

APRIL 2020

Marketing Science

Professional exam
study guide

FACEBOOK

Table of contents

Overview	3
Glossary	4
Assess	19
Hypothesize	25
Recommend measurement solutions	32
Perform an analysis	44
Generate insights	56
Make data-driven recommendations	61

Overview

Certification helps you stand out in your field.

The Facebook Marketing Science Professional Certification recognizes advanced-level proficiency with marketing science, giving you a chance to demonstrate your professional expertise. Getting certified is the highest level of accreditation that Facebook recognizes in marketing science.

Prepare to boost your resume, credibility and career.

This document will help prepare you for the Facebook Certified Marketing Science Professional Exam, which measures your competency in using data, insights and measurement to make informed marketing recommendations.



To learn more about the exam, visit the [Facebook Certification website](#) or the [Certification FAQ](#) page for answers to frequently asked questions.

Glossary

Acronym	Term	Definition
	A/B test	A test that allows you to conduct experiments that compare multiple targeting groups or campaigns by splitting audiences into randomized and mutually exclusive groups.
	Advanced matching	A Facebook pixel feature that allows websites to pass additional site-visitor information (such as email addresses or phone numbers).
	Alternative hypothesis	A hypothesis contrary to the null hypothesis, that there's a relationship between two measured phenomena or an association among groups.
API	Application programming interface	Defines how software components communicate.
	Attribution	The practice of assigning value to various marketing efforts.
	Attribution model	Determines how credit is given to touchpoints for a conversion. The logic that determines how credit is given to touchpoints for a conversion. The attribution model logic can be based on a rule or set of rules, or a statistical model.
	Attribution window	The finite period of time during which conversions can be credited to a particular ad.

Acronym	Term	Definition
	Auction	An ad buying methodology in which the ads run based on the maximum bid and performance. Ads compete against each other in this process and the system determines the ones most likely to be successful to be displayed.
	Bid	The amount an advertiser is willing to pay to achieve their desired outcome.
	Bid cap	A bid strategy that enables advertisers to set a maximum bid Facebook can use in each auction.
	Bid pacing	Adjusts a bid or which auctions to enter based on how much budget and time are left for an ad set.
	Bid strategy	A setting in Ads Manager and Reporting that helps Facebook determine how to spend a budget to compete in a Facebook auction.
	Brand lift	Measurement product that uses experimental design (randomized control trials) to detect brand impact that might be caused by ads run on Facebook.
	Budget allocation	The amount of marketing expenditure allotted for each marketing activity.

Acronym	Term	Definition
	Buying type	Options in Ads Manager that determine the method by which you purchase ads on Facebook, either through auction or reach and frequency.
CTR	Click-through rate	The number of times an ad or a link to a web page is clicked, compared with the number of times it's displayed.
	Control group	The group in an experiment or test for which none of the factors in the test are variable. It's used as a benchmark to measure the effect of the test.
	Conversion efficiency	How effectively your ads drove the interactions you're measuring.
	Conversion Lift	A Facebook product that uses randomized control trials (RCTs) to measure the number of incremental conversions that result from Facebook ads.
	Conversion lift	A marketing metric that quantifies the number of additional conversions that result from Facebook ads.
	Conversion lift percent	The percent difference in conversions between the people who did and didn't see your ads during a test.

Acronym	Term	Definition
	Conversion rate	The (estimated) number of times a link on a web page is clicked, compared with the number of times it's displayed.
	Conversion window	Period of time considered between seeing an ad and acting upon it toward the ad's main goal, be it generating a lead or making a purchase.
	Cost cap	A bid strategy that enables advertisers to set a maximum average cost per optimization event for an ad set. Facebook will keep the average cost as far below that amount as possible, but keep showing ads until it's reached.
CPA	Cost per action	The cost to the advertiser each time an ad prompts an action.
CPC	Cost per click	The cost to the advertiser each time an ad is clicked.
CPM	Cost per thousand impressions	Also known as "cost per mille," it's the average cost for 1,000 impressions of an ad, or the average revenue received for 1,000 impressions of an ad on apps or websites.
	Cross-channel measurement	Indicates outcomes related to advertising across numerous online or offline channels, such as Facebook and television.

Acronym	Term	Definition
	Custom event	A logged action based on a specific action you want audiences to take on your website, app or offline.
CRM	Customer relationship management	A tool that enables businesses to manage customers' contact information and interactions through the customer life cycle.
	Daily budget	The average amount you're willing to spend on an ad set or campaign every day.
	Data analysis	A process of inspecting, cleansing, transforming and modeling data with the goal of discovering useful information, informing conclusions and supporting decision-making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, and is used in different business, science and social-science domains. In today's business world, data analysis helps businesses to operate more effectively and make decisions more scientific.
	Data source	A tool, connection, piece of code or other object that collects information, such as Facebook pixel, Facebook SDK or offline conversions. The information can be used for measurement and analysis.
	Dependent variable	A variable whose value depends on that of another.

Acronym	Term	Definition
	Event	A logged action that people take on your website, app or offline, usually used for capturing and measuring ad performance.
	Exact matching	In marketing research, an observational method that examines a group of people exposed to an ad campaign and tries to find a match for each person in the non-exposed group.
	Experimental method	In marketing research, a measurement method that shows different types of ads to separate groups of people in a controlled manner.
	Facebook Attribution	A Facebook measurement product that provides advertisers with cross-platform, cross-channel, cross-device, multi-touch attribution performance reports for ad campaigns.
	Facebook's data-driven attribution	The process of determining credit for touchpoints on a conversion path based on their estimated incremental impact and statistical modeling.
	Facebook pixel	A piece of code installed on a website that captures website events.
	First-party data	Data a brand collects directly from its customers (for example, website activity data, sales data, and so on). Data a brand collects directly from its customers (for example, website activity data, sales data, and so on).

Acronym	Term	Definition
	First-touch attribution	A rule-based attribution model that gives 100% of conversion credit to the first click or visit in a conversion path. If there is no click or visit, then it will credit the conversion to the first impression.
GRP	Gross rating point	A unit of measurement of audience size for TV advertisements. GRP is used to measure exposure to one or more programs or commercials, without regard to multiple exposures of the same advertising to individuals.
	Holdout test	Measures the total conversions caused by your Facebook ads.
	Hypothesis	A supposition or proposed explanation made on the basis of limited evidence. Used as a starting point for further investigation.
	Impression	A single instance of an ad or piece of content (such as a post) appearing on screen.
	Independent variable	A variable whose variation does not depend on that of another. It is the factor that is purposely changed or controlled in order to see what effect it has.
ITT	Intent to treat	A randomization method that includes all randomized participants in a statistical analysis and analyzes according to the group they were originally assigned, regardless of what treatment (if any) they received.

Acronym	Term	Definition
	Inter-channel budget	The allocation of budgets across different channels.
KPI	Key performance indicator	A metric selected to evaluate the success of a campaign or ad.
	Last-touch attribution	A rule-based attribution model that gives 100% of credit to the last ad a person interacted with before a conversion, whether it's an impression or a click.
	Lifetime budget	The amount you're willing to spend over the entire runtime of your ad set or campaign.
	Lift solutions	A platform for running experiments on Facebook ads and measuring the incremental impact of ads on business outcomes.
	Liquidity	In the context of machine learning, the concept of allowing Facebook to determine the best placement, ad set budget and bids for a campaign.
	Lowest-cost bid strategy	The bid strategy that provides the highest volume of conversions for the available budget.

Acronym	Term	Definition
	Machine learning	A discipline that uses science, information and computer code to automatically predict certain outcomes based on discovered patterns that are not explicitly programmed.
MMM	Marketing mix modeling	A regression-based analysis that quantifies how much sales and thus return on ad spend can be correlated to each media channel in the mix, for both offline and online channels.
	Multi-cell test	A test that runs multiple experimental designs at the same time. For example, in a two-cell multi-cell test, cell A has two groups (test and control) and cell B has two groups (test and control).
	Multi-touch attribution	The process of considering credit for each touchpoint on a conversion path.
	Natural experiment	An observational study in which subjects fall into either the exposed or non-exposed groups based on a naturally occurring event.
	Nested test	An experimental method in which the treatment group for one test is subdivided into a control group and a secondary testing group.
	Null hypothesis	A general statement or default position in inferential statistics that there is no relationship between two measured phenomena or no association among groups.

Acronym	Term	Definition
	Observational method	A way of collecting data through observing.
	Offline conversions	Allow you to measure how much Facebook ads lead to offline outcomes, such as in-store purchases, phone orders, bookings and more.
	Opportunity logging	In an ad's test period, for the target audience that has an opportunity to see the ad at some specific stage along the delivery funnel (meaning, for a user's request, that the user has an ad passed at some stage), Facebook logs the opportunities (uniquely identified by tags like, userId, studyId, dynamicHoldoutId and isControl) to scribe tables.
	Pacing system	A component of ad delivery whereby Facebook measures and projects a campaign's end date to ensure a budget is spent as evenly as possible over the lifetime of an ad set.
	P-value	The probability of obtaining test results at least as extreme as the results actually observed during the test, assuming that the null hypothesis is correct.
	Parameter	Included alongside events to measure additional information about the product or service type people engage with on an app or website.

Acronym	Term	Definition
	Propensity score matching	In marketing research, an observational method that assigns everyone in the exposed and non-exposed groups a probability of being exposed. Then people from each group are matched based on their similar probabilities.
	R ²	Also known as the coefficient of determination, R ² is the proportion of the variance in the dependent variable that is predictable from the independent variable(s).
RCT	Randomized control trial	RCTs test a hypothesis by introducing a treatment, studying the effects and determining the impact of your ad. Ultimately, an RCT can help determine how much to spend on each marketing channel in order to maximize results.
	Reach	The number of people exposed to a medium at least once during a given period.
	Reach and frequency	A method of buying ads on Facebook that allows advertisers to predict the audience size reached and control the average frequency that the audience is exposed to their ads.
	Regression adjustment	In marketing research, an observational method whereby people build a model based on the observed data and use the model to predict the outcome of the campaign based on a set of observed variables, including whether or not people were exposed to the advertising campaign.
ROAS	Return on ad spend	An economic indicator used to evaluate the effectiveness of ad spend. It is calculated as the ratio of the amount gained or lost relative to the amount invested.

Acronym	Term	Definition
ROI	Return on investment	An economic indicator used to evaluate the efficacy of total media investment, including trade. It is calculated as the ratio of the amount gained or lost relative to the amount invested.
	Rule-based attribution model	Different attribution models distribute different amounts of credit for conversions across ads. They can be based on a rule or a set of rules, or a statistical model. Rule-based models let you select the rule that will determine how conversions should be attributed to different touchpoints. Single-touch models give credit to only one touchpoint, while multi-touch models give credit to multiple touchpoints in the consumer's conversion path.
	Sales lift	The additional revenue caused by ads in a test, when compared to the test and control groups.
SEM	Search engine marketing	The practice of marketing a business using paid advertisements that appear on search engine results pages.
	Single-cell test	A test with one test group, where group A is shown the ad and group B is not.
SDK	Software Development Kit	A piece of code installed on an app that captures app events.

Acronym	Term	Definition
	Statistical attribution model	An attribution model that uses algorithms to determine credit for each touchpoint.
TRP	Targeting rate point	The number of impressions bought per 100 people in an ad's target audience.
	Test duration	How long a test runs for, from beginning to end.
	Third-party data	Data collected by a party that does not have a direct relationship with the user (such as DMP).
	Total value calculation	Advertiser Bid x Estimated Action Rates + User Value
	User value	A prediction of how engaging or relevant a user may find an ad based on available signals.

Acronym	Term	Definition
	Variable	A quantity or other piece of data that can assume different values.
	Visit	In Facebook Attribution, the number of times a person loaded your website from any channel (including paid, direct, organic and untracked channels), as recorded by the Facebook pixel or SDK.

Assess



Introduction

Clearly defined goals and KPIs are the foundation of any measurement approach. When you create a marketing strategy, your business goals should guide all of your strategic decisions. In addition, at the beginning of the measurement journey, it's important to assess your data sources, the quality of the data that they enable and the methodologies available to you.

Define business goals and KPIs

The best-defined business goals follow a rubric: they are specific, measurable, achievable, relevant and time-bound, or SMART. If you define a business goal that is non-measurable or lacks specificity, strategic decisions will become increasingly complex and less effective.

Once you decide on a business goal, you'll need to determine the KPIs that will measure the success of your campaign. KPIs make clear what outcome will be measured to evaluate your success. But KPIs are more than metrics—they tell a story about what is happening in a business at the time of measurement.

To identify your KPIs, ask yourself:

- What does success look like?
- Are my current metrics proxies or do they correlate with business outcomes?

Metrics such as likes, comments and followers are proxies and do not necessarily measure incremental impact, or the additional impact that results from running an ad. They can vary by channel. For example, TV metrics include gross rating point (GRP), cost per mille (CPM) and target rating point (TRP), while paid search metrics include impressions and click-through rate (CTR). Instead of using these proxy metrics for KPIs, use metrics such as:

- Incremental reach
- Website visits
- Conversions
- Lift
- App events
- Ad recall

EXAMPLES OF GOALS TURNED INTO KPIS

GOAL	Increase sales by 10% in 2021	Increase app installs by 10% in Q4	Increase ad recall by 5 points in Q1	Generate new leads in Q1
KPI	Number of sales units	Number of mobile app installs	Ad recall lift	Number of submitted forms

Primary and secondary KPIs

The primary KPI is the overall business objective that ad spend is being measured against. It might be the primary question that the business is trying to answer. Secondary KPIs support primary KPIs. They are important business objectives that ad spend can be measured against to better contextualize the primary KPI.

- Example of a primary KPI: Ad recall lift
- Example of a secondary KPI: Ad recall lift in a specific target audience caused by video campaigns

Evaluate limitations of KPIs

While KPIs are important, they have limitations. To evaluate the limitations of a KPI, identify:

- Which business objectives might not be measurable with available tools (for example, non-traceable tender) and therefore cannot be valid KPIs.
- Which KPIs are actually primary vs. secondary. Ensure focus on the primary and don't switch between KPIs mid-campaign.
- Whether the amount of available data for a specific metric is enough to provide an accurate measurement of a proposed KPI. If not, evaluate switching to a different KPI or moving to a different proxy metric.

Inventory existing data sources

Once you have your business goals and KPIs defined, assess your existing data sources. Data sources can capture and report KPI data with accuracy and timeliness. A data source is a tool, connection, piece of code or other object that collects information that can later be measured and analyzed.

A business can receive data from the following sources:

- Tests and experiments (for example, Brand Lift, Conversion Lift and A/B Test results)
- Data about marketing performance (for example: Facebook Attribution, Facebook Analytics and marketing mix models)
- Actions people take on a website, in a mobile app or in stores (for example, from a Facebook pixel, Facebook SDK or offline events).

Types of data

First-party data refers to data generated from Facebook, while third-party data refers to non-Facebook data. Within these categories, there are four types of data you'll use:

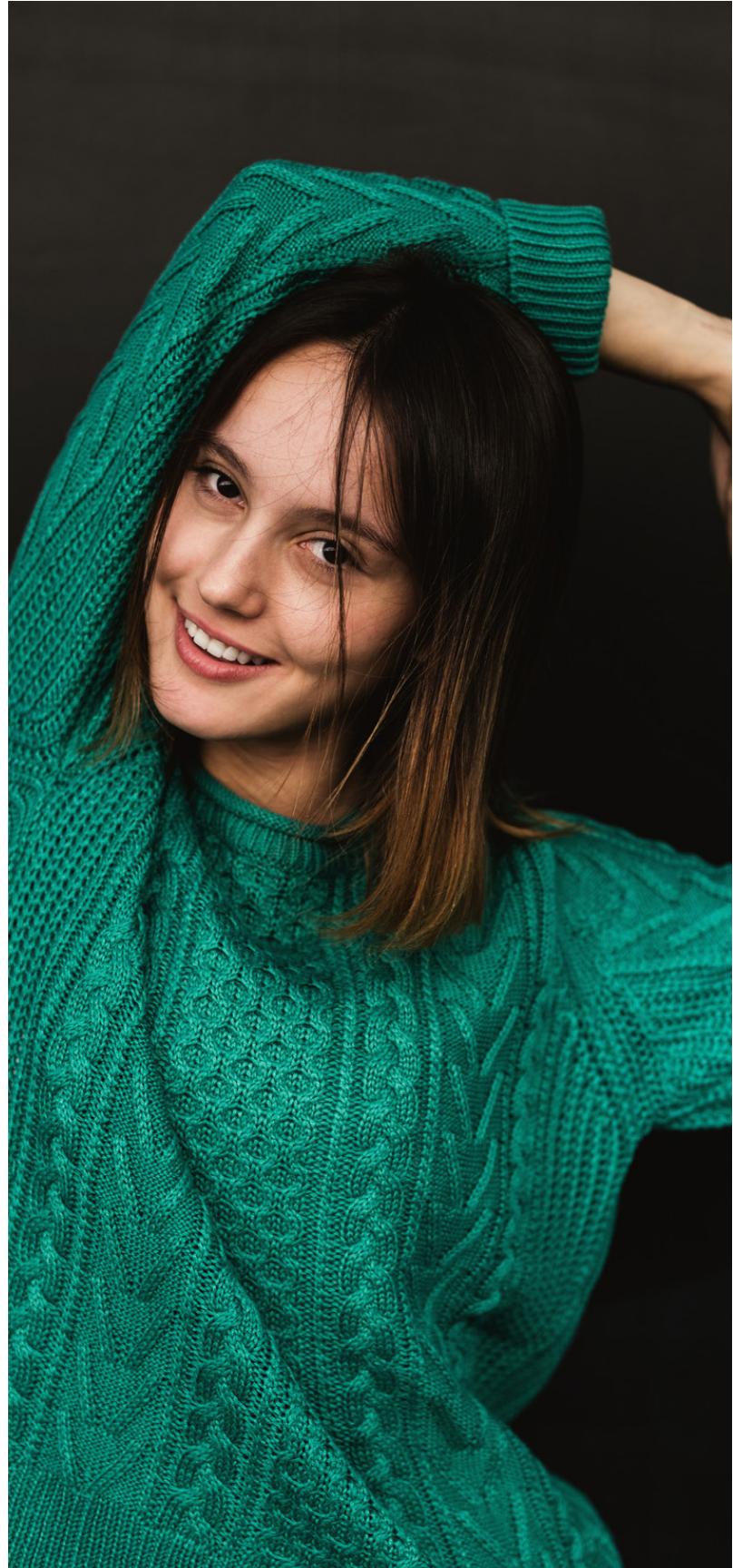
- Information about actions people take on your website, in your mobile app and in your stores
- Data from Facebook campaign performance
- Data from tests or experiments
- Data about marketing performance

To assess your data source strategy, ask yourself:

- What data sources are fueling my success metrics?
- What data sources are in place and what data do you have access to?

Validate data quality

Not all data and data sources are equal. They vary based on dimensions like granularity and scope. Consider all the tools available to you and use those that will generate data aligned with your business goal. Once you have access to a data source, identify abnormalities in data, such as missing data or outliers.



Evaluate differences in measurement methodology across

Understanding the types of data sources and data available is foundational to choosing an appropriate measurement methodology. Consider the different methodologies that can be used to measure impact. Below, we define the measurement methodologies and review the limitations of each.

A/B test

A test that allows you to conduct experiments that compare multiple ad sets by splitting audiences into randomized and mutually exclusive groups.

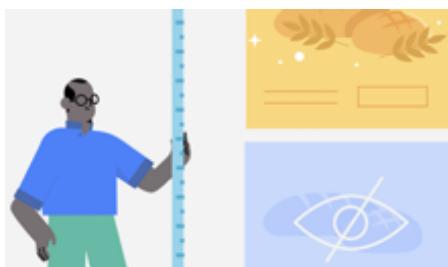


Limitations

- Does not assess incremental impact.
- Reliable only if the confidence level is at least 75%.

Randomized control trial (RCT)

RCTs test a hypothesis by introducing a treatment, studying the effects and determining the impact of your ad. Ultimately, an RCT can help you decide how much to spend on each marketing channel to maximize your results. It can infer causality.



Limitations

- Tests may not be set up with sufficient statistical power.
- The treatment variable may not always be isolated.
- Some tests will have effects beyond initial user interaction.
- They can't account for the unknown (e.g., people use cash or make other untraceable purchases).
- Test and control groups might have outliers.
- Outcomes might be difficult to replicate.

Observational method

A measurement method in marketing research that observes the effect of ads on people without changing who is exposed to the ads.



Limitations

- Not experimental, so causal inferences cannot be made.
- Difficult to perform strategy comparisons in a controlled way.
- Might deliver biased outcomes.
- Does not take into consideration contextual variables that may affect the final outcome.

State assumptions based on situation assessment

Each combination of data type and methodology requires a statement of assumptions in order to correctly assess the situation at hand. Identify whether business objectives are being measured in a way that is compatible with Facebook's measurement tools and whether there are any potential data blind spots.

For example, if you are measuring online conversions, make sure you have the correct data source in place (Facebook pixel) and it is implemented correctly. If you do not have a Facebook pixel on your website, then you will not be able to use Facebook Attribution or Lift solutions.

Hypothesize



Introduction

To run an effective experiment on Facebook, you should first choose a hypothesis, or question, that you want your experiment to answer. A strong, well-structured hypothesis can be confirmed or rejected through testing and can lead to valuable insights.

Formulate a hypothesis

What is a hypothesis?

A hypothesis is an idea or explanation that you can test through study and experimentation. A strong hypothesis includes:

- Who [audience]
- What [behavior of that audience]
- Where [location]
- When [ad schedule]
- Why [the rationale for the anticipated audience behavior or perspective]

In order to develop a hypothesis, you need to first determine a variable and then apply research and industry context.

Example of variables

- Audience
- Placement
- Creative (format, message, quantity of ads),
- Delivery optimization
- Campaign objective
- Account structure
- Budget
- Frequency

Example of hypotheses

<p>An ecommerce clothing company's goal is to increase online purchases. In May, they launch their summer line and hypothesize that lifestyle-focused creative will achieve more online purchases than value-focused creative among the 18-34 age group.</p> <p>Who: people, ages 18-34</p> <p>What: purchase</p> <p>Where: online</p> <p>When: May</p>	<p>A CPG/FMCG advertiser's goal is to increase brand awareness for a new hair-care product among a broad global audience of women over the age of 25 between June and August. The advertiser seeks to test the hypothesis that a 10-second video format on Facebook and Instagram would increase brand awareness more effectively than their current 30-second videos.</p> <p>Who: women over the age of 25</p> <p>What: brand awareness</p> <p>Where: Facebook and Instagram</p> <p>When: June through August</p>
---	--

Formulate a test hypothesis

What is a test hypothesis?

A test hypothesis is a proposed explanation for an observation you can test, usually in the form of an if/then statement. While a hypothesis could be a subjective assumption, a test hypothesis includes a null and an alternative hypothesis. The objective is to test if the null hypothesis can be rejected and the alternative can be accepted.

To create a test hypothesis, identify the independent variable(s) and dependent variable(s). Variables should be specific, measurable and aligned with your business goal. You can test multiple variables at once, but advertisers should test one variable at a time if the goal is to understand and isolate the effect of the strategy being tested. Be sure to identify a null and an alternative hypothesis in order to understand exactly what is being tested.

For example, if an advertiser increases the number of ad placements from 1 to 4 or more, their average cost per acquisition (CPA) will decrease. In this example, the independent variable is the number of ad placements and the dependent variable is the CPA.

The null hypothesis is that $CPA(1 \text{ placement}) = CPA(4 \text{ placement})$ and the alternative hypothesis is that $CPA(1 \text{ placement}) < CPA(4 \text{ placement})$.

Determine a measurement approach

Once you have a hypothesis, prove or disprove it by gathering existing insights or research or conducting a test. Choose from the following measurement approaches:

Cross-channel reach reporting

Measures how channels work together to generate business outcomes. Channels include but are not limited to email, TV, direct mail, Facebook and paid search.

Limitations

- Metrics vary by channel.
- Cross-channel reach reporting can be challenging, because not all channels share touchpoint/reach data.
- Limitations vary by specific solution. In general, limitations arise when metrics are not comparable or like-for-like data is not available.
- Reach does not always correlate with brand and conversion business outcomes.

Example		
Context	Hypothesis	Measurement approach
A CPG advertiser runs ads on multiple platforms, including TV and digital channels, with the goal of reaching a broad audience at an efficient cost per person.	The advertiser seeks to test the hypothesis that investment in TV delivers more efficient reach relative to their digital channels.	The advertiser uses cross-channel reach reporting to test this hypothesis.

Attribution

The process of determining credit for each touchpoint on a consumer's path to conversion.

Multi-touch attribution models, or MTAs, allocate value to more than one touchpoint in a consumer's path to conversion. Data-driven attribution is the process of determining credit for touchpoints on a conversion path often based on historical data and statistical modeling.

Limitations

- Statistical attribution models can be costly to access in some cases, while others are limited to specific channels.
- Cross-device limitations on cookie- or web-based systems.
- Many tools do not have access to the full path to conversion (for example, in-app impression data is often not shared across publishers.)
- Often only includes digital channels.

Example		
Context	Hypothesis	Measurement approach
An advertiser running prospecting and retargeting campaigns on Facebook properties sought to increase ROAS (return on ad spend) from their Facebook advertising during their highest sales period. They do not want to have a holdout on their Facebook media during this time.	They seek to test the hypothesis that their prospecting campaigns deliver less incremental value than their retargeting campaigns but cannot run an experiment at this time.	They use Facebook's data-driven attribution model to assess the estimated incremental value of these campaigns in the interim.

Marketing mix modeling

A data-driven statistical analysis that quantifies the incremental sales impact and return on investment of marketing and non-marketing activities, measuring both offline and online sales across channels.

Limitations

- Can struggle to capture incremental sales where an increase is minimal.
- Requires collaboration between modelers and an econometric model.
- Doesn't help with in-channel optimization.
- Does not infer causality, only correlation.
- Can be time-intensive to implement.

Example		
Context	Hypothesis	Measurement approach
An agency wants to optimize spend across channels for a soda brand. The soda brand client delivers media on TV, email, direct mail, Facebook and other digital channels.	The agency hypothesizes that TV achieves a higher ROI than direct mail, and therefore more budget should be allocated to TV next year.	Instead of looking at the impact of each channel in a silo, a marketing mix model helps to understand the effect of each channel on sales outcomes in the previous year.

A/B test

Testing multiple campaigns against one another to see which tactical approach produces the best results based on your KPIs.

Limitations

- Some A/B tests do not include control groups, only randomized test groups. In these cases, they do not measure causality or the incremental value of a strategy, and therefore are not recommended when strategy A has a different baseline conversion rate than strategy B (such as audience).
- Not all tests are appropriately powered with adequate conversion numbers in each group.

Example		
Context	Hypothesis	Measurement approach
An advertiser running ads on Facebook News Feed only wants to reduce their average CPA.	They seek to test the hypothesis that incorporating Instagram Feed as an additional placement along with Facebook News Feed would reduce their average CPA.	They run an A/B test to measure the cost per result from both strategies.

Randomized control trial (RCT)

An experiment designed to measure causality. It includes randomization of participants into mutually exclusive groups. One or more of these groups receive the treatment called the test group(s), while one or more do not receive the treatment, called the control group(s). The control provides a standard of comparison and can represent a standard practice, a placebo or no treatment.

Limitations

- Tests may not be set up with sufficient statistical power (for example, budget is too low, test duration is too short, not enough conversions).
- Accurate power calculations can be challenging to carry out where there is a lack of historical data from similar activity on which to base the calculation.
- Control groups may become contaminated by media running outside the experiment that targets the audience being measured.
- Treatment variable may not always be isolated.
- Tests may not run long enough to capture the full purchase cycle or longer-term impact of the strategy being measured.
- Experiments may not always capture the full impact of a strategy (for example, offline data may not be available to upload).
- Not all experimental approaches manage outliers and variance equally.

Example		
Context	Hypothesis	Measurement approach
An advertiser running ads on multiple channels, including Facebook, wants to measure the sales caused by their Facebook advertising in order to assess the accuracy of their current attribution model.	The advertiser hypothesizes that their Facebook advertising achieves \$500,000 in incremental sales and a \$50 cost per incremental purchase in the month of June.	They run a randomized control trial experiment to measure the causal impact of their Facebook advertising.

Identify Next Steps

Once you've validated or invalidated your hypothesis, determine the possible actions for the outcomes and recommend appropriate next steps. For example, if your hypothesis was validated, you might test a new hypothesis. You might find that your insights will lead to new questions and new hypotheses that will be the foundation for new tests. It's always a good idea to think about testing beyond what you have already tested.

**Recommend
measurement
solutions**



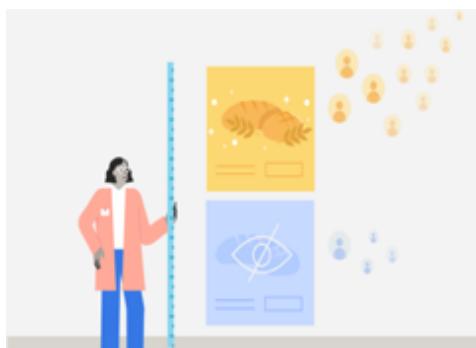
Introduction

Facebook measurement unlocks the potential to optimize your ads, understand your audience and grow your business. Measurement solutions like Brand Lift and Conversion Lift tests can help your business find answers to many of the questions you have about ads with the help of rigorous scientific testing. Using randomized control groups, you'll be able to see how much your Facebook ads lead to conversions, which campaign causes the lowest-cost conversions and much more.

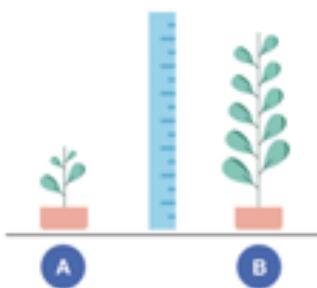
Design a test

Facebook offers a variety of solutions to test your hypothesis. You're ready to design a test once you have the following:

- A business goal
- A primary KPI
- A strong hypothesis
- A variable to test



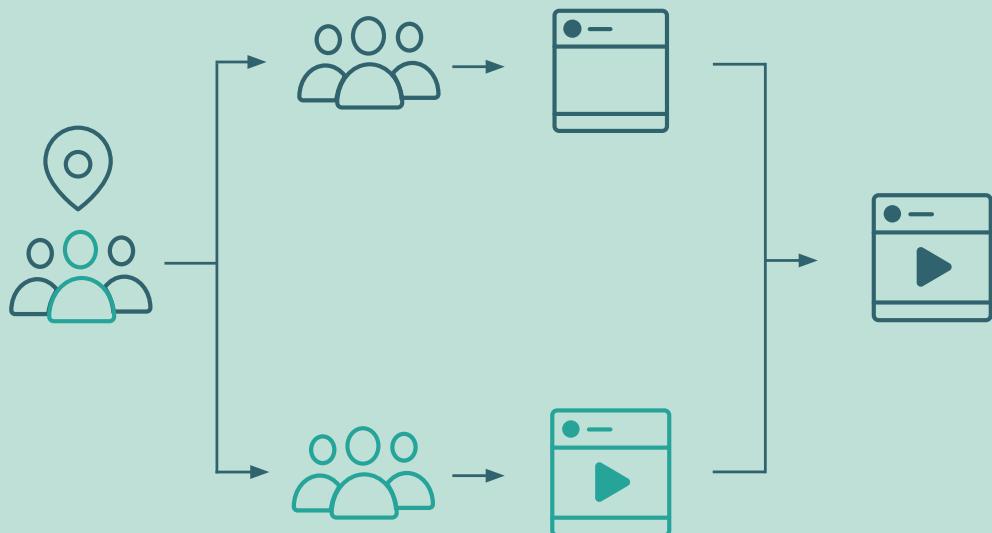
Facebook A/B test



This tests different treatments of one of the following variables: ad creative, delivery strategy, placement, product sets or target audience. After you choose the variable you want to test, we'll divide your budget to equally and randomly split exposure between two versions. An A/B test can then measure the performance of each strategy on a cost per result basis or cost per conversion lift basis with a holdout.

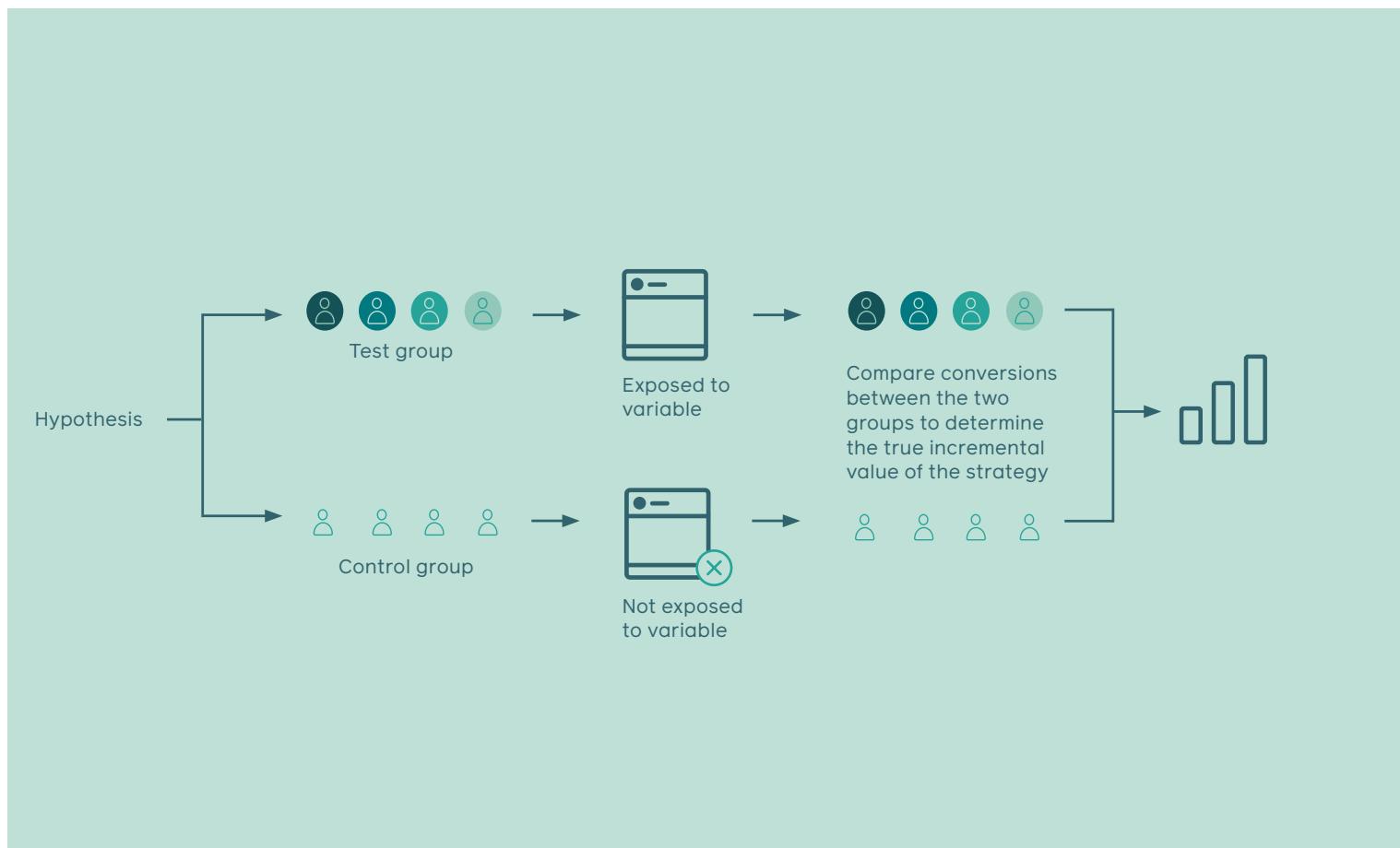
A/B tests are recommended to determine best practices, perform day-to-day tactical decision-making and see results based on last ad attribution. A/B tests are best used when you are sure that baseline levels between your A and B groups are similar. The benefit of this test is that it's easy and quick to set up.

For example, a marketing strategist at Wind & Wool, a fashion retailer, wants to test the impact of a "Learn More" call-to-action button, as compared to a "Shop Now" button. Both buttons direct the audience to the promotions page on their website. With an A/B test, Wind & Wool learns which text is more effective and uses that knowledge to refine their future campaign strategies.



Lift test

Effective measurement starts by understanding the incremental business outcomes, like brand equity and conversions, that your ads can affect. Use a Lift test to measure incremental outcomes by comparing the actions of people who have seen your ad with people who haven't. With Lift testing, you can see how Facebook affects the outcome of your ads. You also get the benefit of understanding cost per lift point, which allows advertisers to optimize their spend in the most efficient way possible. Lift tests with statistically significant results can infer causality and accurately measure incrementality, unlike proxy metrics, like clicks and likes, which are indirect approximate measurements that may not be correlated with actual business value and can result in suboptimal business decisions.

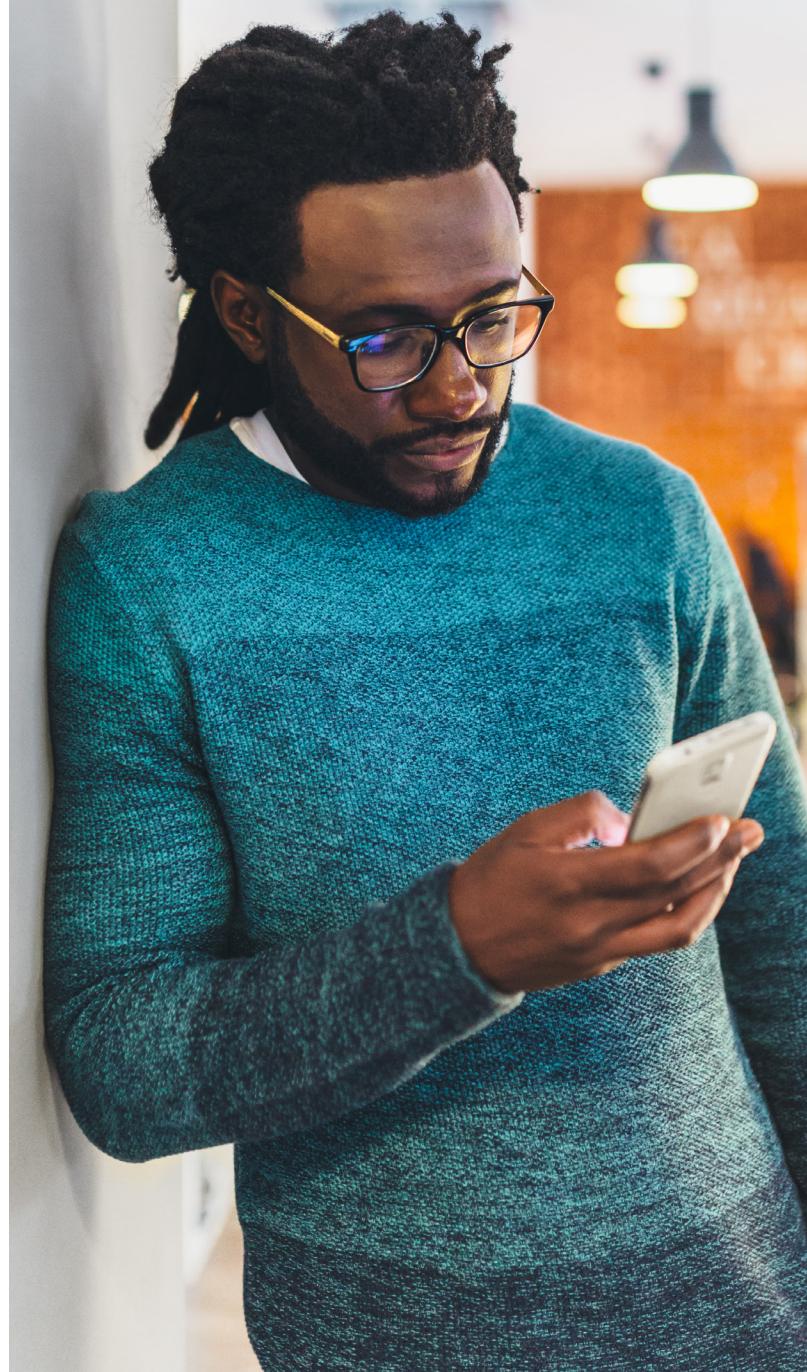


Example of Conversion Lift test

An analyst at an ecommerce business has a test hypothesis that using automatic placements increases incremental sales for their business as compared with Facebook placements alone. They run a Conversion Lift test to compare sales from Facebook with sales from automatic placements. Results show with 99.9% confidence that the use of automatic placements resulted in additional conversions, compared with Facebook alone.

Example of Brand Lift test

Radiance, an online jewelry business, wants people to get to know their brand and think of them for special occasions. Because they are a new business, it is critical for them to attract and dazzle their prospective customer base, which is identified as men and women currently in relationships. Radiance's goal is to see a 20-point lift in ad recall by mid-February (after Valentine's Day). They run a Brand Lift test to quantify the value of their Facebook advertising on ad recall.



Design a lift test

There are three ways to design your lift test:

01 Single-cell test

This option is best used to get a baseline understanding of incremental brand or conversion outcomes your campaign is currently driving.

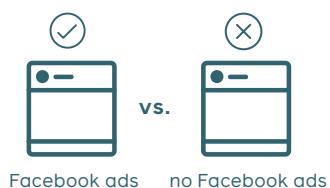
02 Multi-cell test

Compare two competing strategies to understand which leads to greater incrementality.



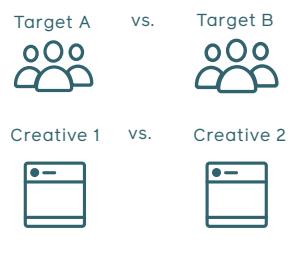
Was your campaign a success?

SINGLE CELL



Optimizing Facebook to work better?

MULTI



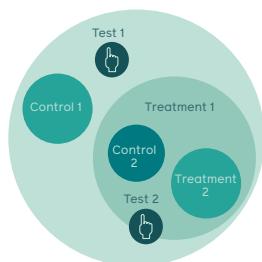
CELL

Broad vs. narrow targeting
Influencer vs. brand
Feed vs. Stories
Was the frequency of the buy sufficient to deliver creative impact?

03 Nested test

In this experimental method, the treatment group for one test is subdivided into a control group and a secondary testing group. A nested test can help an advertiser to understand the incremental impact a new strategy has on a strategy that's already under way. For example, an advertiser can use a nested test to figure out the marginal impact of a brand campaign over and above their BAU DR spend.

In general, keep Lift tests as simple as possible. The more cells you add, the more complex the test becomes. You can also perform multiple tests—for example, an A/B test to choose between two creatives, and in addition, a Conversion Lift test to understand the incremental conversions that result from this new creative strategy.



Facebook measurement solutions

You can choose from the following Facebook solutions to measure your ad performance.

Facebook Attribution		
Strengths	Limitations	Outputs
<p>Measure the performance of your ads across channels (paid vs. organic), publishers and devices.</p> <p>Understand your consumer's journey to purchase.</p> <p>Choose from two types of models: rule-based and statistical-based.</p> <p>Can be a useful complement to lift tests.</p>	<p>Since there are a variety of attribution models, it will take time and experimentation to find the one that best fits your business.</p> <p>The length of the attribution window may limit results.</p> <p>Results may not reflect performance from all marketing efforts.</p>	<p>Metrics for variables related to the media channels used in marketing (paid, organic, direct)</p> <p>Metrics for variables that relate to the desired action (visits, conversions, sources)</p> <p>Return on ad spend (ROAS)</p>

Example

An advertiser who uses a mix of prospecting and retargeting campaigns can track their consumer journey and attribute incremental value to all of their media touchpoints, allowing them to optimize budgets across publishers and tactics.

Brand Lift		
Strengths	Limitations	Outputs
<p>Measure the incremental impact your ad has on people's perception of your brand. Can be single-cell or multi-cell.</p> <p>See how your campaign performs against norms for campaigns in your industry and your region.</p> <p>See lift by demographic breakdown (for example, age, gender).</p> <p>Can be performed with third-party measurement partners.</p>	<p>You need to get at least 250 responses to one poll question in order for Facebook to show results.</p> <p>A holdout is required for measurement.</p>	<p>Poll results</p> <p>Brand lift percent for all responses</p> <p>Brand lift percent by demographic</p> <p>Cost per Brand Lift</p> <p>Test details: a summary of your test setup</p> <p>Confidence levels</p>

Example

An advertiser uses Brand Lift to understand which tactics result in the greatest awareness of its new line extension.

Note: For managed Brand Lift studies, work with a Facebook account representative to set up the tests.

Conversion Lift		
Strengths	Limitations	Outputs
<p>Measure the incremental impact your ad has on people's perception of your brand.</p> <p>Use intent to treat (ITT) to manage the effect of potential error in the test results and more accurately ensure comparable audiences.</p> <p>Can be performed with third-party measurement partners.</p>	<p>A holdout is required for measurement.</p> <p>Must ensure that the test has at least 80% statistical power in order to allow for statistically significant outcomes.</p>	<p>Conversion lift</p> <p>Sales lift</p> <p>Cost per conversion lift</p> <p>ROAS lift</p> <p>Conversion lift percent</p> <p>Breakdowns by demographic and attribution window</p> <p>Confidence levels</p>

Example

An advertiser uses Conversion Lift to understand which of its targeting audiences generates the greatest incremental ROAS.

Marketing mix models		
Strengths	Limitations	Outputs
<p>Quantify the impact of a large set of variables on sales.</p> <p>Understand what influenced past sales and predict what may happen as a result of future marketing.</p> <p>Understand how your marketing activity impacts sales.</p>	<p>Requires high-quality data.</p> <p>Requires collaboration between modelers and an econometric model.</p> <p>Doesn't help with in-channel optimization.</p> <p>Does not infer causality, only correlation.</p> <p>Can take up to six months to fully implement.</p>	<p>Marginal return associated with each marketing channel</p> <p>A report that details how much influence each of your marketing activities had on sales</p> <p>An overview of how your spending in different channels contributed to success</p>

Example

An advertiser wants to cut its marketing budget by 10% and uses MMM to decide where to direct the cuts.

A/B test		
Strengths	Limitations	Outputs
<p>Assess the correlation between different versions of your ads. Create multiple ad sets and test them against each other to see which tactical approach produces the best results.</p> <p>Understand which specific images, videos, placement, text and/or call to action performs best.</p> <p>Know which combination of variables (creative, audience, delivery optimization, product sets or placement) performs better at meeting your business goal.</p> <p>Understand the best allocation between full funnel stages.</p>	<p>While split testing creates random, non-overlapping groups, it does not create a corresponding control group, like Lift studies do. As a result, A/B tests do not show incremental impact.</p> <p>If your split groups have different baseline levels, then results will be difficult to interpret, because differences in metrics are to be expected.</p>	<p>Winning ad set</p> <p>Cost per result of each ad set</p> <p>Confidence level</p>

Example

An advertiser hypothesizes that their ads get more engagement with Instagram Stories as compared to Instagram News Feed. They use an A/B test to understand which placement is more effective for their ads.

Determine test feasibility

Now that you've chosen an approach, there are several factors to consider when assessing the likelihood of success of your chosen measurement solution, including:

POTENTIAL REACH

A larger holdout increases statistical power because it increases the size of the control group that you are comparing against. Look for a big difference between the test group and the control group. It's harder to detect lift with a small control group. If you'd like to increase the statistical power, you can either increase the reach or the control group. Both actions will give you more chances to detect lift. Conversely, with smaller reach, you'll have a smaller holdout and less statistical power.

BUDGET

A higher budget can make for a more powerful test. Budget affects the media pressure to actually cause an effect (also called media weight). Although budget doesn't technically affect statistical power, it does affect lift. If you spend more money, you'll be able to expect a larger effect. If your test has a larger effect, it's easier to detect lift. Because statistical power is the ability to detect lift, a greater budget will lead to greater statistical power.

DATA COVERAGE AND AVAILABILITY

Does the platform have the ability to tie orders from all channels (for example, app, website, offline) to impressions?

TIME CONSTRAINTS

Consider whether your test duration aligns with best practices. For example, the ideal time frame for an A/B test is at least 3 days, but no longer than 30 days.

TECHNOLOGICAL CONSTRAINTS

For example, does the platform in question have the capability to run a RCT test (such as a lift tool)?

MAXIMIZE MEASUREMENT VALIDITY

Ensuring that your test is setup for success is a crucial step in any lift test. You may need to adjust the test and/or campaign parameters to maximize measurement validity. For example:

- **Perform power calculations**

This can maximize your chances of detecting the effect. Statistical power is a vital indicator of whether there will be enough data to report reliable results.

- **Perform a preliminary analysis**

Build a rudimentary MMM model with key variables.

Perform an
analysis



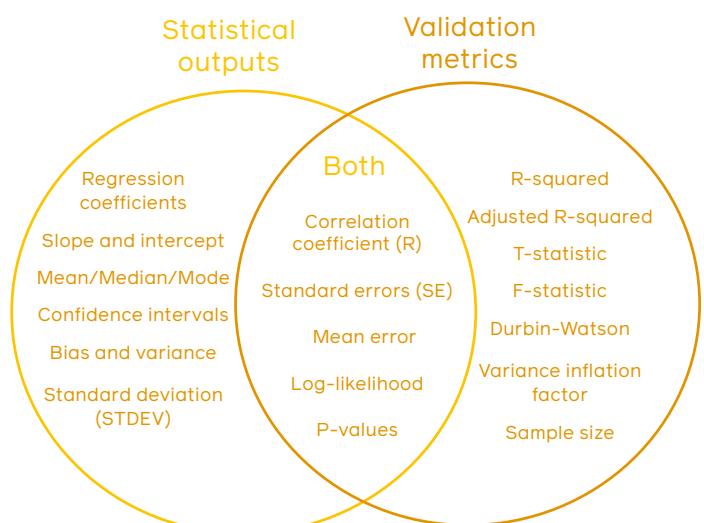
Introduction

When performing an analysis, it's important to use the right data, matched with the right methodology. To conduct statistical and data analyses, you need to interpret statistical outputs, consider validation metrics, create data visualizations and write a simple script or query to extract or manipulate data.

Identify and interpret statistical outputs

WHY ARE THESE IMPORTANT?

Statistical outputs help you to interpret the results of your analysis, while validation metrics allow you to measure the quality of the analysis. Together, they indicate how robust your data is. Consider the value of each statistical output across different media channels and platforms. Almost every output has a validation metric, so it's important to consider both when conducting an analysis. You can distinguish the value of statistical outputs across media channels and platforms through the validation metrics. Review some examples of outputs and validation metrics in the graphic below.



Choose an attribution model

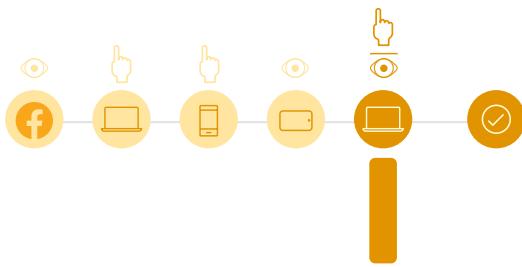
Given the validation metrics, recommend an attribution model.

SINGLE-TOUCH ATTRIBUTION MODELS

Single-touch attribution models give credit to only one touchpoint.

FIRST CLICK OR VISIT	
WHAT IT IS AND HOW IT'S USED	HOW IT'S CALCULATED
 <p>The diagram illustrates the First Click or Visit attribution model. It shows two parallel conversion paths, each consisting of six circular nodes representing different touchpoints: an eye icon, a hand icon, a laptop icon, a smartphone icon, a tablet icon, and a checkmark icon. In the first path, the first node (eye) is highlighted with a thick orange border. In the second path, the first node (eye) is also highlighted with a thick orange border. An orange vertical bar is positioned under the first node of both paths, indicating that credit is given to the first click or visit in the sequence.</p> <p>The first-click or visit attribution model gives 100% of the credit for a conversion to the first click on the conversion path.</p> <p>Use this model to better understand how to value the first click or visit in a conversion path, especially when success is defined within a longer attribution window or a longer consideration period.</p> <p>It gives no credit to impressions or later touchpoints that could have incremental effects on your conversion rate, and may oversimplify conversion paths that rely on middle- and lower-funnel activity. If you want to understand and credit the full conversion path, consider even-credit, positional or time-decay attribution models.</p>	<p>The first-click or visit model is a rules-based single-touch attribution model. It gives 100% of the credit for a conversion to the first click or visit in a conversion path. If a click and visit happen within 60 seconds of each other, then only the click is counted.</p> <p>For example, if a conversion path contained an impression first, then a click, and then a visit, the click would receive 100% of the credit for the conversion. If a conversion path contained an impression, then a click, and then a visit 30 seconds later, the click and the visit would count as the same touchpoint and get 100% of the credit for the conversion.</p>

LAST TOUCH (INCLUDING LAST CLICK)



WHAT IT IS AND HOW IT'S USED

The last-touch attribution model gives 100% of the credit for a conversion to the last click, visit, impression or view that happened in a conversion path. If there is no click or visit, then this model credits the last impression.

Use the last-touch model when you want to consider only the last touchpoints in a conversion path. For example, in a last-click attribution model, the last touch is a click.

This model can help you understand how to value the last touchpoint in a conversion path, especially when success is defined within a shorter attribution window or you have low-consideration conversions.

This model does not give credit to earlier touchpoints that could have incremental impact, and may oversimplify conversion paths that rely on upper- and middle-funnel activity like awareness and consideration. If your goal is to understand and credit the full conversion path, consider even credit, positional or time-decay attribution models.

HOW IT'S CALCULATED

The last-touch model is a rules-based single-touch attribution model. It gives 100% of the credit for a conversion to the last click or visit that happened in a conversion path. If there is no click or visit, then it will credit the last impression. If a click and a visit happen within 60 seconds of each other, only the click is credited.

For example, if a conversion path contained an impression first, then a click, and then a visit, the visit would receive 100% of the credit for the conversion. If the path didn't contain a click or a visit, then the impression would receive 100% of the credit for the conversion. If a conversion path contained an impression first, then a click, and then a visit 30 seconds later, the click and the visit would count as the same touchpoint and get 100% of the credit for the conversion.

MULTI-TOUCH ATTRIBUTION MODELS

Multi-touch attribution models take into account more than one interaction with a given media channel. They are inclusive of other models, including even credit, positional and time decay, which are explained below.

EVEN CREDIT



WHAT IT IS AND HOW IT'S USED

The even-credit model considers the full conversion path and gives each touchpoint equal credit for a conversion, regardless of where it appeared on a conversion path or if it was an impression, click or visit.

This model helps you understand how to value the first touchpoint that introduced the product, the middle touchpoints that build consideration and the last touchpoint that helped people get to the point of conversion. Typically, even-credit models are more illustrative than actionable, since it's unlikely that all touchpoints are equally effective. Compared to a last-touch or last-click model, even credit better reflects how all touchpoints can lead to a conversion, and can inform your business decisions.

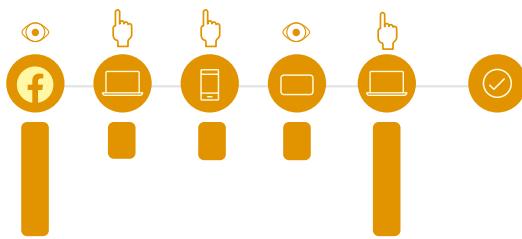
If your goal is to understand and credit the full conversion path, consider positional and time-decay attribution models.

HOW IT'S CALCULATED

The even-credit model is a rules-based multi-touch attribution model. It gives an equal credit percentage to each click, visit and impression on a conversion path. For example, if there was one impression, 3 clicks and one visit on the conversion path, each one would share 20% of the credit for the conversion.

If a click and visit happen within 60 seconds of each other, then only the click is credited. If an impression and a click appear to be associated with the same ad and happen within 24 hours of each other, then they are counted as a single touchpoint when receiving credit for a conversion.

POSITIONAL



WHAT IT IS AND HOW IT'S USED

The positional attribution model gives a specific percentage of credit for a conversion to the first and last touchpoints in a conversion path, with the remaining credit distributed evenly across all intermediate touchpoints.

The positional model considers the full conversion path, but gives weighted credit to the first and last touchpoints.

This model helps you understand how to value the touchpoints that occurred first and last in a conversion path. This model typically values any middle touchpoints with less credit than the first and last. Compared with a last-touch or last-click model, positional better reflects how all touchpoints helped lead to a conversion while considering the important roles that the first and last touchpoints may have played.

If your goal is to understand and credit the full conversion path, you should also consider even-credit and time-decay attribution models.

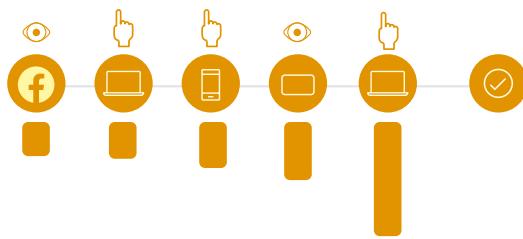
HOW IT'S CALCULATED

The positional model is a rules-based multi-touch attribution model in which the first and last touchpoints are given a specific percentage of credit and the remaining credit is distributed evenly across all other touchpoints.

The positional model is offered in two configurations, 30% and 40%, where either 30 or 40 percent of the credit is given to both the first and last touchpoints, with the remaining 40 or 20 percent of the credit distributed evenly among the remaining touchpoints. For example, if you choose Positional 30%, and there are five touchpoints in your conversion path, the first touchpoint will receive 30% of the credit, the last touchpoint will receive 30% of the credit and the remaining three touchpoints will each get 13% of the credit.

If a click and a visit happen within 60 seconds of each other, then only the click is credited. If an impression and a click appear to be associated with the same ad and happen within 24 hours of each other, then they are counted as a single touchpoint when receiving credit for a conversion.

TIME DECAY



WHAT IT IS AND HOW IT'S USED

The time-decay attribution model gives an increasing percentage of credit for a conversion to touchpoints as they get closer in time to the conversion.

The time-decay model considers the full conversion path, but gives weighted credit to touchpoints as they get closer in time to a conversion.

This model helps you understand how to value the multiple touchpoints that helped lead to a conversion, but gives the most recent touchpoints more credit. Compared with a last-touch or last-click model, time decay better reflects how all touchpoints lead to a conversion in a way that may more realistically represent how customers interact with and consider ads as they get closer to converting.

To understand and credit the full conversion path, consider even credit and positional attribution models.

HOW IT'S CALCULATED

The time-decay model is a rules-based multi-touch attribution model. It decreases the amount of credit given to each touchpoint by half after a set amount of time, with more credit given to the most recent touchpoints.

The time-decay model is offered in two configurations, 1 day and 7 day half-life. A longer half-life leads to a more even distribution of credit over time, whereas a shorter half-life distributes a majority of credit to the most recent touchpoints. For example, choosing a 1 day half-life means that touchpoints that happened 1 day before the conversion get 50 percent of the credit, and touchpoints that happened 2 days before get 25 percent of the credit.

DATA-DRIVEN ATTRIBUTION MODEL

The data-driven attribution model assigns fractional credit for a conversion to Facebook touchpoints based on their estimated incremental impact. This is a statistical-based model developed by Facebook and updated periodically. It has coefficients that can vary from advertiser to advertiser, industry to industry and analyst to analyst. All other models—last click, last touch, even credit, positional and time decay—are rule-based models, which follow a set of finite and transparent rules and a predetermined formula.

Because this model uses learnings from actual data observations and is trained on randomized control experiments, it can more accurately measure the incremental value of your marketing efforts. This model is available on Facebook, Instagram, Audience Network and Messenger only.

Conduct a statistical analysis

Based on your hypothesis, determine which statistical analyses is required:

- Simple linear regression
- Multiple linear regression
- Logistic regression
- T-Test
- Chi-Square Test
- F-Test
- ANOVA
- Correlation

Given a set of coefficients, the functional form of a model and a data table, calculate the output column. See an example of how it could be calculated below. Note that this data is independently compiled and not the output delivered from an actual test, as it is meant to serve as an example to demonstrate a calculation.



SUM	A	B	C	D	E	F	G
	x ✓ f(x) = B19 + (\$B\$4*C19) + (\$B\$5*D19*1000) + (\$B\$6*E19)						
1							
2	Coefficients						
3	Intercept	3400					
4	TV	25					
5	Facebook	0.1					
6	Competitive TV	-15					
7							
8							
9	Functional Form						
10	Sales = Intercept + 25x TV (GRPs) + 0.1x Facebook (000s Impressions) - 15x Competitive TV (GRPs)						
11							
12	Data Table						
13		Intercept	TV (GRPs)	Facebook (000s Impressions)	Competitive TV	Output column	
14	week 1	3400	100	25	0	8400	
15	week 2	3400	100	15	0	7400	
16	week 3	3400	0	15	100	3400	
17	week 4	3400	0	35	150	4650	
18	week 5	3400	150	10	150	5900	
19	week 6	3400	150	20	100	\$B\$6*E19)	
20	week 7	3400	0	25	0	5900	
21	week 8	3400	0	35	0	6900	
22	week 9	3400	100	25	0	8400	
23	week 10	3400	100	10	0	6900	

Coefficients						
Intercept	3400					
TV	25					
Facebook	0.1					
Competitive TV	-15					
Functional Form						
Sales = Intercept + 25x TV (GRPs) + 0.1x Facebook (000s Impressions) - 15x Competitive TV (GRPs)						
Data Table						
	Intercept	TV (GRPs)	Facebook (000s Impressions)	Competitive TV	Output column	
week 1	3400	100	25	0	8400	
week 2	3400	100	15	0	7400	
week 3	3400	0	15	100	3400	
week 4	3400	0	35	150	4650	
week 5	3400	150	10	150	5900	
week 6	3400	150	20	100	7650	
week 7	3400	0	25	0	5900	
week 8	3400	0	35	0	6900	
week 9	3400	100	25	0	8400	
week 10	3400	100	10	0	6900	

Reconcile differences across different measurement solutions

Because not all Facebook tools use the same methodology, you may have to reconcile results across different measurement solutions. To do that, ask yourself:

- What data input is used? Identify which events are included in the data, whether they are accurately monitored and how data is collected across devices.
- What time frames are used?
- What conversion window is applied?
- What attribution window is used?
- What measurement methodology is used?
- Does it use an observational method, like attribution or marketing mix modeling? Or an experimental method, like lift studies?
- Does it include the use of historical data or data from similar campaigns or industries?

EXAMPLES

Here are two examples of reconciling differences across measurement solutions.

- 01** Each platform (for example, YouTube, Facebook, Twitter) defines a video view/thruplay differently, so it's important to consider what counts as a video view.
- 02** The standard Facebook Ads Manager attribution window is set to 1-day view and 28-day click, but in Google Ads conversion reporting is 30 days, so attribution windows need to be reconciled before analysis.

Conduct a data analysis

To kick off a data analysis, make a table that breaks down summary statistics. Summary statistics give a quick and simple description of the data. They can include mean, median, mode, minimum value, maximum value, range and standard deviation. For example:

DATA	DATA	DATA
34		
56	Mean	65
112	Standard error	7.63201278
78	Median	56
65	Mode	55
44	Standard deviation	29.5586584
55	Sample variance	873.714286
75	Kurtosis	-0.9432981
23	Skewness	0.18550307
110	Range	92
98	Minimum	20
97	Maximum	112
53	Sum	975
55	Count	15
20		

CALCULATE LIFT BASED ON EXPERIMENT DATA

Breaking down a summary statistic is the first step of most analyses. After, you can perform additional analyses, such as lift calculations. Lift results include information about the results your ads caused, including the metrics:

- **Lift %:** Indicates how much your ads increased the rate at which people converted (as defined by the conversion events you chose when you created the test). For example, if your ads increased the conversion rate by 50%, that could mean that you got 100 conversions during the test without ads and 150 with them. That would mean that they got you 50 additional conversions.
- **Lift % calculations:** Divide the number of additional conversions by the number of conversions you would've gotten without ads and multiply that by 100 to calculate Lift%. In this case, that would be:
 - $50 / 100 = 0.5$
 - $0.5 \times 100 = 50\%$
- **Conversion lift:** The number of conversions that wouldn't have happened without your ads.
- **Confidence:** A percentage that represents how confident Facebook is that your ads caused conversion lift. Results Facebook is at least 90% confident in are considered reliable. Facebook's testing methodology includes thousands of simulations based on your test. If your ads caused conversion lift in 80% of Facebook's simulations, Facebook would be 80% confident that your ads caused conversion lift during the test.

WRITE A SIMPLE SCRIPT OR QUERY TO EXTRACT AND MANIPULATE DATA

Raw data for analysis often exists in databases and other sources and needs to be retrieved. Data that exists in various databases or data tables needs to be combined and filtered to extract what is suitable to enter into an analysis.

A JOIN clause combines rows from two or more tables, based on a related column between them.

- 01 **Inner join:** Returns records that have matching values in both tables.
- 02 **Left join:** Returns all records from the left table and the matched records from the right table.
- 03 **Right join:** Returns all records from the right table and the matched records from the left table.
- 04 **Full join:** Returns all records when there is a match in either left or right table.
- 05 Read [SQL Joins](#) for examples about how to apply the different JOINs.



Imagine a retail analyst has a database that contains comprehensive data for stores of all sizes from the last 5 years, but they only want to analyze data from stores in California that are larger than 500 square feet and from the last 12 months. The analyst queries a database to pull such data using SQL and then conducts some of the analysis—including visualizing the data, creating descriptive statistics and running a form of statistical analysis such as regression. An appropriate JOIN based on data structure would combine data from multiple tables.

Create data visualizations

Data visualization is a graphic representation of data. It involves producing images that communicate relationships among the represented data to viewers. This communication is achieved through the use of a systematic mapping between graphic marks and data values to create a visualization. While this is not required, it's recommended as a good practice for analysts.

TYPES OF DATA VISUALIZATIONS

- Heat map
- Bubble chart
- Line graph
- Scatterplot
- Bar chart

See examples in the [Vega-Lite Example Gallery](#).

DETERMINE WHICH DATA VISUALIZATIONS MOST EFFECTIVELY CONVEY THE NARRATIVE

To choose an effective chart for your data set, consider whether there is more than one variable and if so, whether they are similar, ordered or have a hierarchy. These articles can help you think about how to represent your data using visualizations like a scatter matrix, box plot or line plot.

- [How to choose the right chart given a scenario](#)
- [How some narratives land better or may be perceived differently when using one data visualization over another](#)

Generate
insights



Introduction

Data-driven insights can inform the next steps in your marketing strategy. Through your analysis, you may have learned which marketing actions, campaigns and campaign strategies had a positive effect. You can use these insights to make media planning and buying decisions or decide on your future campaign strategies.

Synthesize results from statistical and data analyses

After completing an experiment and analyzing marketing performance across multiple tools, it's time to draw insights to develop media recommendations. Contextualize the results by taking the following actions:

- **Combine campaign insights with research.** Leverage all insights and research available to inform your marketing recommendations.
- **Identify a common thread across studies, platforms and/or channels.** For example, an advertiser ran a series of Conversion Lift tests against different strategies. Results showed that including video creative in addition to static creative drove incremental results across all strategies. Because of this, the advertiser considers prioritizing the development of video assets when new creative is developed.

Generate insights

Insights can be captured from the following sources.

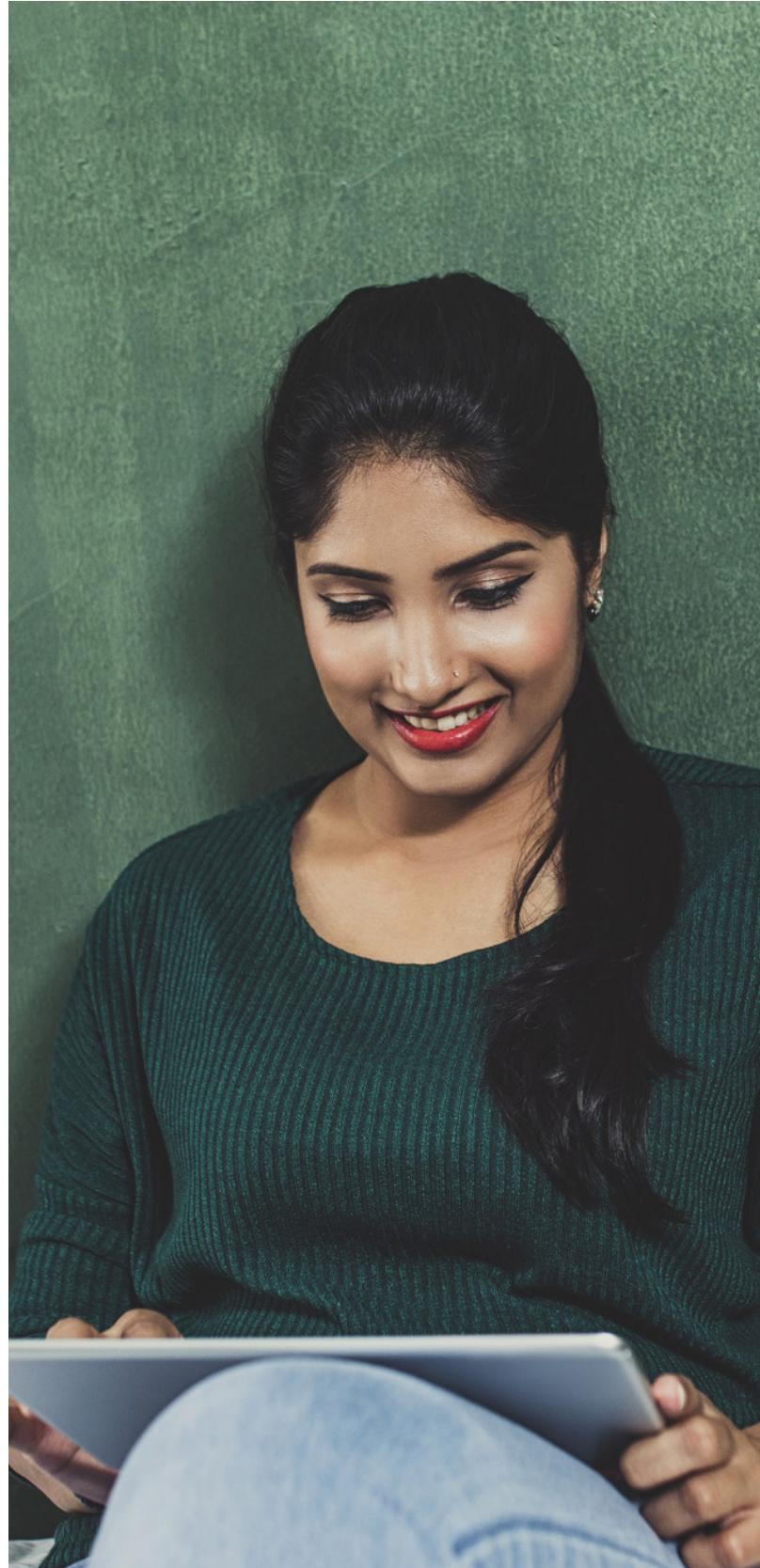
FROM CLIENTS (FIRST-PARTY DATA)

These insights are derived from a client's efforts to learn and gather information. This would include campaign data available in Ads Manager or results from a lift test, or actual sales data and qualitative customer data. For example, an analytics team identified customers with the highest lifetime value. Testing the incrementality of a lookalike audience based on this segment showed a significant increase in incremental conversions compared with their current strategy in a multi-cell Conversion Lift test.

FROM FACEBOOK

These insights are derived from Facebook IQ, a robust offering of studies designed to inform and fuel campaigns, all housed in one online location. Through meta-analysis, FBIQ-commissioned surveys and industry research, FBIQ is able to formulate three types of insights:

- People insights, which convey trends among consumer groups across demographic interests and behaviors.
- Advertising insights, which convey information about behaviors on different platforms, such as messaging, video views and other digital insights. These insights are derived from an analysis of aggregated campaign and test results within a specific period of time, across advertisers.
- Industry insights, which include vertical and market-level insights and support broader stories and pitches.



FROM THIRD-PARTY RESOURCES

There are a variety of free and paid online hubs where you can gather more insights and research to flesh out your story.

Insights should be based on data and can incorporate a variety of dimensions, including but not limited to:

DIMENSION	EXAMPLE
Budget	Doubling the campaign budget made ROAS less efficient.
Inter-channel allocation	A brand sees that overall incremental return on ad spend increases by 10% when running with a media allocation of 60% on channel A and 40% on channel B, vs. 50% on channel A and 50% on channel B.
Intra-channel allocation	A brand sees that overall incremental return on ad spend increases by 10% when allocating 30% of their budget to upper-funnel campaigns, versus allocating 50% of their budget to upper-funnel campaigns.
Reach	Reach across both TV and Facebook has more impact on in-store purchases compared to reach on each platform alone.
Bid strategy	Utilizing cost cap drove business outcomes with the most efficient returns compared to target cost.
Buying strategy	ROAS was more efficient when using reach and frequency buying instead of auction buying.
Audiences	<p>Targeting women ages 18-24 brought more value than targeting women ages 18-55.</p> <p>Remember, core audiences use information that people provide to Facebook, such as interests. Custom audiences use information that the advertiser provides to Facebook, such as activity from a pixel or a list of email addresses from a customer database.</p>

DIMENSION	EXAMPLE
Placement	Selling products is more effective on Instagram and Facebook combined, as compared to Facebook alone.
Creative	Using Creative A outperformed Creative B.
Test duration	Running a four-week campaign resulted in better outcomes than a two-week campaign.

Prove or disprove a hypothesis

Approach your research with your proven or disproven hypothesis in hand, and let that hypothesis focus your research. Interpret the significance of your test results using relevant metrics, such as:

- P-value: The probability of obtaining test results at least as extreme as the results actually observed during the test, assuming that the null hypothesis is correct. The null hypothesis is rejected when $p < \alpha$ and not rejected when $p > \alpha$ where α is determined by the analyst.
- R²: Also known as the coefficient of determination, R² is the proportion of the variance in the dependent variable that is predictable from the independent variable(s). This is typically used when evaluating the goodness of fit of multiple models to determine the most accurate model.

Evaluate the success of a measurement approach by determining whether it adequately measured your KPIs. There are issues that could come up that would prevent you from adequately measuring your KPIs, such as:

- Dilution during a test
- Not accounting for offline transactions during a Conversion Lift test
- Insufficient statistical power
- Contamination between the test and control cells of an experiment

Adjust the measurement approach if the original plan failed to meet the intended measurement goals by considering either testing a new hypothesis or retesting a hypothesis. Retest a new hypothesis if the test results were contaminated, the test results were inconclusive or you want to validate the results.

Construct a narrative

Explain why the hypothesis was true or false by contextualizing the data, determining the caveats and acknowledging that the consumer path is complex. Stay clear on the “how” and “why” of the data, as well as the tools and research that yielded it.

EXAMPLE

The p-value of a statistical test showed that there was insufficient evidence to reject the null hypothesis, but the analyst uncovered a data issue with the pixel that led to conversion volume being drastically lower than it should have been. During a re-test, the team needs to ensure that the proper data is flowing into the experiment so that the results are as accurate as possible.

**Make data-driven
recommendations**



Introduction

Measurement is an iterative process. As your marketing strategy evolves, it's important to continue to test different variables to determine which strategy is most effective at driving results.

The Facebook ad delivery system

It's important to know how the Facebook ad delivery system works so you can make effective recommendations, such as adjusting your bid strategy or targeting.

Facebook gives you many opportunities to show ads. The delivery system determines which ad is shown using the following three components:

- **Ad auction** determines the best ad to show to a person at a given point in time. The winning ad maximizes value for both people and businesses. Understanding the ad auction can help you understand your ad performance.
- **Pacing system** spends your budget evenly over the schedule of your ad set. Budget and bid strategy determine pacing.
- **Advertiser controls** are the strategic levers to consider before launching a campaign and include bid, budget, audience, creative, placement and optimization.



To ensure that all ads are evaluated in a consistent way and the winning ad maximizes value for both people and businesses, Facebook assigns a “total value” to every ad that competes in the auction. The total value is based on the amount you bid, how likely it is that showing your ad to a person will lead to your desired outcome, and ad quality, along with how relevant your ad is to the targeted individual. The ad with the highest total value wins the auction for the targeted individual.

The total value is a combination of three factors:



ADVERTISER BID

The amount the advertiser is willing to pay to achieve their desired outcome (such as a conversion). A bid can be the same as or less than a budget, which is the total amount of money an advertiser is willing to spend through the life of a campaign.

ESTIMATED ACTION RATES

The probability that showing an ad to a person leads to the advertiser's desired outcome. The desired outcome is aligned with the advertiser's campaign objectives.

USER VALUE

A measure of the quality of an ad. It measures the ad's quality and how interesting a person will find it.

The ad with the highest **Total Value** wins the auction and is shown to the individual.

Buying types

There are two main buying types for Facebook ads:

- **Auction buying:** Auction buying offers more choice, efficiency and flexibility, with less predictable results. Ads can be placed across Facebook, Instagram, Messenger and Audience Network.
- **Reach and frequency:** Reach and frequency buying lets you plan and buy your campaigns in advance, with predictable ad delivery and more control over your frequency settings.

Pacing system

Two aspects of pacing work in tandem: budget pacing and bid pacing.

BUDGET PACING

The aspect of pacing where we may increase budget if there's an opportunity to get many optimization events with costs aligned with your bid strategy.



BID PACING

The aspect of pacing where we adjust your bid or which auctions we enter based on how much budget and time are left for your ad set.

Bid strategies

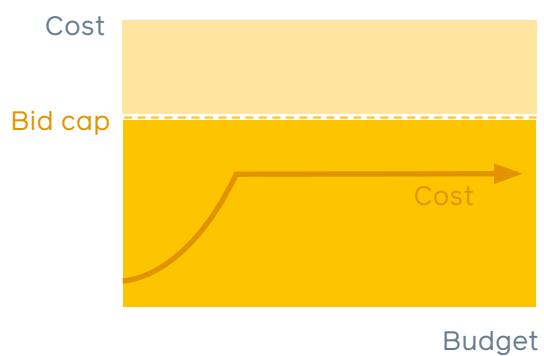
There are four bid strategies to choose from. You can also choose not to enter a cost control.

LOWEST COST

Select the lowest-cost bid strategy if you want to spend as much of your budget as possible without having to keep costs within a specific amount. With the lowest-cost bidding strategy, you don't have a specific cost threshold; you prioritize spending budget over cost control. The lowest-cost bid strategy may lead to more cost fluctuation. For example, if auction competition decreases, costs may go down. If auction competition increases, costs may go up. We will work to get you the most results available for your ad set.

BID CAP

Use this strategy if you want to set a maximum bid across auctions to limit the bid amount in every auction and reach as many people as possible at that bid. This bid strategy maximizes volume at a specified maximum bid cost and can increase competitiveness against other advertisers who are targeting similar audiences. If you want to control for the cost of actual results, we recommend the cost-cap bid strategy.



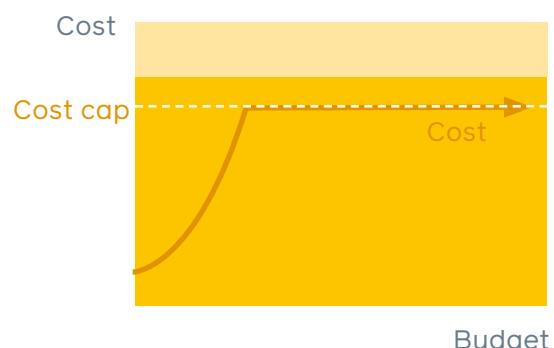
TARGET COST

If you choose the target-cost bid strategy, Facebook randomly enters you into auctions using your full cost control. Some outcomes are expensive, and some are cheaper. Cost stability versus cost efficiency is the trade-off when you use target-cost bidding.



COST CAP

Using a cost control with the cost-cap bid strategy lets Facebook deliver the maximum number of conversions. The cost provided is an average amount, which Facebook tries to stay under by going after the lowest cost events available. As you spend more or increase your budget, your average cost per optimization event might increase. Cost controls apply to your average cost per optimization event, so Facebook's ad delivery system can pursue opportunities across auctions at a wider range of costs. Some optimization events cost more than your cost control. Over the lifetime of your ad set, your average cost should be at or below your cost-control amount.



LOWEST COST	COST CONTROLS		BID CAP
Lowest cost	Cost cap	Target cost	Bid cap
Best for: <ul style="list-style-type: none"> Spending full budget Reaching lowest cost opportunities 	Best for: <ul style="list-style-type: none"> Getting the most volume within your acceptable CPA/CPI Maximizing cost efficiency 	Best for: <ul style="list-style-type: none"> Maintaining consistent costs 	Best for: <ul style="list-style-type: none"> Controlling bids in the auction
Things to consider: <ul style="list-style-type: none"> You're willing to trade cost control for spending budget/low cost opportunities 	Things to consider: <ul style="list-style-type: none"> Costs may increase as budget increases 	Things to consider: <ul style="list-style-type: none"> Costs stay fixed as budget increases: might forgo cheap results You're willing to trade cost efficiency for cost stability 	Things to consider: <ul style="list-style-type: none"> The bid is different than the cost per result—bid isn't what you will see in reporting May not spend full budget

Advertiser Controls

Adjustments can be made on the following dimensions to help improve your ad performance:



Make recommendations for future campaigns based on insights

Once you have assembled and contextualized your data, insights and research, compose a holistic story, including recommendations for future marketing efforts. Make your recommendations using insights that are anchored to the levers you can pull to maximize performance. For example, given a set of insights, determine the optimal media buy adjustments by considering:

- Short-term impact: If the goal is to decrease cost per action and/or increase ROAS.
- Long-term impact: If the goal is to increase brand awareness and/or brand equity.
- Inter-channel allocation: How you allocate media budget between different marketing channels (Facebook, Search, Video, etc.).
- Intra-channel allocation: How you allocate budget against different marketing tactics within one channel (audiences, creative, optimization, etc.).

Cross-channel and single-channel recommendations

CROSS-CHANNEL RECOMMENDATIONS

Cross-channel solutions allow advertisers to use the same KPI to measure performance across distinct marketing channels. The solutions Facebook offers (Cross-Publisher Conversion Lift, Facebook Attribution, Cross-Channel Brand Lift, Nielsen TAR and DAR) can measure performance between channels. Consider which metrics you use to compare performance between these channels, such as cost per action, return on ad spend, brand metrics and reach.

SINGLE-CHANNEL RECOMMENDATIONS

Single-channel solutions enable advertisers to measure different placements and/or strategies within Facebook products and technologies. Solutions available to test different variables include Conversion Lift, Brand Lift and A/B testing.

Form a powerful story

To give effective recommendations that guide future marketing decisions, identify what stakeholders know, feel and do to form an impactful story. Tailor the recommendations provided based on the role of each stakeholder who could take action based on the insights from the test. To create a compelling story with recommendations, ask yourself:

- What should the stakeholders know? Include a range of insights and facts from your research.
- What should they feel? Be as audience-specific as possible, and speak to your audience's unique position. Leverage visuals to inspire emotions.
- What should they do? Be clear about what actions you want your stakeholders to take.

Identify iterative measurement opportunities based on insights

It's important to have a test-and-learn mind-set. Testing is a science and an art. After adopting your findings, identify new opportunities to test and learn from. You can retest your hypothesis, repeat the same test or a similar one or use your conclusions to inform a new test for a new hypothesis.

- Determine potential new variables for iterative testing.
- Evaluate new approaches to test the same variable(s) using either an A/B test or a lift methodology.

EXAMPLE

Historically, an advertiser has only allocated budget targeting previous customers and has seen this audience lead to a 10x ROAS based on their last touch model. However, they have a hypothesis that many of these customers are already loyal and would have converted without seeing any ads. They decide to use a different method, lift, to measure the same variable (audience) and determine if this strategy is leading to a significant lift in sales.

Identify opportunities beyond the scope of the measurement approach

Given a situation, recommend new approaches for future analyses. You can:

- Address data blind spots.
- Isolate which variables/strategies are most effective at achieving outcomes.
- Develop a strategy to measure cross-channel performance.
- Consider depth, breadth and scope.

EXAMPLE

An advertiser runs a multi-cell test to determine if allocating budget against a Lookalike audience and a remarketing audience can lead to a higher lift than just targeting a remarketing audience. The lift test estimates that the Lookalike and remarketing audiences drove a significantly higher lift compared to solely targeting the remarketing audience. The insight is that allocating budget against an acquisition audience can increase incremental outcomes. The new opportunity is to allocate budget against an ever more broad, prospective audience and re-run the measurement test to determine if a broader audience can result in even more incremental outcomes.

Congratulations!

You've reached the end of the study guide. If you'd like to schedule an exam, click [here](#).