention

By quantifying these retention differences, you'll better understand which personas to focus on as part of your retention strategy.

Retention curves make it easy to view these retention differences at a glance. Below are the daily retention curves for three different behavioral personas in Amplitude.

Persona 2 (teal) has much better retention than the other two. To improve retention, you'd want to understand whether you can influence people in Persona 1 (blue) and 3 (pink) to behave more like Persona 2.
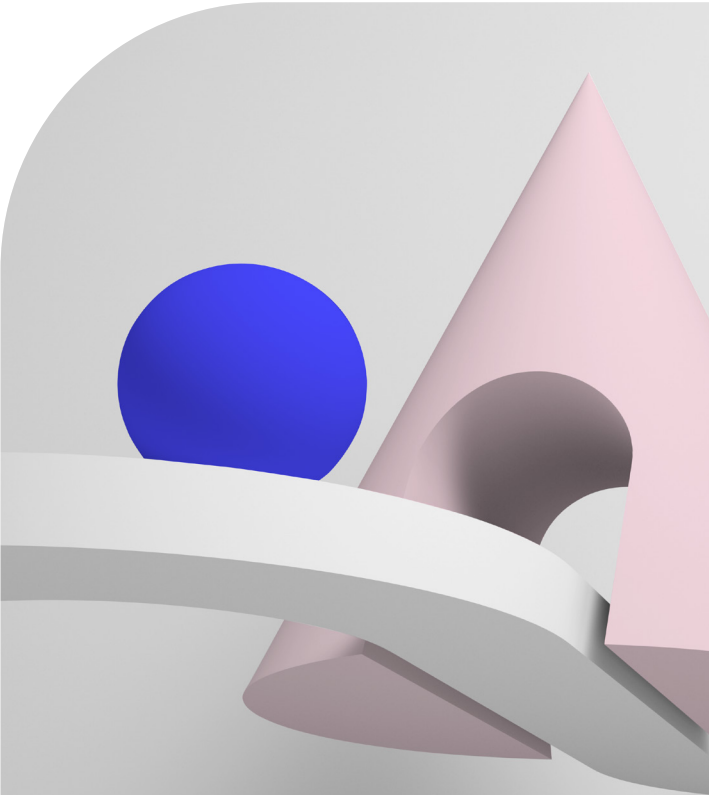
How an on-demand delivery company segments users

An on-demand delivery company segmented their retention curve for current users by the Platform user property. Notice the significant differences in retention between platforms, with the lowest retention among iOS users. We recommend they look more closely at behavior across their three platforms and identify user experience improvements to elevate Android and iOS retention.

Retention for Users Segmented by Platform

Investigate and segment retention by user properties

Looking at user properties, or attributes that provide additional context around your users, will give you a high-level understanding of your users.
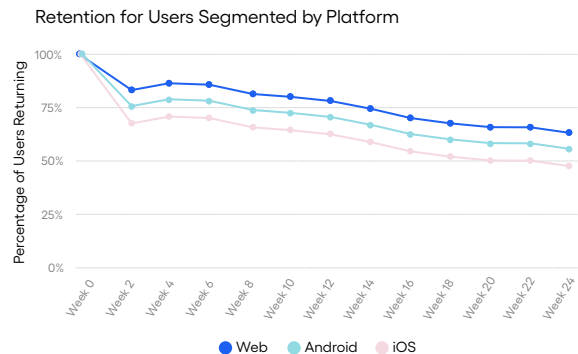
User properties are characteristics describing who they are before they come to your platform, such as:

- Country
- City
- Region
- Language
- Age
- Platform (iOS, Android, web)
- App version
- Referral source
- Number of friends
- Current level in a game
- Customer plan type
- Paying v. non-paying user

You can measure the breakdowns of fundamental user properties to help you identify trends and groups of users you should study more closely. Once you identify any user properties you want to study, segment your retention curve by these properties to help you identify any significant differences worth exploring.

DO IT IN AMPLITUDE
Define User Properties

Amplitude helps automate the process of defining user and event properties by tracking a default list and enabling customization. Learn more in our support documentation.

Use behavioral cohort analysis to measure the impact of different user actions

In user analytics, the broadest definition of a **cohort** is a group of users who share some common characteristic. There are two main types of cohorts:

- **Acquisition cohorts** group users by when they signed up for your product. You might break down your cohorts by the day, week, or month they signed up. By measuring the retention of these cohorts, you can see how long people continue to use your product from their initiation point.

- **Behavioral cohorts** group users by behaviors they perform in your product within a given timeframe. These could be any number of discrete actions that a user performs—sharing a photo, playing a song, buying gold coins, or any combination of these actions. A cohort will be a group of users who did those actions within a specified timeframe. You can then measure how long different cohorts stay active in your app after they perform those actions.

Forward-thinking companies today use behavioral cohorts to understand how different user actions or characteristics impact retention.

Although segmenting your retention curve by user properties can help you uncover valuable insights, it doesn't give you insight into how users' behavior within your product impacts retention. That's where behavioral cohorts come in. A behavioral cohort is a group of users who did or didn't perform specific actions in your product within a defined period.

Behavioral cohorts are dimensions describing **what a user does** after they come to your platform, such as:

- Sign up
- Complete profile
- Consume content
- Create content
- Perform a search
- View support article
- Invite
- Buy

Behavioral cohorting is an analysis of user segments that are based on any combination of actions taken (or not) in the product. It can help you form and test hypotheses about necessary actions for retention.

For example, Facebook identified that users who added at least seven friends (a specific behavior) within their first ten days (defined time period) were more likely to be retained long-term.

We created a worksheet to help you frame these questions and guide your behavioral cohort definition. Get your copy.

A HANDY GUIDE TO BEHAVIORAL COHORTS

Finding Behaviors that Lead to Retention

REAL-LIFE EXAMPLE

Music App uses behavioral cohorting to improve retention

In Amplitude, it's easy to create and apply behavioral cohorts across different charts to measure the impact of user actions on your metrics. This chart shows the retention curve for an Amplitude customer's three cohorts of users:

- Started trial - first seven days
- Did not start trial - first seven days
- Played at least three songs - first seven days

Retention for Three Cohorts
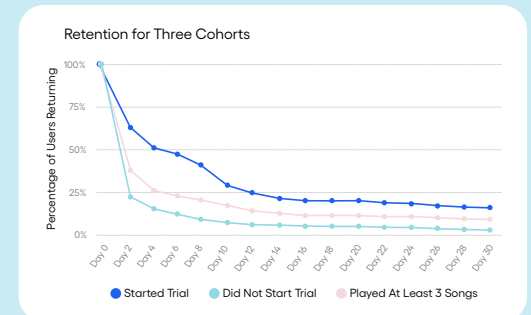
As you can see, users who started a trial in their first week have significantly better retention than users who didn't, indicating that starting a trial can potentially contribute to better retention. Retention for users who play at least three songs is somewhere in between, but nowhere near users who start a trial.

In this case of correlation but not causation, we recommend running a test in which you encourage more users to start a trial early in the user experience, such as in the onboarding flow or with an email reminder. Then, you can evaluate whether influencing more users to start a trial causes higher overall retention.
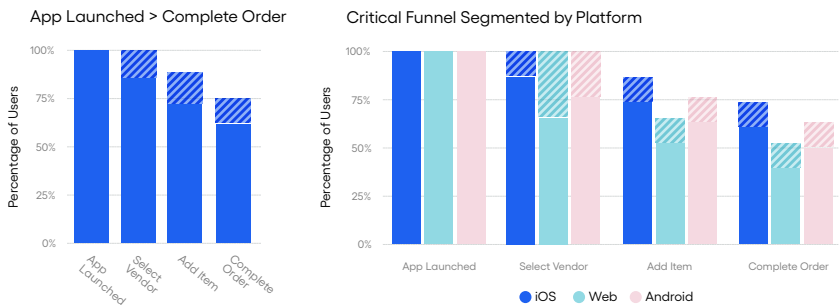
REAL-LIFE EXAMPLE

Music App uses behavioral cohorting to improve retention

An on-demand delivery company we work with identified their critical [funnel](#) as:

App launched → Select vendor → Add item → Complete order

Here's the funnel for the company's current users—each step in the funnel shows the number of users who moved on from the previous step. Of everyone who entered the funnel by opening the app, 66% completed all the steps and executed the critical event, which was completing an order.

When we segmented the funnel by platform (iOS, Android, or web), we found that users on iOS had a higher conversion rate through the critical funnel than web and Android.

The most significant drop-off happens between the App launched → Select vendor step. We recommend our customer first focus on this step to improve the conversion rates for web and Android.

Find your most common user flows

Funnels are great for measuring well-defined sequences, but what if you'd like a broader picture of new user behavior? It's impossible to anticipate every single route a user might take in your product, and people often defy our expectations of 'normal user behavior.'

In these instances, user activity streams that show sequences of events can be beneficial. Depending on your analytics setup, you can get raw logs of all user events and study them to look for patterns. Some analytics platforms, including Amplitude, can give you out-of-the-box access to these user timelines. In addition, you can perform user testing to observe how people navigate through your product.

Important insights you can glean from path analysis include:

- Comparing the paths of retained and dormant users.

- Seeing what users who drop out of a funnel are doing instead.

- Identifying the main paths to an important event in your product, like creating a new account or making a purchase.

For example, you can use path analysis to discover the paths users take to your critical event.
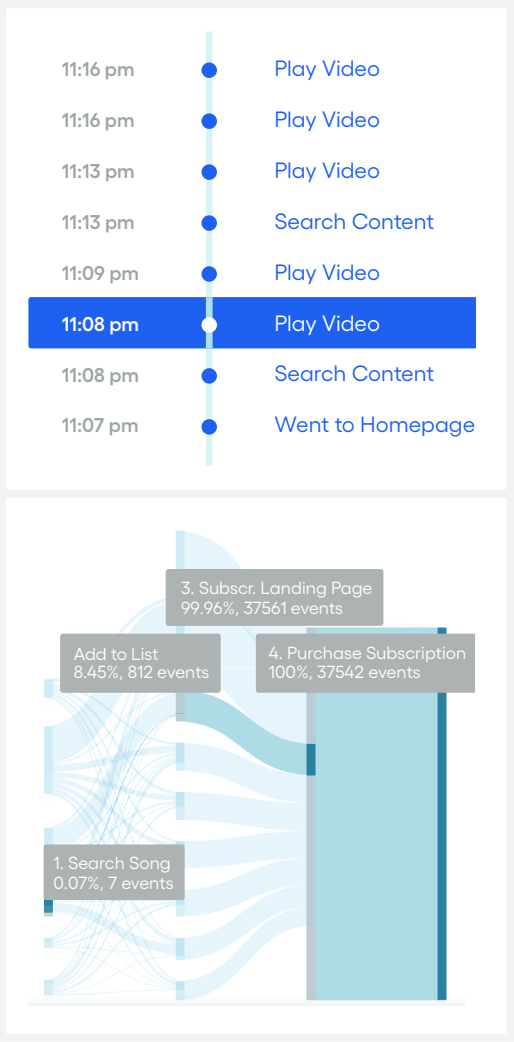
In the image above, you see users' actions before purchasing a subscription in a music streaming app.

Measure stickiness

Stickiness provides another dimension of understanding user engagement. While retention measures the rate users return over time, stickiness looks at usage frequency—how often people use your product within a specific period.

To compare stickiness metrics, measure for:

- **General usage:** How many days out of a week or month did users open the app and do something?

- **Your critical event:** How many days out of a week or month did users perform the critical event?

If your product has a daily or weekly usage interval, you should compare the weekly stickiness metrics of your persona cohorts. You should compare the monthly stickiness metrics if your product has a biweekly or monthly usage interval.

DO IT IN AMPLITUDE
Visualize user routes with Journeys

Creating your path analysis visualization can be very time-consuming. In Amplitude, the Journeys feature automates this process enabling you to explore user actions to or from any point in your product.

TERMS TO KNOW

Stickiness: The frequency at which people use our product. Specifically, stickiness measures the number of days out of a given time period that a user was active, or did a specific event (like your critical event). In Amplitude, we have two options for measuring stickiness:

- **Weekly Stickiness:** The percentage of users who were active or performed a specific event at least N days out of a week.

- **Monthly Stickiness:** The percentage of users who were active or performed a specific event at least N days out of a month.

Social mobile game measures stickiness

Stickiness can help you identify your most engaged users. This chart shows stickiness for one of Amplitude's customer's social mobile game product. This graph measures stickiness for general usage, counting each day a user opens the app:

Active User Stickiness
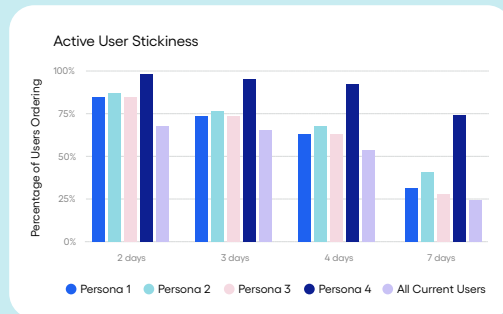
As you can see, Persona 4 is the most sticky: Almost 75% of the users in that cohort open the app 7 out of 7 days a week.

With results like this, we'd recommend focusing on Persona 4 to learn more about what makes them so engaged and then encourage those behaviors in other personas to get more people to match Persona 4.

Session metrics

Yet another way to supplement your understanding of user engagement is with session metrics. Loosely defined, a session is the period during which a person is actively using your product.

There's one caveat: The length of time someone spends in your product may be a poor indicator of engagement for your business.

DO IT IN AMPLITUDE
Session Metrics

Amplitude has default ways of defining sessions, but you're free to modify this definition as it makes sense for your product. For example, a music streaming service would want a session to last as long as someone played music, even if the app is in the background.

Key session metrics you can measure are:

- Length distribution: the distribution of session lengths of all users, shown as a histogram.
- Average length: the average session length per user.
- Average per user: the average number of sessions per user daily.

Accordingly, it's best to only look at session metrics if it makes sense for your app. For example, an on-demand delivery service or an exercise class booking app don't necessarily care how much time a user spends in the product. They care more about having a fast and seamless ordering or booking process. For social games or music streaming services, however, the amount of time spent in the app directly correlates with user engagement.

Below, you can see a graph of session length distribution. The chart shows that the most significant number of sessions are 10 to 30 minutes long.

Session Length Distribution

With an understanding of how to find your behavioral personas and these [product analytics](#) methods, it's finally time to roll up your sleeves and get to work. You'll apply these methods in the following chapters as we begin to understand how to improve retention throughout the user lifecycle.

REAL-LIFE EXAMPLE

Lifestyle app behavioral persona's session length

In this average session length chart, we see that Power Users (blue) spend much longer in the app, with an average session length of around 30 minutes, compared to roughly 16 minutes for Passive Users (green) and Total Current Users (orange).

Average Session Length

Power Users · Passive Users · Total Current Users

New user retention

As covered in the introduction of this playbook, there are two main ways to improve your retention curve: shift the curve up or flatten it. **Improving new user retention shifts the curve up by decreasing the initial drop-off during a user's early experience.**

Shift the Curve Up

Early new user retention

Percentage of Users Returning

100%

75%

50%

25%

0%

0 10 20 30 40

Days Since First Use
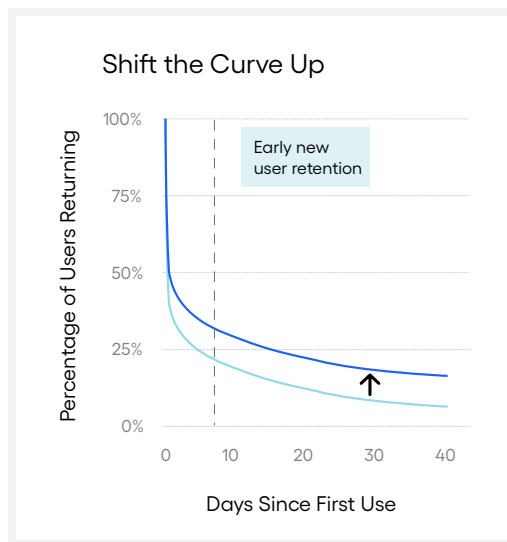
Why new user retention matters

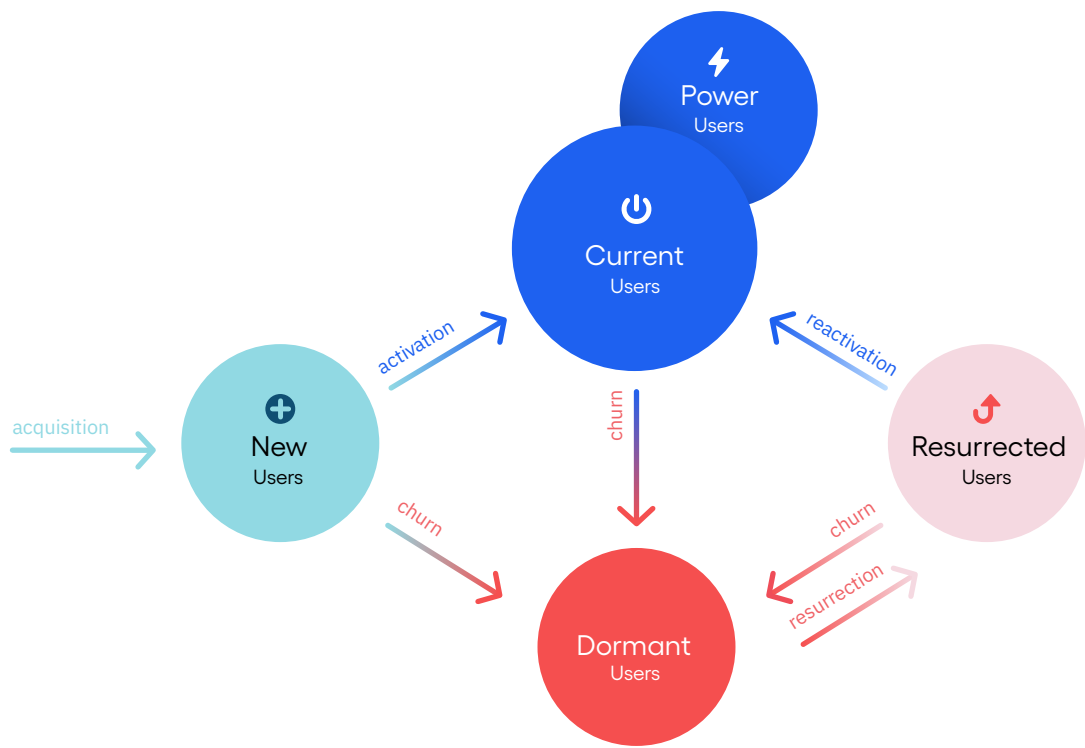New user retention is the most commonly and closely analyzed type of retention. And for a good reason: A user's early experience is critical.

Leveraging Amplitude user data for iOS and Android apps on 500 million mobile devices, we benchmarked new user retention using both Return On and bracketed retention and found:

- 14% of users return to an app 7 days after installing the app

- 66% of new users don't return in the first week after installation

TERM TO KNOW

New user:
A new user is someone engaging with your product for the first time. For this playbook, we define a new user as someone using your app for the first time in the current period that you're measuring.

Average Retention Curves for Mobile Apps

Percentage of Users Returning vs Days Since First Use

● N-Day Retention   ● Bracket Retention

Understanding your new users provides insight:

- The behaviors and factors contributing to whether a new user retains or churns

- How to effectively onboard new users

- How to quickly show value to new users early on

New users diagnostic

First, take the new user cohort you created in Chapter 3, and plot your baseline retention for new users.

Investigate user properties and segment your retention curve

Once you create your new user cohort, look at user properties to get a high-level understanding of these users. Measuring the breakdown of key user properties can help you identify trends and groups of users to study more closely.

You should also segment your retention curve by significant user properties to identify any differences to investigate; for example, platform, location, attribution source, etc.

What this indicates is that the new user experience presents a huge improvement opportunity for retention and growth. If you don't successfully onboard and show value to new users as quickly as possible, there's a very high chance your new user will never return.

Think of it like dating: On the first date, you just want to make a good impression and get to the second date—not get married. In the same way, focus your early user experience on getting users to return for the next session. Analyzing new user retention will help you understand your user onboarding experience and value discovery.

EXAMPLE

Brazil
United States
France
United Kingdom
Spain
Chile
India
Mexico
Germany
Columbia

Retention for New Users Segmented by Country

Percentage of Users Returning

100%
75%
50%
25%
0%

Day 0, Day 2, Day 4, Day 6, Day 8, Day 10, Day 12, Day 14, Day 16, Day 18, Day 20, Day 22, Day 24, Day 26, Day 28, Day 30

● Brazil   ● United States   ● France   ● United Kingdom   ● India   ● Spain

The pie chart shows the breakdown of where new users are coming from. When we segment the new user retention curve by country, we see that although the overall retention curve looks similar across countries, there are some significant differences. For example, by Day 7 users in India have 9.6% higher retention than those in Brazil.
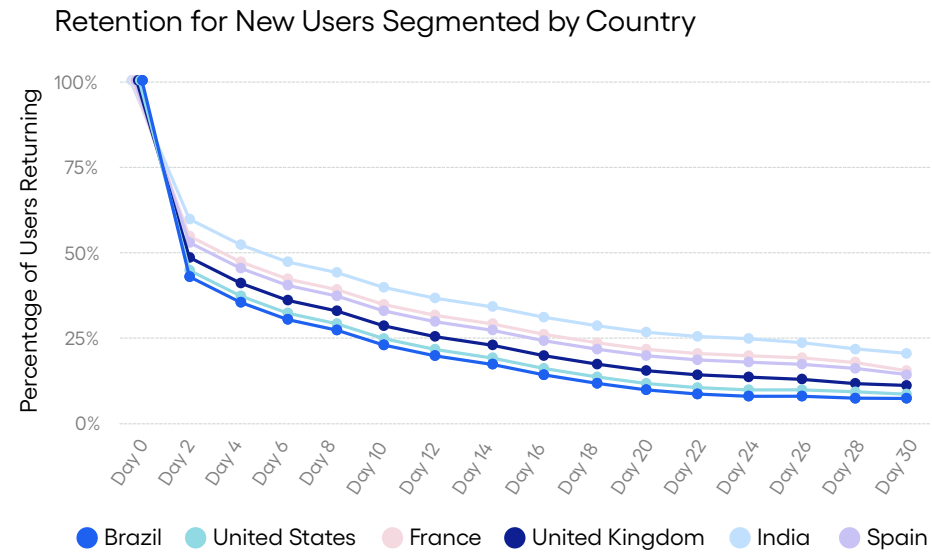
If you see differences like this, it's worth digging into the user experiences in these countries to find contributing factors. Are there ways that this company could get its retention in Brazil and other countries to match India?

Find behavioral personas of new users

Now it's time to look for user personas who are new to your product. Remember, behavioral personas describe distinct ways people use your product. For more background on behavioral personas and their importance, flip back to Chapter 4.

Studying your new user personas can help you understand:

• Why users try your product

• Where new users come from

• Patterns of early behavior that might positively or negatively impact retention later

By measuring user retention for each persona, you can compare the best-retained clusters to those with lower retention. For personas with high retention, you can hypothesize that their behaviors as new users correlate to their retention. Further testing can confirm whether that's true.

REAL-LIFE EXAMPLE

New user personas of a B2B SaaS company

Amplitude works with a B2B SaaS company that enables marketers and other professionals to make professional animated videos easily. When this customer looked at new user personas on their website, they first established a critical way to group new users: those who created an account vs. those who did not.

Users who created an account were likely to be video "producers," whereas users without accounts were likely video "consumers" using the platform to view video content. This company decided to separate account creators from those who didn't create an account before looking for distinct personas within each group. This is an excellent example of using qualitative product knowledge to group users before using quantitative data analysis methods.

Discovering new user Personas in Amplitude

To start, the team created two behavioral cohorts in Amplitude: "New User - Account" and "New User - No Account." Then, they ran each cohort through the Personas tool to find clusters of users who behave similarly (see Chapter 4 for a refresher on how Personas works).

For the "New User - Account" cohort, they identified that most users were taking actions related to producing videos—"Producers." Using the Personas feature, the SaaS company identified two main groups within "Producers:"

- **Producers - Heavy Asset Users:** Launched the video maker and added many assets to videos.

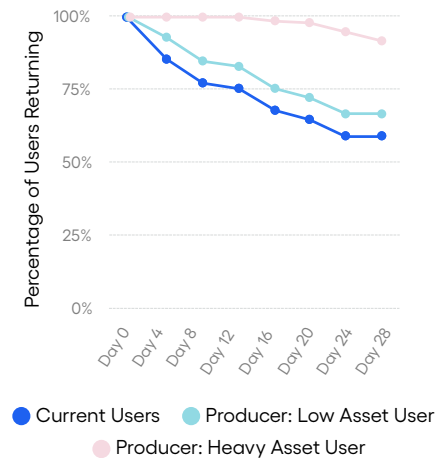- **Producers - Low Asset Users:** Launched the video maker but did not use many assets.

The chart shows that retention of "Heavy" users is significantly better than that of "Low" Asset Users.

These findings highlight that using assets in a video early on is essential to understanding the platform's value, which increases the chances of user retention.

For the "New User - No Account," they also found some interesting personas.

- **Consumers:** Mainly watched videos created on the platform.

- **Potential Leads:** Visited the company's website and performed actions consistent with potential platform customers.

Retention for New User Accounts

(Chart: Percentage of Users Returning vs. Days (Day 0 to Day 28). Legend: Current Users, Producer: Low Asset User, Producer: Heavy Asset User)

The differentiating action was visiting the pricing page—most users in other personas were not doing this.

Overall, this company found that the product experience and messaging should be very different for these personas, which they easily identified via Personas in Amplitude. The company used website analytics to optimize the web experience for "Potential Leads" persona.

New user lifecycle phases

After users start using your product, they progress through three phases: Onboarding → Value Discovery → Habit Formation. Users who don't make the transition across these phases are dormant.

Onboarding - During onboarding, a user engages with your product for the first time and completes the onboarding experience. Users must experience your product's core value in this phase quickly.

Value Discovery - After onboarding, there's a limited window to continue showing your core value to new users. During this phase, ensure users experience the core value as often as possible so they understand how your product improves their current way of doing things.

Habit Formation - Once a user has discovered product value, you must ensure they develop a habit so they keep returning over time.

In this chapter, we want to understand the transitions during the Onboarding and Value Discovery phases. What behaviors push someone into the next phase? In the next few sections will deep-dive into each of these phases.

Phases of new and current user retention
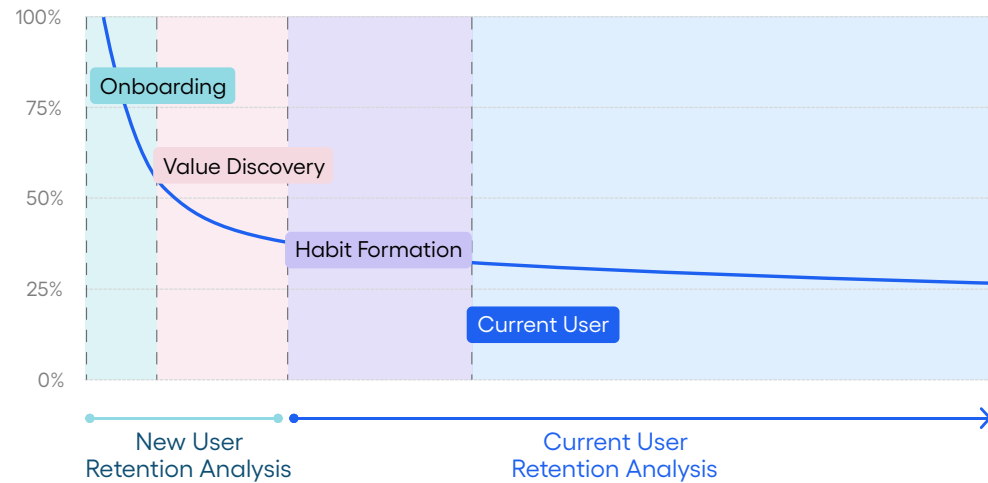
Understand your onboarding funnel

First impressions matter

Poor onboarding leads to poor new user retention. This is why one of the most important parts of understanding new user retention is analyzing your onboarding funnel. Onboarding is the first phase of new user retention, so increasing the number of successfully onboarded users will shift your entire retention curve.
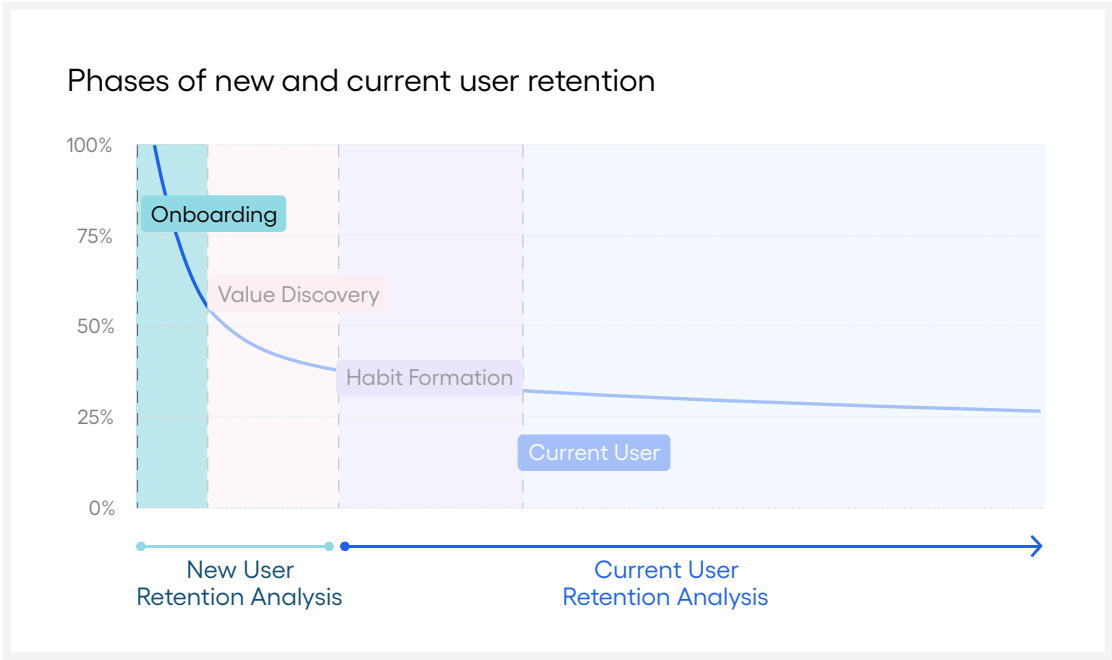
Define your onboarding funnel

Many apps have a well-defined sequence new users move through. If that's the case for your

product, defining your onboarding funnel is quite easy: Simply track an event for each step to define your funnel.

If your first-time user experience is more open-ended and flexible, think about the key events a user needs to complete before getting value out of your product (see Chapter 4 for help identifying those event sequences).

Measure the retention impact of your onboarding flow

If you have a defined onboarding flow or tutorial, you should also measure the impact your onboarding has on retention. Do users who complete the onboarding flow have higher retention than those who don't? How important is it to get users to complete the tutorial?

Phases of new and current user retention

REAL-LIFE EXAMPLE

Onboarding funnel for B2B SaaS

A B2B SaaS company customer's onboarding includes a tutorial to introduce new users to the platform. They created a funnel to capture the significant steps in their onboarding process, from sign-up to tutorial completion. At each step, they measure the percentage of users who continue from the previous step and those who don't continue.

Start with the most significant drop-offs

Any time you're diagnosing a funnel, it helps to start with the most significant drop-off to see what you can improve. Here, you can see that the most significant drop-off is between the "Begin Tutorial" and "Completed Tutorial" steps. Only about one-third of the users who start the tutorial complete it.

In this case, the company started tracking specific steps within the tutorial to learn where users were losing interest. Then they used that data to redesign the tutorial to make it more engaging.

Onboarding Tutorial Funnel
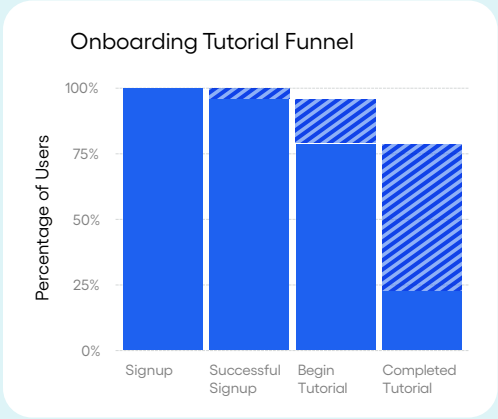
REAL-LIFE EXAMPLE

Retention impact of an onboarding tutorial

In another Amplitude customer example, a marketplace app enables users to buy and sell items. The first time a user opens the app, they enter a tutorial that points out key features, but new users can exit the flow as desired.

As the funnel chart shows, only 26% of users finish the onboarding tutorial.

Onboarding Conversion Funnel
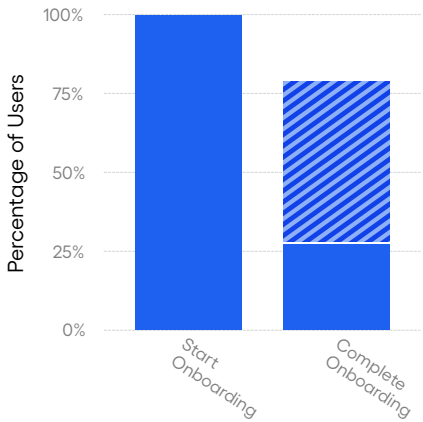
Retention for Two Cohorts Who Did and Did Not Complete Onboarding

● Cohort: Onboarding Abandoned   ● Cohort: Onboarding Completed
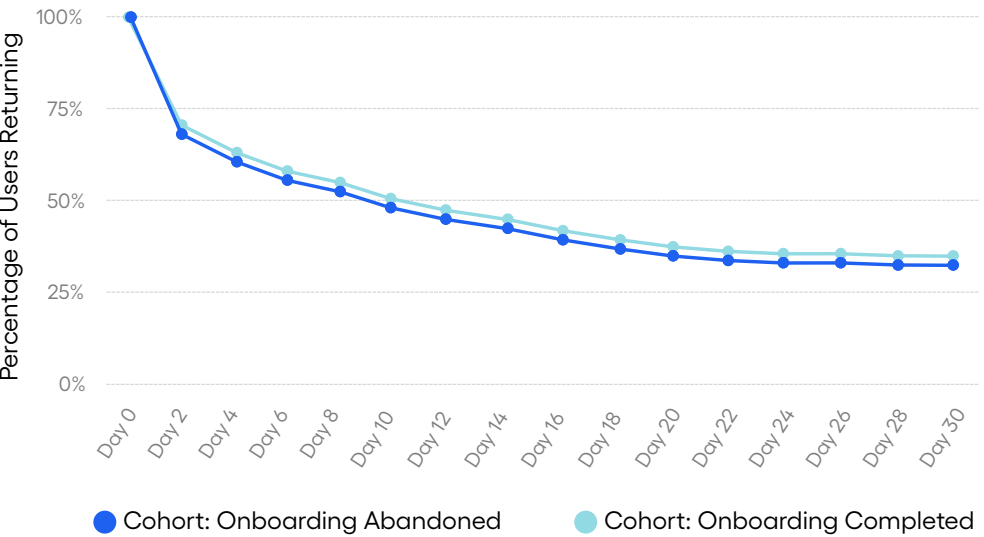
Five percent might not seem like a huge difference, but over time it adds up. Incremental improvements like this can result in more users retained in your product over time. We recommended this company investigate the following:

- What value is the onboarding flow adding for users who complete it? Is there a specific feature that they're using earlier?

- Is there a way to resurface that value later in the user experience for users who skip the onboarding flow?

- Why are 74% of new users abandoning the onboarding flow? Could it be improved to convey the essential information but have a higher completion rate?

What do "dropped-off" users do instead?

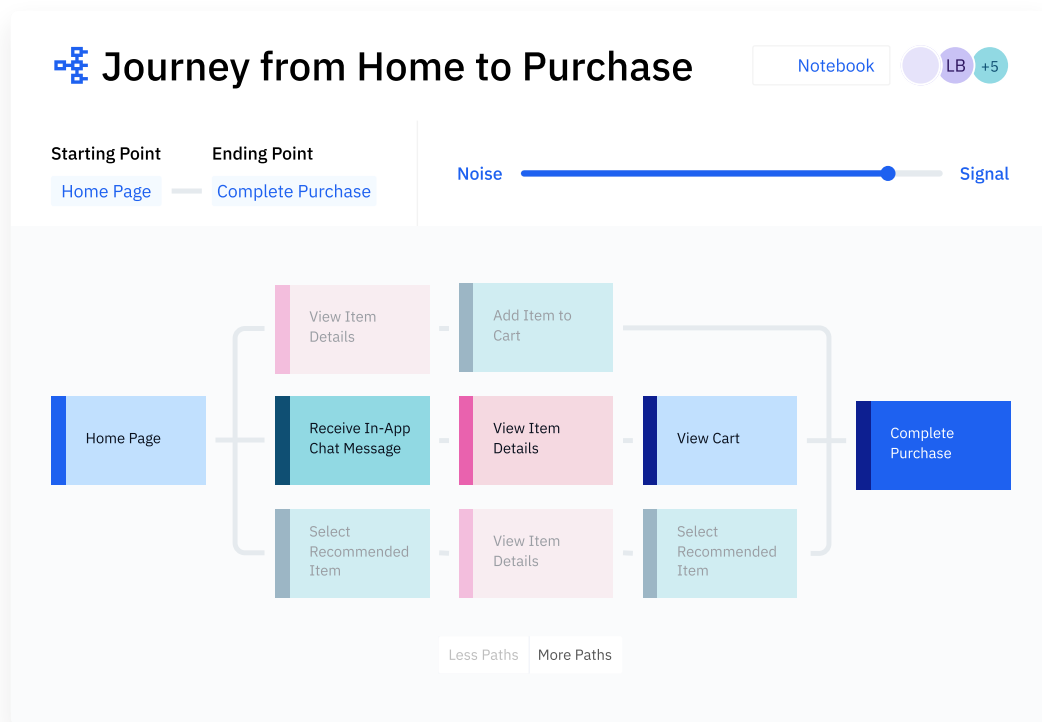Path analysis can be instrumental in identifying what users do once they drop out of a funnel. Do these users abandon the app altogether, or are they doing something else instead?

For example, look at the Journeys chart for the aforementioned marketplace app, where around 74% of new users abandon the onboarding tutorial. What are those users doing instead?

The chart shows that of users who abandon the onboarding flow, around 5% leave the app after abandoning onboarding. The majority of the time, their next action is to view product listings, followed by viewing product details, other product listings, or searching for items. Some users even begin listing an item to sell.

Based on this data, most users who abandon the onboarding flow end up using the product as expected. This may be because the marketplace app is intuitive enough for users to understand without a structured onboarding tutorial.

Journey from Home to Purchase

Notebook LB +5

Starting Point — Home Page
Ending Point — Complete Purchase

Noise ———————————— Signal

Home Page → View Item Details → Add Item to Cart
Home Page → Receive In-App Chat Message → View Item Details → View Cart → Complete Purchase
Home Page → Select Recommended Item → View Item Details → Select Recommended Item

Less Paths | More Paths

We recommend the marketplace company try the following to see how they impact retention:

- Streamline the onboarding flow so it has a higher completion rate.

- Try eliminating the onboarding flow. Drop users straight into the app and provide contextual tooltips to explain features and encourage users to act as they encounter them.

The phases of new user retention: Onboarding and value discovery

The prevailing wisdom around new user retention has been to benchmark Return On retention on some arbitrarily appointed days: D1, D7, D30, and D90. This approach is problematic because products have very

different expected usage patterns. For instance, you expect someone to play a mobile game or use a music streaming service at different frequencies than an ecommerce site or on-demand food delivery app.

Defining the timeframes for the onboarding and value discovery phases

For any product, we're setting the Onboarding phase to Day 0, which is the first day someone opens your app. The length of the Value Discovery phase, however, is determined based on your product's usage interval, which you calculated in Chapter 2.

The table to the right outlines the phases for products of different usage intervals.

Once you have the timeframes for your product, create cohorts of new users who return during those time frames. You'll use these cohorts to understand the transitions between the phases.

Phases of new user retention: onboarding and value discovery
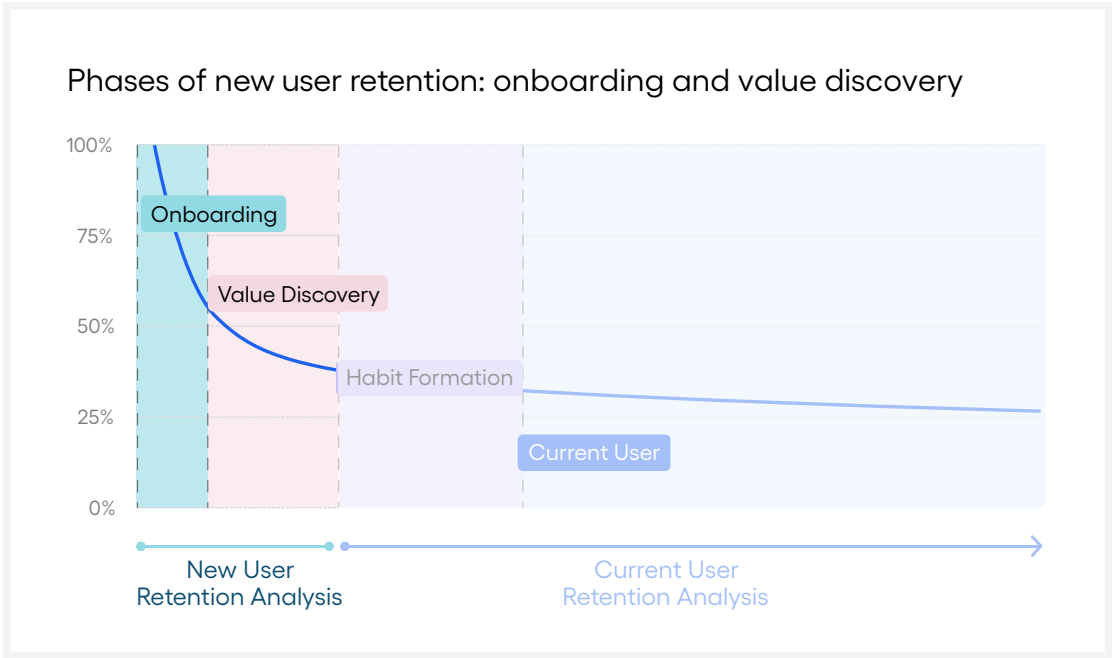
Usage Interval	Onboarding	Value Discovery	Habit Formation
Daily	Day 0	Day 1-3	Day 4-6
Weekly	Day 0	Day 1-7	Day 8-14
Bi-weekly	Day 0	Day 1-14	Day 15-28
Monthly	Day 0	Day 1-30	Day 31-60

Identify the drivers of successful onboarding

To identify behaviors that drive a new user to successfully onboard, follow these basic steps:

- **Step 1:** Create a base cohort of new users during your usage interval.

- **Step 2:** Create a retained cohort who were in the base cohort and were retained in the Value Discovery period.

- **Step 3:** Create a dormant cohort who were in the base cohort and were not retained in the Value Discovery.

- **Step 4:** Compare your retained and dormant cohorts to identify behaviors present in the former but not the latter.

- **Step 5:** Once you've formed a hypothesis of trigger actions, measure the difference in retention between users who do and don't complete that action.

Alternatively, you can enter your new user and value discovery cohorts into Amplitude Compass to get a list of potential drivers. Compass will identify the user actions most correlated to successful onboarding. In the next chapter, we'll look at these same steps in more detail, but applied to discovering behaviors that lead to habit formation.

REAL-LIFE EXAMPLE

Retention impact of an onboarding tutorial

Below is an example Compass report from a meditation app.

Let's look at the "Meditation Session Completed" event. According to Compass, completing this event at least one time within the first day of use is moderately predictive of successful onboarding.

The "Compare Retention Rates" graph also shows that users who complete a meditation session on their first day have better retention than new users overall.

Showing: Correlation	Within:	1 Day
[Amplitude] End Session		0.21 (≥3)
Meditation Session Completed		0.19 (≥1)
Application: Launched		0.19 (≥1)
[Amplitude] Start Session		0.17 (≥6)
Meditation Session Began		0.20 (≥4)

Based on this Compass report, the company learned that getting a new user to perform one meditation session in their first 24 hours indicates they will successfully complete the Onboarding phase. Accordingly, the company tailored a first-session experience to encourage users to complete a meditation.

Phases of new user retention: value discovery

New User
Retention Analysis

Current User
Retention Analysis
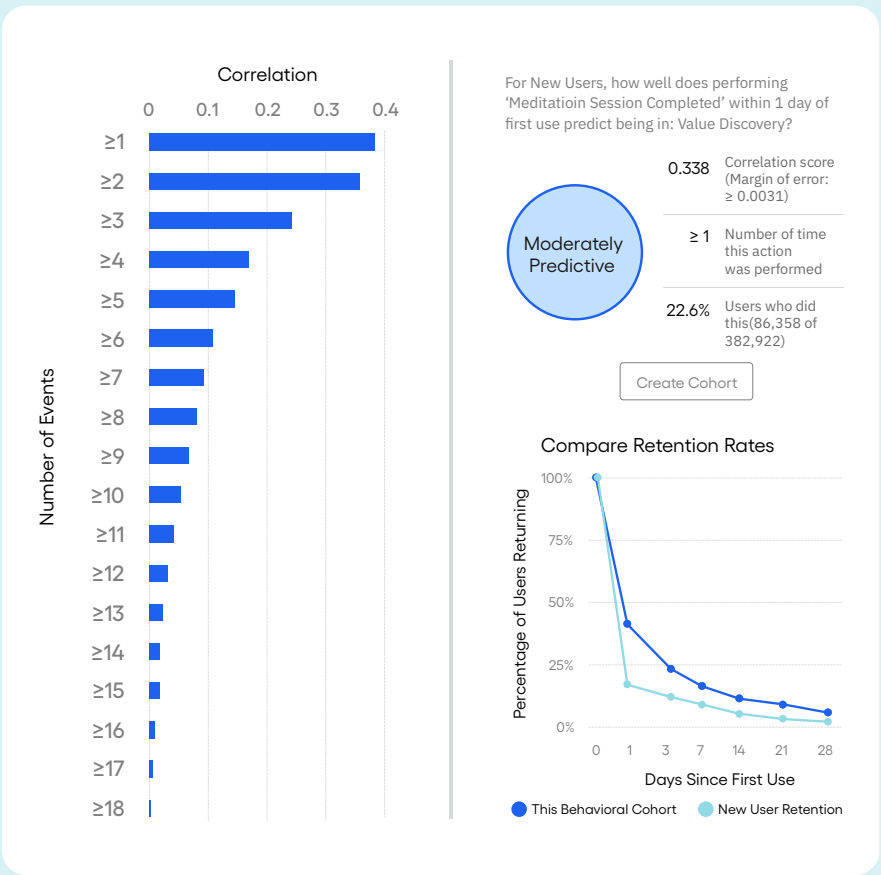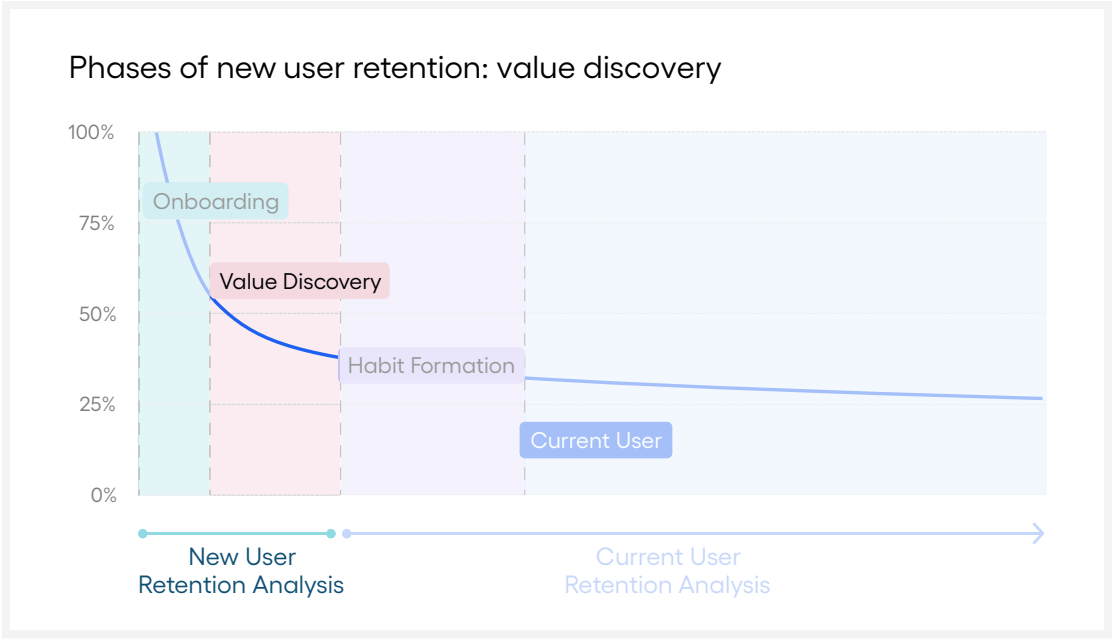
Identify the drivers of successful value discovery

Now, we'll repeat the same process for the transition from the Value Discovery into the Habit Formation phase.

REAL-LIFE EXAMPLE

Value discovery drivers for meditation app

Let's continue with the meditation app example. In Compass, we'll now set the "Value Discovery" cohort as the base cohort and the "Habit Formation" cohort as the target predicted cohort.

The report shows that completing meditation sessions in the first seven days is still the most correlated action for retention from the Value Discovery to the Habit Formation phases. The best predictor of successful Value Discovery is completing at least three meditation sessions in the first week.

Based on these findings, the company tested ways to encourage users to complete two additional meditation sessions between days 1-7, for three meditation sessions in the first week.

Showing: Correlation	Within:	1 Day	2 Days	3 Days	4 Days	5 Days	6 Days	7 Days
Meditation Session Completed		0.24 (≥1)	0.28 (≥2)	0.30 (≥2)	0.32 (≥3)	0.33 (≥2)	0.34 (≥3)	0.35 (≥4)
[Amplitude] End Session		0.30 (≥1)	0.30 (≥1)	0.31 (≥2)	0.31 (≥2)	0.32 (≥2)	0.33 (≥3)	0.34 (≥2)
Meditation Session Began		0.20 (≥2)	0.24 (≥2)	0.26 (≥3)	0.28 (≥3)	0.30 (≥3)	0.31 (≥4)	0.33 (≥4)
[Amplitude] Start Session		0.22 (≥3)	0.24 (≥3)	0.26 (≥3)	0.27 (≥3)	0.28 (≥4)	0.29 (≥4)	0.31 (≥4)
Application: Launched		0.22 (≥2)	0.24 (≥3)	0.26 (≥3)	0.27 (≥3)	0.28 (≥4)	0.29 (≥4)	0.30 (≥4)
Landing_Button_ Tapped		0.16 (≥6)	0.20 (≥6)	0.23 (≥7)	0.25 (≥7)	0.27 (≥7)	0.28 (≥8)	0.30 (≥8)
Profile: Landed		0.17 (≥2)	0.21 (≥3)	0.24 (≥3)	0.25 (≥3)	0.27 (≥4)	0.29 (≥4)	0.30 (≥4)

Apply what you've learned: Getting more users through the onboarding and Value discovery phases

Once you've discovered your drivers for Onboarding and Value Discovery, you'll understand the milestones new users need to achieve to increase their likelihood of retention.

Sometimes you'll find that the drivers are similar for both the Onboarding and Value Discovery phases; in this case, it may make sense to consolidate your approach to focus on a single period.

This was the case for an Amplitude customer whose app helps users find and book nearby fitness classes. The company's highest correlated event for both phases was booking a class, so we recommended they focus on getting users to book one class during the Value Discovery Phase instead of limiting the focus to only the Onboarding period.

To implement these insights and improve overall retention, think of ways to get more users to achieve these milestones during their early experience. By experimenting with different methods, you can find the most effective ways to get users through the phases of new user retention.

To get your ideas flowing, here are additional examples and recommendations to get more users to complete those actions:

Product	Driver	Phase	Ideas
Music app	Share 1 song	Onboarding (Day 0)	Since sharing is a major use case of the app, include sharing a song as a step in the onboarding ow for new users
Marketplace app	Send 1 message to a seller	Onboarding (Day 0)	During a rst-time experience, encourageusers to send a message to a seller on an item they're interested in
Casual social game	Play 6 games	Onboarding (Day 0)	Encourage users to play more games on their rst day. Can do this by pushing more people to keep playing games once they've started, or by using push notications after they've left the app
B2B SaaS video platform	Saved video 1 time	Value Discovery (Day 1-7)	Once users have opened the video maker and played around a bit, prompt them to save their progress
Lifestyle app for booking appointments	Book 1 appointment	Value Discovery (Day 1-7)	Optimize their browsing process and potentially recommend some classes nearby to make it easier for someone to book their class
On-demand delivery app	Place 1 order	Value Discovery (Day 1-30)	If a user doesn't place an order on their rst day, stay top of mind with a few targeted emails over the course of the rst 30 days

Don't forget retention detractors

This playbook mainly focuses on finding positive correlations with retention so you can get more users to complete milestones that improve their retention. However, it's also essential to consider factors that might hurt retention. Fixing retention detractors can provide massive wins.

Improve product quality first

The overall quality and performance of your product can have a big impact on retention. Common culprits include bugs, crashes, and slow load times. If your app performance is unreliable, it doesn't matter how much value your product can theoretically provide. Users will quickly give up and abandon your app. If you have any performance issues, spend engineering resources to fix them before implementing your retention strategy.

Here are some ways to find detractors via your analytics data:

Find bugs or crash events if you log them in your user analytics.

- Find events that have a low correlation with retention. In Amplitude, you can find these low correlation events in Compass.

- Segment your dormant users by different user properties to identify any trends. For example, you might notice that retention on Android devices has taken a sudden dip, and pinpoint a bug in your latest release.

- Use Amplitude's Personas feature, or a similar clustering algorithm, to identify groups of users with low retention, and see what events or properties they have in common.
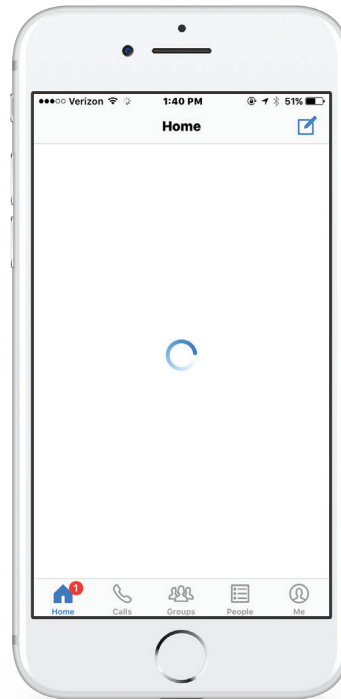
Take action

To recap, these are the key components of new user retention analysis:

- Identify important user properties and behavioral personas of your new users.

- Diagnose your onboarding funnel.

- Identify the actions that drive users to complete the Onboarding and Value Discovery phases of new user retention.

- Identify and mitigate retention detractors.

Here are some key questions to ask yourself:

- Who are your new users, and what are their behavioral personas or significant user properties? Is there a specific persona that you should focus on?

- Why do some of your behavioral personas retain better than others? Are there particular behaviors that seem to positively or negatively impact retention?

- How does the first-time onboarding experience affect later retention? Are there steps that can be improved? Would a tutorial or structured onboarding flow be beneficial for your product?

- What key actions did you identify as drivers for successfully passing the Onboarding and Value Discovery phases of new user retention? What methods can you test to get more new users to cross those milestones?

- What are you retention detractors? How can you improve them?

- What experiments can you run to determine whether a certain action or sequence of actions is critical to your new users retention?

Track improvement over time

As you start testing some of your hypotheses and trying new ways to improve your new user retention, it's important to keep track of your metrics to see what is and isn't working.

Remember, the overarching goal of new user retention analysis is to lay the foundation for new users to become current users. Remember this as you form your metrics and KPIs for new user retention.

KPIs to help measure your progress in converting new users to current users:

- The percentage of new users who become current users.

- Retention over time of new users and important behavioral personas.

- Set up a Return On (Custom) retention curve that follows your New → Onboarding → Value Discovery → Habit Formation phases. Depending on where the most significant improvement opportunity is, you might choose to focus on improving one part of this curve first.

- Conversion rate over time through your onboarding funnel.

Now that you've completed the new user retention analysis summarize what you've found and form some hypotheses to test using this New User Retention worksheet.

Current user retention

Improving your current user retention is critical to creating a sustainable business. If your retention curve doesn't flatten out at some point, it will become impossible to sustain real growth.

Retention for Sustainable Growth

The most important element is that it flattens

100%
75%
50%
25%
0%

Percentage of Active Users

0   5   10   15   20

Days Since First Use

● Sustainable   ● Unsustainable
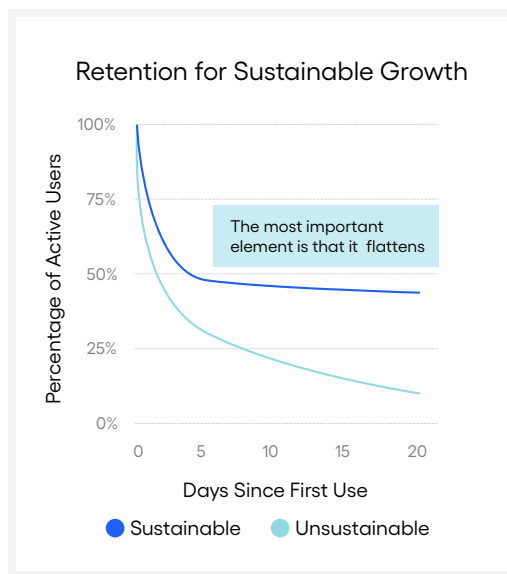
At some point, even if you keep acquiring new users, poor retention will cause your overall growth to stagnate and even decrease.

Notice how the blue curve flattens off around day 7. Although there's some initial drop-off in the first seven days, a steady user base remains—these are your current users.

The goal of current user retention analysis is to move this baseline up to capture a higher percentage of retained users.

The teal curve, however, never flattens off, meaning that your product is not attracting a steady base who continue using the product.

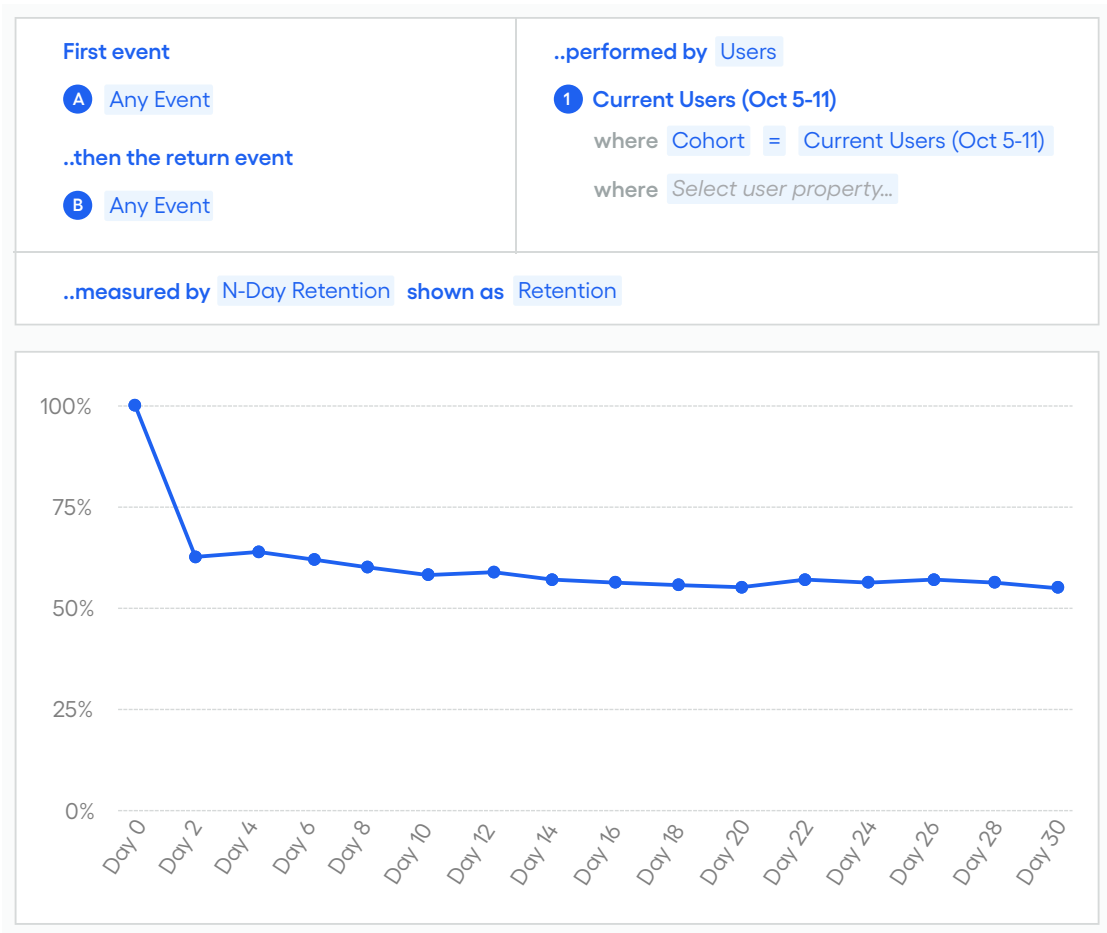This retention curve shape indicates you haven't yet reached product-market fit.

Current users diagnostic

As defined, a current user was active in the previous period and is active in the current period you're measuring.

First, create your current user cohort, as covered in Chapter 3, and plot your baseline current user retention. Remember, you can use either N-Day (Return On) or unbounded (Return On or After) retention.

The example below shows a retention curve for a cohort of current users:

First event

A Any Event

..then the return event

B Any Event

..performed by Users

1 Current Users (Oct 5-11)

where Cohort = Current Users (Oct 5-11)

where *Select user property...*

..measured by N-Day Retention **shown as** Retention

Investigate user properties and segment your retention curve

Once you create your current user cohort, look at user properties to get a high-level understanding of these users. Measuring the breakdown of key user properties can help you identify trends and groups of users you should study more closely.

You should also segment your retention curve by significant user properties (e.g., platform, location, attribution source) to identify differences to investigate. Refer to Chapter 4 for a refresher on segmenting by user properties.

Find behavioral personas of your current users

In Chapter 4, we introduced the concept of behavioral personas—each persona represents a distinct way of interacting with your product.

The purpose of identifying the personas of your current users is to understand:

• The value current users get from using your product.

• Whether there are distinct use cases.

• Behavioral patterns that might positively or negatively impact retention.

This section will discuss some examples of behavioral personas and principles for determining which personas to focus on.

REAL-LIFE EXAMPLE

Personas for a casual mobile game

One of our customers has a social casual game for mobile smartphones. The game matches players in real time and includes a social component with interplayer chatting.

When they analyzed their current users, they identified three core personas with high retention despite distinctly different behavioral patterns:

- **High social only:** Heavily use social features, but don't play many games

- **High gameplay only:** Mainly play games, but don't use social features

- **High gameplay + high social:** Actively play games and use social features

As you can see in the retention chart, the three personas have significantly higher retention than the baseline for all current users. In addition, the **"high gameplay + high social"** persona has the highest retention.

Retention Curve Segmented by Personas
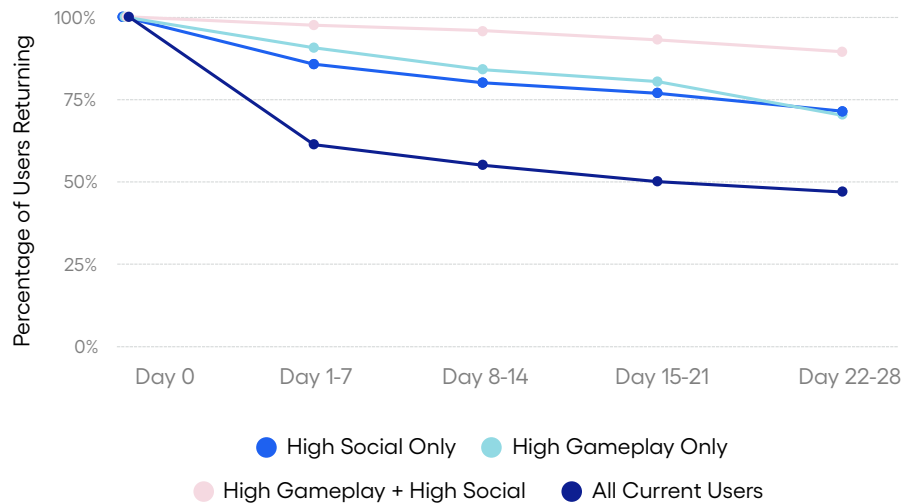
Although this data indicates that users who exhibit both behaviors have the highest retention, users who actively play games or use the social features will still be retained at a much higher rate than the baseline. So even if the company focuses on increasing engagement with just one aspect of the product first (social or gameplay), they'll likely see significant retention gains.

REAL-LIFE EXAMPLE

Meditation app's passive and core user personas

Another Amplitude customer has a mobile mindfulness app that provides meditation courses and scenes with calming background sounds.

Using the Personas feature, the app's product team identified three user personas:

- **Listeners:** Primarily listen to and swipe through different scenes
- **Meditators:** Completed more meditations than average
- **Alert Savers:** Activated a feature that sends a Daily Reminder to meditate. These users also completed several meditations per week on average.

The Alert Savers persona was particularly interesting: Only ~1% of users were setting an alert. This feature was buried deep within the app's Settings screen, so very few users discovered it—but these users had very high retention compared to other groups.

★ Starred Events	All Clusters 215,775 Users	Meditators ▾ 108,058 Users	Listeners 107,396 Users	Alert Savers 321 Users
	Avg # Events	Avg # Events	Avg # Events	Avg # Events
★ 1 Session Completed	3.12	8.75	0.52	10.23
★ 2 Session Started	4.21	9.12	0.88	10.98
★ 3 Scenes Swiped	3.19	2.89	9.51	2.76
★ 4 Set Alert	0.11	0.13	0.11	0.98

Using the power user, core user, and passive user framework, the company classified:

- **Listeners** = Passive users
- **Meditators** = Core users
- **Alert Savers** = Power users (because they used a "power feature")

Comparing retention curves of different personas

This company also compared the retention curves of "Listeners" and "Meditators." Both personas had similarly high Day-N retention 30 days after the current period, although Listeners had slightly lower retention.

To see how these personas might differ in retention longer-term, they looked at weekly retention for the next 24 weeks to help uncover some larger differences: Alert Savers have the highest long-term retention, followed by Meditators, then Listeners.

Based on these retention graphs, Listeners are a fairly active Passive persona, but still have lower retention than Meditators long-term. In addition, Alert Savers who set a daily reminder to meditate have the highest long-term retention at 24 weeks. To increase overall retention, the company should try to convert Listeners into Meditators and encourage Meditators to set a daily reminder and become Alert Savers.

Dig deeper into your personas: Product Analysis Toolkit

Once you identify your current user personas, you can use some or all of the analyses in the Current User Worksheet to better understand how these users behave. This will help you identify improvement opportunities and additional drivers of current user retention.

Reference the Product Analysis Toolkit if you need to review these methods.

Daily Retention by Behavioral Persona

Meditators · Listeners · Alert Savers · All Current Users

Long-Term Weekly Retention by Behavioral Persona

Meditators · Listeners · Alert Savers · All Current Users
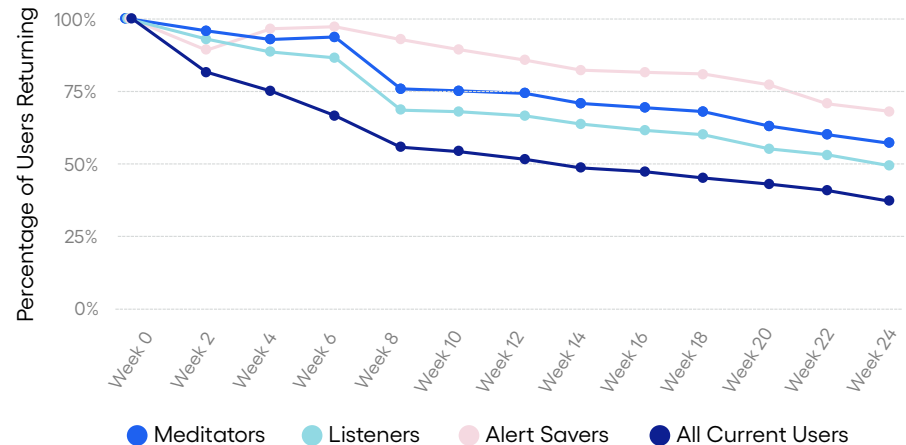
Stickiness Graph 1:

Monthly Stickiness for Appointment Booked

Legend: ● Persona 1 ● Persona 2 ● Persona 3 ● All Current Users
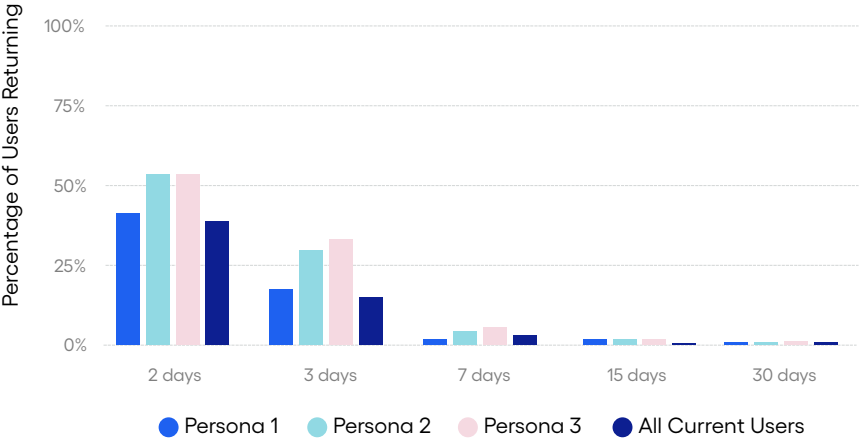
Stickiness Graph 2:

Monthly Stickiness for Any Event

Legend: ● Persona 1 ● Persona 2 ● Persona 3 ● All Current Users
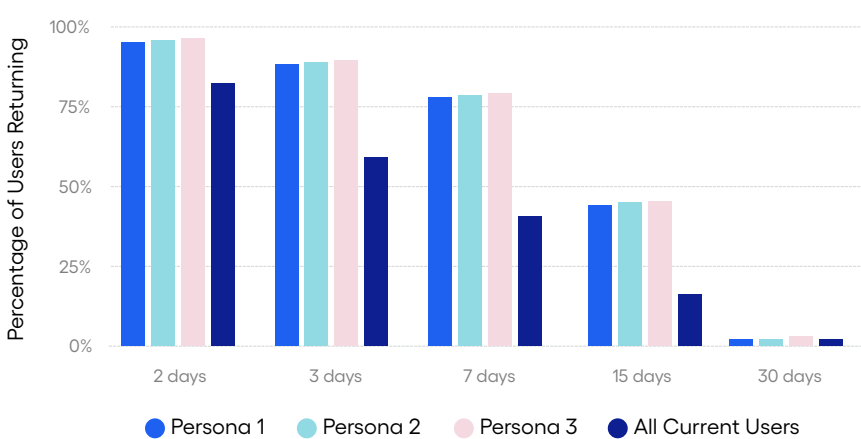
Critical event stickiness

It's also essential to look at critical event's stickiness, or the frequency (number of days) a user is active or did a specific event.

- **Amplitude Customer Example:** App that helps users find and book nearby fitness classes.

- **Stickiness Graph 1:** Measures each day user performed critical event—when a user books a class— within a month

- **Stickiness Graph 2:** Measures each day the user performed any activity—like browsing classes or checking a class schedule—within a month

Stickiness Graph 1 compared to Graph 2 told our Amplitude customer that although a high percentage of each of the three personas are opening and engaging with the app 15 days a month, the percentage booking appointments frequently is much lower.

Stickiness Graph 1 also helped this Amplitude customer uncover that Persona 2 and 3 are booking appointments at a higher frequency than Persona 1, and that it's more valuable to focus on increasing the number of users and improving the experience for Personas 2 and 3.

Discovering the drivers of habit formation

Once you successfully onboard and demonstrate value to new users, they're returning regularly. This is habit formation.

Studying current user retention is about understanding the factors that encourage people to form a habit. By studying current users, you'll pinpoint indicators of habit formation. You can then apply this to encourage more new or resurrected users to form habits. To help make this a repeatable process, we will show you how to look for behavioral drivers that tip the scale for habit formation.

To understand what gets new users to become current users, you dig into the behaviors that drive that transition.

Formed Habit / Behavioral Driver / Took Action

Phases of new and current user retention
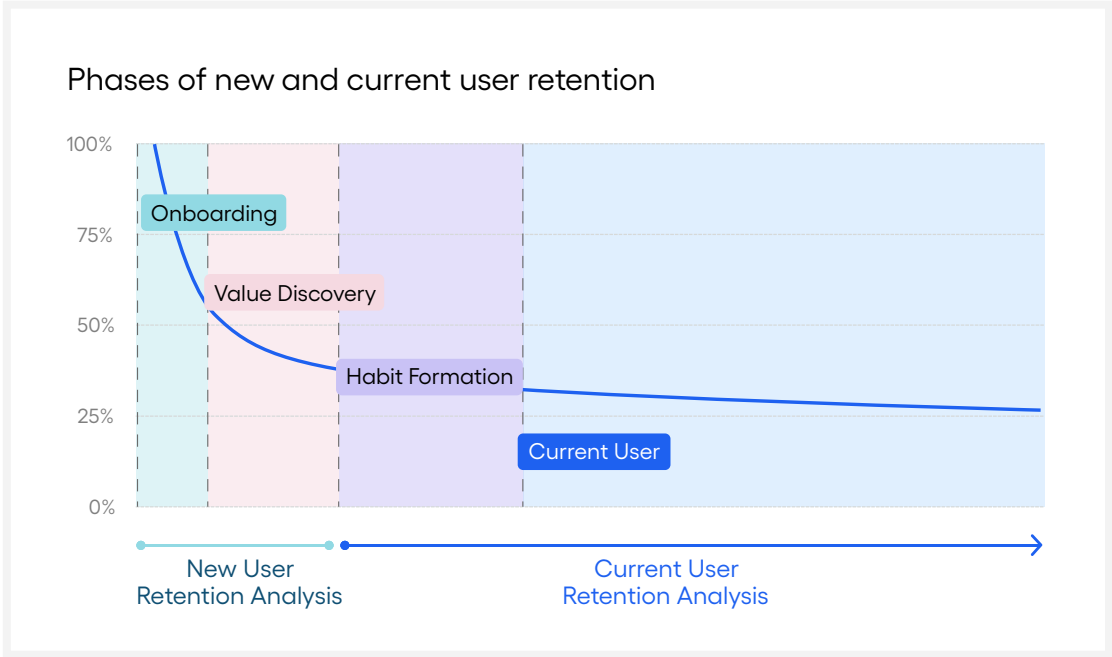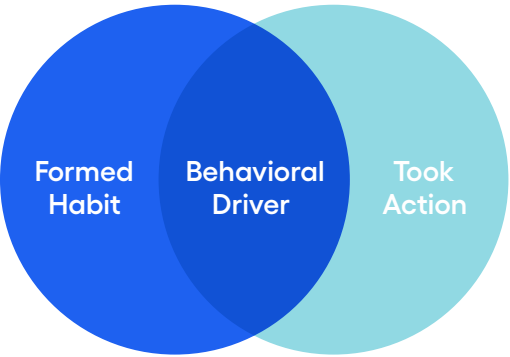
Identifying the behavioral drivers that move users through phases is similar to identifying your "aha" moment. Traditionally, the "aha" moment is an action a user takes early in their experience that makes them much more likely to retain. The most famous example is when Facebook identified that users who added at least seven friends in their first ten days are more likely retained.

Interested in other companies' "Aha" moments? Amplitude customers speak to the data discovery that transformed their role and company in this ebook.

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However, you can apply this concept of important behaviors to any stage of the user life cycle, not just for the "aha" moment of new users. To identify the drivers of habit formation, find an action or set of actions that separates users who complete Habit Formation from those who don't. For action(s) to qualify as a driver:

Most users who complete the action(s) form a habit and become current users

Most users who do not complete the action(s) churn before becoming current users

How to find your drivers of Habit Formation

In this section, we'll cover how to identify the behaviors that drive users to complete the habit formation phase.

Step 1: Create a base cohort of users who were retained during the Habit Formation period. The table and images below show the Habit Formation period that you should analyze based on the usage interval you calculated in [Chapter 2](#).

Step 2: Create a retained cohort of users who were retained in the next interval after the Habit Formation phase. These are current users who successfully formed a habit.

Product Usage Intervals	Habit Formation Period
Daily	Days 4-6
Weekly	Days 8-14
Bi-weekly	Days 15-28
Monthly	Days 310-60

Create Your Retained Cohort
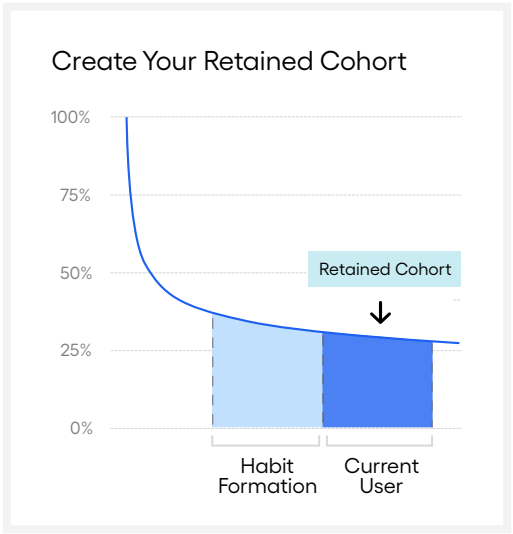
Step 3: Create a dormant cohort of users who were in the base cohort and were not retained in the following period.

Step 4: Compare your retained and dormant cohorts to find behaviors in the retained cohort but not in the dormant cohort.

You can do this by:

- Brainstorming actions you think might be essential drivers and measuring the percentage of users in your retained dormant cohorts who performed those actions.

- Talking to users from both groups to get qualitative data.

- Watching user replays or looking at user activity sequences from both cohorts.

For example, a music streaming product could hypothesize that important actions might include: playing songs, creating playlists, favoriting songs, and so on. The team would then evaluate any differences between the retained and dormant cohorts in the frequency they perform these actions.

Step 5: Once you've formed some hypotheses of potential drivers, measure the difference in retention between users who perform that action and those who don't. This will help confirm whether or not performing that action correlates with higher retention.

Below you can see that users who favorite at least one song have significantly higher retention than users who do not.

Daily Retention for New Users
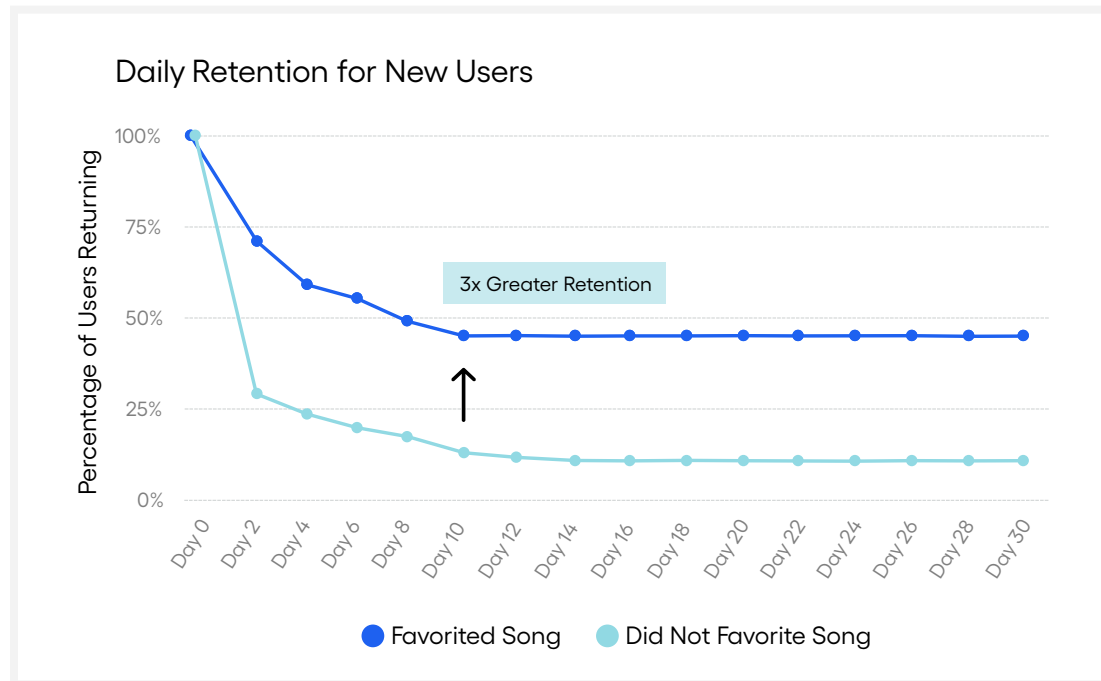
Apply what you've learned: Get more users to form habits and become current users

Once you've discovered your drivers of habit formation, you'll know the milestones that new users need to get through to increase the odds that they'll continue using your product as current users.

To implement these insights, consider getting more users to pass these milestones during their early experience. For the gaming company we previously discussed, these could include:

Sending push notifications when a user's social connection is active in the game, encouraging them to join them.

Presenting users with a reward, like a badge or in-app currency, once they've used the social feature a specific number of times.

By experimenting with a few methods, you can uncover the most effective ways to get users across the habit formation threshold.

Discover drivers from passive → core → power personas

As we discussed in Chapter 4, you can classify personas as passive, core, or power users. Earlier in this chapter, you identified more active and valuable personas than others.

Remember that for the mindfulness app, they found a passive persona of Listeners and a core persona of Meditators. To increase core usage of their app, they should try to get more Listeners to become Meditators.

So, how do you get a passive user to become a core user or a core user to become a power user? Just like we identified drivers of Habit Formation, you can identify behaviors that drive people to become core or power users. To do so, use the same process as before.

Take action

Now that you've completed the current user retention analysis, summarize what you've found and form some hypotheses to test.

Here are some key questions to ask yourself:

- What are the key action(s) you identified as drivers of Habit Formation? What methods can you test to get more new users to cross those thresholds?

- Who are your passive, core, and power users? How are they different? How can you convert core users to power users?

- Did your behavioral persona analysis reveal any use cases you didn't expect or didn't think were very important? How might you improve or tailor the experience for those users?

- Are some of your personas more important to your main business objective, like revenue?

- How can you get more users to convert into one of your core or power [user personas](#)? The most significant improvements can come from targeting users who are not well-retained and getting them to perform the same actions as your power behavioral personas.

Track improvement over time

As you test some of your hypotheses and pilot new ways to improve your current user retention, it's essential to keep track of metrics to see what is and isn't working.

Keep the goals of current user retention in mind as you form your metrics:

- Get new users to form habits and become current users.

- Get current users to become core users and core users to become power users.

We suggest tracking these metrics over time to measure your progress:

- The size (in absolute numbers) and percentage of your total active users that consists of your current users (as calculated via Lifecycle or manual analysis).

- Retention over time of all current users and of each behavioral persona.

- Size and percentage breakdown of your important behavioral personas. Are you getting more people into important personas?

- Stickiness over time for critical events, showing you any changes in how current users behave in the product.

- Conversion rate over time through your critical path funnel.

Resurrected user retention

Now we're down to the last stage of the Retention Lifecycle: resurrected users. In this chapter, you'll apply many methods you've learned and compare resurrected user behavior with current and new users.

TERMS TO KNOW

Resurrected User
A resurrected user has returned to your product after being inactive or dormant for a period of time. Specifically, we're defining a resurrected user as someone who is active in the current period, was not active in the previous period, and was active at some point before that.

Resurrected User Timeline
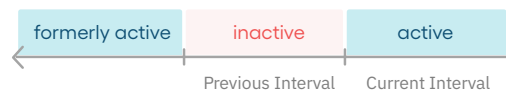
Why resurrected user retention matters

A resurrected user has returned to your product after being inactive or dormant for some time. Resurrected users are often overlooked in retention, but offer immense potential for improving overall retention and active user count. You can potentially resurrect all of your product's dormant users, and if you're like most companies, that's a pretty big pool.
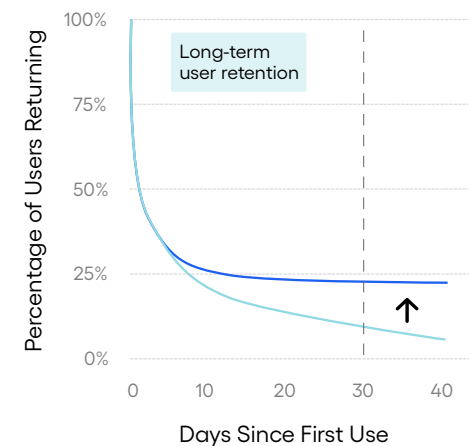
You've already acquired these users—so you have a better chance of reengaging them than convincing a new prospect to try your product. Often, you can spend fewer resources resurrecting users than trying to acquire new ones.

Resurrecting inactive users can help you flatten the retention curve and increase your baseline of active users, and in some cases, even inflect the curve upward.

Don't let users come back to a poor empty experience

Think about a resurrected user's experience: When they return to your product after a period of inactivity, what do they see? If it's an empty state with little for them to engage with, they might close the app and never return.

Here we see two examples of empty states. In the screenshot on the left, we see no messages—but there's nothing else to interact with on the screen.

On the other hand, the screenshot on the right shows a travel app. The user has no "Recents and favorites" yet, but the screen encourages them to start with a prominent call to action to "Plan a journey," and even offers a relevant promotion.
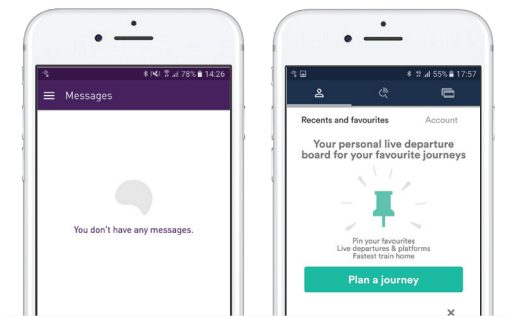
Think of any empty state as an opportunity to engage users and get them to perform an action you care about. For example, the app on the left could improve this screen with a call to action to send a message to a friend.

Take another example from mobile gaming—Words with Friends is a popular game by Zynga in which people play a Scrabble-esque game against their friends in real-time. Users who have been inactive on Words with Friends for a prolonged period don't have any active games with their friends. So if they return to the app, they don't have anything to engage with immediately.
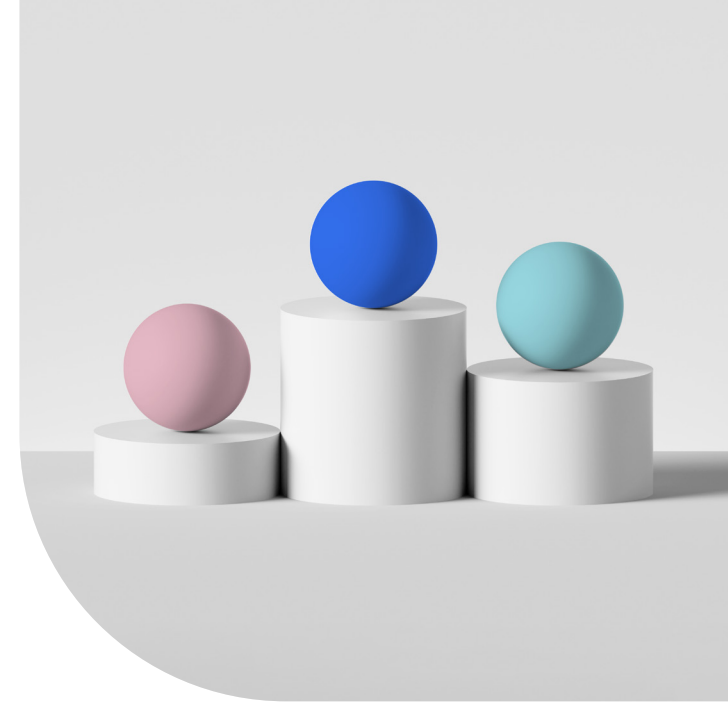
The Words with Friends team realized that due to this poor user experience, most resurrected users didn't re-engage well and didn't return to the app. They decided to send push notifications to the person's friends, encouraging them to invite that user to start a new game. That way, when users returned to the app, they had game invites waiting and were likelier to start playing again.

Providing a rich, resurrected user experience is a meaningful way to encourage them to re-engage and become current users.

What you'll learn in this chapter

The overall goal of resurrected user retention analysis is to learn how you can:

1. "Resurrect" or reactivate dormant users, and

2. Get them to become current users of your product

You also want to determine whether resurrected users are an excellent potential source of product growth.

We'll answer the following questions as we cover resurrected user retention analysis. Remember these as you work through this chapter and complete your analysis:

- Are there any behavioral personas of resurrected users that differ from current users?

- Can you identify any triggers for resurrection? How do metrics like retention and conversion compare those who do and don't receive the trigger?

- How do resurrected users compare to new and current users regarding key behaviors and revenue?

- What is the ROI of resurrecting existing users compared to acquiring new ones?

Resurrected users diagnostic

Just like you did for new and current users, take the resurrected user cohort you created in Chapter 3 and plot your baseline retention for resurrected users.

It's helpful to look at longer-term effects, at least 1-2x your product's usage interval.

How do resurrected users retain compared to other users?

You should also compare this to your current and new user retention curves, enabling you to understand how your resurrected users perform relative to these other two groups.
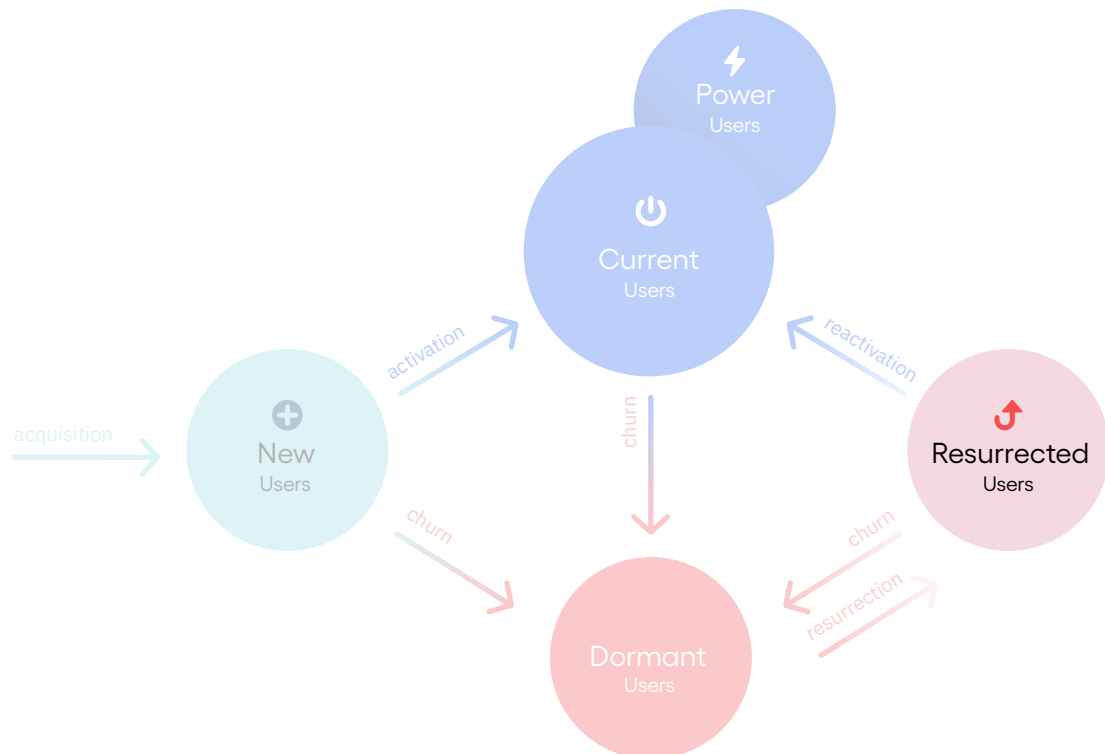
REAL-LIFE EXAMPLE

Retention of resurrected users for on-demand delivery company

In the chart, we've added the retention curves of current and new users for the on-demand delivery company. Although resurrected users don't retain as well as current users, they retain better than new users during the same period.

Remember, you should also look at retention for your critical event, not just for "active" users who may not be doing anything valuable in your product.

The second chart shows retention during the same period but with the company's critical event, 'Checkout,' set as the returning event. You can see that resurrected users have significantly better rates of returning and placing an order than new users during the same period, even many weeks after they initially resurrect.

In this case, resurrected users retain and place orders at much higher rates than new users. This indicates that resurrecting users could be a good source for gaining more current users and increasing revenue.

Here's a different situation for a product where the retention for resurrected users is very low, even lower than for new users. This could mean that the product isn't demonstrating value to resurrected users, so people don't re-engage and just leave the app.

The good news is that this product has solid current user retention. For a situation like this, we recommend looking at what it would take to increase resurrected user retention and weigh that effort against the potential benefit. Focusing on improving new user retention in the short term might make more sense for smaller teams with limited time and resources.

Retention for Users

Retention for Users Where Return Event is Checkout

Comparing Retention for New, Current & Resurrected Users

Legend: ● Current Users ● Resurrected Users ● New Users

feature. Here's a hypothetical example of active users during a week:

	# of Users	% of Total Active Users
Total Active Users	**590,084**	
New Users	76,167	13%
Current Users	429,394	73%
Resurrected users	84,523	14%

- 73% of the active users are current users using the app consistently. The product has a healthy user base, not new users who quickly churn.

- Nearly equal percentage of resurrected (14%) and new users (13%) indicates that the company is already successfully resurrecting users, whether organically or with targeted marketing efforts, and increasing their efforts could positively impact overall retention.

Determine the opportunity size of resurrected users

Now that you have your baseline resurrected user retention and understand how these users retain relative to current and new users, it's time to assess whether resurrected users could be a good source of product growth. Two calculations that help you determine the opportunity size are:

- The percentage of your active users that are resurrected.

- The number of potential resurrected users.

What percentage of your active users are resurrected?

Calculate the breakdown of your active users during the period you're measuring. In Amplitude, you can do this using the Lifecycle

How many potential resurrected users do you have?

Next, let's look at the size of the potential resurrected user pool. Anyone who has used your product in the past but has not used it in the current analysis period is a potential resurrected user. A practical way to assess this opportunity size is to calculate the number of people who used your product sometime in the preceding six months but have not used it in the current period. Depending on your product type, usage interval, and any seasonality of your product, you may want to look at a period that's longer or shorter than six months.

In Amplitude, you can calculate this group of users with a behavioral cohort definition. Let's suppose you're looking at the week of July 3 to 9, 2023. You would create a cohort of users who were active any time in the last six months but were not active in the current week:

👥 Behavioral Cohort

Users active in the last 6 months, but not active in the current week

The Users who..	..had been active
	any time since Jan 3, 2016
And not who	..had been active
	any time during July 3, 2023 - July 9, 2023

	# of Users	% of Total Active Users
Total Active Users	**590,084**	
New Users	76,167	13%
Current Users	429,394	73%
Resurrected users	84,523	14%
Potential Resurrected users	1,302,242	–

Returning to our example, this product has 1.3 million potential resurrected users. Think about this from an acquisition perspective. That's 1.3 million people who have downloaded their app in the last six months, but are currently inactive. They can re-engage them with a well-timed push notification or email. They're much easier to reach than the potential new users that they're spending money to acquire.

Find behavioral personas of your resurrected users

Just like you did for new and current users, you should examine the behavioral personas of your resurrected users. Understanding these behavior patterns can show why users might be returning or what may have triggered their resurrection. For a refresher on behavioral personas, see Chapter 4.

REAL-LIFE EXAMPLE

Resurrected personas for on-demand delivery company

An on-demand delivery company used Amplitude Personas to find clusters of users within their resurrected user cohort. They identified a few exciting personas listed in the table on the right.

The first two personas are especially encouraging—people in these personas place an order when they return to the app, and almost all remain retained two months later. Together, these personas make up 20% of resurrected users and use the product as expected when they return.

The other two personas, "Just browsers" and "Discount redeemers," provide some interesting information.

Persona	Description	2 Month Retention	% Resurrected Users
People who know what they want	These people did not have many events related to browsing different vendors or items, but instead found exactly what they want and placed an order	99%	11%
Browsers who order	These people did place an order eventually, but did a lot of browsing of di erent vendors before making their decision	97%	9%
Just browsers	Like the previous persona, these people also did a lot of browsing, but ended up not completing an order	75%	21%
Discount redeemers	This group of people all did an event called 'redeem discount'. This was a discount emailed to a subset of users for a few dollars o a delivery	90%	5%
Open and leave	People who just opened the app	35%	37%

Browsers

The "Just browsers" persona contains a lot of users, making up 21% of the resurrected user cohort. These people exhibit similar browsing behavior to "Browsers who order" but ultimately don't complete an order that day. As a group, they have pretty high 2-month retention at 74.52%, demonstrating that despite not placing an order that day, there's a high likelihood they'll return later.

Since 21% of resurrected users browse but do not order, improving the browsing experience could effectively boost resurrected user retention. If the company could convert more "Just browsers" to "Browsers who order," not only would they get more revenue from orders on the day they resurrect, but this data shows that "Browsers who order" have much higher long-term retention as well (97% 2-month retention).

Discount redeemers

The "Discount redeemers" Persona showed several events related to redeeming an emailed discount on their next order.

Any time you're looking at the impact of discounts, you need to measure how well they incentivize users to place an order in the short term and become repeat customers moving forward. We'll look at that more in the next section.

Identify triggers of resurrection

The next step is to determine any measurable triggers of resurrection. These could be push notifications or emails that you send to your users. For example, if you already have some re-engagement campaigns targeted at users who have been inactive for some amount of time. If your product has a social component, you can base these notifications on actions from users' friends or networks, like the notification you get when someone mentions you on Twitter.

Your product might also have triggers that coincide with outside factors like holidays, sporting events, or weather. For example, you might notice users place more orders with an on-demand app during a week of heavy snow when people are less inclined to go outside to run errands. It's hard to confirm these factors in your data, but consider these outside influences when you notice spikes or dips in usage.

For resurrected users, we want to identify external triggers that brought them back to the product. Then we can measure how effectively they re-engage users and think of ways to improve.

PRO TIP
Internal vs. External Triggers

In his book *Hooked*, author Nir Eyal talks about two types of triggers: external and internal.

External triggers are things like push notifications, emails, or ads that we use to get users' or potential users' attention. Many mobile apps use push notifications to encourage users to return to their app.

Internal triggers, on the other hand, happen in a person's mind. According to Nir, an internal trigger occurs when "a product is tightly coupled with a thought, an emotion, or a pre-existing habit." For example, we open Facebook when we're feeling bored or lonely—the impulse to open Facebook is cued by emotions.

The best habit-forming products start with external triggers to initially attract and educate the user, but over time users no longer need the external triggers to keep using the product, relying instead on internal ones.
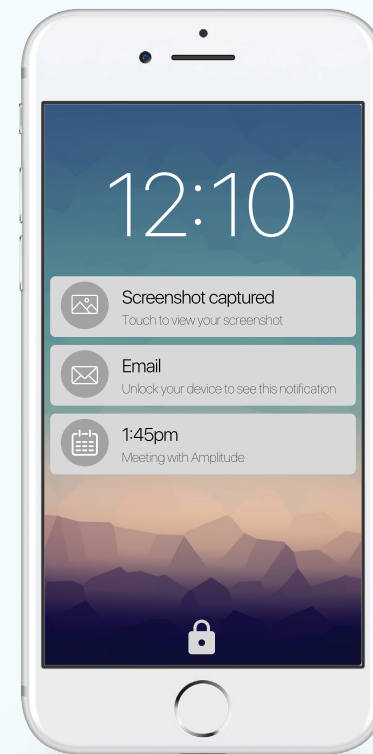
Here are a few ways to identify triggers:

- If you have a website or web app, look at session UTM parameters and referrer data to look for common sources, like an email campaign or ad.

- If you perform a cluster analysis to determine behavioral personas, as we did in the previous section with the Personas feature, you can look for events within each cluster that could have triggered resurrection.

Analyze the paths of resurrected users using Amplitude's Journeys or a similar path visualization to explain why users return.

Once you identify potential triggers, compare downstream metrics to understand whether they have the intended effect; for example, compare critical funnel conversion rates and long-term retention for users who receive these triggers.

PRO TIP

Tracking messaging data (push notifications and emails) and attribution data in your product analytics platform enable you to measure the impact of these campaigns on later in-product behavior. We recommend sending messaging and attribution data to your product analytics to get the complete picture of user behavior. If you're using Amplitude, we partner with best-in-class providers across messaging and attribution so that you can easily integrate different data sources into Amplitude.

REAL-LIFE EXAMPLE

The impact of discount email offers

n the previous section, we discussed the "Discount redeemer" persona for the on-demand company. These discounts are sent via email to a subset of users who have been inactive for some amount of time.

We created a behavioral cohort of resurrected users who received the special offer, and found that 22% of all resurrected users had received a discount offer.

When we compared the critical funnel conversion rates for resurrected users who did and did not receive the special offer, we found a vast difference—94.5% of resurrected users who received a special offer completed an order, compared to only 26.5% for the rest of the resurrected users.

Almost every user who returned to the app after receiving a discount completed an order. The team also looked at the conversion rate from receiving a discount to launching the app and found that 58% of users who receive a discount offer launch the app within seven days.

Critical Funnel: App Launched > Delivery
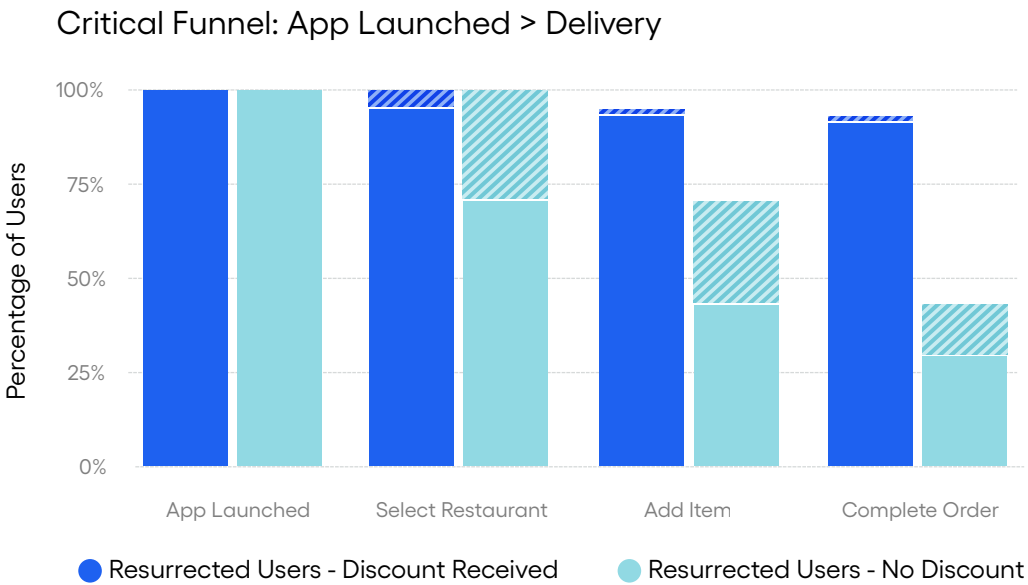
The company wanted to look at the long-term impact because the special offer effectively got people to return and place an order. Do users just return one time with the special offer, or do they keep placing orders over time?

Looking at monthly retention moving forward, where the returning event is to "Complete order," you can see that people who got the special offer retained at significantly better rates than those who did not—even many months later.

REAL-LIFE EXAMPLE

Monthly Retention for the Critical Event: 'Complete Order'

Percentage of Users Returning

100%
75%
50%
25%
0%

Month 0 · Month 1 · Month 2 · Month 3 · Month 4 · Month 5

● Resurrected Users - Discount Received ● Resurrected Users - No Discount
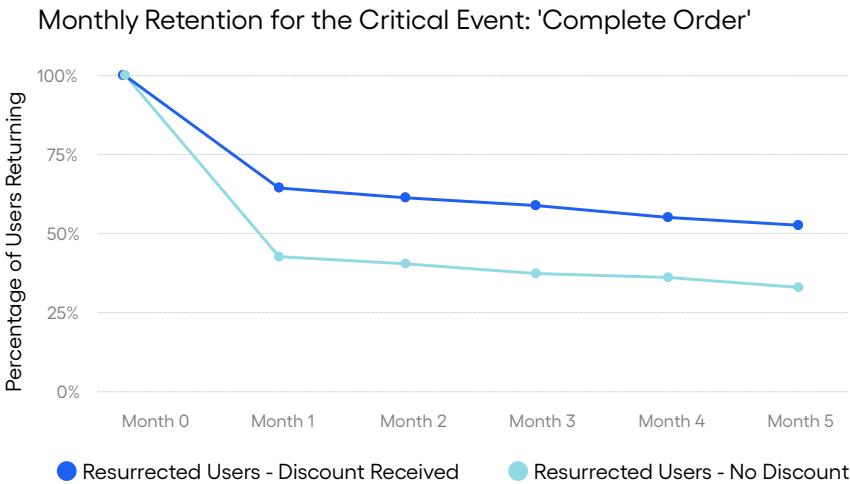
The discount program has a significant long-term effect on increasing purchases. The on-demand company decided to try expanding this program to more of their dormant users to encourage resurrection.

Compare resurrected user behavior to new and current user behavior

Once you identify triggers and behavioral personas, compare these to your current and new users. We recommend looking at long-term retention and critical funnel conversion rates. You can also measure revenue and use other methods from the Product Analysis Toolkit to help you assess the value of focusing on current users relative to other groups.

Notification spam doesn't work

It might be tempting to blast your inactive users with notifications or emails. But chances are these will be ineffective and only annoy your users, prompting them to unsubscribe—or worse, stop using your product forever.

Remember that external triggers, like push notifications, must be well-timed with a

user's internal triggers and existing behavior. Notifications work best when they redirect existing emotions or behaviors to your product. They're even better when you can personalize them based on what you know about the user— whether it's preferences they've set or prior actions they've taken.

REAL-LIFE EXAMPLE

Compare long-term retention and critical funnel conversion rates

Continuing the on-demand company example from the previous sections, the company split resurrected users into two primary personas: Organic did not receive any email reactivation campaign, and Non-Organic received a reactivation campaign. Then they compared the retention of these two resurrected user personas to current and new user retention.

Here is the weekly retention chart, where the returning critical event is placing an order. Organic resurrected users have retention about 65% higher than new users, while non-organic resurrected users retain far better than new users—with 260% greater retention. These retention impacts are also long-term, extending 24 weeks out.

Weekly Retention for the Critical Event: 'Placing an Order'

Legend: Current Users, New Users, Organic Resurrected Users, Non-Organic Resurrected Users
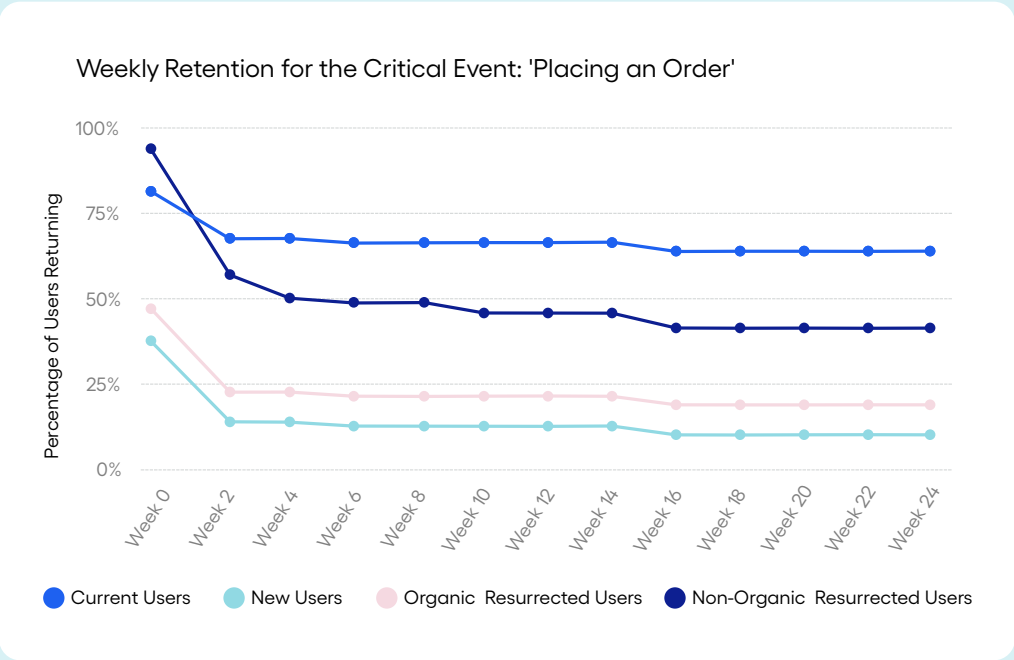
Compare critical funnel conversion rates

Comparing the critical funnel conversion rate for resurrected users to new and current users will show you whether resurrected users are helping your business goals. You can also identify any critical drop-off points for resurrected users and see what dropped-off users do instead of converting.

Here's the critical funnel comparing the same user groups during the current period. The funnel shows the conversion rate from opening the app to completing an order. Non-organic resurrected users have the highest conversion rate, at 94.6%. Organic resurrected users have a slightly lower conversion rate than new users: 28.2% compared to 33.2%.

For this company, reactivation email campaigns increase conversions during the current period and significantly impact retention and repeat orders over at least the next 24 weeks. This is a good indication that their campaigns are working, and they should explore sending campaigns to more of their dormant users.

In addition, this data shows that resurrected users have higher conversion rates and place more orders in the long term than new users, especially non-organic resurrected users.

Measure critical events and event properties

Remember, your critical event is the user action that represents that they're using your product and getting value out of it (e.g., completing a game, placing an order, playing a song). When analyzing your resurrected users, investigate how much they perform your critical event, not just whether they return to the product.

Comparing critical events and event properties help you understand whether resurrected users have different behavioral patterns or perform these events at a different frequency

Critical Funnel: App Launched > Complete Order
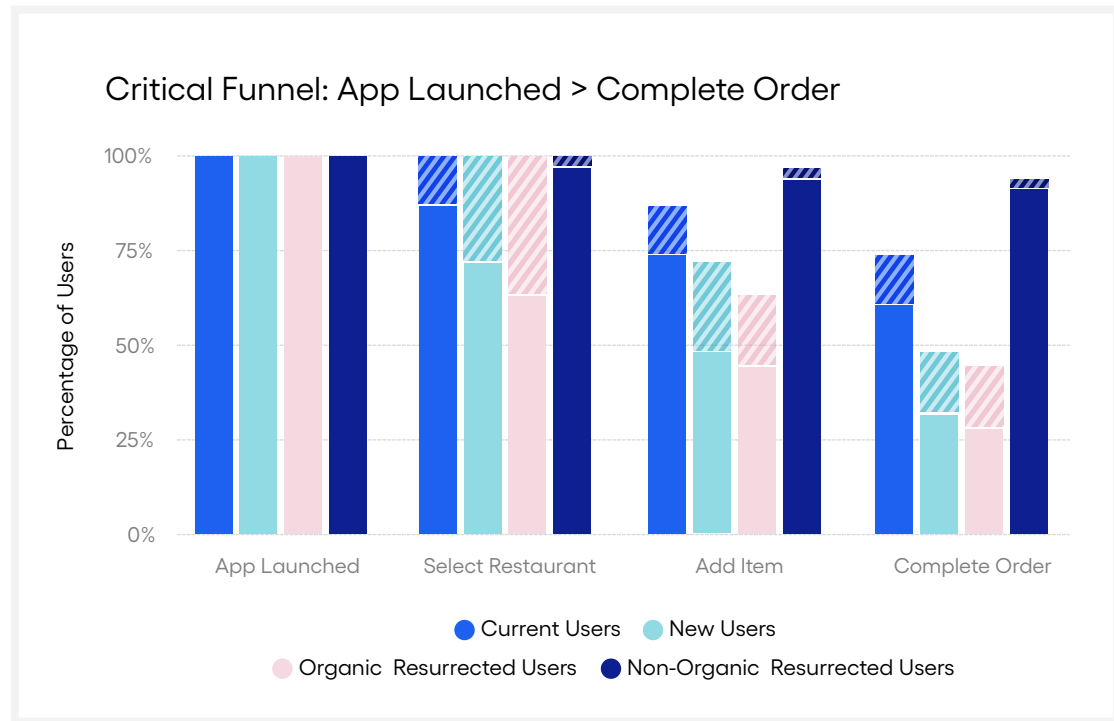
than current users. This can help you determine whether:

- It's worth focusing on resurrecting more dormant users from a retention or monetization perspective.

- If there's something unique to how resurrected users behave that you should use to tailor their experience upon return.

Compare engagement for critical events

One way to compare critical event engagement between different user cohorts is to measure the percentage of users in each cohort that executed the event. Remember also to graph any significant personas of resurrected users you've identified.

REAL-LIFE EXAMPLE

Compare long-term retention and critical funnel conversion rates

The critical event for one Amplitude customer, whose product is a lifestyle app, is booking an appointment. To the right you can see this critical event as a percentage of active users in each cohort. In other words, the percentage of each cohort (current, new, or resurrected) that booked an appointment each day.

Resurrected users have a lower rate of users booking an appointment compared to new and current users.

The average number of times a user performs the event is another way to look at engagement. The following graph shows a similar pattern, with resurrected users booking fewer classes on average than new and current users.

% Daily Active Users Who Booked an Appointment

● Resurrected Users ● Current Users ● New Users
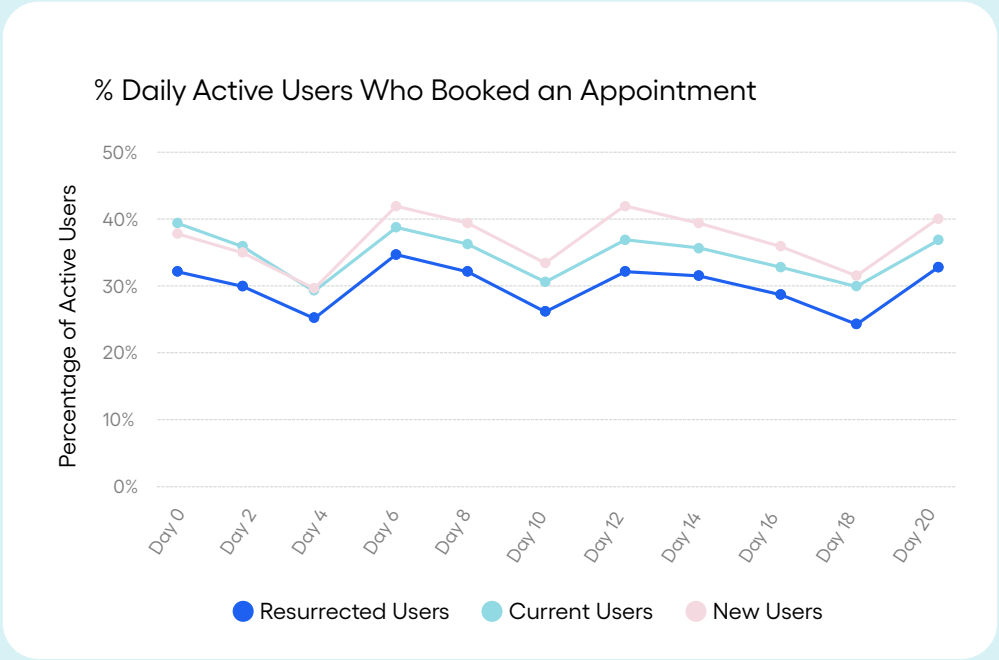
Compare important event properties

Although the number of bookings made by users is an important metric for this company, the end goal is revenue. So, they also looked at "cart total price," an event property for their booking event.

Graphing the average cart total price for each user group, they found that resurrected users spend more than new users on average for each transaction.

Although resurrected users make fewer bookings, they spend more per transaction. This company also has a large pool of potential resurrected users. We recommend dedicating some time and resources to resurrect users.

Average Cart Total

Average Number of Appointments Booked Per User
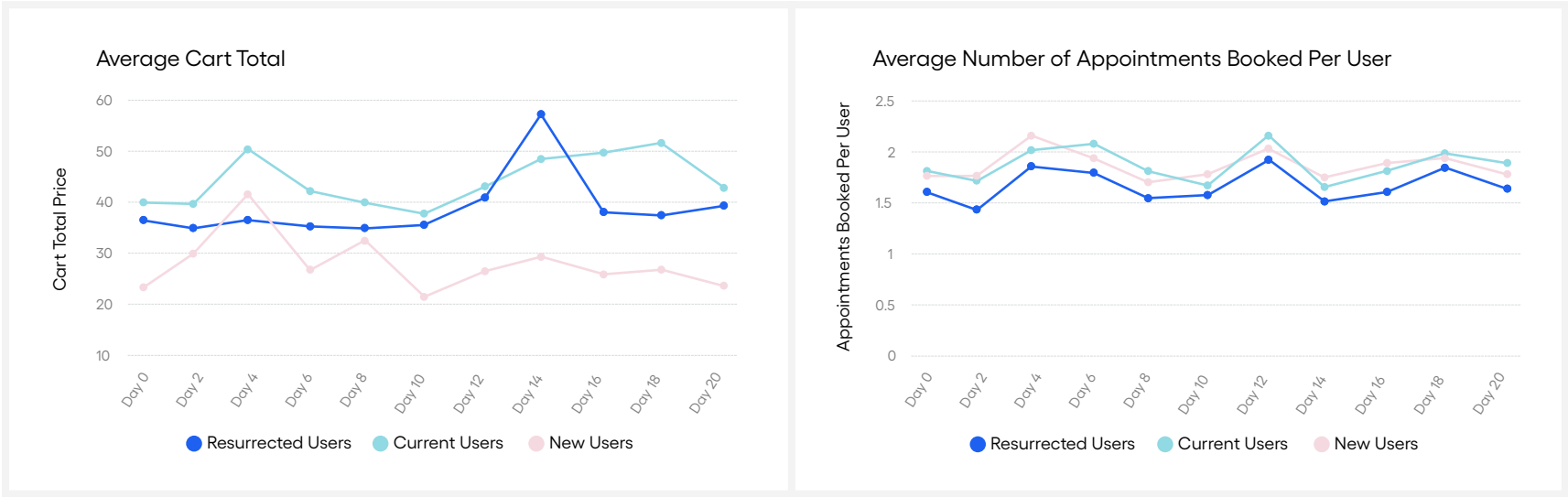
Compare stickiness and session metrics

In addition to looking at critical event patterns and event properties, you can look at stickiness and session metrics to understand other aspects of resurrected user engagement. We covered these metrics in Chapter 4, so
review those sections for more detail on measuring them.

Stickiness and session metrics are another way to compare the engagement and behaviors of your resurrected and current users. Identifying differences enables you to form hypotheses about resurrected users and find ways to get resurrected users to behave more like current ones.

We recommend doing the following analyses:

- Compare the stickiness of your critical event(s) for resurrected, new, and current users.

- If session length is important to your business, compare session length distributions and average session length for resurrected, new, and current users.

Session Metrics

Graphing the session length distributions for resurrected vs. current users lets you compare their behaviors. Similar distributions indicate that resurrected and current users behave similarly, so getting them to become current users in the long term should be easier.

REAL-LIFE EXAMPLE

Meditation app uses session length to measure engagement

For the meditation app, session length, session length is a good indicator of engagement. The more time users spend in the app, the more value they get from the product.

Looking at the average session length, the team found that current users, on average, have longer sessions than resurrected users.

When looking at the distribution of session lengths, they found that resurrected users have a much higher percentage of sessions that are less than 30 seconds. A user can't accomplish much in this app in less than 30 seconds, so we can assume they aren't using it during that time.

Current users also have a much higher percentage of sessions that last 10 minutes or longer.

Session Length Distribution

Resurrected Users

Session Length Distribution

Current Users

Average Session Length

Current Users   Resurrected Users
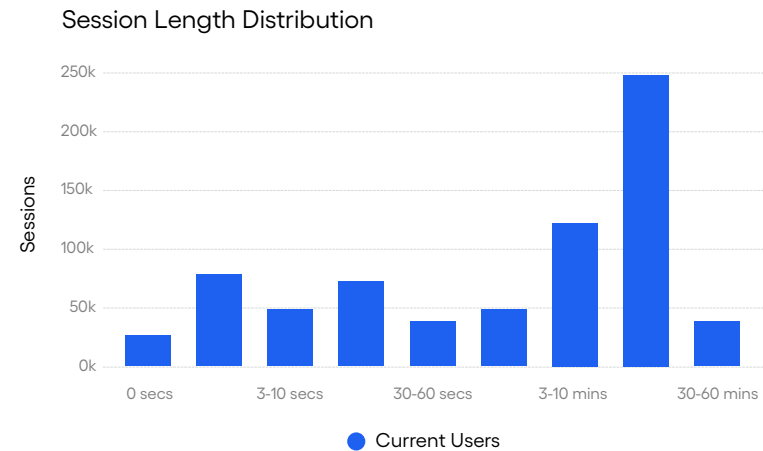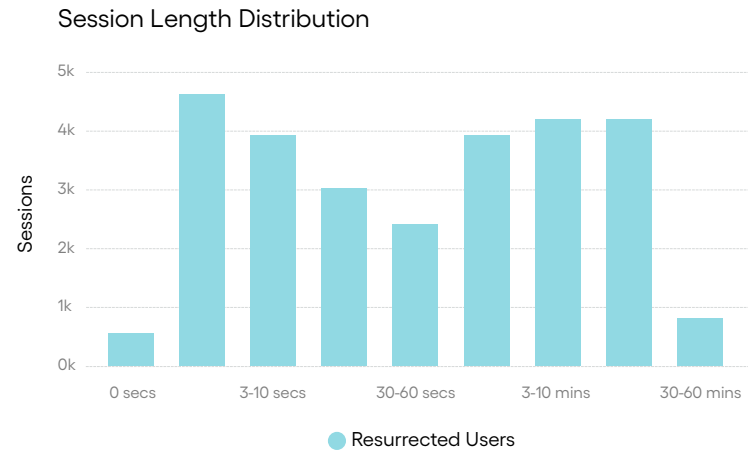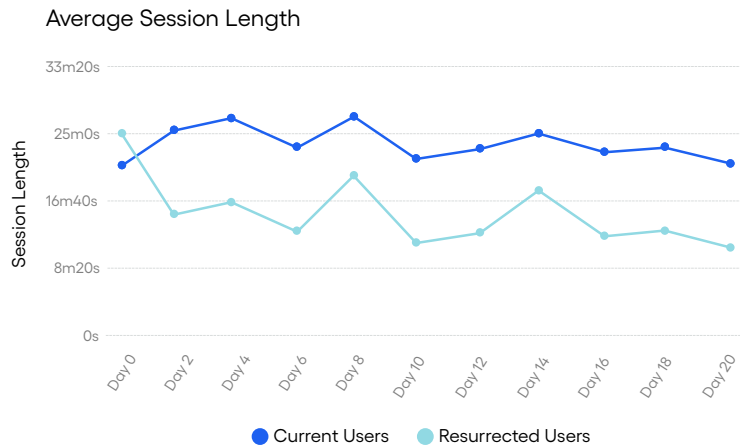
This data shows that current users spend more time in the app and have longer, more meaningful sessions than resurrected users. If this company wants to re-engage resurrected users, it should improve the resurrected user experience to encourage them to behave more like current users.

Compare revenue for resurrected, current, and new users

The bottom line for most businesses is revenue. Comparing the revenue for resurrected, current, and new users will help you decide whether resurrection efforts are worthwhile for your team.

Resurrecting a user will likely cost less than acquiring a new one. So, by comparing the

potential monetization of resurrected users compared to new ones, you can determine the relative ROI and decide how to spend your resources.

We recommend comparing revenue metrics like:

- ARPU: Average revenue per user

- ARPPU: Average revenue per paying user

In the graph to the right of ARPU, resurrected users spend more per user than new users during the same timeframe and spend about the same amount as current users.

The ARPPU values are more similar but still show that per paying user, resurrected users are spending more than new users and similar amounts to current users.

Average Revenue Per User (ARPU)

● Current Users ● Resurrected Users ● New Users

Average Revenue Per Paying User (ARPPU)

● Current Users ● Resurrected Users ● New Users
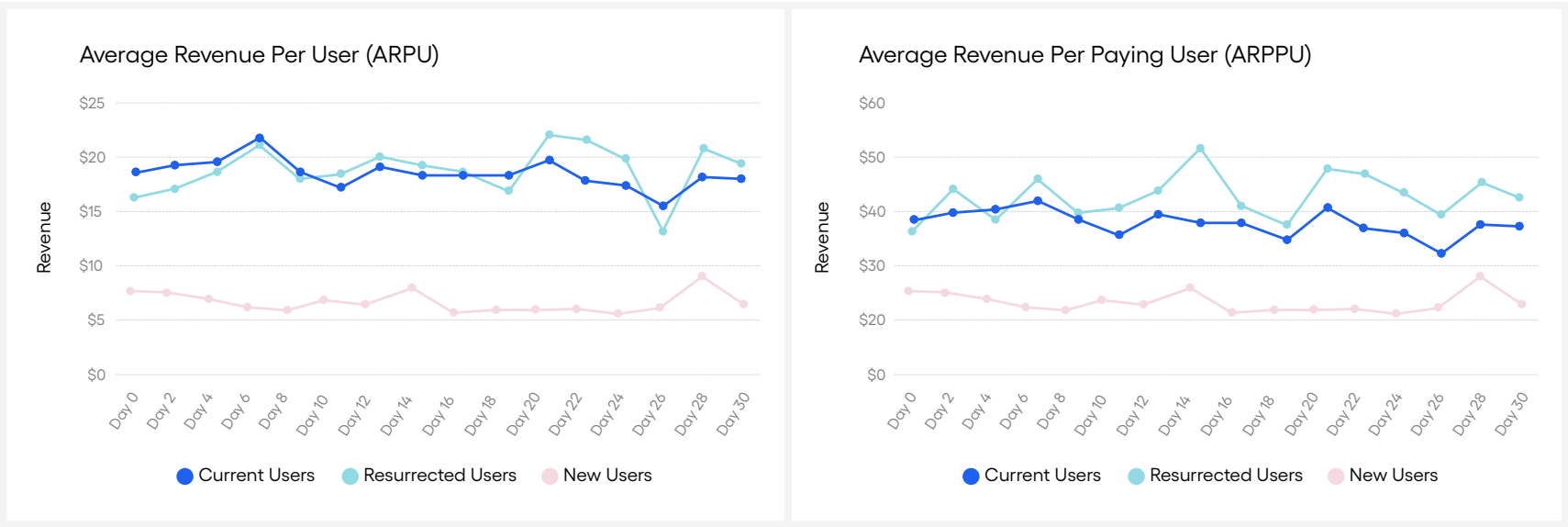
Take action

Remember, resurrected user retention analysis aims to learn how to reactivate dormant users and encourage them to become current product users. You also want to understand the potential value of resurrected users, especially compared to resources spent acquiring new ones.

Although not always the case, several of our customers have seen resurrected users convert and retain better than new users and contribute more revenue per user. And since you've already acquired these users, the cost to resurrect them via a push notification, email, or special offer is likely less than your new acquisition cost. You'll need to do your own analysis to ensure this is true for your business, but it's certainly worth investigating as an often-overlooked source of growth. Here are some key questions to ask yourself as you form hypotheses:

☐ What percentage of your active users currently come from resurrected users, and what's the potential active user growth you experience by increasing the number of resurrected users?

☐ How can you tailor your resurrected user experience to increase the chance they'll re-engage and become a current user?

☐ Is there an opportunity to trigger more users to resurrect to provide an overall lift in your retention and other core metrics?

☐ What are effective triggers that you can experiment with for resurrecting dormant users?

Track improvement over time

Keep the goals of resurrected user retention in mind as you form your metrics:

- Trigger dormant users to become resurrected users.

- Get resurrected users to become current users.

We suggest tracking these metrics over time to measure your progress:

- The percentage of active users that come from resurrected users.

- Long-term retention of resurrected users to understand what percentage become current users. You want to avoid strategies that only result in short-term spikes in activity.

- Efficacy of re-engagement campaigns, like push notifications or emails. Keep track of open and click-through rates, and downstream metrics like retention and critical funnel conversion rate for each campaign.

- Stickiness of critical events.

- Conversion rate over time through your critical path funnel.

Use the Resurrected User Retention worksheet to take notes and keep organized.

What to do next

By now you understand—user retention is vital to product growth. No matter how much you invest in top of the funnel acquisition, if you have a leaky bucket, you won't experience real growth.

With your new knowledge of each part of the Retention Lifecycle, you're equipped with proven concepts and frameworks to help shape your long-term retention strategy. It's time to start putting this playbook into action.

Next steps: your retention diagnostic

Benchmarking your retention

There's only one product you need to benchmark your retention against: your own. To uncover trigger points and implement retention strategies, you must measure baseline retention metrics for your current, new, and resurrected users.

After determining your critical event and product usage interval, decide which type of retention calculation works best for you. We covered the three ways of measuring retention—Return On retention, Return On or After retention, and Return On (Custom) retention—and different use cases for each in Chapter 3.

Then, based on your usage interval, create new, current, and resurrected user cohorts and create a retention curve for each user group. We recommend collecting at least three months of data before completing this step.

Recall from Chapter 1 that the shape of these retention curves gives a high-level indication of how your retention trends for each user group. First, look at the shape of the current user retention curve—is it going straight to zero? Is it flattening off? How many users come back at certain time intervals? Do you need to focus on shifting up or flattening the curve?

Next, you should compare your new and resurrected user retention curves to your current users to give a high-level idea of what's happening.

Once you benchmark your retention metrics and diagnose any problems, it's time to set retention goals.

> Explore Amplitude customer's retention benchmarks across industries, regions, and by company size.
>
> **SEE THE BENCHMARKS** →

Setting concrete retention goals

Brian Balfour, CEO of Reforge and previously VP of Growth at Hubspot, likens the retention building process to constructing a machine.[12] If you can set up the right processes and incentives, then growth will run itself. That's why it's critical to set retention goals for you and your team.

We recommend using a goal-setting system called OKRs—Objectives and Key Results. Your retention plan could look like this:

1. State your goals.

2. Set a timeframe (30 to 90 days).

3. Assign three key results related to retention that you want to achieve. Each needs to be an objective you can measure:

   a. Improve retention by 20%

   b. Improve retention by 2x

   c. Improve retention by 10x

4. Brainstorm actionable objectives you'll use to hit your key results.

Balfour recommends coming up with three key results separated in terms of the likelihood of success.[13] You should have a 90% chance of achieving the first and a 50% and 10% chance of achieving the second and third, respectively. This ensures you have short-term goals that keep morale high and "reach" goals that drive

your team to go above and beyond.

There are lots of different retention tactics and strategies that you can experiment with. Using a framework like OKR lets you stay laser-focused on your retention goals.

The importance of monitoring key metrics

Once you've defined your goals and the metrics you'll use to track progress, you need to ensure they're easily visible to everyone on your team. Displaying these metrics on a big dashboard in your office is a great way to keep goals top of mind and keep your team aligned.

A recent survey showed that companies who set and track key metrics are more likely to reach their goals and that teams who track these metrics in real-time are 2x as likely to reach those goals versus those who don't.[14]

Of course, the metrics you track over time depend on your goals. We'll provide some recommendations to choose from or adapt; the best metrics will be those custom to your business.

REAL-LIFE EXAMPLE

FunCraft improves retention by keeping Analytics front and center

FunCraft is a mobile gaming app that aims to create new genres and make mobile games that are daily rituals in players' lives. Analytics is the lifeblood of learning how to make a game better, to hear from players, and see the actions that they're taking in each game. Everyone—from the product team to the CEO—uses Amplitude Analytics for high-level KPI dashboards to see how the business is trending daily, and dive into specific user actions.

With Analytics, the FunCraft team set up custom reports in a templated way for easy re-use. This has become increasingly important as FunCraft iterates on its product experience.

Experimentation is core to FunCraft's product improvement. One experiment examined how many letters players placed on their first turn in their crossword puzzle game. Insights from Analytics enabled the team to make product changes, improving Day 1 retention 10%.

DO IT IN AMPLITUDE
Create, share, and subscribe to dashboards in Amplitude

Monitoring and sharing data is critical to forming a data-informed company. That's why we make it easy to pin Amplitude charts to dashboards and share them with your team. You can also share dashboards with teams and set up regular email report sends to stakeholders.
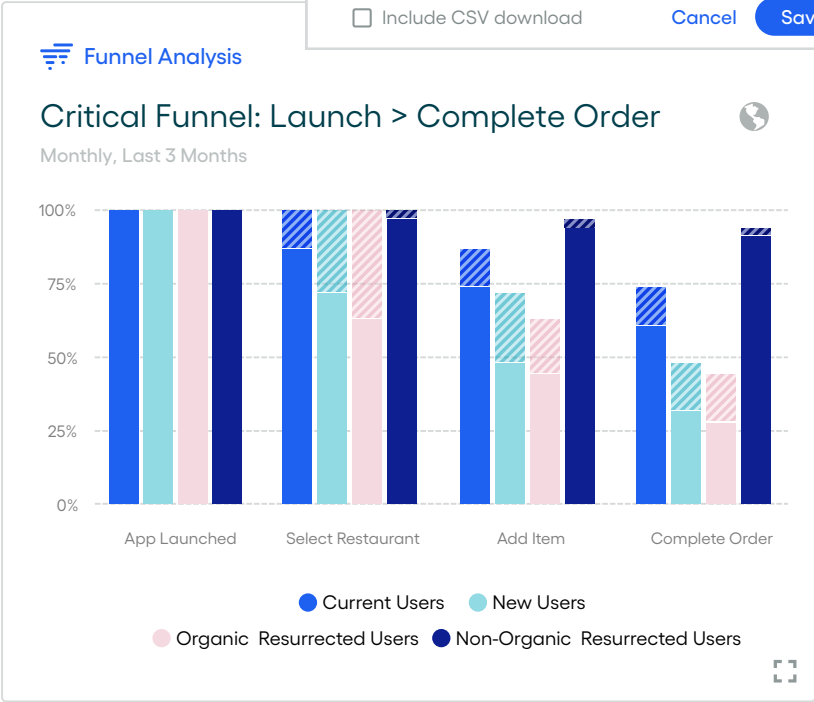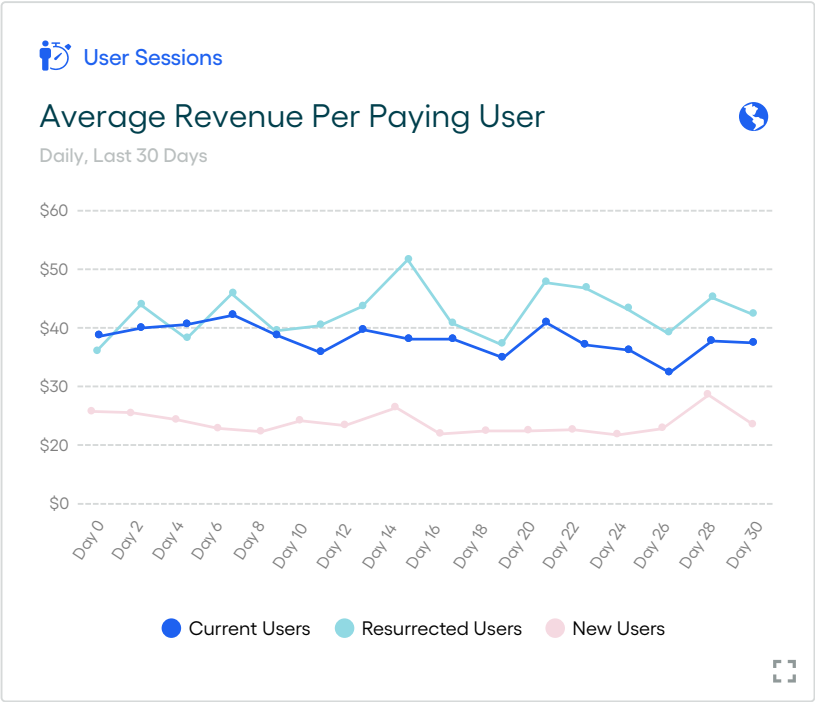
Email Subscriptions   ✕

Add New Subscribers

Meredith Fay ✕   Alicia Shiu ✕

Set Updates
Send email updates Mondays at 12:00pm UTC

☐ Include CSV download   Cancel   **Save**

User Sessions

Average Revenue Per Paying User
Daily, Last 30 Days

● Current Users   ● Resurrected Users   ● New Users

Funnel Analysis

Critical Funnel: Launch > Complete Order
Monthly, Last 3 Months

● Current Users   ● New Users
● Organic Resurrected Users   ● Non-Organic Resurrected Users

App Launched   Select Restaurant   Add Item   Complete Order

+ Add a chart

Retention lifecycle breakdown—lifecycle and pulse

Any company will benefit from measuring its active user makeup using Lifecycle or a similar framework, which we discussed in Chapter 3.

We recommend graphing your lifecycle breakdown and pulse metric every period and comparing how each user stage changes to help you quickly course-correct if you notice concerns, like an increase in dormant users or a dip in current users. You can also track the overall health of your user base as you implement new retention strategies.

As you work on the goals of the Retention Lifecycle Framework, Lifecycle shows you how you're doing:

- Activating new users → current users
- Retaining current users
- Resurrecting dormant users
- Reactivating resurrected users → current users

Retention lifecycle metrics to track over time

At the end of Chapters 5 to 7, we recommended metrics to track the improvement of current, new, and resurrected user retention.

Lifecycle
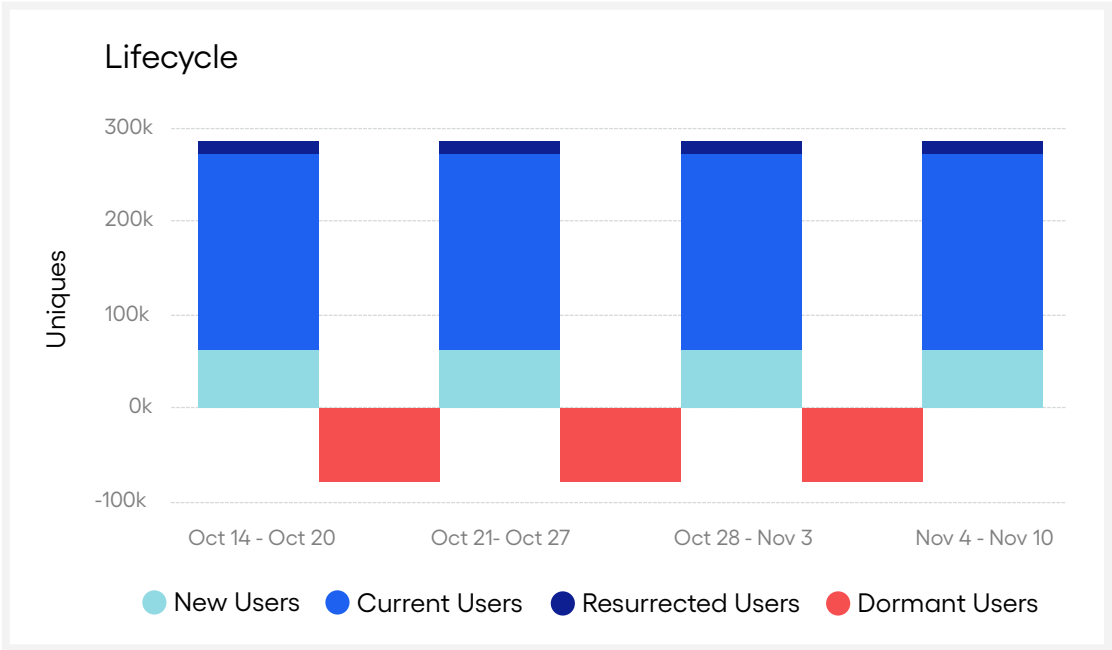
Current	**New**	**Resurrected**
Retention over time of all Current Users and key current behavioral personas	Retention over time of your New Users and key new behavioral personas	Retention over time of your Resurrected Users and key new behavioral personas
Size and percentage breakdown of your important behavioral personas. Are you getting more people into important personas?	Bracket retention curve that follows your New > Onboarding > Value Discovery > Habit Formation phases	Downstream metrics from reengagement campaigns like retention and critical funnel conversion rate
Stickiness of critical events	Conversion rate through your onboarding funnel	Stickiness of critical events
Conversion rate over time through critical path funnel	The percentage of new users who become current users	Conversion rate over time through critical path funnel
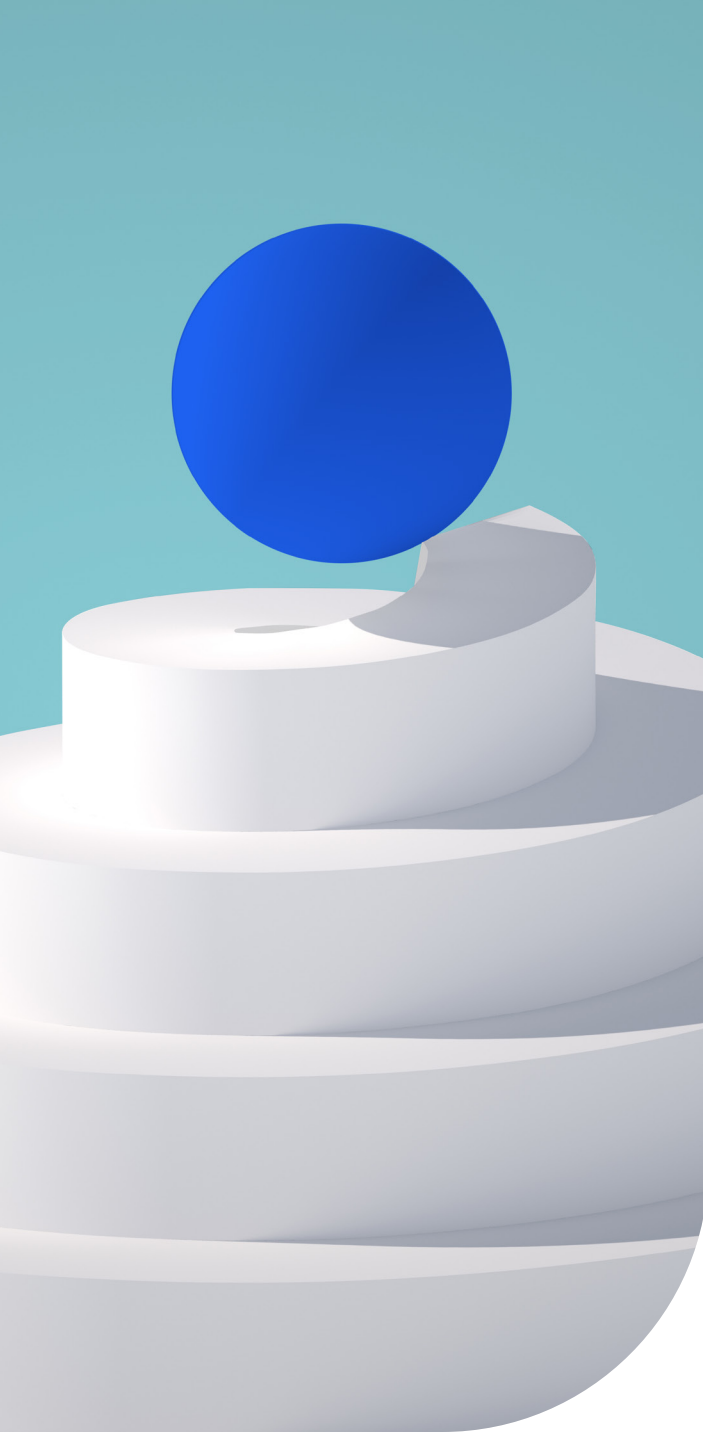
Prioritizing experiments

After working through all the chapters of the playbook, you'll have lots of insights and tactical ideas to help you improve retention. How do you decide what to do first?

Prioritizing your growth ideas is critical to making progress toward your goals.

There are some great existing resources and frameworks for prioritizing growth experiments. In particular, Brian Balfour and Sean Ellis, the founder of GrowthHackers.com, have shared their processes, and we highly recommend checking out their work for more details.

Ultimately, you need to pick a process that works for your company and use it to drive accountability. As Balfour puts it: "There is no one right or perfect growth process. The important part is just to have one, stick to it, and improve it over time."

Here are some principles drawn mainly from Balfour's and Ellis' processes, which share many similarities. [15&16]

1. **Brainstorm and keep a backlog of ideas:** First, start with a central place to keep a backlog of all your ideas. A simple spreadsheet will work great.

2. **Prioritize:** To prioritize which ideas to work on first, you can score each idea on a few factors. Sean Ellis' ICE score[17] is a great way to rate ideas on three key factors:

   1. **Impact: What impact do you expect this experiment to have?** You can use quantitative data from your playbook analysis and previous experiments to inform this or qualitative data from user feedback.

      By identifying the expected outcome or value of making a change, you have something quantitative to prioritize experiments and measure your actual results against. Balfour recommends thinking about your hypotheses like this:

      If successful, [variable] will increase by [impact] because of [assumptions].

      For retention specifically, multiply the expected increase in retention by the number of impacted users—that gives you a sense of how much the change could impact your overall retention.

2. **Confidence:** How sure are you that your hypothesis is correct? This one can be harder to determine, especially when starting out, but it gets easier as you run more experiments.

   If you have a lot of data to back up the experiment, you will assign a higher confidence score. If the idea is based more on a hunch or is something completely new, you'd give it a lower score.

3. **Ease:** How much work will it be to implement this experiment? Think about the time it will take for each team involved, like design, marketing, product management, and engineering.

3. **Run experiments:** Once you've prioritized your ideas based on impact, confidence, ease, and any other factors that might matter to you, it's time to design and run those experiments. This reference provides a template of an experiment doc based on Balfour's process, which you can use for your team.[18]

   When designing experiments, Balfour advises that you define the "minimum viable test" to understand your hypothesis. Also, consider the user sample size you'll need to see a significant result.

4. **Analyze and share results:** After each experiment, compare the results to your original hypothesis. How close did you get? What was the impact on retention? Most importantly, why did you get the result that you did? Record learnings and action items, like rolling out a positive experiment to the entire user base.

5. **Keep up a cadence:** Ellis and Balfour recommend holding a weekly growth meeting to discuss experiments, their results, and action items. They also discuss the importance of keeping up a regular cadence of experiments. Ellis is a proponent of "high-tempo testing"—the more tests you run, the more you learn.[19] The faster you run tests, the faster you learn, adjust, and ultimately drive growth.

   Evaluate experiments on a regular interval and readjust your goals as necessary.

Idea Backlog	Impact	Confidence	Ease
Create push noti cations for reengagement of dormant users	8	6	8
Enable social logins	6	5	5
Add onboarding step encouraging users to set a daily reminder	9	8	7

REAL-LIFE EXAMPLE

Calm increases retention 3X

When Calm completed their current user retention analysis, they found that Alert Savers who set a daily reminder had around 3X the retention of users who did not set a daily reminder.

At the time, the Daily Reminder feature was buried at the bottom of the Settings page, and most users never found it. Since only 1% of their users were setting an alert, they couldn't know whether this was a causal relationship.

It could be that the power users of their app, who would have been well-retained anyways, were digging into the Settings page and finding the Reminders feature.

Prompting more users to save a daily reminder

After discovering the high retention experienced among users who set a daily reminder, they tested whether getting more users to set a daily reminder would increase their overall retention. In the test, after a user completed their first meditation session, they were immediately shown a screen encouraging them to set a daily reminder.

Results

There was an equal boost in retention among people who set a reminder from the new prompt, similar to the users who had previously found the reminder feature on their own. This indicated that the relationship between daily reminders was causative, not just correlative.

Additionally, 40% of users who saw the prompt went on to set a daily reminder, so the new prompt provides a significant boost to overall new user retention. Accordingly, Calm rolled out the new reminder prompt to their users.

DO IT IN AMPLITUDE

Measuring experiment results

With Amplitude's unified approach to experimentation, teams no longer have to manage multiple point solutions to deliver experimentation at scale. Customers have instant access to run targeted experiments using the same metrics, cohorts, and user properties already available on Amplitude.

Here's a retention graph highlighting how members of the AmpliStore loyalty program drive 10% higher retention on average. With this insight, we can run targeted experiments to drive more engagement and membership into our loyalty program to drive higher lifetime value.

Qualitative feedback matters

Building a strong-retention product is about listening to your users from a qualitative and quantitative perspective.

While this playbook emphasizes quantitative processes, qualitative feedback adds value to your analyses. To holistically understand how users engage with your product, try supplementing your analytics insights by talking directly with your users. Some ideas include:

- Conducting user interviews to understand common flows taken through the product and to identify different behavioral personas.

- Organizing focus groups to test out new features or services.

- Sending feedback surveys to current and dormant users.

- Directly talk to users who drop off at specific points in your critical path funnel to understand why.

Quantitative and qualitative data complement each other. Your behavior data can inform the type of qualitative data you seek, and your qualitative feedback can be validated or invalidated with analytics. While putting this playbook into action, you should also consider how and when to communicate directly with your customers to capture qualitative feedback.

Frequency of repeating this playbook

How often you repeat the playbook process depends on the nature of your product and how often you roll out updates or launch new features.

We recommend repeating the playbook analyses, in whole or in part, in the following scenarios:

- When you launch a significant product update or new feature or make changes to your product strategy.

- If your product has seasonality, you might run the playbook process for different times of the year. For example, if your product is used heavily during the school year and less in the summer, you could run the process for the following periods: summer, the beginning of the school year, and sometime in the middle during peak usage.

You gain a significant new source of users and want to understand how those users behave and retain relative to others.

Without these situations, we recommend monitoring your key metrics with every product release and then running the playbook less frequently. For example, our company sets goals quarterly, so running the playbook quarterly is a good cadence for us.

Even if you don't run through the whole playbook, we recommend looking at your behavioral personas for new, current, and resurrected users at least once a quarter to ensure you're always up to date on user behavior.

Tackle user retention today

By now, you're well-equipped to analyze your product's retention at all stages of the retention lifecycle. It's your turn to put the playbook into practice and start changing the shape of your retention curve.

You're now ready to take your product's growth to the next level! Amplitude can guide you to growth by helping you gain a deep understanding of user behavior throughout the end-to-end journey so that you can cultivate customers for life.

Learn more about how Amplitude can help.

GET YOUR DEMO →

Appendix

Instrumentation Review

Before analyzing metrics, you must first ensure you've instrumented your analytics correctly. It's tempting to rush through this part, but this would be a mistake. Sending optimal event data to your analytics platform is the most important step toward understanding how your users engage with your product. It's worth the upfront time investment to get your instrumentation correct.

Organize your event taxonomy

In event-based analytics, the term event describes any action performed by the user or any activity associated with the user. Opening an app, making a payment, and adding songs to a playlist—all of these are examples of events a user can perform.

In contrast, things like receiving or interacting with push notifications are examples of activities associated with the user.

It's critical that your event taxonomy reflects your business objectives. That's why understanding your company type (e.g., the vertical you're in, your business model),

PRO TIP
Naming your events

We strongly recommend naming your events as human readable strings. This is because if someone on your team wants to look at the data, they should be able to understand what the event is by its event name and not have to guess based on a mysterious shorthand.

what success criteria you care about, and the metrics that are important to you.

Quickly check your event taxonomy by asking yourself:

- **Are the events you're tracking aligned with your analytics goals?** Think about your analytics goals in terms of business objectives. How will you use analytics to measure the value you deliver to your users and vice versa? Are you able to track revenue, retention, and conversion? What experiments and funnels do you want to run in the future? Are you tracking the relevant events to run those experiments?

- **Can everyone understand what each event is and why it's being tracked?** Ensure you understand the context around all the events you're currently tracking and when you expect them to fire. Having an organized event taxonomy document listing each event currently being tracked and its corresponding name and properties in a central location is critical to everyone being able to derive data insights. Check out Amplitude's Event Taxonomy training or our Taxonomy Playbook for more information.

- **Are you tracking events aligned with your critical path funnel?** You've probably envisioned an ideal path to conversion that your users flow through—one that perfectly

syncs with the product's core value. Make sure you're tracking all events along this path. For example, if you're an ecommerce product, you should be tracking all events leading up to the user clicking 'checkout' and completing a transaction. We discuss how to determine your critical event in Chapter 2 and how to set up your critical path funnel in Chapter 4.

- **How are you defining an active user?** Do users simply need to open an app to be considered "active," or are there specific actions they need to take?

Validate your data

To analyze your user behavior, you need to have a deep understanding of how their actions reflect in your analytics platform. The easiest way to check your instrumentation is to be your own user.

- **Check your onboarding:** Download your app and simulate your first-time user experience. Go through the onboarding process. Identify yourself as a new user in your analytics platform, which should be possible with a unique user ID. Then check to see that events are firing correctly and all behaviors are being captured properly as you complete each step of the onboarding process.

PRO TIP

Start with the right amount of data

Have you just started tracking your data? Now's a good time to make sure your events are instrumented correctly and the data you're collecting is in good condition. We recommend having 3 months of data minimum before you begin with the analyses in this playbook.

- **Check your critical paths:** Simulate an "ideal" user flow through your app, from start through conversion, and make sure those events are being captured correctly.

- **Complete rigorous error testing:** Bugs and crashes can be major retention detractors and should be resolved before making product optimizations (more on this in Chapter 6). Try "breaking" your app and forcing it to throw errors and track events that correspond to those errors and crashes.

Taking the time to do a comprehensive audit of your event taxonomy and data quality will ensure you have a solid foundation for more granular analyses. Doing this legwork upfront is critical to being able to trust your data.

REFERENCE SHEET
Your product analysis toolkit

This "toolkit" includes critical concepts and methods to help you understand user behavior and retention at all stages of the retention lifecycle. Reference this sheet as you work through Chapters 5-7 of this playbook to remind yourself of all the methods available.

Behavioral personas

A behavioral persona describes a distinct way of using your product. Identifying your product's personas will inform your product development for different types of users.

- Qualitative: User interviews and testing can provide more context for trends observed in your product analytics data.

- Quantitative: Segment by different user & event properties. Bucket users based on the frequency at which they perform key events or use a clustering algorithm to group users based on similar behaviors automatically.

Compare baseline retention for each cohort and persona

Comparing the retention curves of different behavioral personas will help you decide which personas to focus on. For example, should you commit resources to convert more users to specific "power" personas?

Make sure you choose the best retention method for your product: Return On, Return On or After, or Return On (Custom) retention.

Return On or After retention

- Return On or After retention shows what percentage of users return on a specific day or later. You can also think of Return On or After retention as the opposite of your churn rate.

- Example: Day 7 retention = percentage of users who returned on Day 7, or any day after that

Return On retention

- Return On retention tells you what percentage of users return on a specific day.

- Example: Day 7 retention = percentage of users who returned exactly on Day 7.

Return On (Custom) retention

- Return On (Custom) retention allows you to define custom time Return On (Custom), from a single day/week/month to multiple days/weeks/ months.

- Example: You could set your 1st Return On (Custom) as Day 0, your 2nd Return On (Custom) as Day 1-7, and your 3rd Return On (Custom) as Day 8-14. Amplitude will measure the percentage of users that return during each Return On (Custom).

Segment by user properties

Measure the breakdown of key user properties to identify trends and groups of users you should study more closely. Some common examples are country, language, platform, and paying vs. non-paying. Make sure you segment by the properties most relevant to your business!

Segment your baseline retention curve by different properties to identify factors that could positively or negatively impact retention.

Behavioral cohort analysis

A behavioral cohort is a group of users who did or didn't perform specific actions within a defined period. Create cohorts for specific behaviors and then measure the retention of those users to see how well that behavior correlates with retention.

You can also apply behavioral cohorts to funnel conversion rates and other analyses in this toolkit.

Critical path funnel

A critical path funnel is the series of actions you anticipate users taking to complete your critical event. Comparing conversion rates for your behavioral personas and by different user properties will help you identify areas for improvement.

Common user flows

Funnels are great for measuring well-defined sequences, but user behavior isn't usually so linear. Observe the most common paths to or from important actions, and compare the paths of your behavioral personas and cohorts.

Stickiness

Stickiness refers to the frequency at which people use your product. Specifically, stickiness measures the number of days out of a given period that a user was active or did a specific event, like your critical event.

Session metrics

Key session metrics you can measure are:

- Length distribution: the distribution of session lengths of all users, shown as a histogram.

- Average length: the average session length per user.

- Average per user: the average number of sessions per user per day.

Glossary

Here are some definitions of terms used throughout this book. To learn more about these topics, check out our Help Center at amplitude.com.

Acquisition cohort: A group of users who started using your product during the same period.

Active user: A user who has done some action in your product during a given period.

Behavioral cohort: A group of users who did or didn't perform certain actions within a defined period in your product.

Behavioral persona: A group of users who have a distinct way of using your product. Understanding the behavioral personas within your product will inform how you design the experience to meet the needs and habits of different types of users.

Churn rate: The percentage of users who used your product on Day 0 but did not return; the inverse of your Return On or After retention rate.

Cohort: A group of users who share some common characteristics. See acquisition date cohorts and behavioral cohorts.

Compass: A feature in amplitude that identifies the user behaviors that best predict retention.

Conversion window: The amount of time a user has to complete a funnel from the time they enter it.

Core user: People who are using your app at a regular frequency and in the "expected" way. This can describe one of your behavioral personas.

Critical event: An action users take within your product that aligns closely with your core value proposition. This is the action you want users to perform to be counted as active or retained.

Critical path funnel: The series of actions you anticipate users taking to complete your critical event.

Current user: Someone who has been using your product consistently for a defined period. In Amplitude, this is defined as a user who used the product during the last interval and the current interval.

Dormant user: Users who once actively used your product and then became inactive. In Amplitude, this is defined as a user who did not use the product in the current interval but was active in the previous interval. You can think of dormant users as people who you have the potential to resurrect.

Event: An action a user takes in your product. This could be anything from pushing a button, completing a level, or making a payment.

Event property: An attribute that provides more detail about that event. These are up to you to track and depend on the information necessary to understand a particular event. For example, if you had a 'Check-out' event, some event properties might include 'total amount,' 'number of items,' and 'payment method.'

Habit Formation phase: Follows the Onboarding and Value Discovery phases of new user retention. Once a user has discovered value in your product, you must make sure they develop a habit to keep returning over time. Users who successfully pass through the Habit Formation phase become current users of your product.

Journey: A feature in Amplitude that enables you to explore users' actions to or from any point in your product (i.e., path analysis). Journeys aggregates users' paths to see the percentage of users or sessions that followed each sequence.

Lifecycle: A feature in Amplitude that breaks out your active user base into new, current, resurrected, and dormant users during any time interval. Lifecycle helps you measure the health of your product and can identify imbalances, for example, if your churn is outpacing new user acquisition.

New user: Someone who is using your product for the first time. In Amplitude, this user is in their first interval of using the product.

Onboarding phase: This is the first phase of new user retention and is the first day of use for this playbook. During this phase, a new user of your product completes the onboarding experience and uses the product for the first time. You must get users to experience your product's core value quickly.

Passive user: People who might not be contributing or using your app in the core way you designed but are still returning at a regular frequency to do something. This can describe one of your behavioral personas.

Path analysis: Measures the most common sequences of events users take in your product.

Personas: In Amplitude, Personas automatically groups users into clusters based on similarities in behavior. This is one way to identify behavioral personas in your product.

Power-user: People who use your product with a very high frequency or use a "power" feature that most users don't take advantage of. This can describe one of your behavioral personas.

Product usage interval: How often (daily, weekly, monthly, etc.) users naturally use your product. When determining your product usage interval using the framework in Chapter 2, this is the time interval at which 80% of users complete the critical event a second time.

Pulse: A chart view in Ampliude's Lifecycle feature that depicts the incoming and outgoing user ratio for a particular period. This ratio is calculated as follows: (# of new users + # of resurrected users) / (# of dormant users).

Resurrected user: Someone who was once actively using your product, then became dormant for a period of time, and then became active again. In Amplitude, this is defined as a user who used the product sometime before

the previous interval but not in the previous interval and is now active in the current interval.

Retention: Measures how many users return to your product over time after some initial event (usually first use). For different methods of retention, see Return On (Custom) retention, Return On retention, and Return On or After retention.

Retention curve: A line graph depicting user retention over time. It shows the percentage of users that returned to the product during a specified time period after acquisition.

Retention lifecycle: The flow of active users between the different stages of user retention: new, current, and resurrected user retention.

Return On (Custom) retention: A flexible version of Return On retention where you can look at the proportion of users who return during custom time frames you define.

Return On or After retention: Measures the proportion of users returning to your product on a specific day or later. For example, Day 30 Return On or After retention would give you the percentage of users who returned on Day 30 or any day after Day 30. This is the inverse of your churn rate.

Return On retention: Measures the proportion of active users in your product on a specific Nth day after an initial event.

Segment/Segmentation: A subset of users with a common characteristic, like a user property. Segmentation involves dividing a chart by this characteristic; for example, graphing a retention curve by country.

Stickiness: Measures the frequency with which people are using your product. Specifically, stickiness measures the number of days out of a week or month a user was active or did a specific event.

User Composition: A view in Amplitude that lets you quickly visualize the breakdown of different user properties for a specific group of users.

User property: Any characteristic tied to an individual user. User properties include country, device type, age, gender, referral source, plan type, number of photos uploaded, number of units of in-game currency, and current level in a game.

Value Discovery phase: Follows the Onboarding phase of new user retention and precedes the Habit Formation phase. During this time, it's essential to show your product's core value as often as possible.

Endnotes

1. "Digital Around the World," Datareportal, https://datareportal.com/global-digital-overview.

2. "How Many Apps Are On The App Store (Jul 2023)," Bankmycell, https://www.bankmycell.com/blog/number-of-apps-on-apple-app-store/) https://www.bankmycell.com/blog/number-of-apps-on-apple-app-store/#:~:text=Total%20no.

3. "How Many Apps Are On The App Store (Jul 2023)," Bankmycell, https://www.bankmycell.com/blog/number-of-apps-on-apple-app-store/) https://www.bankmycell.com/blog/number-of-apps-on-apple-app-store/#:~:text=Total%20no.

4. "Lessons learned from 1-trillion events tracked" (Amplitude, 2016)

5. Brian Balfour, "The Never Ending Road to Product Market Fit," Brian Balfour Essays, December 11, 2013, https://brianbalfour.com/essays/product-market-fit.

6. Nir Eyal, "The Hooked Model: How to Manufacture Desire in 4 Steps," Nir and Far, https://www.nirandfar.com/how-to-manufacture-desire/.

7. Jonathan Crowe, "Why Retention is King of Growth Strategy," OV Blog, June 15, 2015, https://openviewpartners.com/blog/retention-optimization-is-king-of-growth-strategy/.

8. Duncan Elder, "Taking Advantage Of The 1% Rule Of Online Communities," Bettermode, January 28, 2023.

9. Megan Garber, "Instagram Was First Called 'Burbn,'" The Atlantic, July 2, 2014,

10. Catherine Clifford, "Instagram co-founder on selling to Facebook for $1 billion: 'Money itself is no end. It doesn't make you happy,'" CNBC Make It, March 13, 2019.

11. Daniel Ruby, " 77 Instagram Statistics 2023 (Active Users & Trends,)" DemandSafe, July 11, 2023.

12. Brian Balfour, "Building a growth machine," https://brianbalfour.com/growth-machine.

13. 500 Global. "[500DISTRO] The Scientific Method: How to Design & Track Viral Growth Experiments," August 13, 2014, https://www.youtube.com/watch?v=0APJlxMjPw4.

14. Laura Tyson, "US SMBs Who Set and Track Key Metrics Are 2x More Likely to Hit Targets [SURVEY RESULTS]," May 10, 2024 https://www.geckoboard.com/blog/us-smbs-who-set-and-track-key-metrics-are-2x-more-likely-to-hit-targets-survey/.

15. Brian Balfour, "The first step to building a growth machine," Brian Balfour, September 24, 2014, http://www.coelevate.com/essays/growth-process-first-tactics-second.

16. Sean Ellis, "Building a company-wide growth culture: SaaStr Annual 2016," Slideshare, February 10, 2016, https://www.slideshare.net/seanellis/building-a-companywide-growth-culture-saastr-annual-2016#12.

17. Nick O'Neill, "Exposed: Sean Ellis' secret growth framework," Nick O'Neill, November 10, 2014, https://www.nickoneill.com/sean-ellis-interview/.

18. Rob Sobers, "Growth hacking Trello template," Rob Sobers, September 18, 2014, https://robsobers.com/growth-hacking-trello-template/.

19. Sean Ellis, "High tempo testing: Moving beyond the hustle to build a predictable growth machine," Slideshare, May 1, 2015, https://www.slideshare.net/seanellis/500-startups-high-tempo-testing-ellis-final-3-47660394.

Thank you

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