



# BACK TO THE FUTURE

Using data to go  
travelling in time

Russell McAthy  
CEO & Co-Founder, Ringside Data

@therustybear





# About Russell

- CEO & Co-Founder of **Ringside Data**
- **@therustybear** on twitgramchat
- 15+ years in the industry
- Loves: Tech, Gaming, Dinosaurs, Cooking, Quick Maths, Myself
- Dislikes: Coffee, Cola, Cats

STEVEN SPIELBERG Presents

# BACK TO THE FUTURE

A ROBERT ZEMECKIS Film

He was never in time for his classes...

He wasn't in time for his dinner...

Then one day... he wasn't in time at all.



"BACK TO THE FUTURE" Stars MICHAEL J. FOX

CHRISTOPHER LLOYD · LEA THOMPSON · CRISPIN GLOVER

Written by ROBERT ZEMECKIS & BOB GALE Music by ALAN SILVESTRI Produced by BOB GALE and NEIL CANTON

Executive Producers STEVEN SPIELBERG KATHLEEN KENNEDY and FRANK MARSHALL

Directed by ROBERT ZEMECKIS A UNIVERSAL PICTURE

Soundtrack Available on MCA Records and Casablanca Read the DEFFLEY Book PARENTAL GUIDANCE SUGGESTED

STEVEN SPIELBERG Presents

# BACK TO THE FUTURE II

A ROBERT ZEMECKIS Film

MICHAEL J. FOX  
CHRISTOPHER LLOYD

Getting back was only the beginning.



MICHAEL J. FOX

CHRISTOPHER LLOYD · BACK TO THE FUTURE PART II · LEA THOMPSON · THOMAS F. WILSON · ALAN SILVESTRI  
Written by ARTHUR SCHMIDT · HARRY KERAMIDAS · PRODUCED BY RICK CARTER · DIRECTED BY DEAN CUNDEY · EXECUTIVE PRODUCERS STEVEN SPIELBERG  
FRANK MARSHALL · KATHLEEN KENNEDY · BOB GALE · ROBERT ZEMECKIS · BOB GALE · BOB GALE · NEIL CANTON

Directed by ROBERT ZEMECKIS A UNIVERSAL PICTURE

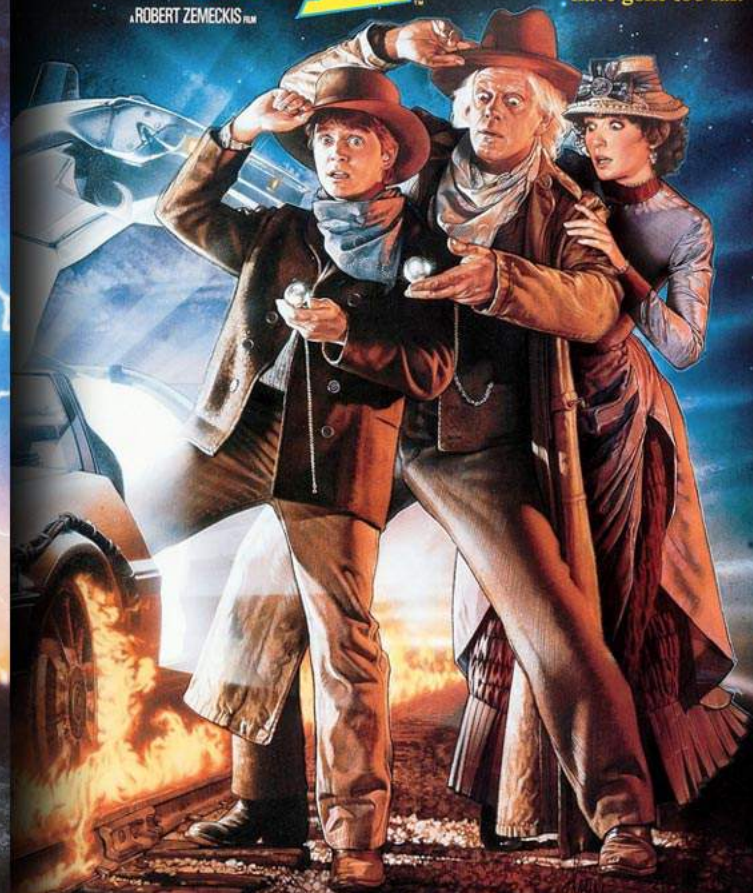
STEVEN SPIELBERG Presents

# BACK TO THE FUTURE III

A ROBERT ZEMECKIS Film

MICHAEL J. FOX  
CHRISTOPHER LLOYD  
MARY STEENBURGEN

They've saved the best trip for last...  
But this time they may have gone too far.



MICHAEL J. FOX

CHRISTOPHER LLOYD · "BACK TO THE FUTURE PART III" · MARY STEENBURGEN · THOMAS F. WILSON · LEA THOMPSON  
ALAN SILVESTRI · ARTHUR SCHMIDT · HARRY KERAMIDAS · PRODUCED BY RICK CARTER · DIRECTED BY DEAN CUNDEY · EXECUTIVE PRODUCERS STEVEN SPIELBERG  
FRANK MARSHALL · KATHLEEN KENNEDY · BOB GALE · ROBERT ZEMECKIS · BOB GALE · BOB GALE · NEIL CANTON

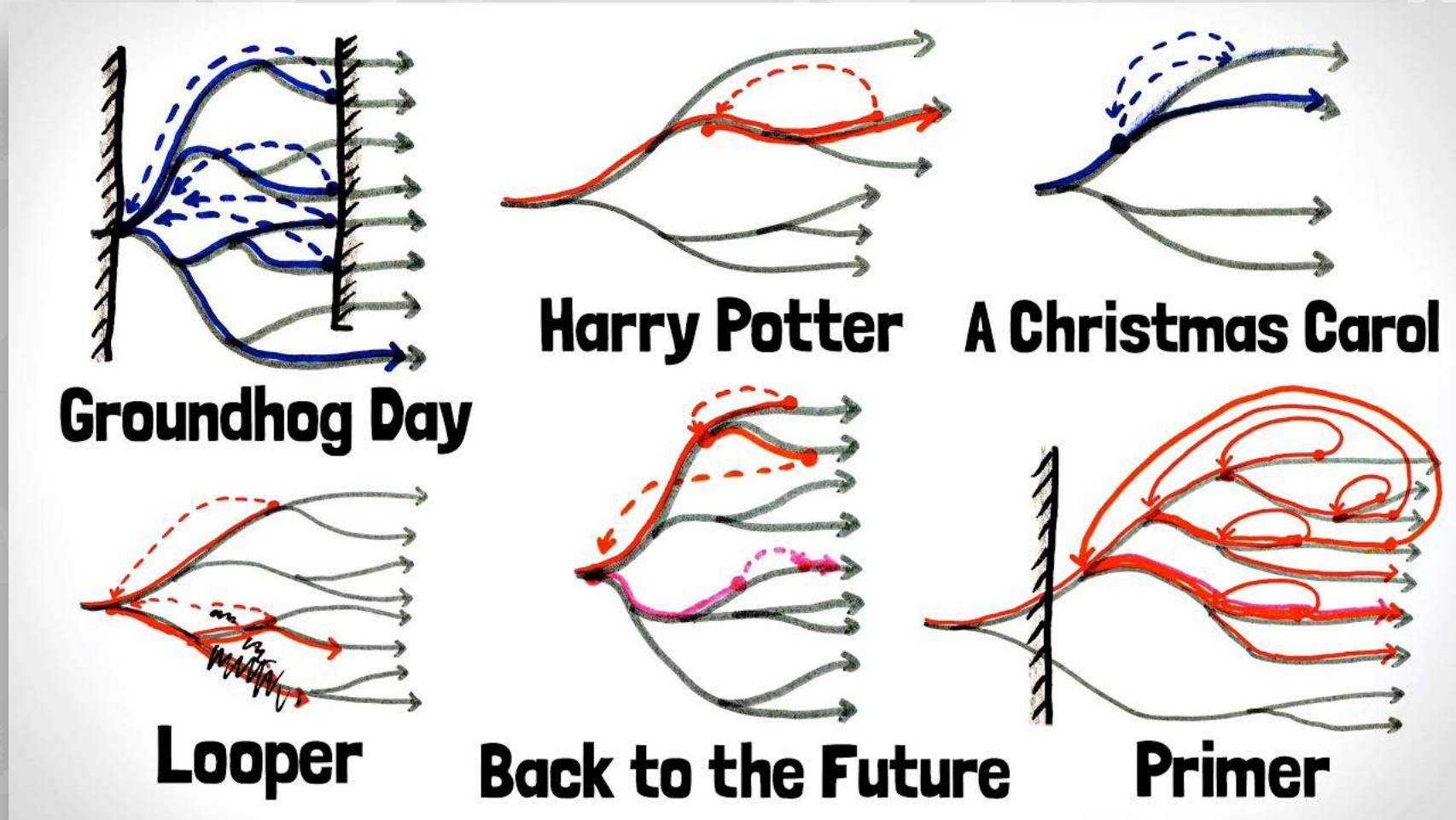
Directed by ROBERT ZEMECKIS A UNIVERSAL PICTURE





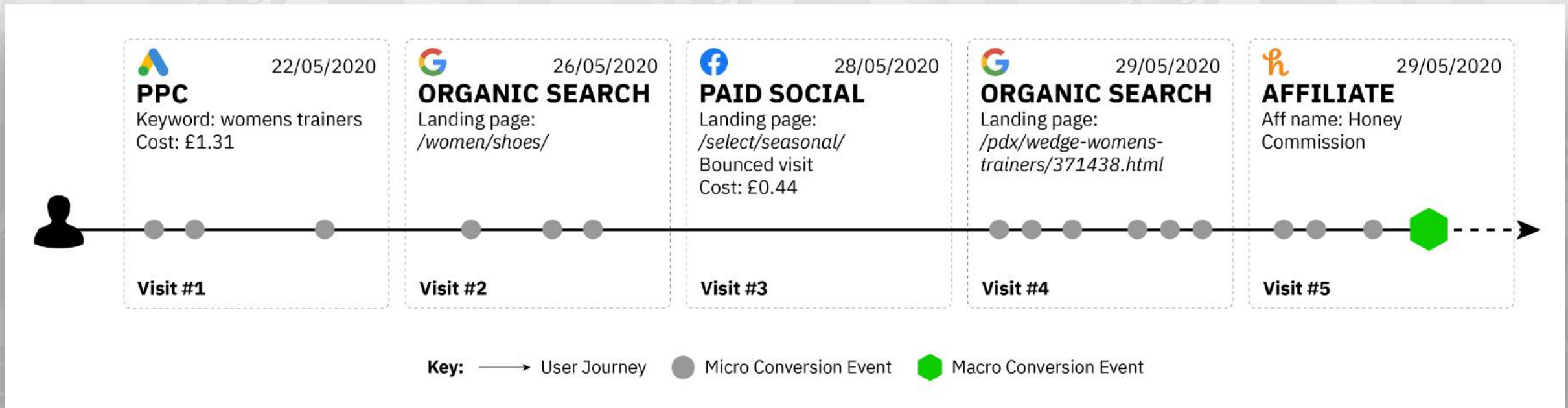
**“I guess you guys aren’t ready for that yet. But your kids are gonna love it...”**

# Timelines in Films



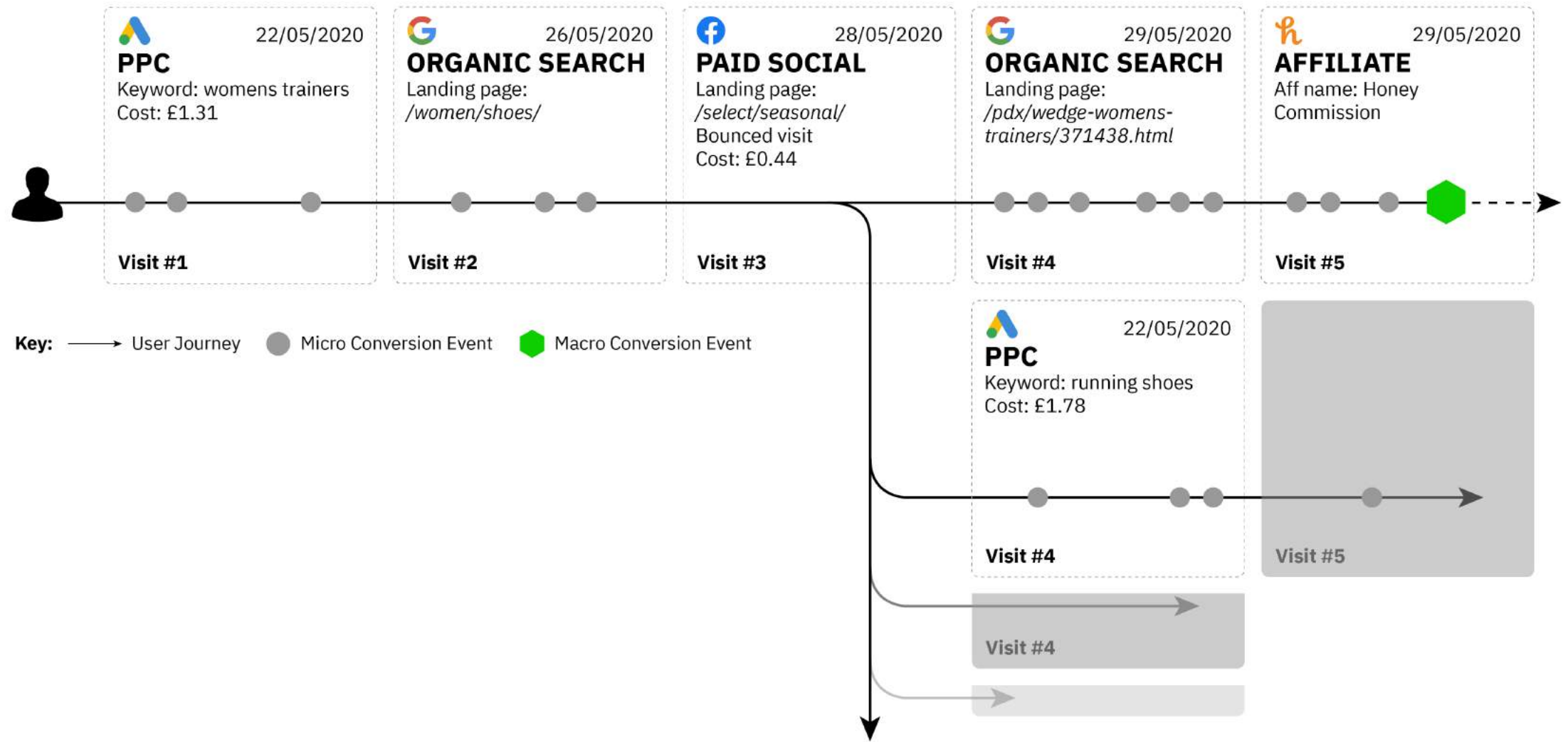
Great video: <https://rsd.is/timelines>

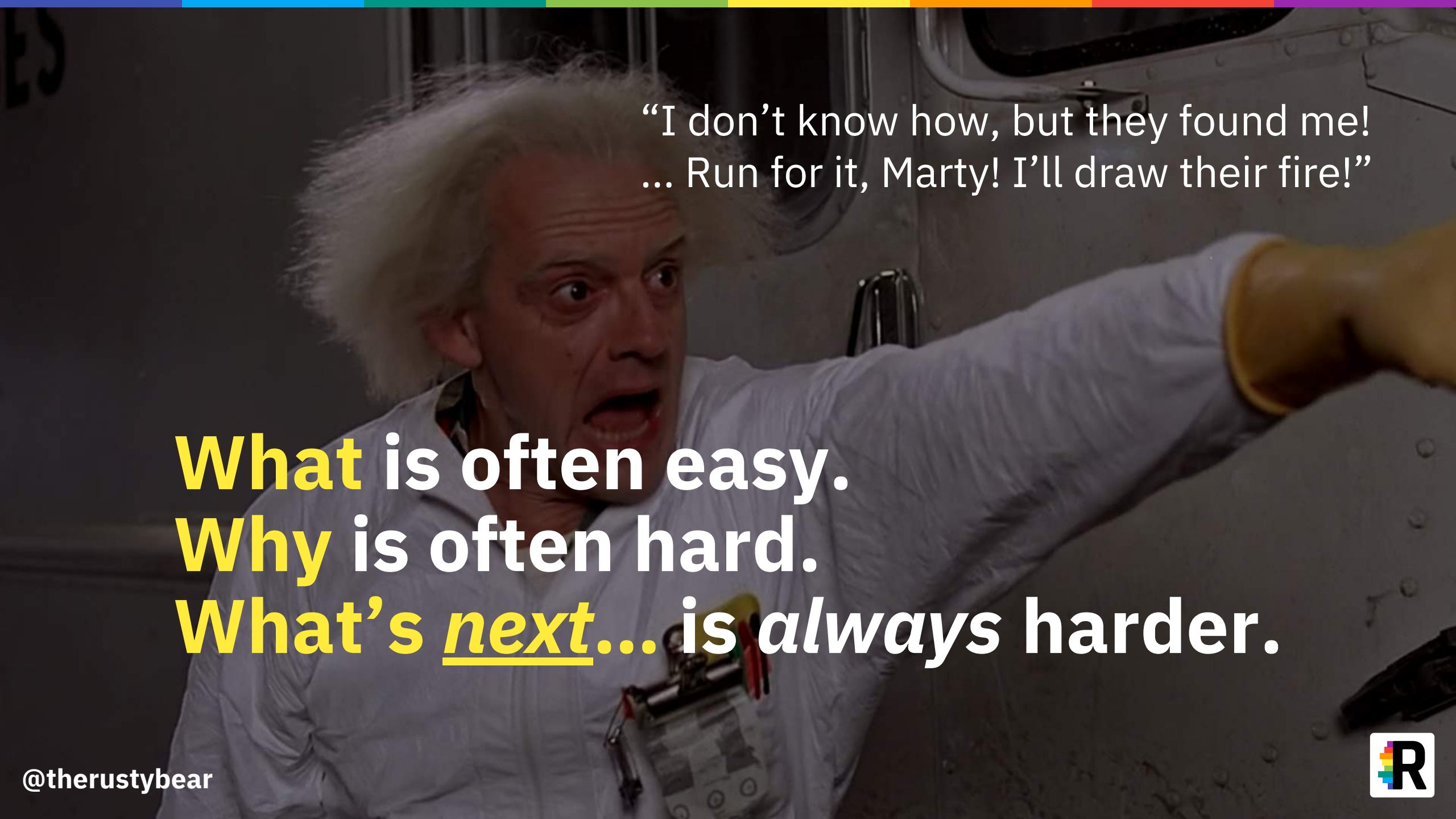
# The Customer Journey – Timeline



A customer's journey is **more complex** than a single visit.

# The Customer Journey – Variances





“I don’t know how, but they found me!  
... Run for it, Marty! I’ll draw their fire!”

**What** is often easy.  
**Why** is often hard.  
**What’s next...** is *always* harder.



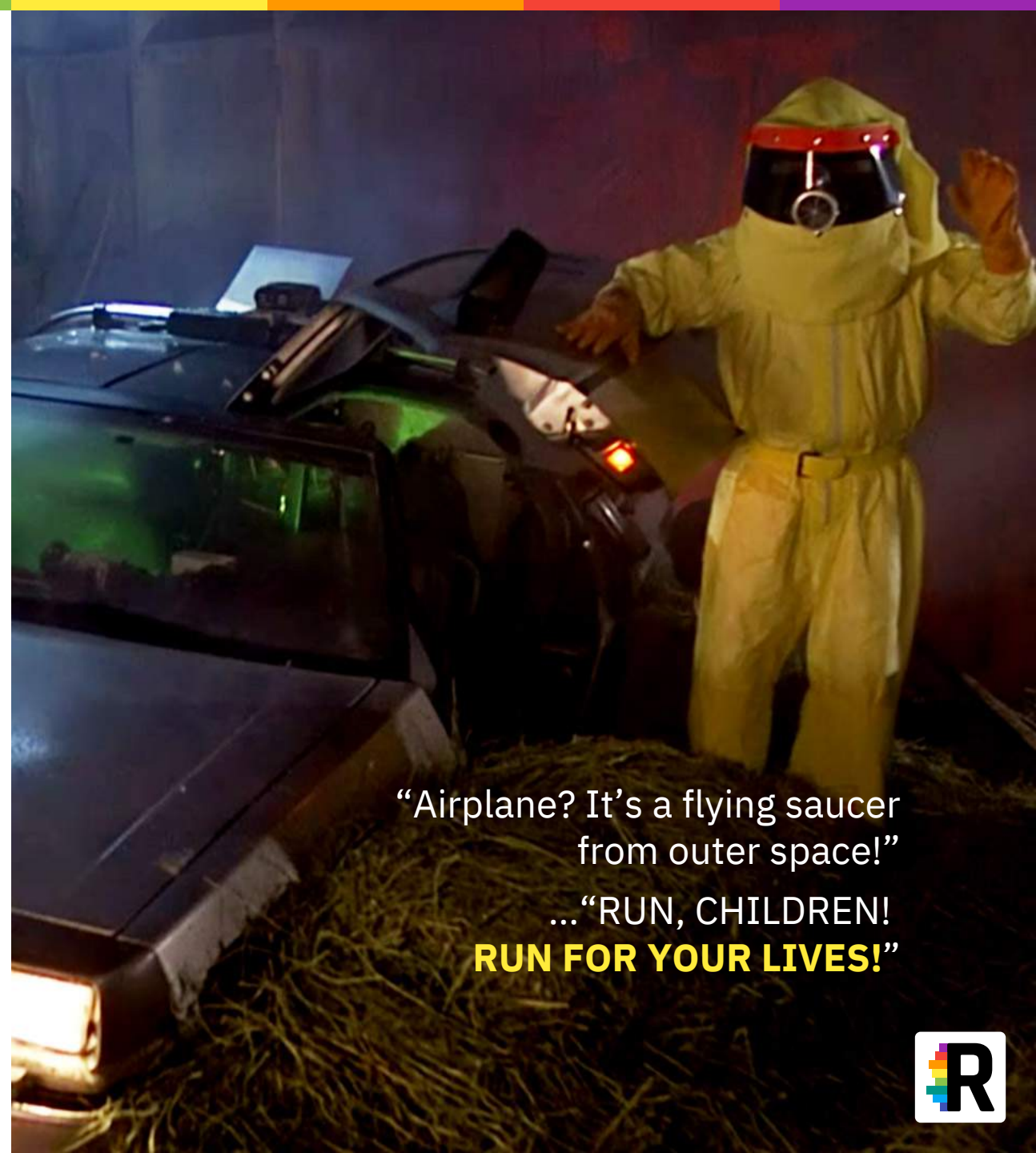
# Basics – Run Rate

## Pros

- Quick and easy
- Easily understood and visualised
- If visualised well - can show relationships

## Cons

- Can be inaccurate against reality
- Hard to show complex "whys"

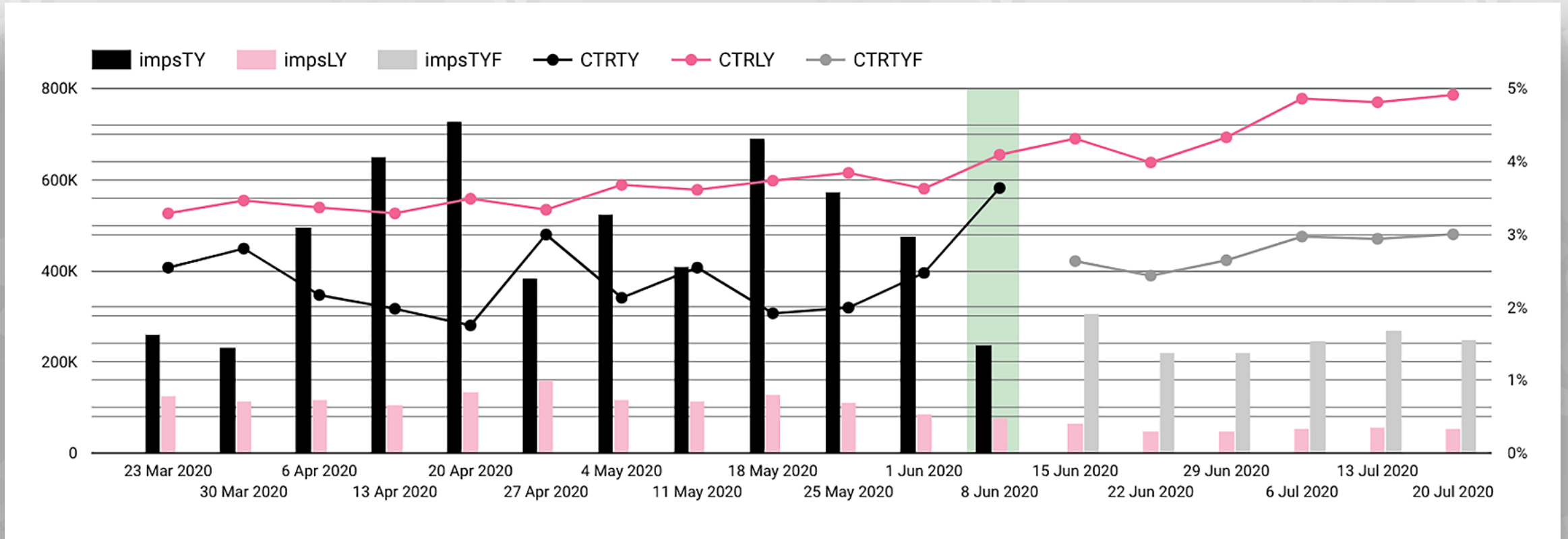


“Airplane? It’s a flying saucer  
from outer space!”

...“RUN, CHILDREN!

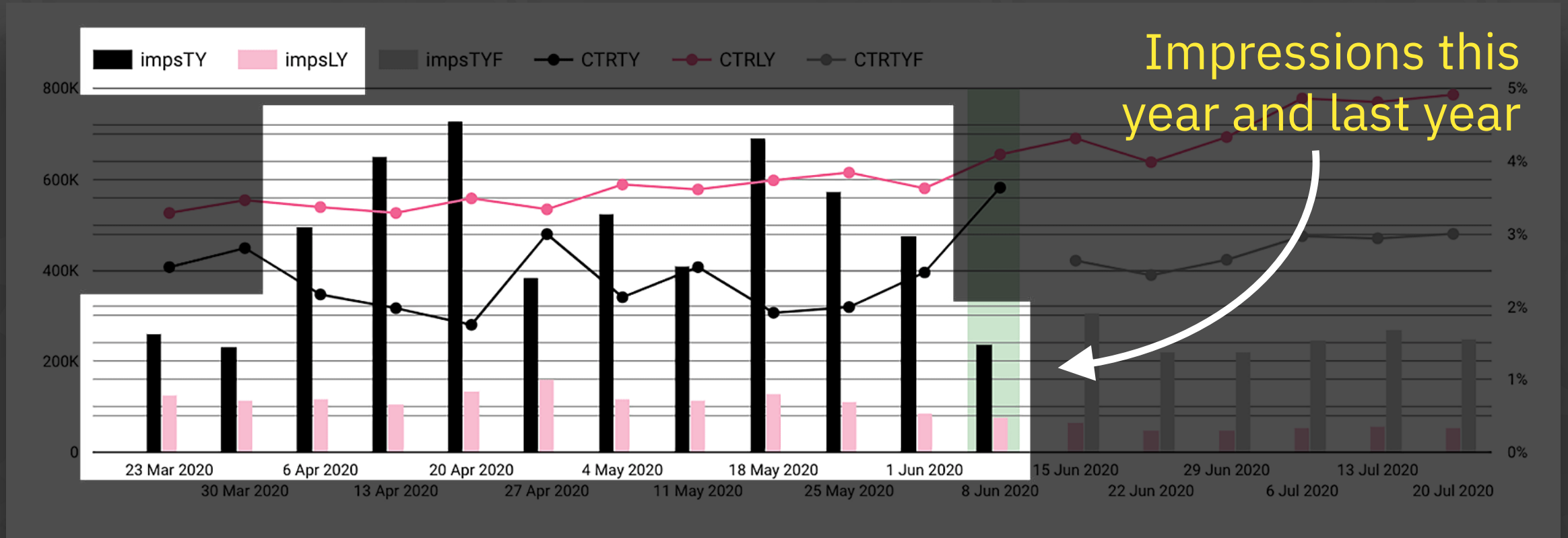
**RUN FOR YOUR LIVES!”**

# PPC Reporting



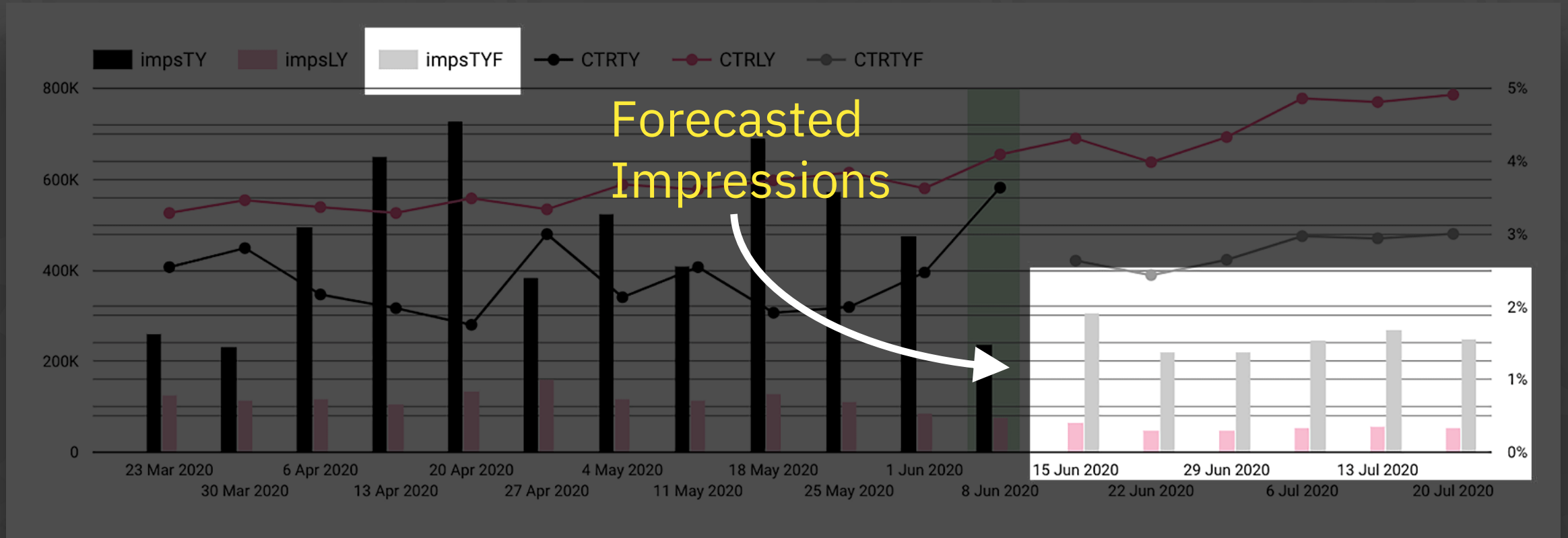
## Reach Performance

# PPC Reporting



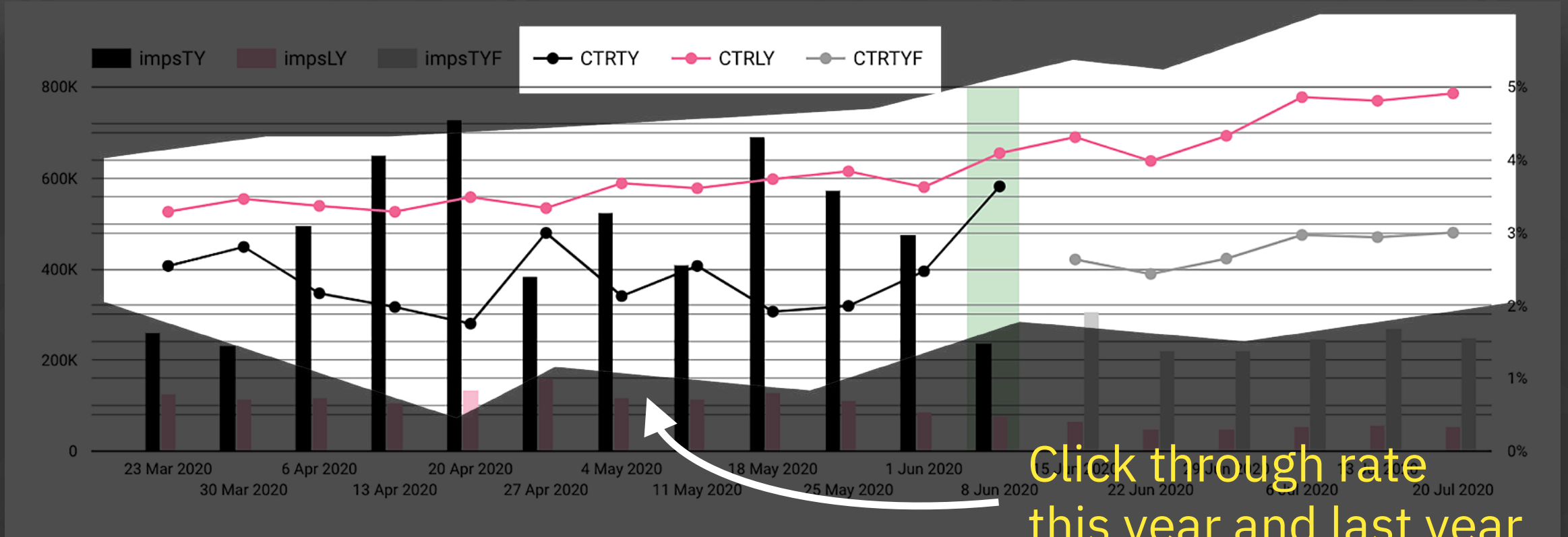
## Reach Performance

# PPC Reporting



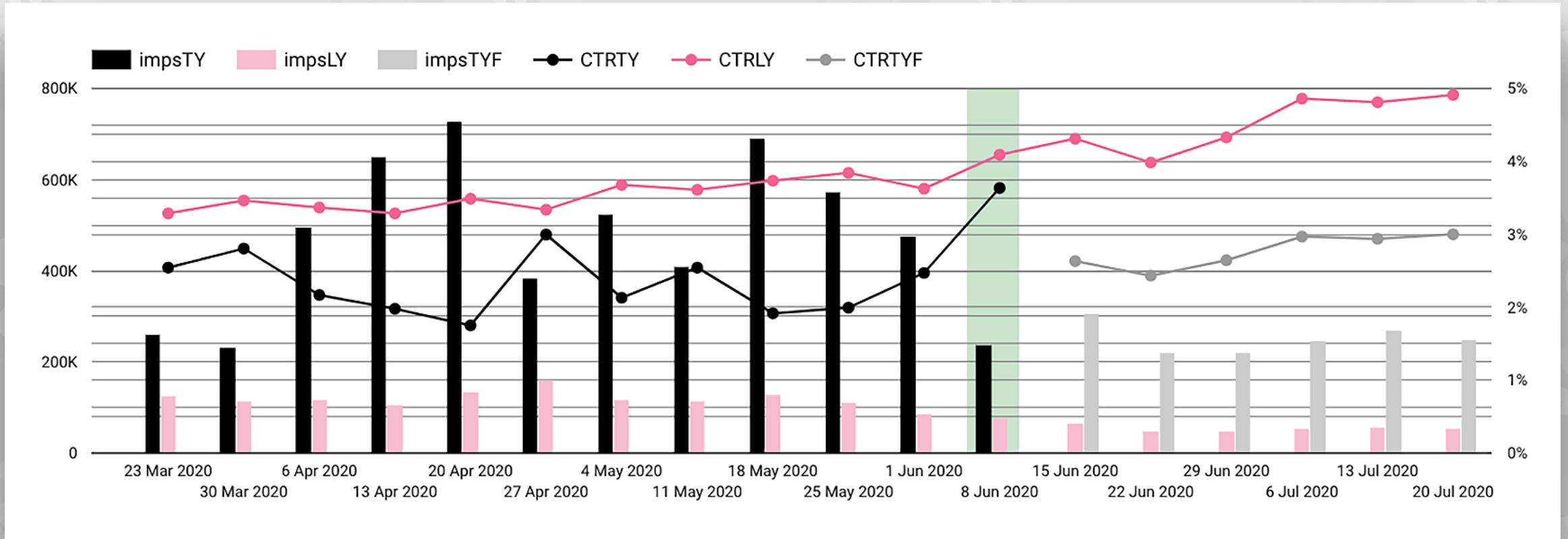
## Reach Performance

# PPC Reporting



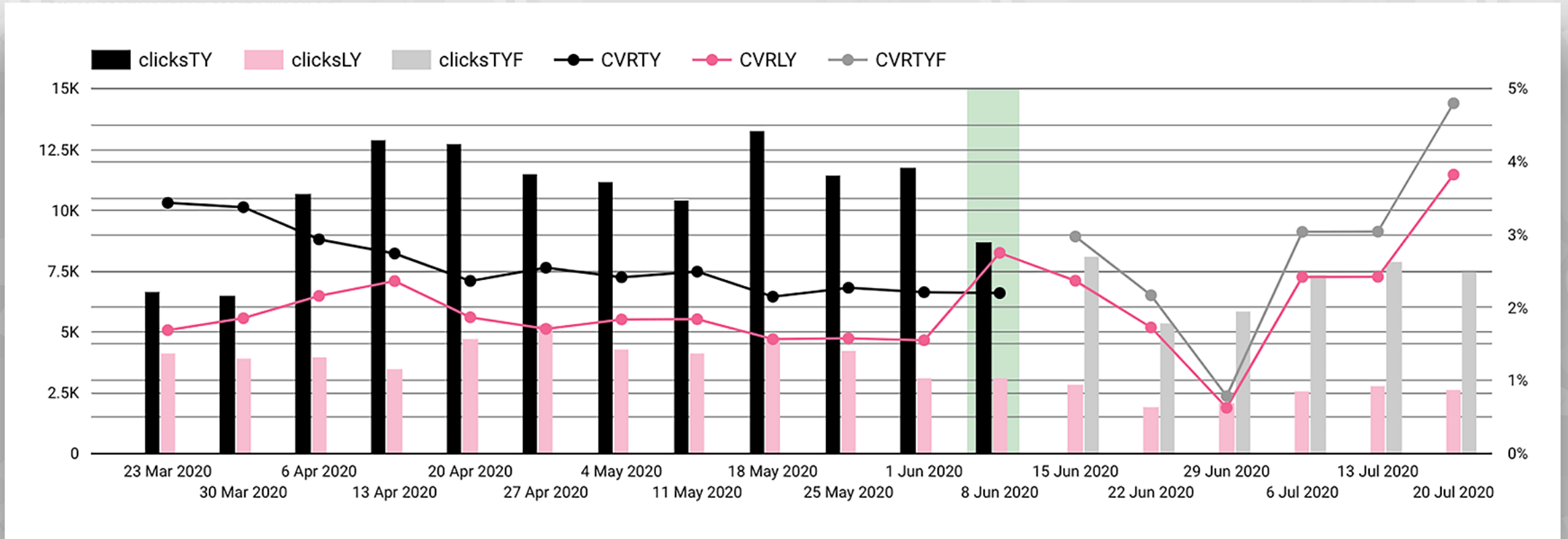
## Reach Performance

# PPC Reporting



## Reach Performance

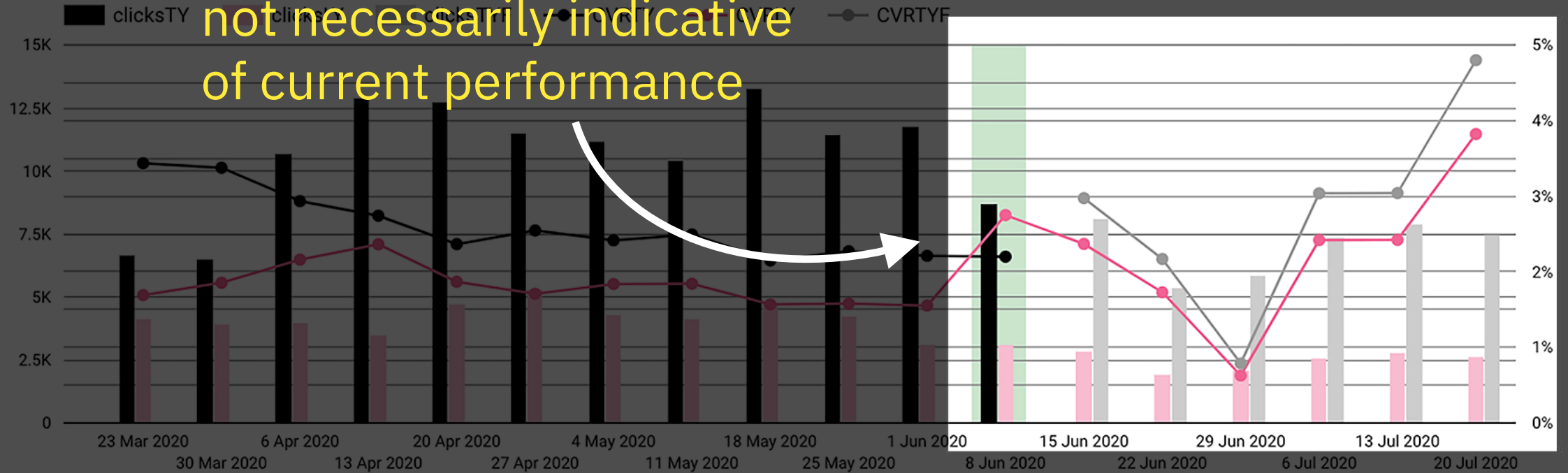
# PPC Reporting



## Click Conversion Performance

# PPC Reporting

Year on year trend is not necessarily indicative of current performance

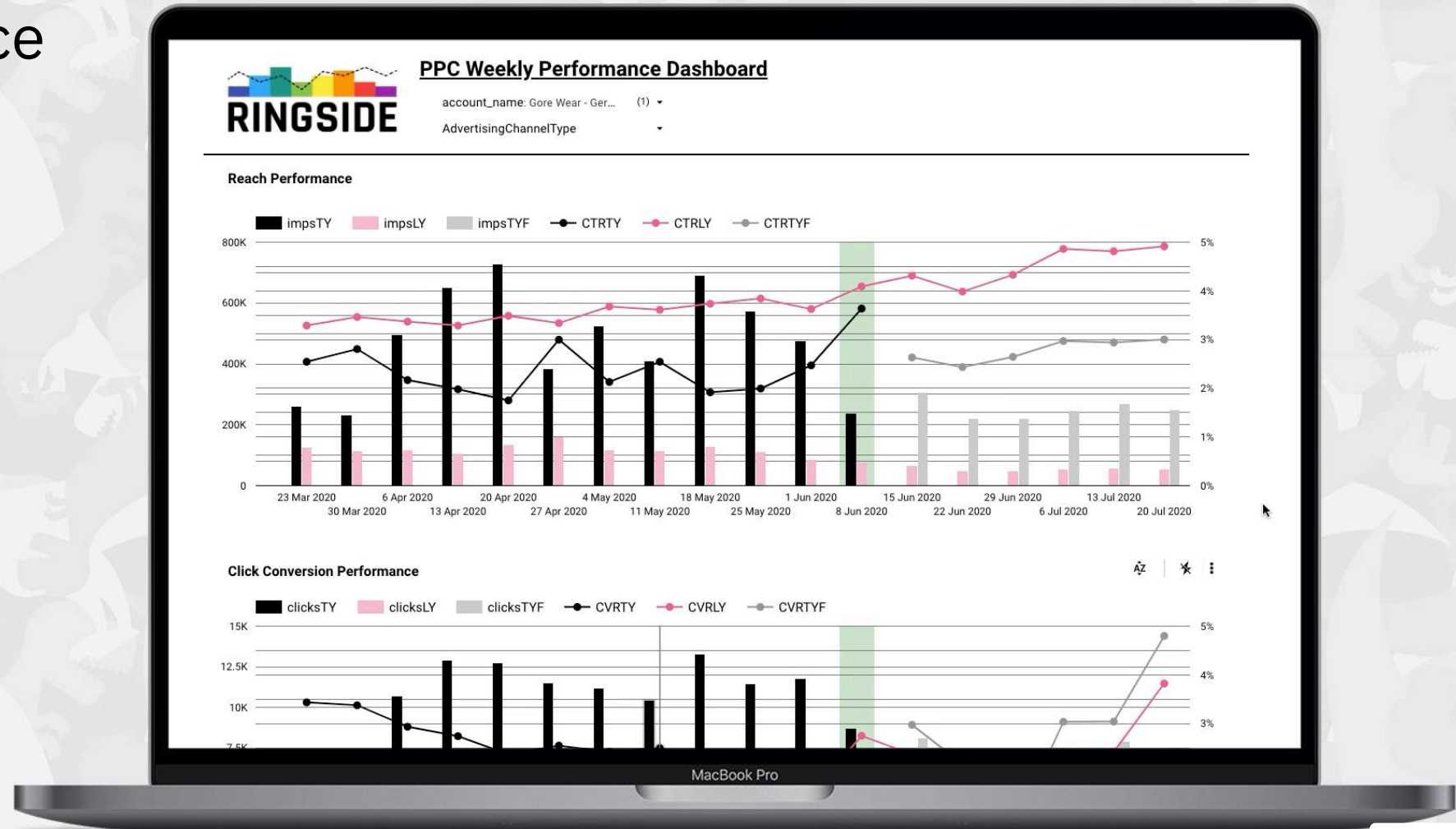


## Click Conversion Performance



# PPC Reporting Example

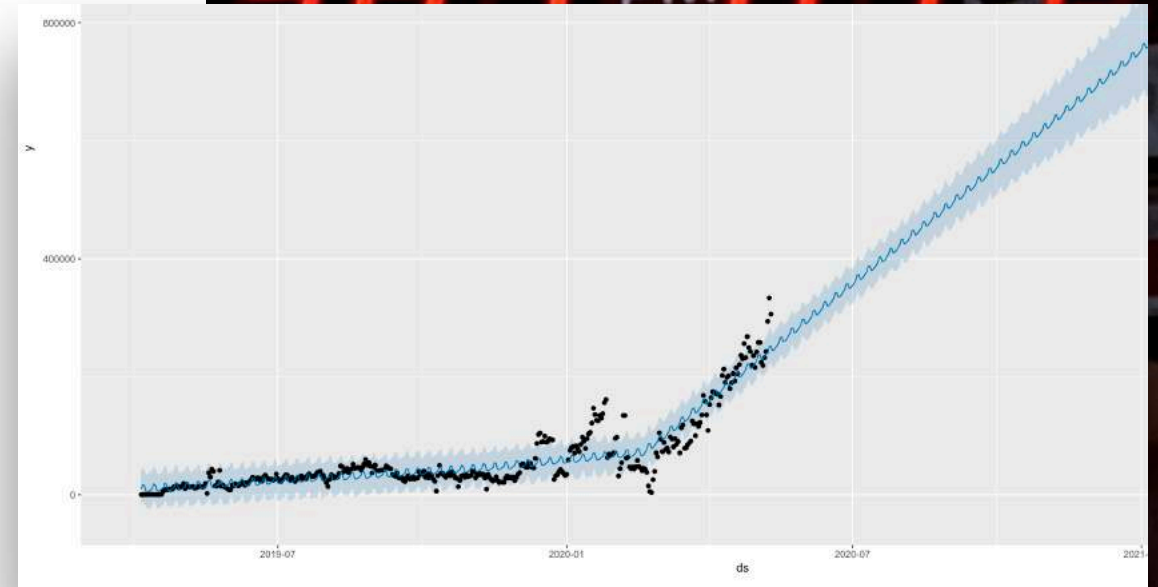
- Reach Performance
- Click Conversion Performance
- Conversion Effectiveness
- Cost Efficiency
- Conversion Value Efficiency



# Facebook Time Series Forecasting

Facebook launched a time series forecasting procedure in R. It's quite easy to set up and test. If you have many years of data it can be good to forecast on a single variable (visits, sales, etc).

However, if you have limited data (14 months in this example) and combine with a global pandemic – it will struggle.



Find it at:  
[facebook.github.io/prophet/](https://facebook.github.io/prophet/)





“Roads? Where we’re going, we don’t *need* roads...”

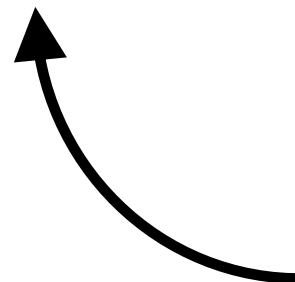
# What we want to understand

We design user journeys...

We expect users to follow our expectations just like a hamster in a maze...



# What we want to understand...



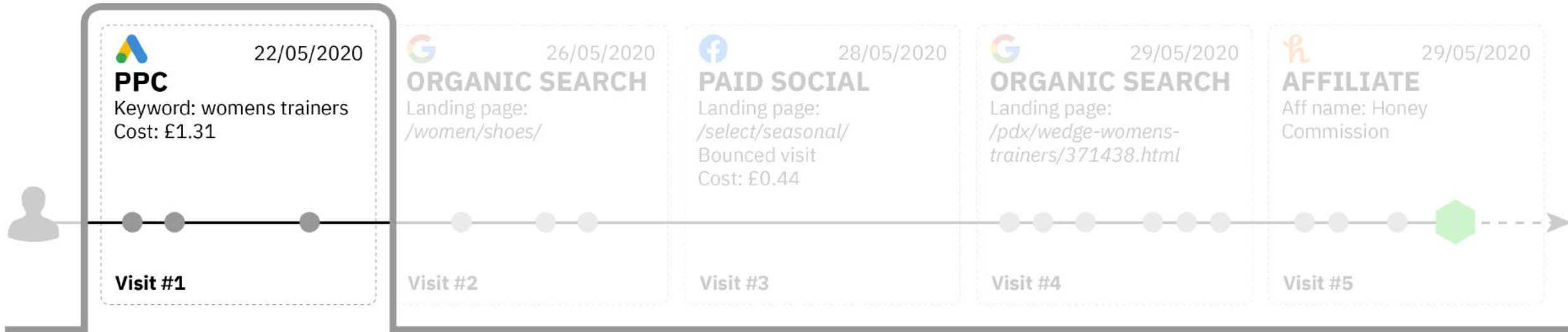
Remember this from **earlier?**



Key: —> User Journey ● Micro Conversion Event ◀ Macro Conversion Event



# ...Not every visit is equal



Timestamp	Type	doc_path	smart_ref	gclid	campaign	event_name	...
2020-05-22 14:51:02	pv	/women/shoes	paid_search	KbH7Bede48F4fnbb	1422141		
2020-05-22 14:51:02	micro					Category – Women’s Shoes	
2020-05-22 14:54:41	micro					Site Search	
2020-05-22 14:54:43	pv	/search?s=running%20shoes					
2020-05-22 14:55:02	pv	/women/shoes/running					
2020-05-22 14:55:02	micro					SubCategory – Women’s Shoes - Running	

Each visit is made up of a number of elements including pageviews, micro conversions and 100s more datapoints.

Key: —→ User Journey ● Micro Conversion Event ◼ Macro Conversion Event



# ...Not every visit is equal



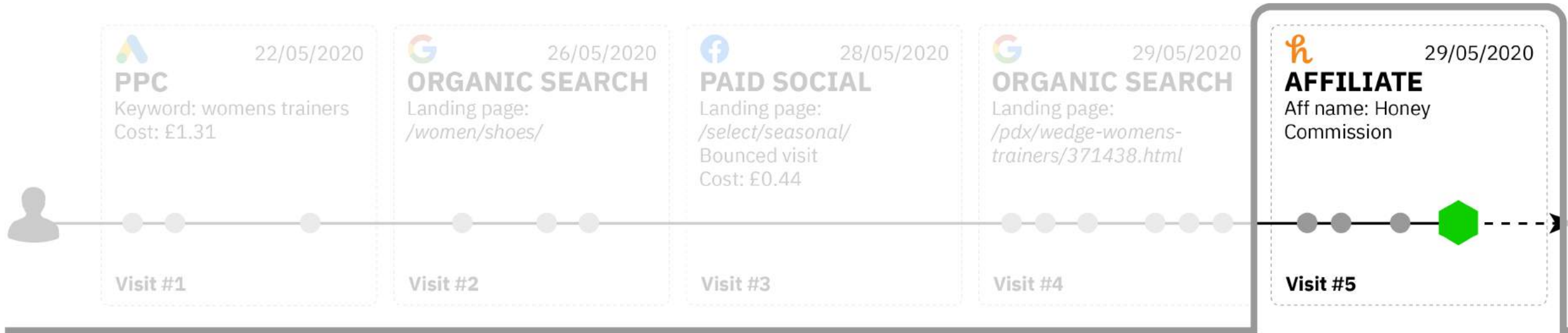
Timestamp	Type	doc_path	Smart_ref	product_sku	event_name	product_price	....
2020-05-29 10:14:10	pv	/pdx/wedge-womens-trainers/371438.html	organic_search	371438_01		8500	
2020-05-29 10:14:10	micro			371438_01	Product Page View	8500	
2020-05-29 10:21:48	micro			371438_01	Add to Basket	8500	
2020-05-29 10:24:01	pv	https://sneakershop.com/uk/en/checkout/start					
2020-05-29 10:24:01	micro				Checkout – Stage 1		

In this visit the user added the item to the basket – but they did not buy. This is an important visit!

Key: → User Journey ● Micro Conversion Event ◀ Macro Conversion Event



# ...Not every visit is equal



Timestamp	Type	doc_path	Smart_ref	event_name	basket_total	basket_items	...
2020-05-29 10:29:14	pv	https://sneakershop.com/uk/en/checkout/start	affiliate		8500	1	
2020-05-29 10:29:14	micro			Checkout – Stage 1	8500	1	
2020-05-29 10:29:55	micro			Add Promo Code			
2020-05-29 10:31:09	pv	https://sneakershop.com/uk/en/checkout/payment		Checkout – Stage 2	7650	1	
...	...	...	...	...	...	...	...

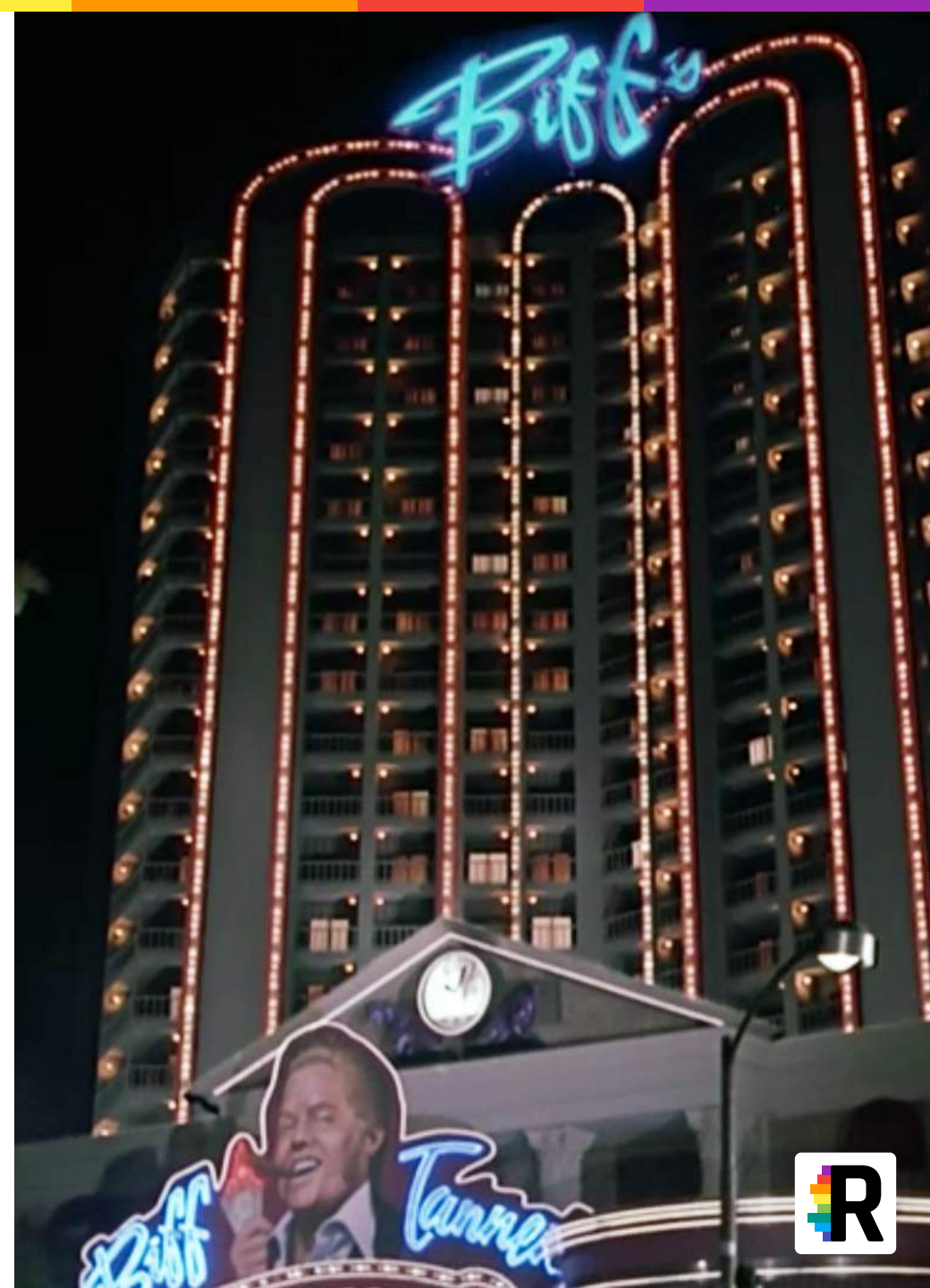
The converting visit was minutes after the previous. This is a user that's left to get a discount code mid session prior to the conversion event.





# Layers of complexity

- Each visit could be x of y within a conversion journey
- Each visit is made up of 1+ pageviews
- What is the value of each of these pageviews?
- What device was this visit on?
- Where did the user complete the visit?
- What day of week did the visit happen?



# Defining Micro Events

What is a **MICRO** conversion?

Basket View

Category Page

Blog Post View

Product Page

Product Impression

Site Search

Checkout Stage  
(Payment)

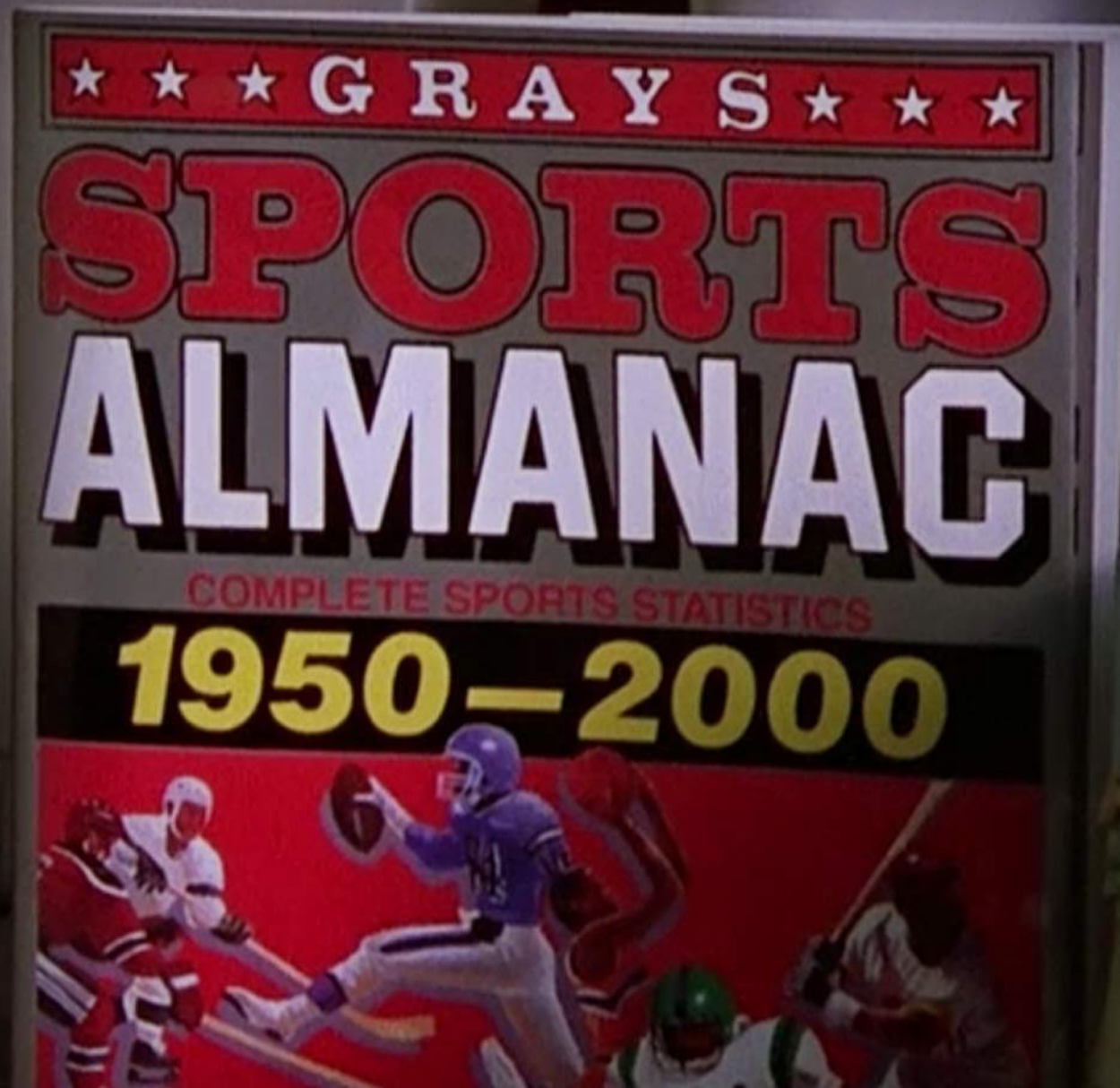
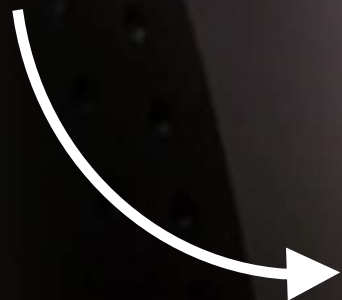
Newsletter  
Subscribe

Sub-Category  
Page

List Segmentation

Add to Basket

# Machine Learning





**P.S.A. – I’m an idiot**

“Hello. Hello. Anybody home?  
**Think, McAthy, think!**”

# Defining Macro Events (Success)

E-commerce Conversion

Retail Sale

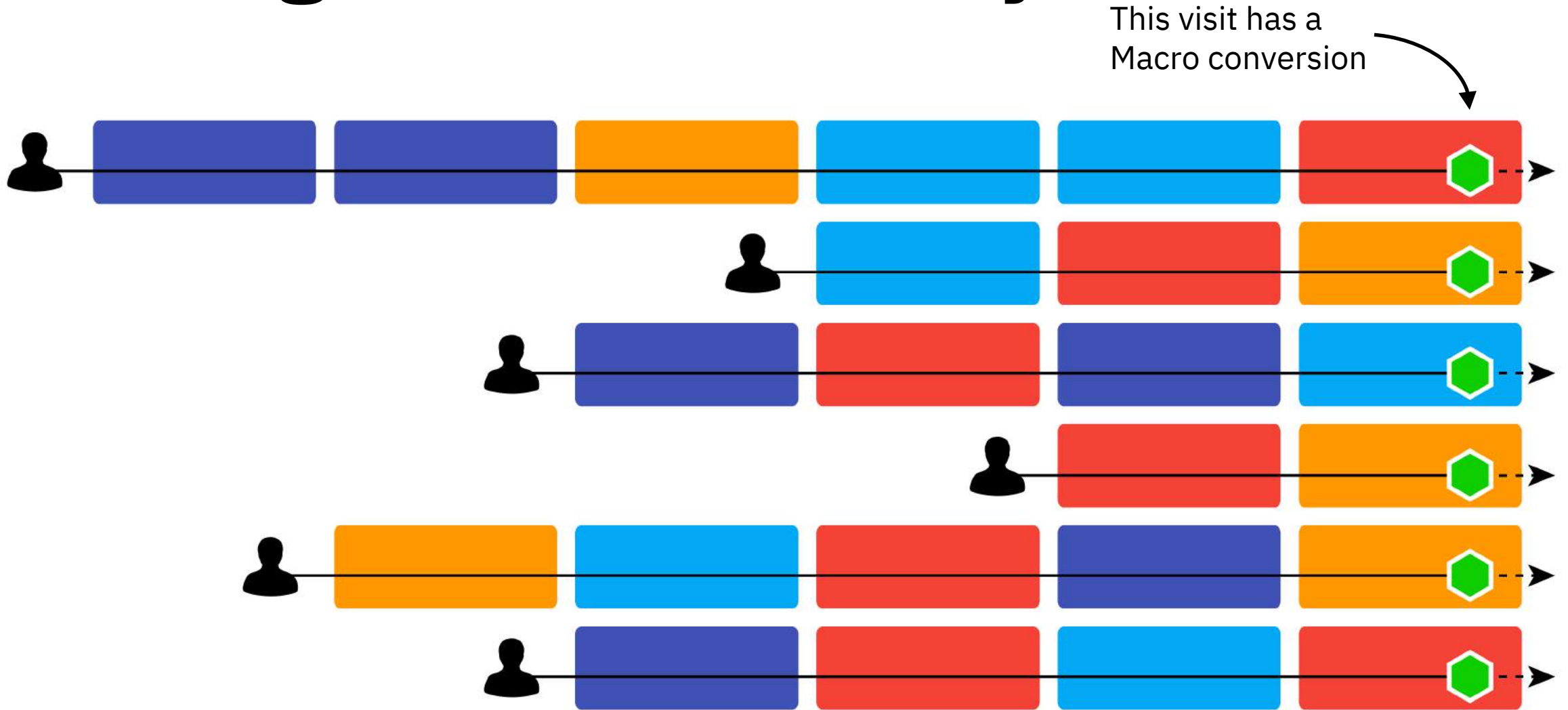
Quote

What is a **MACRO** conversion?

Insurance Policy

New Customer Record

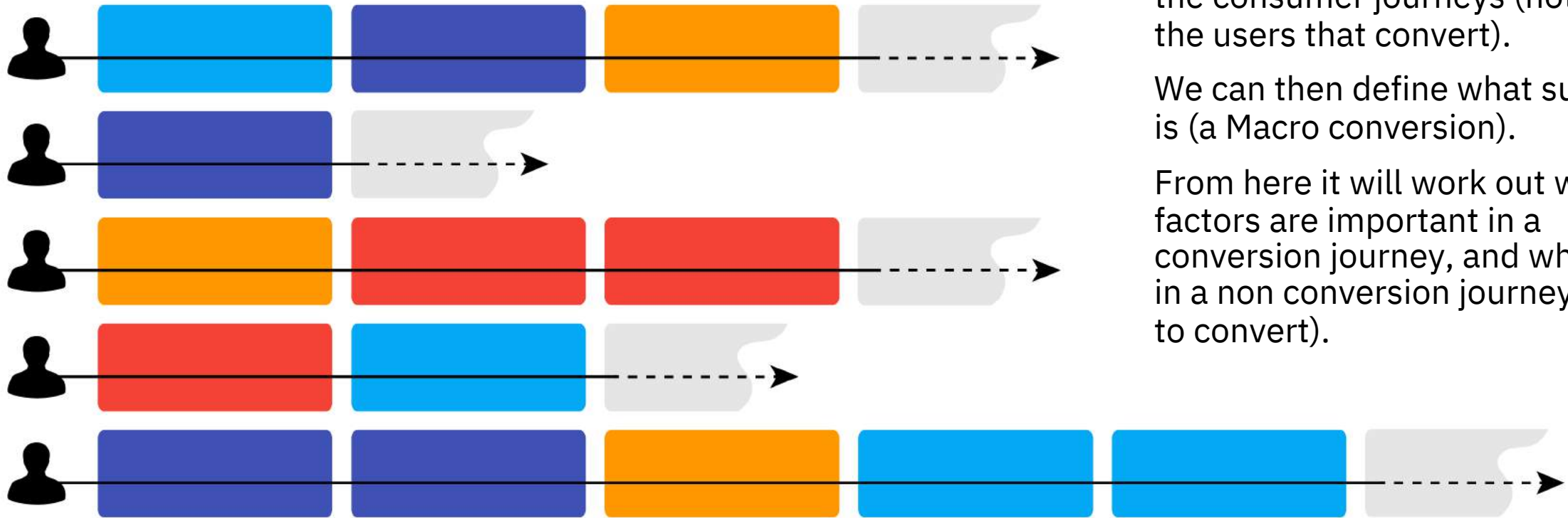
# Creating a Macro Journey



Key: —→ User Journey     Macro Conversion Event     Visits by Channel



# Training a Model

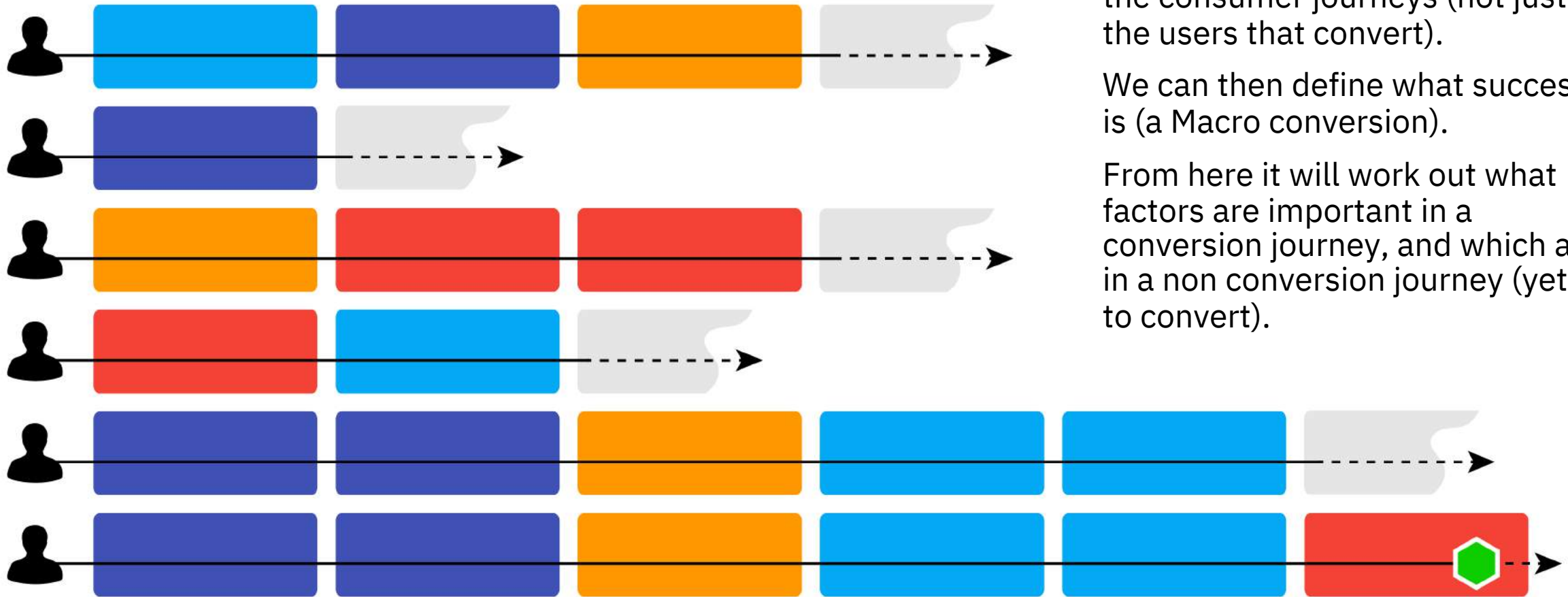


We show the Machine Learning all the consumer journeys (not just the users that convert).

We can then define what success is (a Macro conversion).

From here it will work out what factors are important in a conversion journey, and which are in a non conversion journey (yet to convert).

# Training a Model



We show the Machine Learning all the consumer journeys (not just the users that convert).

We can then define what success is (a Macro conversion).

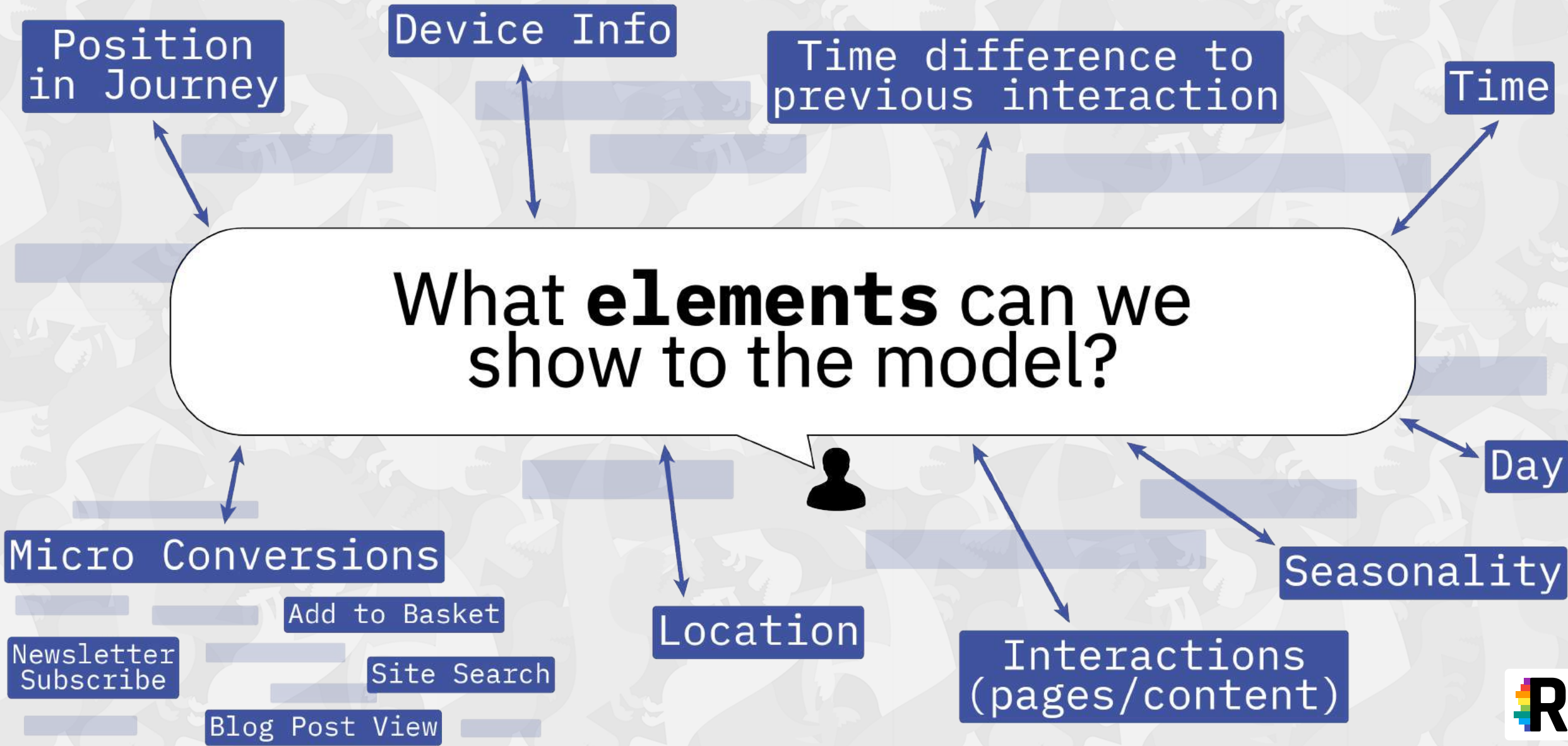
From here it will work out what factors are important in a conversion journey, and which are in a non conversion journey (yet to convert).

Key: —> User Journey     Macro Conversion Event     Visits by Channel     Potential Next Converting Visit





# Training a Model



LEGO® MOC SERIES BUILD THE  
**BACK TO THE FUTURE**  
THE DELOREAN™

e eaglemoss  
COLLECTIONS

UNIVERSAL

1:8 Scale  
Replica  
Model

# Accuracy of a Model

OFFICIALLY  
LICENSED  
OFFICIALLY

ACTUAL SIZE 52.7cm

@therustybear



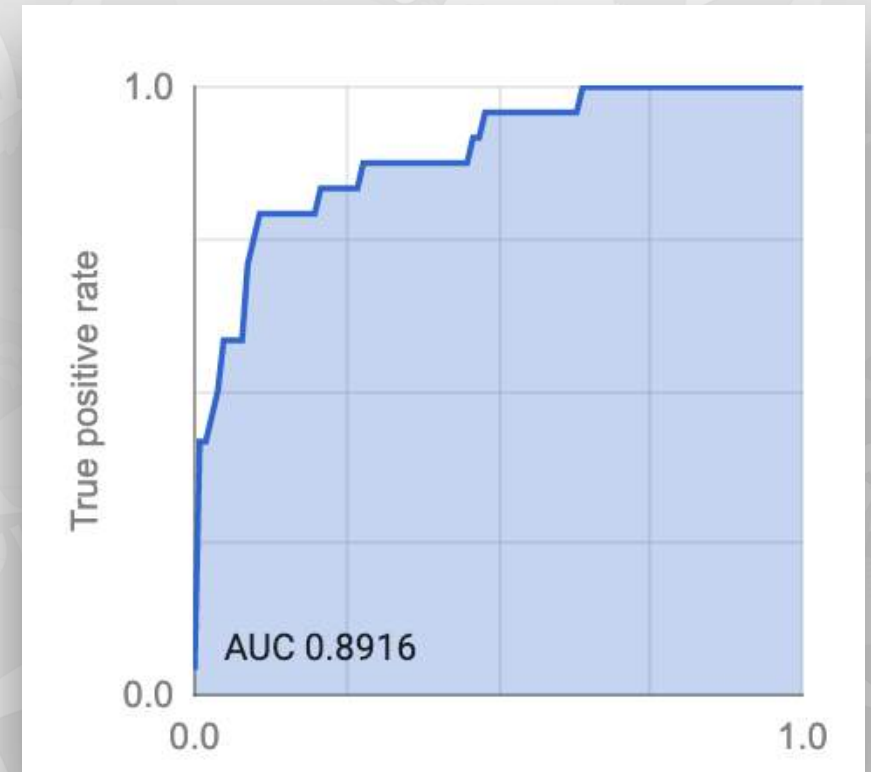
# Accuracy of a Model

This shows how effective each ML model is at classifying a **converting user** vs a **non converting user**.

ROC AUC shows this effectiveness up until 1 - where you are **certain** that this person will convert.

If the line in the graph was  **$y=x$**  then we would have a **0.5** ROC AUC which is effectively a coin flip. Having a ROC AUC of **0.89** is pretty good when forecasting if a user will convert in the future.

## Roc Curve



## Aggregate Metrics

Log loss	0.0734
ROC AUC	0.8916



# Accuracy of a Model

After showing the model test data, we can check our predictions as to whether a user would convert against whether the user did convert.

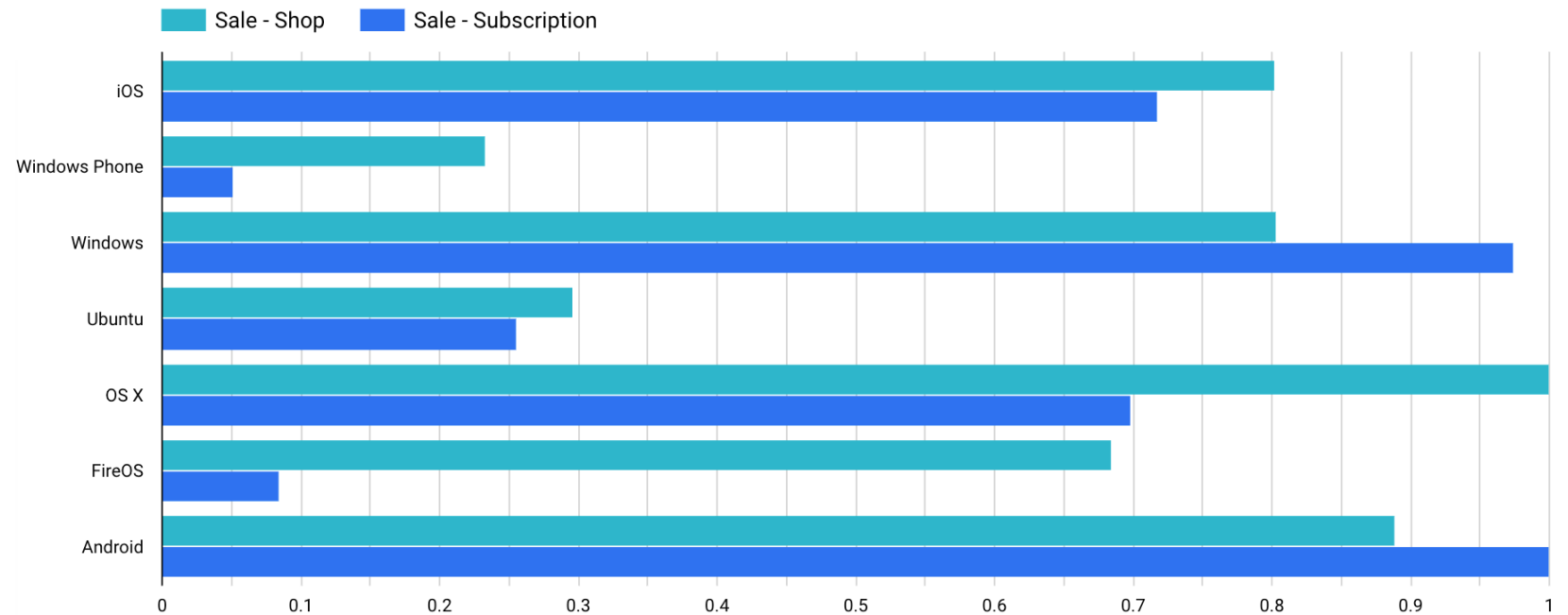
**False negatives** (0,1) and **false positives** (1,0) can be an issue within prediction engines.

## Confusion Matrix

		Actual	
		Macro Conversion	No Macro Conversion
Predicted	Macro Conversion	77.58%	22.42%
	No Macro Conversion	20.05%	79.95%

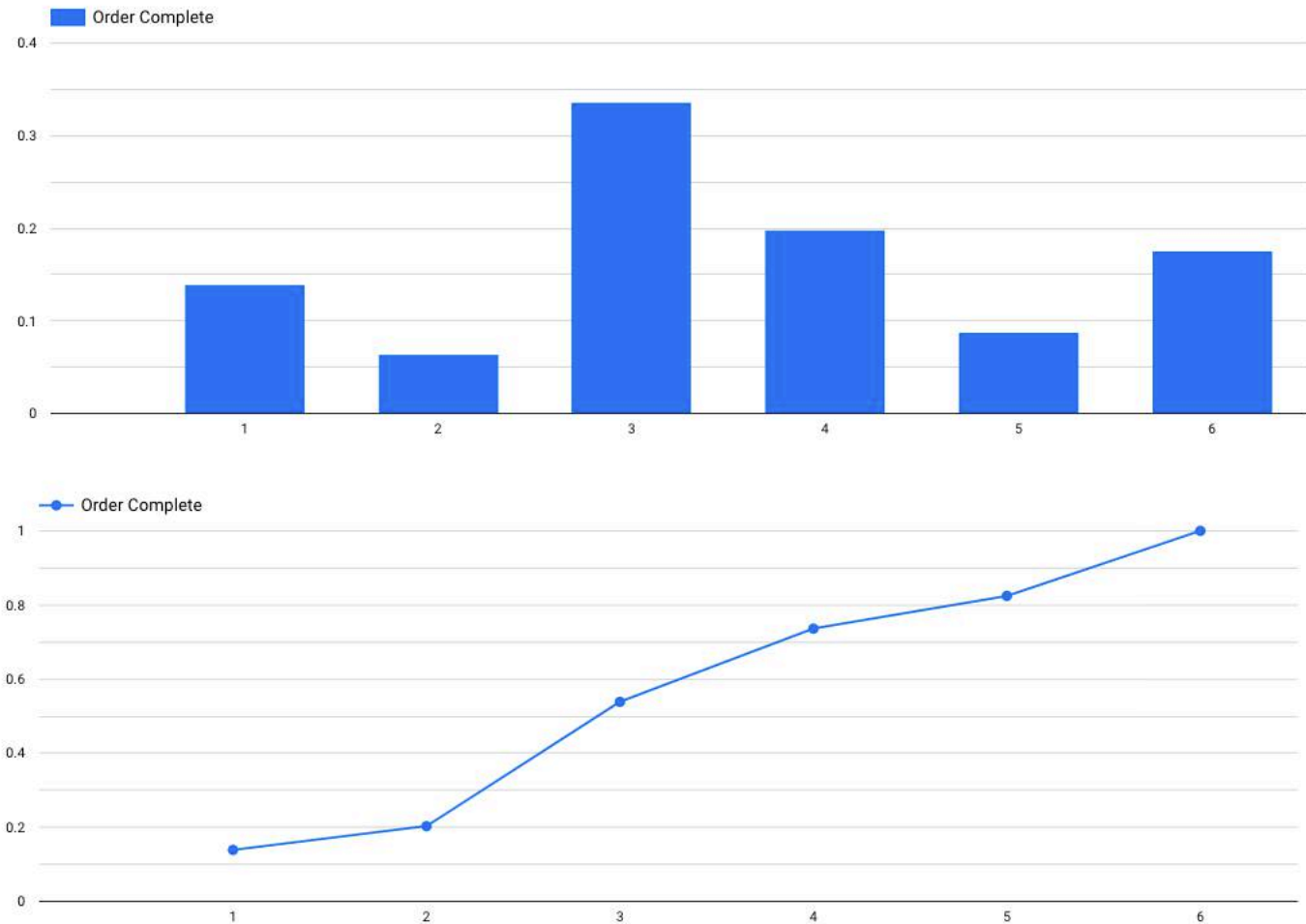
# Model Variables Value

We can show what is built up in the Machine Learning to understand what parts of a user's journey impact the consumer most.



# Using the ML/AI Data

Looking at a single user's journey we can see which visits are the most influential.



# Using the ML/AI Data



“Great Scott!”

**PRO TIP!**

**It's not all about the last visit!**



# Using the ML/AI Data



	Visit #1	Visit #2	Visit #3	Visit #4	Visit #5
Conversions	0	0	0	0	1
Revenue	0	0	0	0	£76.50
Media Cost	£1.31	0	£0.44	0	£4.25
ROI	-100%	-	-100%	-	1800%
RSD Conversions	0.2	0.15	0.05	0.4	0.2
RSD Revenue	£15.30	£11.50	£3.80	£29.80	£15.30
RSD ROI	1167%	100%	863%	100%	360%

We use ML to redistribute the conversion through the journey - splitting the conversion and revenue to each of the previous visits based on the ACTUAL impact they had.

Key: —→ User Journey ● Micro Conversion Event ◼ Macro Conversion Event





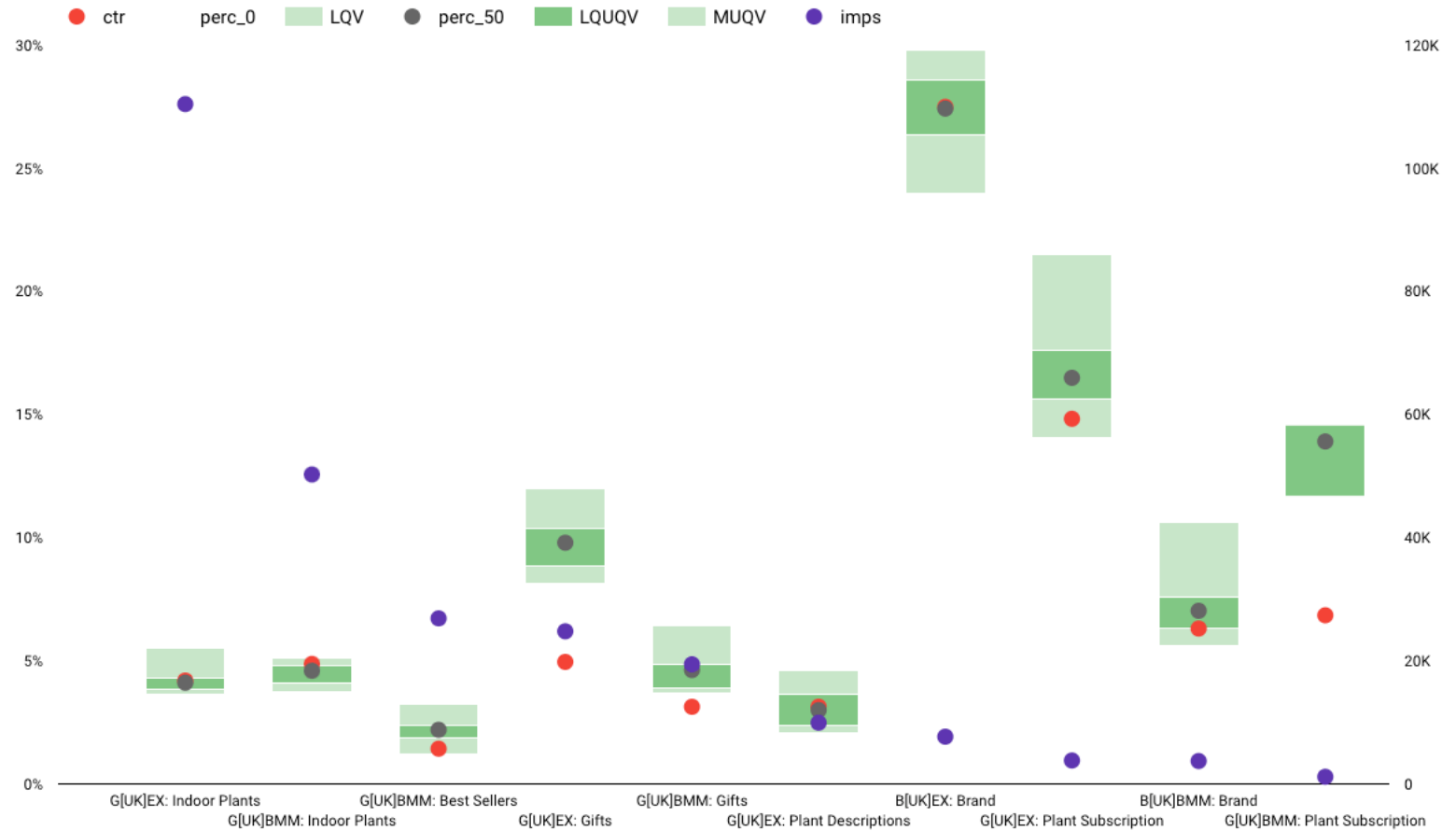


**“In the future, we don't need horses.  
We have horseless carriages called  
auto-mo-biles...”**

# “Old School” Logic - New Approaches

We can use historic data to set a tolerance level for each KPI.

Upper quartile, median and lower quartile can be used to understand if the current performance is outside our allowed values.



# Key Outputs



## What you should be doing already.

Get reports and dashboards that use trends - not just week on week.



## What you should do in the future.

Use machine learning to understand the value of all elements of the consumer journey.



## Don't forget to consider the past.

Don't just look to futuristic AI to calculate. Use age old statistical logic to understand big data.

# Thanks!

**Russell McAthy**

CEO & Co-Founder,  
Ringside Data

@therustybear  
[www.ringside.ai](http://www.ringside.ai)

