CALIBRATING MMM AND MTA WITH EXPERIMENTS

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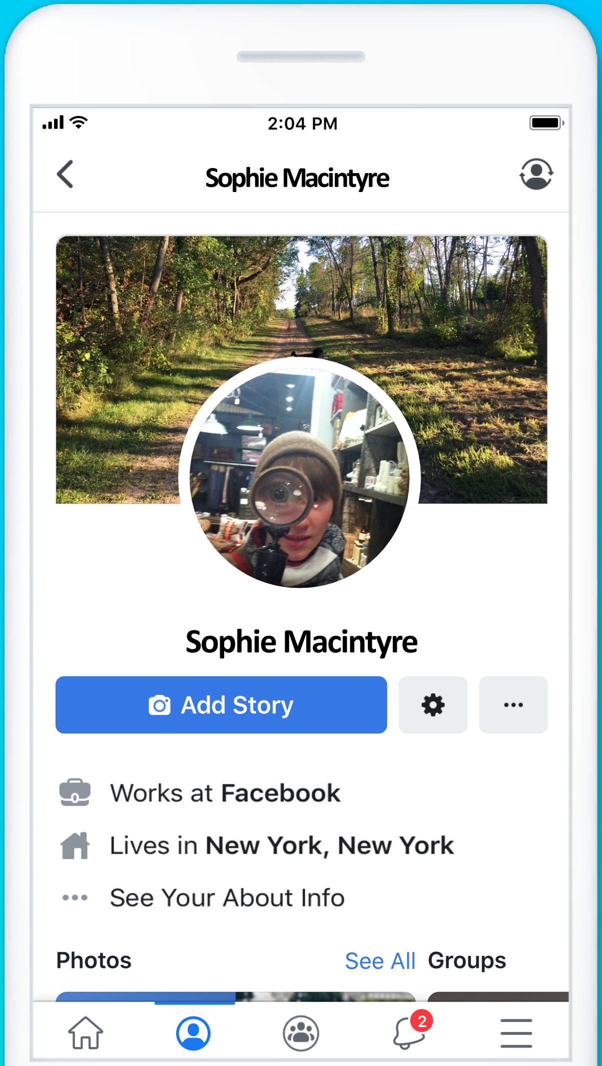

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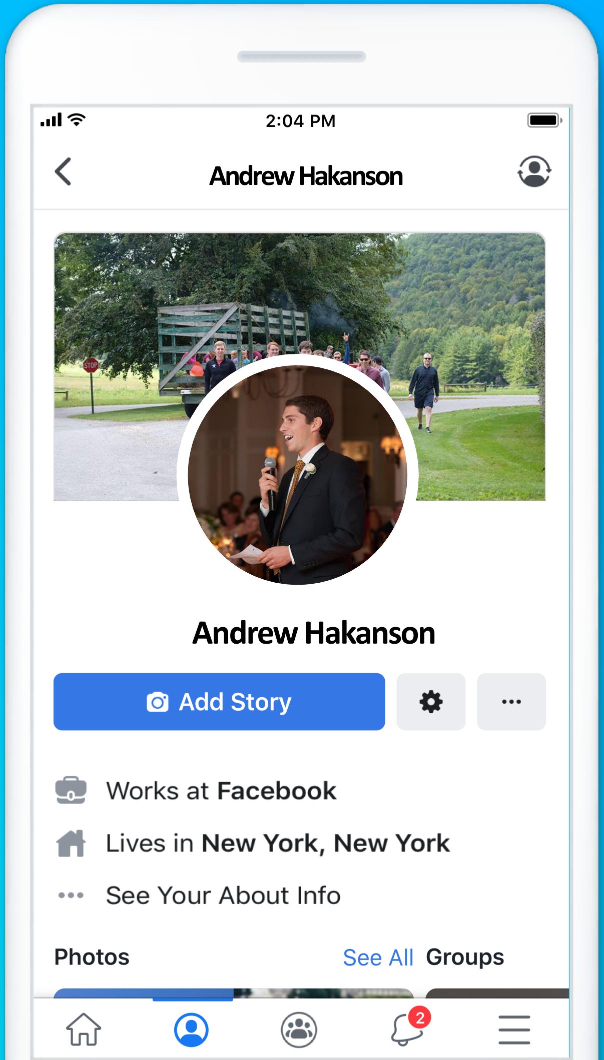
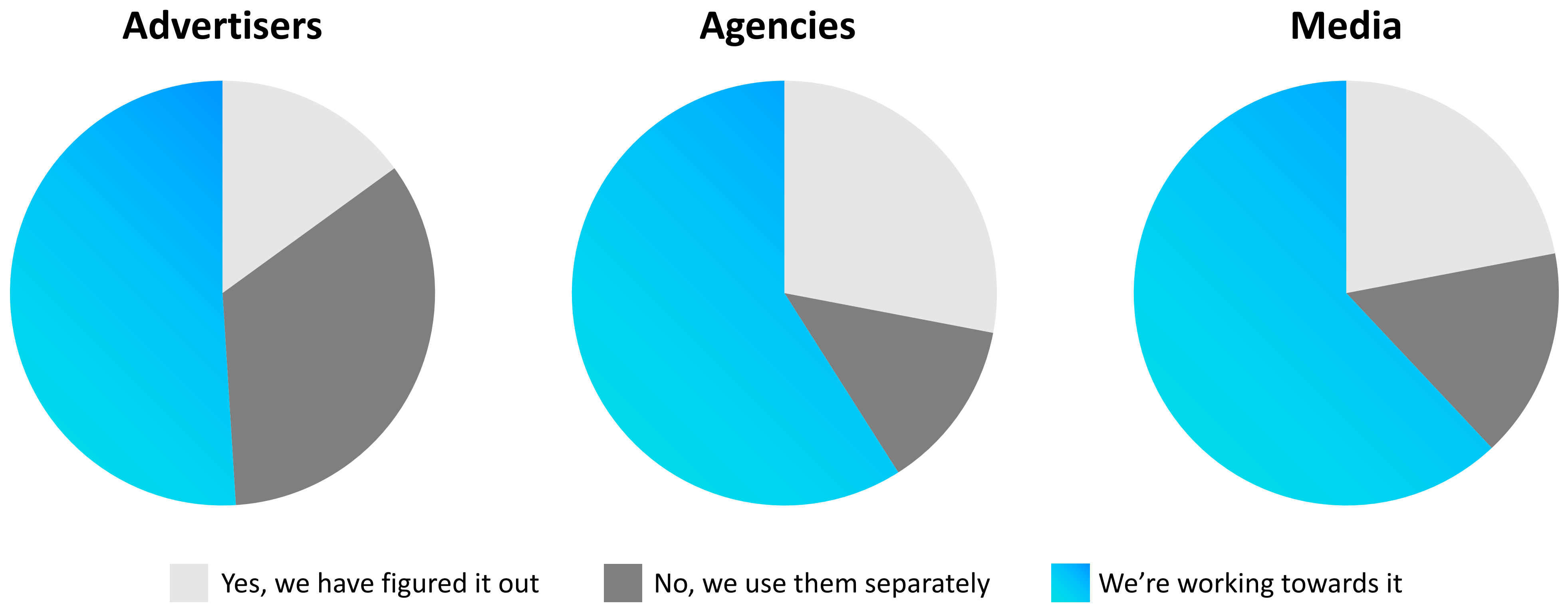


AGENDA

1. Calibration methods
2. Applied example
3. Considerations and limitations

Measurement is fragmented

"Does your team have a good sense of how to integrate marketing ROI results from measurement such as Marketing Mix Modeling, Multi-Touch Attribution or a unified measurement solution?"



Source: Kantar, "Getting Media Right: Marketing in Motion," 2019, http://www.kantar.com/gettingmediaright

Calibration with experiments

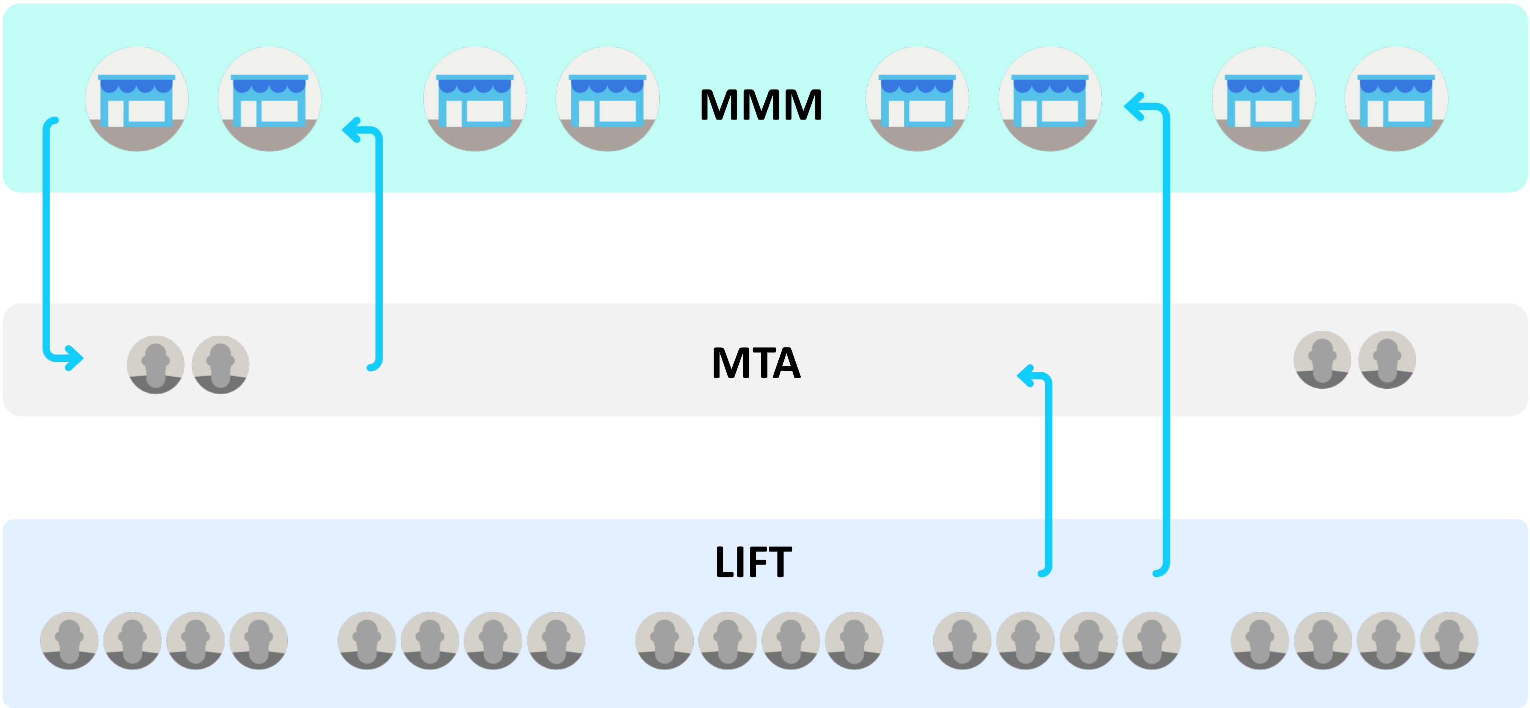
A process in which experimental estimates are used as ground truth to validate or tune a model

Calibration increases incrementality of modeled results

Incrementality
The degree to which a measurement method estimates the true causal effect of an isolated marketing activity

Calibration allows advertisers to advance along the incrementality spectrum without abandoning existing measurement systems

Calibration can unite MMM and MTA



Using the same ground truth for both models can help make results more consistent

MMM, MTA and lift work together to create a powerful analytic toolset

Ways to calibrate

Qualitative calibration

* Based on a survey of subject matter experts and available case studies

Ways to calibrate

Qualitative calibration

Use results to choose model

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Ways to calibrate

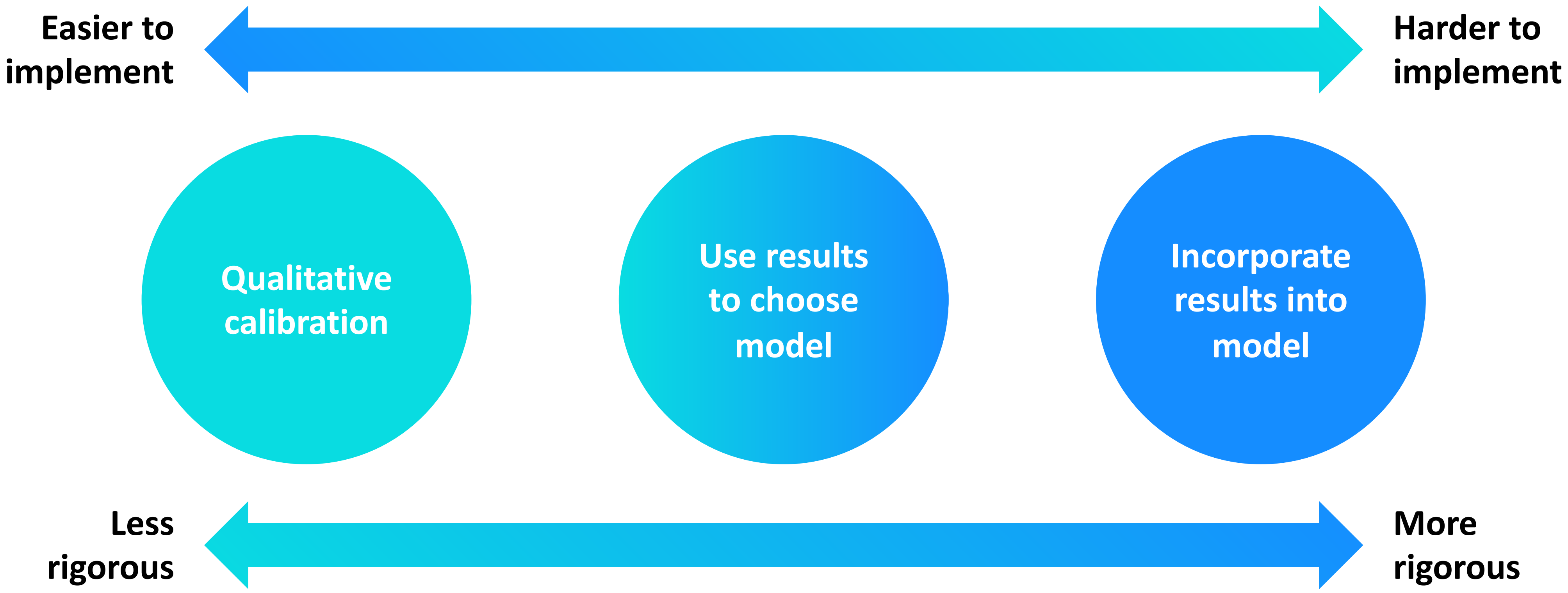
Qualitative calibration

Use results to choose model

Incorporate results into model

* Based on a survey of subject matter experts and available case studies

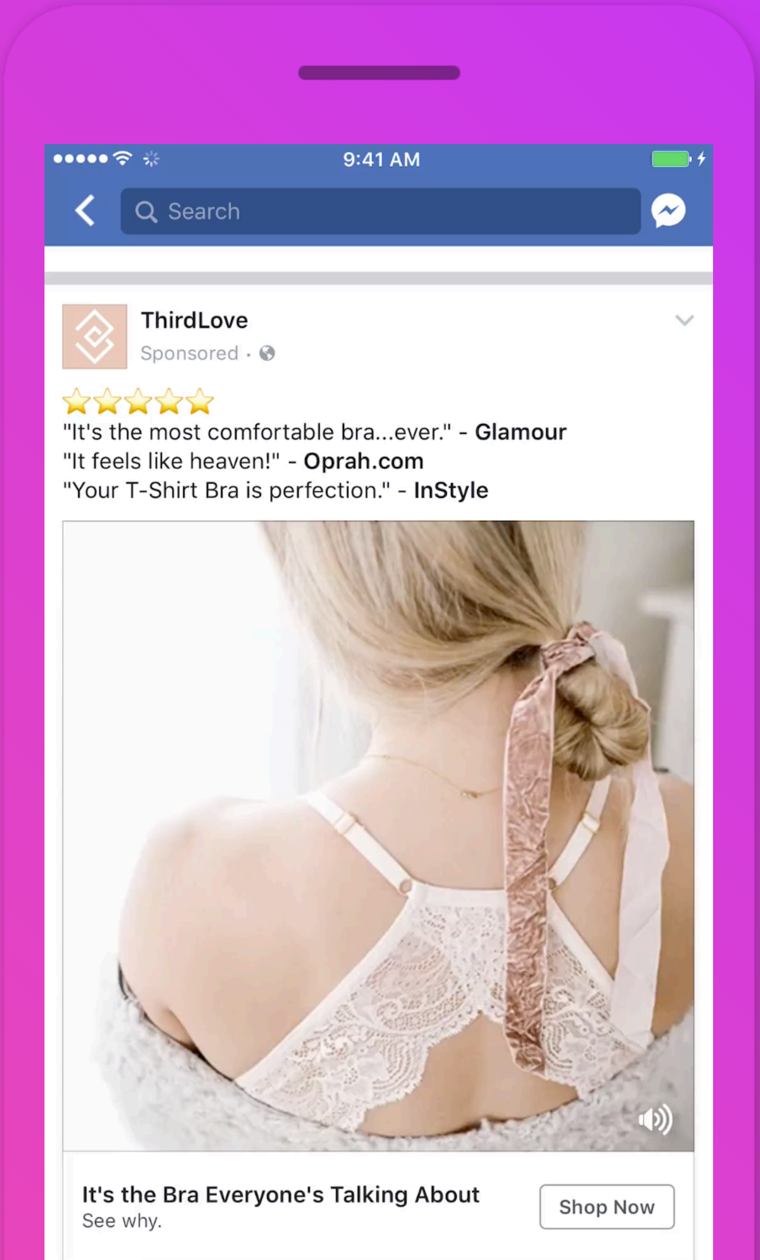
Ways to calibrate



* Based on a survey of subject matter experts and available case studies

Case study

THIRDLOVE



Building and Validating Media Mix Models

by Erica Mason | emason@thirdlove.com

THIRDLOVE

ThirdLove is a growing eComm advertiser designing bras and underwear fit for every woman

Alignment of marketing and measurement strategies

Desire to understand the true business impact of their marketing spend

A culture of testing and learning

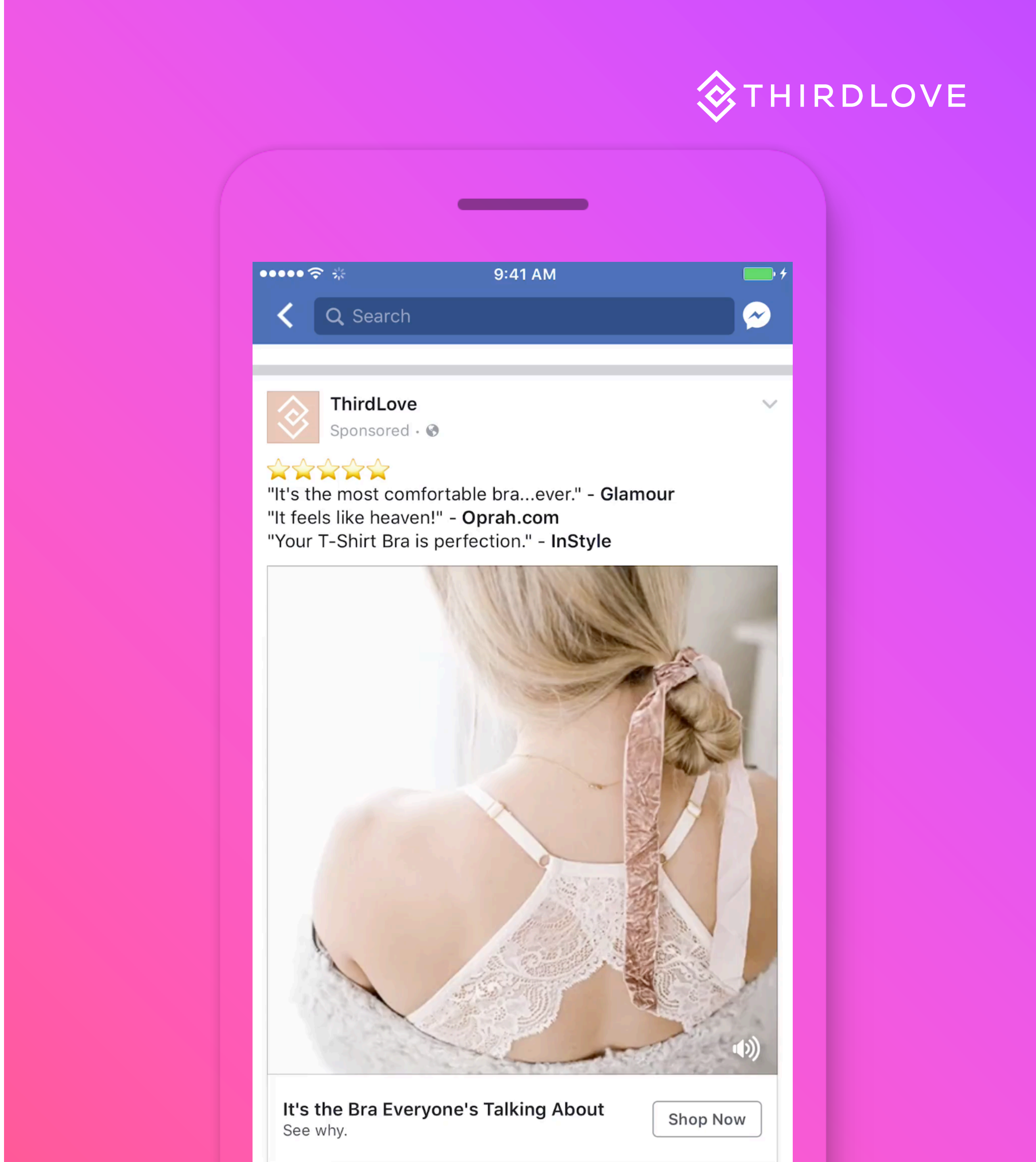
How ThirdLove calibrates MMM

Informed model selection based on lift tests:

Various models are backtested against a forward-looking holdout period to determine % error (actual vs. predicted)

Cost per incremental acquisition (CPIA) are determined from lift tests

Instead of choosing model based on % error, the CPIA is used in context to determine the 'best fit' MMM model



Various models are backtested

Models differ by variable transformations to ad stock and saturation

Models vary by channel

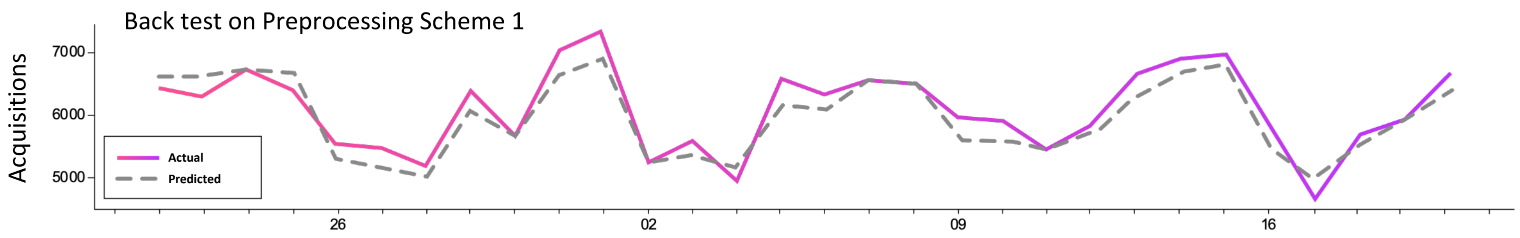
	Channel 1	Channel 2	Channel 3	Channel 4
1	No scaling Add 7 day decay	No scaling Add 7 day decay	No scaling Add 7 day decay	No scaling Add 7 day decay
2	Scale by 5000 No decay	Scale by 5000 No decay	Scale by 5000 No decay	No scaling Add 7 day decay
3	Scale by 15000 Add 4 day decay	Scale by 15000 No decay	Scale by 15000 Add 4 day decay	No scaling Add 7 day decay

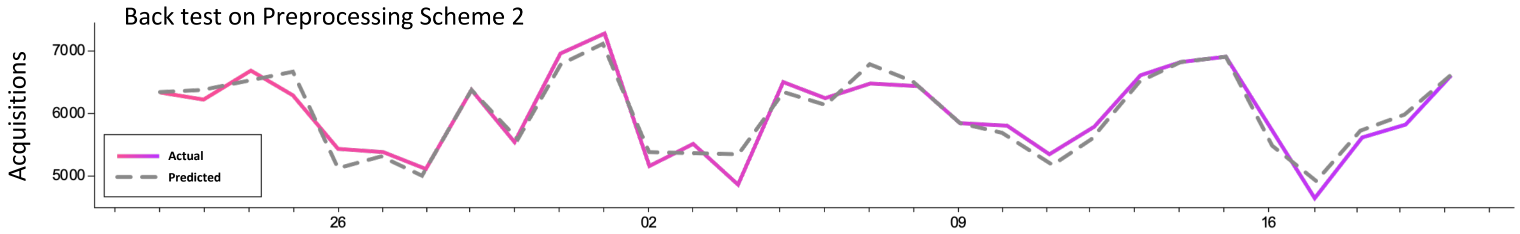
Table 3: Table to show the preprocessing treatment to deal with saturation and acquisition delay for each channel for three models

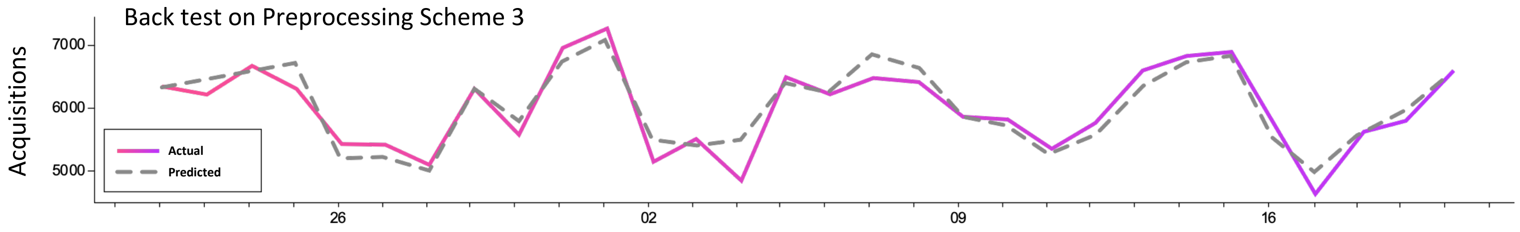
Various models are backtested

Models differ by variable transformations to ad stock and saturation

Backtest of actual v. predicted | April 2018







Aligning backtest error with lift

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Model #3 is selected instead of #2 since it aligns more closely to lift test, despite higher % error

	Backtest Result – Daily MAPE	Channel 1 CPIA/MCPA	Channel 2 CPIA/MCPA	Channel 3 CPIA/MCPA	Channel 4 CPIA/MCPA
Model 1	3.6%	$20 / $229	$12 / $117	$16 / $153	$24 / $269
Model 2	2.5%	$69 / $148	$52 / $127	$50 / $125	$148 / $257
Model 3	3.1%	$48 / $65	$65 / $131	$41 / $70	$130 / $226

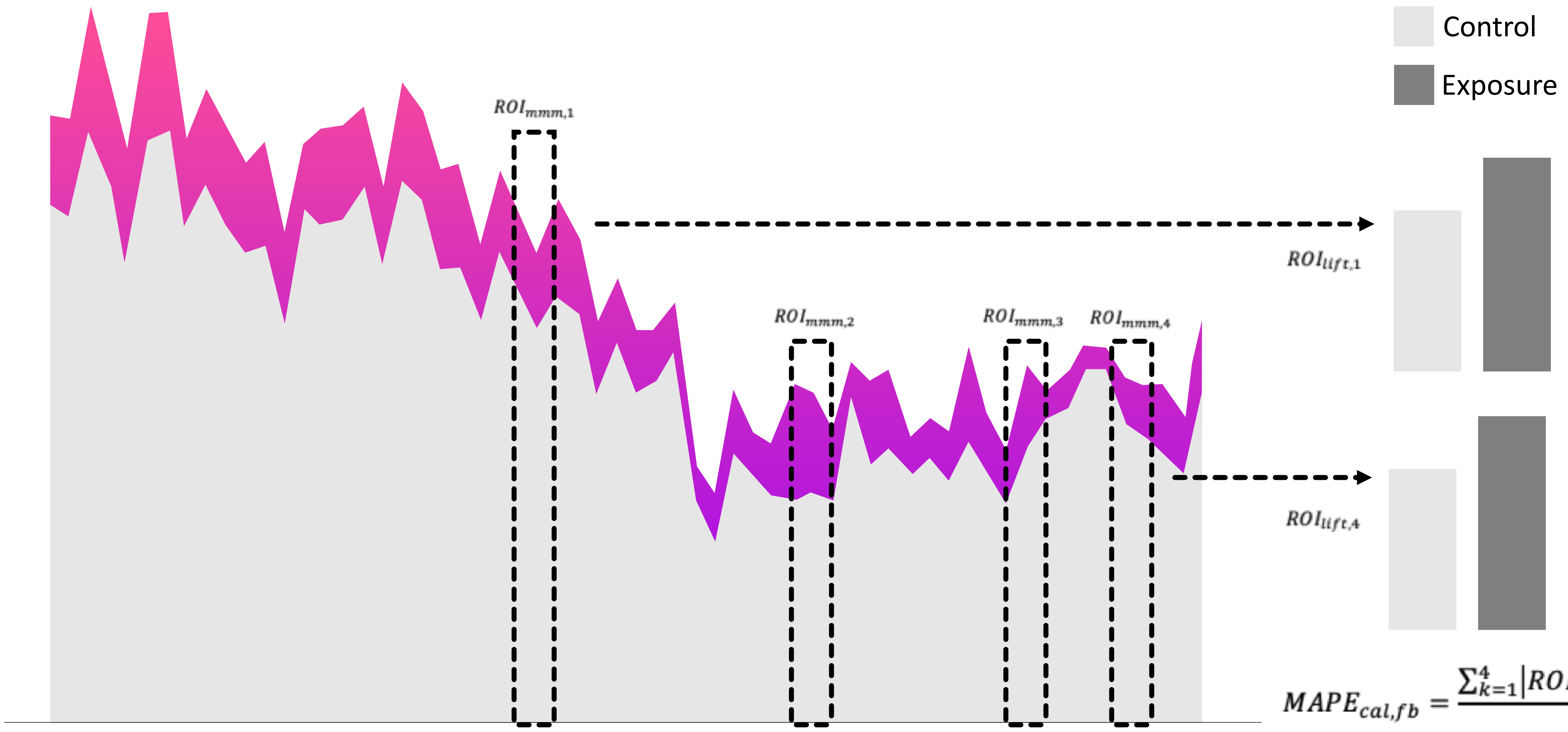
Table 4: Cost Per Incremental Acquisition (CPIA) and Marginal Cost Per Acquisition (MCPA) estimates for each channel from 2018-02-01 to 2018-03-01 for three models built with different preprocessing of spend data according to Table 3.

	Click Attribution form Channel Platform - CPA	Holdout Test Results - CPIA
Channel 1	N/A offline channel	No test data
Channel 2	$36	$66
Channel 3	N/A offline channel	$39
Channel 4	$96	$128

Table 5: Cost Per Incremental Acquisition (CPIA) and Marginal Cost Per Acquisition (MCPA) estimates for each channel from 2018-02-01 to 2018-03-01 for three models built with different preprocessing of spend data according to Table 3.

What if I have multiple experiments?

MMM Model #10 Base + other media Facebook



$$MAPE_{cal,fb} = \frac{\sum_{k=1}^{4} \left| ROI_{mmm,k} - ROI_{lift,k} \right| / ROI_{lift,k}}{4}$$

What if calibration results disagree?

Match decision rule to advertiser priorities – some options:

- Spend/importance weighting
- Minimize sum of squared error

Mean Absolute Percent Error (MAPE)

Model	Channel 1 65% of spend	Channel 2 30% of spend	Channel 3 5% of spend	Average	Spend Weighted	SSE
1	3	22	20	15	9.55	893
2	14	15	16	15	14.40	677

*Simulated data for illustration purposes

Considerations

When designing an experimentation plan:

- Specify model and experiment with equivalent:
  - KPI (e.g., Sales, Cost per acquisition)
  - Brand and product definition
  - Time period
- Use geo experimentation if Conversion Lift is not available
- Experimental results should be stat sig

Limitations

Calibration relies on channels capable of running experiments:

- Calibrating available channels reduces overall model error
- Consider other types of experimentation (eg. geo-testing) when platform doesn’t have experimental tools

Requires close coordination between MMM vendor, client and media partner

Takeaways

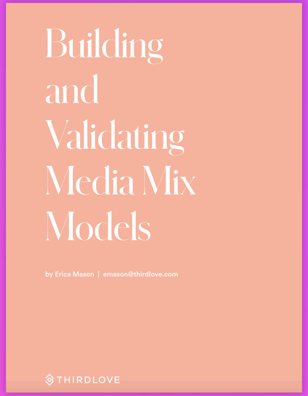
1. Calibration increases the incrementality of modeled results
2. There are several ways to calibrate – match approach to goals and capacity
3. Make an experimentation plan to streamline comparisons
4. Create value by starting with available channels, and add more as measurement evolves

Resources

ThirdLove Whitepaper

[Building and Validating Media Mix Models]

https://fb.me/Thirdlove-MMM



FBIQ Calibration Article

[How to Calibrate Marketing Mix Models with Experiments]

https://fb.me/CalibratingMMM

THANK YOU