Marketing Mix Modelling Summary & Recommendations

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Our client is a US leather good fashion design brand

Data are sales, marketing and spending activities from 2014 to 2017

TLDR

- In 2017, marketing contributed to **34%** of total sales
- Traditional channels contributed to **1/3**, social media contributed to **1/5**.
- Overall sales dropped by $**395K (-3%)**, marketing sales dropped by $**313K (-6.58%)** compared to 2016.
- Facebook is the main reason of loss **(-$313K, -37%)**, WeChat performed better **(+$73K, 17%)**.
- We spent less on Facebook **(-36%)**, more on WeChat **(+17%)**, Magazine is 50% more expensive.
- Facebook Other is more effective and efficiency, we should continue spent more.
- In 2018, we can optimize our spending to increase ROI and marketing sales by **36%(+$1.3m)** !

Summary of Marketing Performance in 2017

Plan for 2018

Other recommendations

What are the impacts of different marketing channels on our sales?

How are the marketing channels performing in 2017 compared to 2016?

What are the effectiveness and efficiency (ROI) for each channel?

How should we optimize spending on difference marketing channels in 2018?

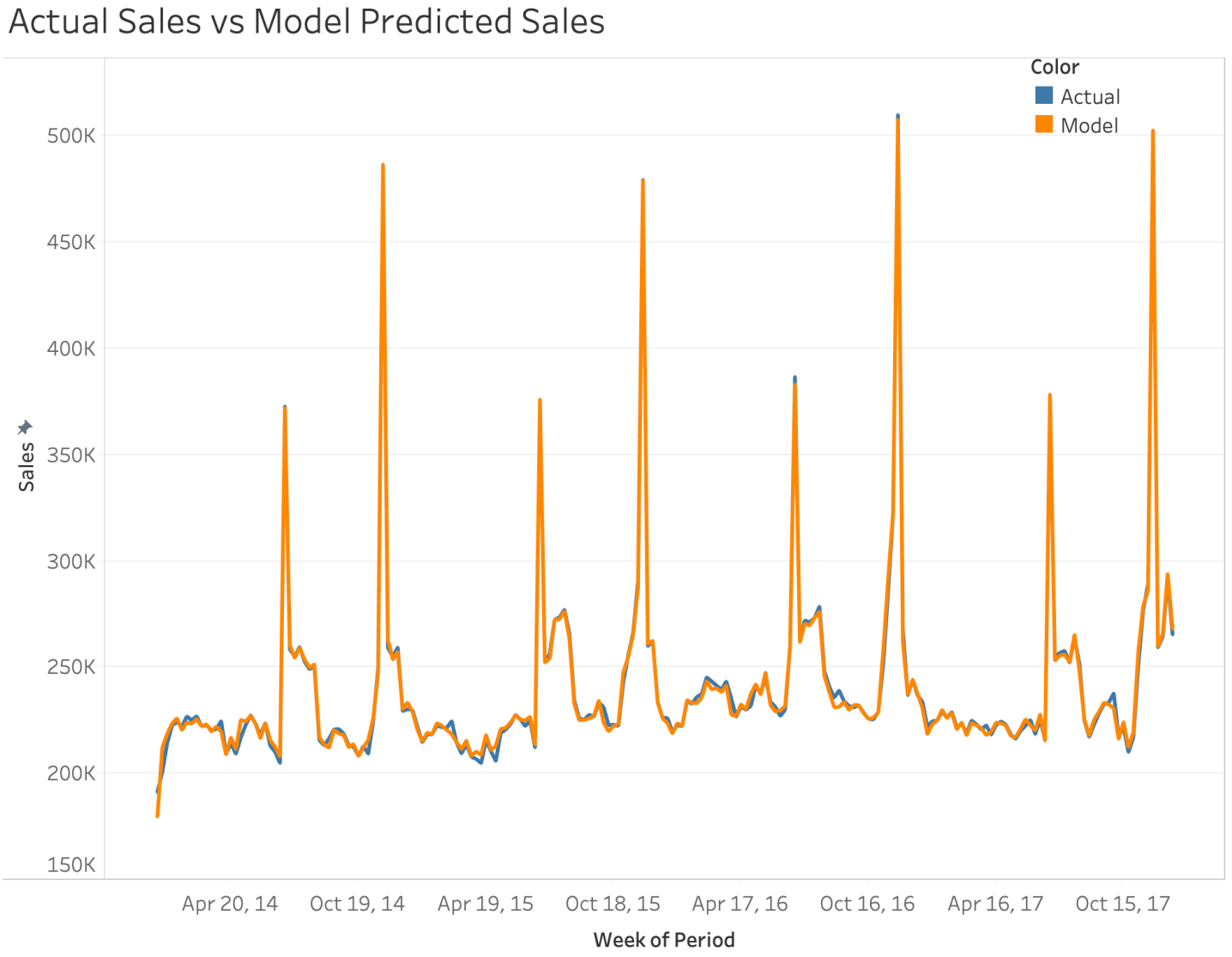
What will the predicted sales be in 2018?

Overall model captured 99.5% of sales variations

MAPE: ~0.78%

All variables strongly significant (p-value< 0.01)

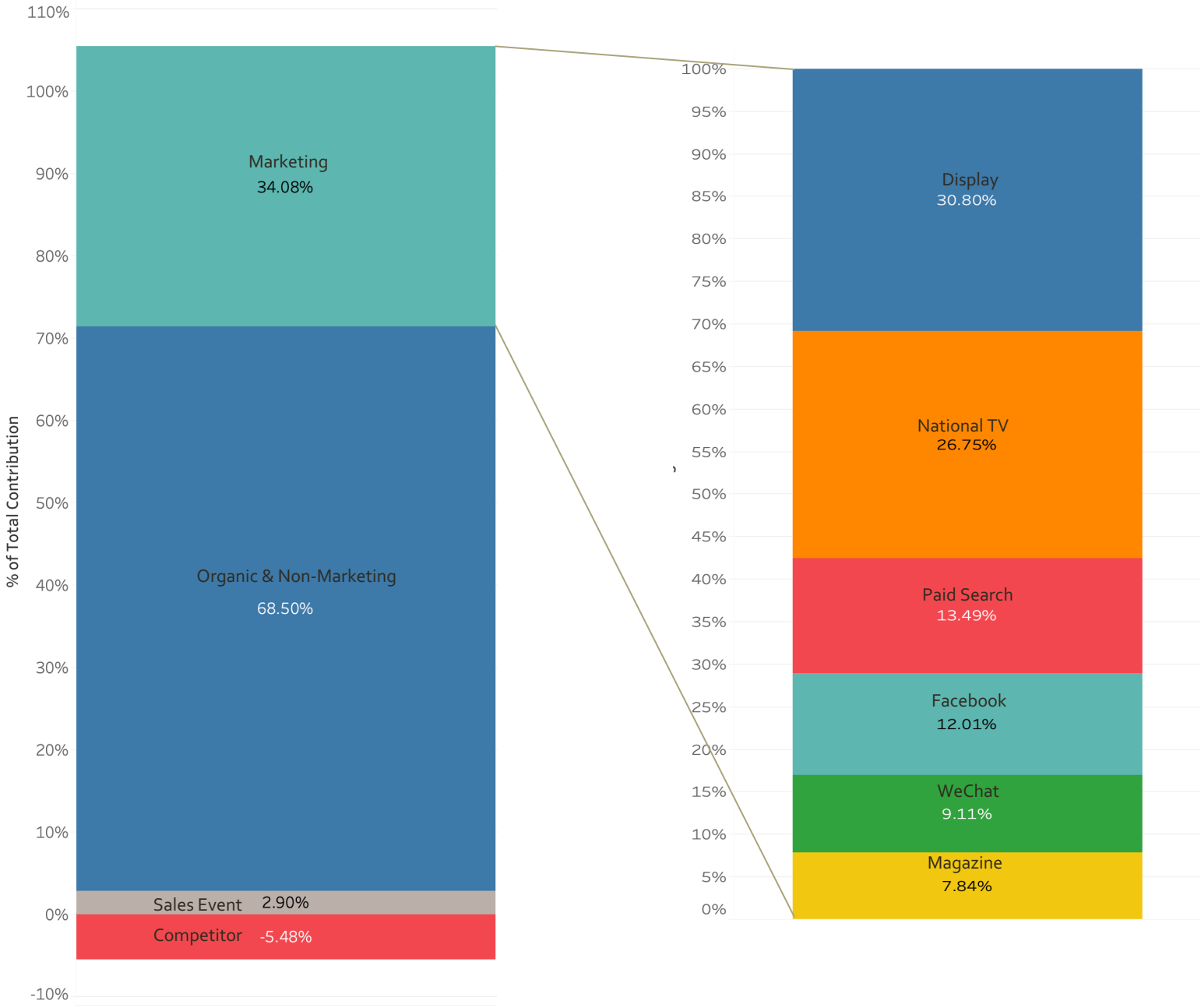
Model statistical details In Appendix



What were the impacts of marketing channels in 2017 sales?

Marketing contributed to 1/3 of our total sales

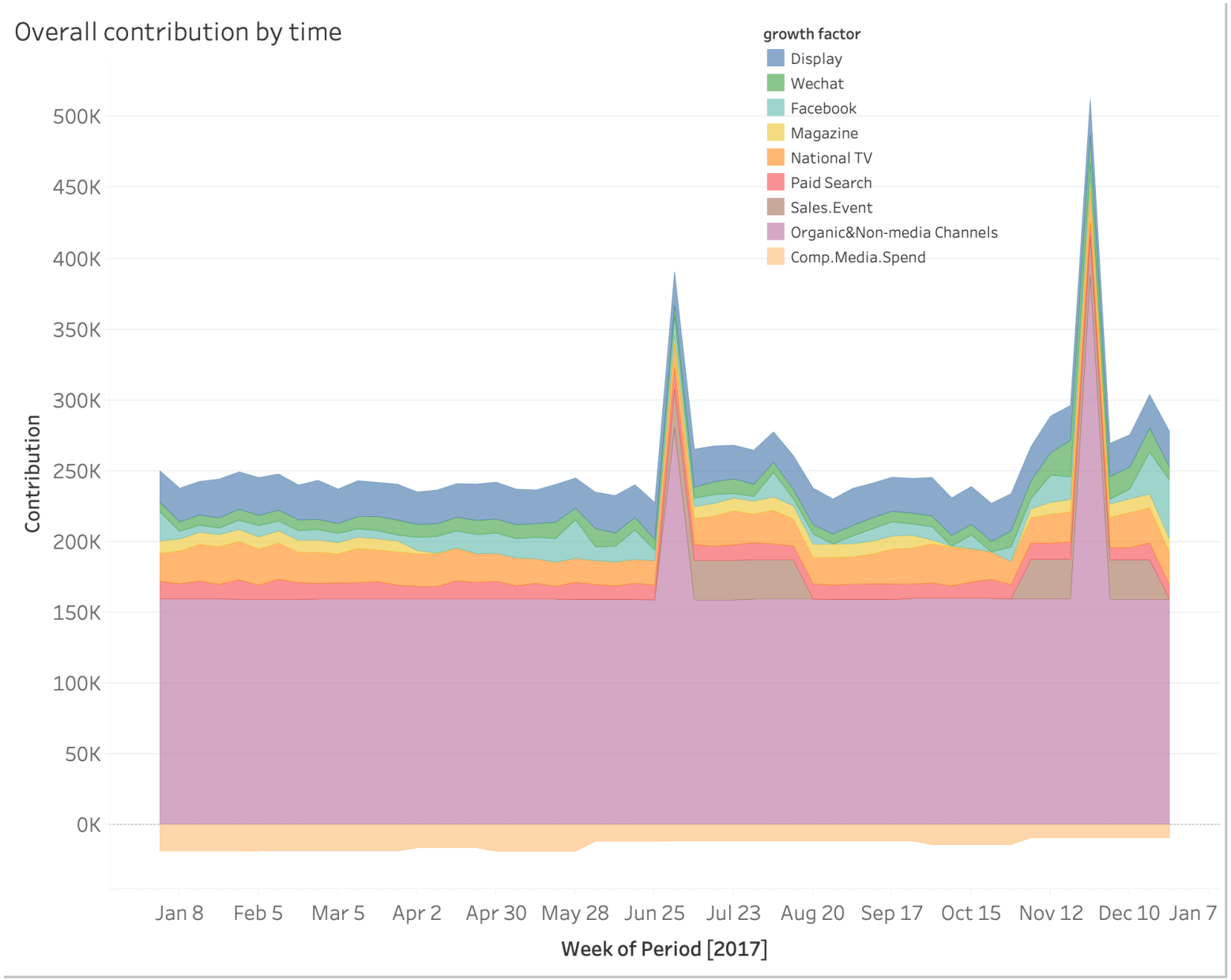
Social media 1/5, TV & Magazine 1/3 of marketing sales



How were the impacts of marketing channels distributed throughout 2017?

Marketing factors evenly distributed across 2017

Non-marketing factors dominated during holiday season

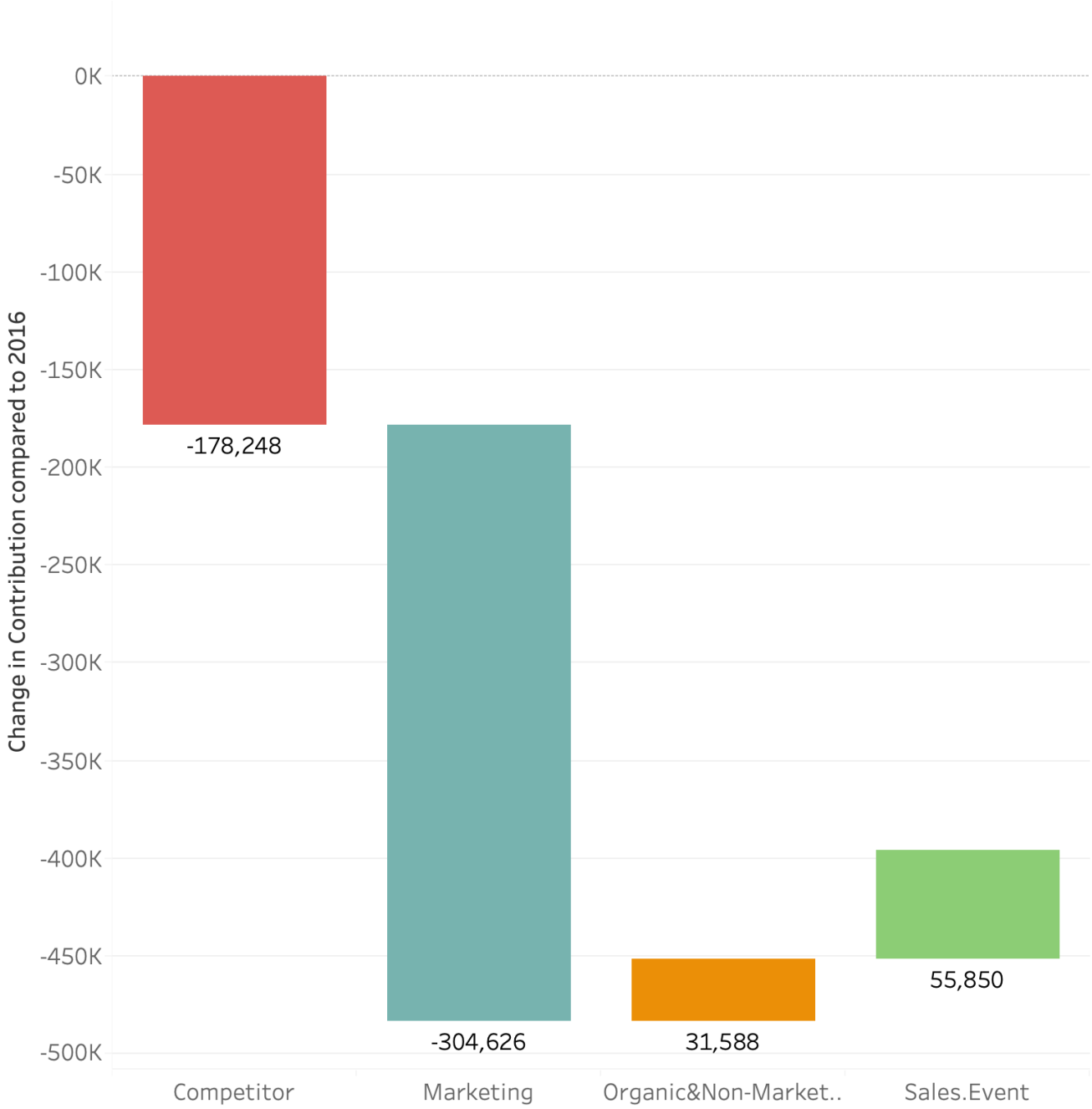


How did marketing channels perform comparing to 2016?

Overall sales
-395K
-3.05%

Marketing decreases
-305K
-6.58%

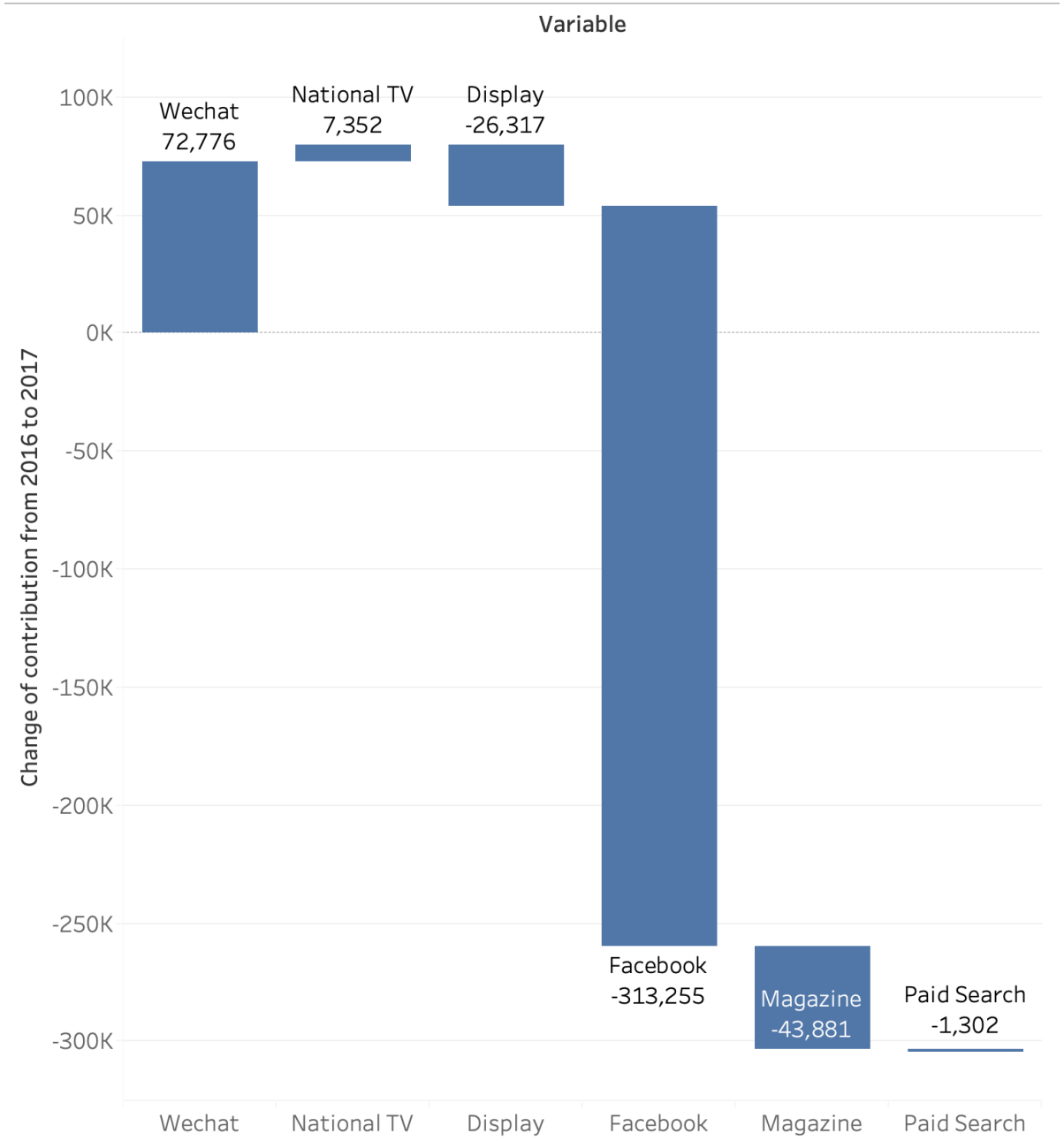
Competitor (-)
neutralized organic (+)
& sales event (+)

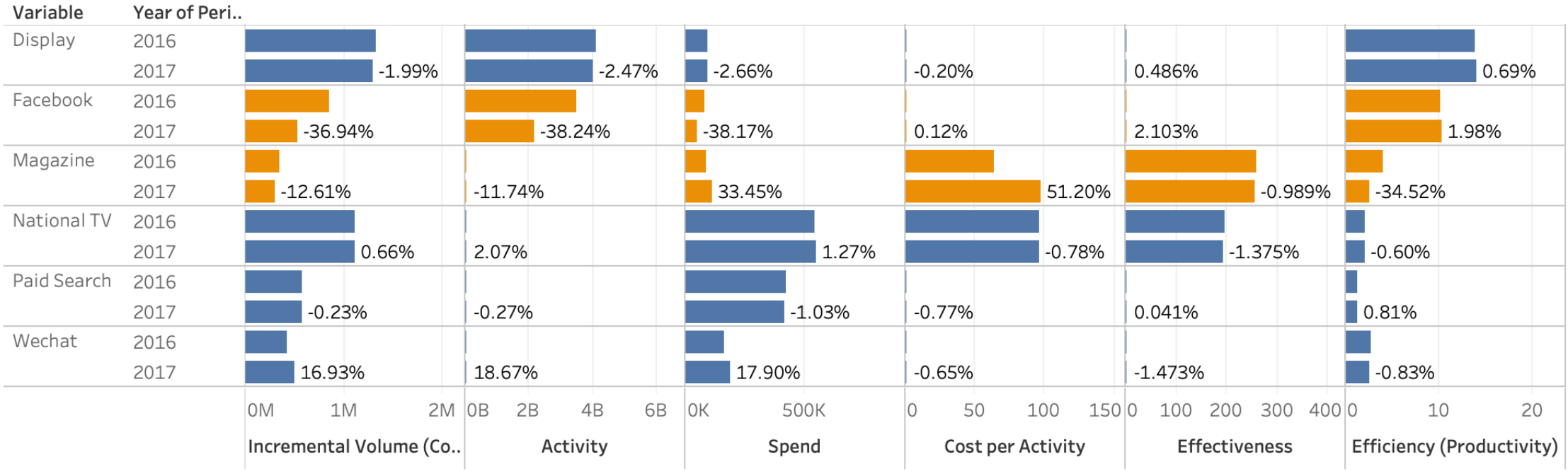


Where did the -$305K performance come from?

Facebook was the main reason of most marketing loss (-$313k)

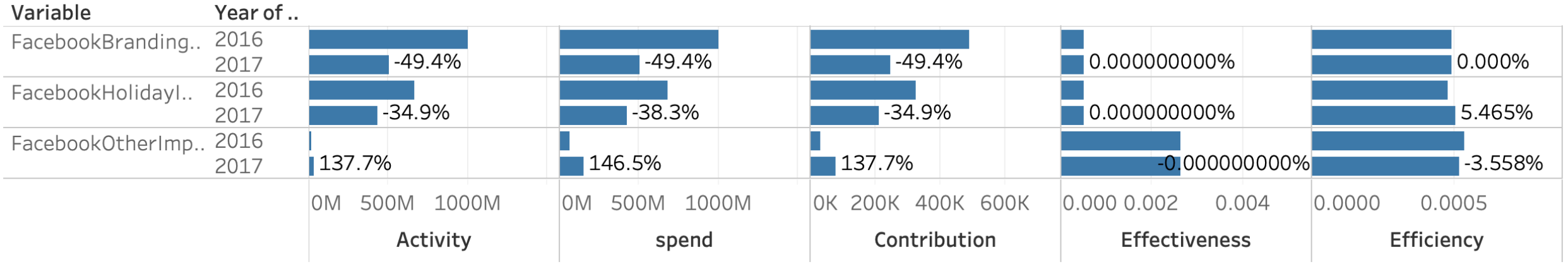
WeChat contribution increased (+$73k)





Why did Facebook perform poorly?

We spend less on Facebook (-), it is almost as equally effective and efficient as 2016.
Magazine is **50%** more expensive (-), it is equally effective but **34%** less efficient.
We spent 17% more on WeChat (+).



Side Diagnosis for Facebook

"Branding" & "Holiday" are the main contributor of sales, despite their effectiveness & efficiency are lower than "Other".

"Other" is the most effective and most efficient channel.

Therefore, we should continue on increasing Facebook spending in "Other".

Marketing sales is increased by 36%, Efficiency is increased by 37%!

Original

Total Spend	TV	Magazine	Paid Search	Display	Facebook	WeChat	Total Sales	Efficiency
$623,337	$274,552	$57,546	$209,566	$46,368	$25,770	$9,532	**$3,518,629**	**5.64**

Optimized

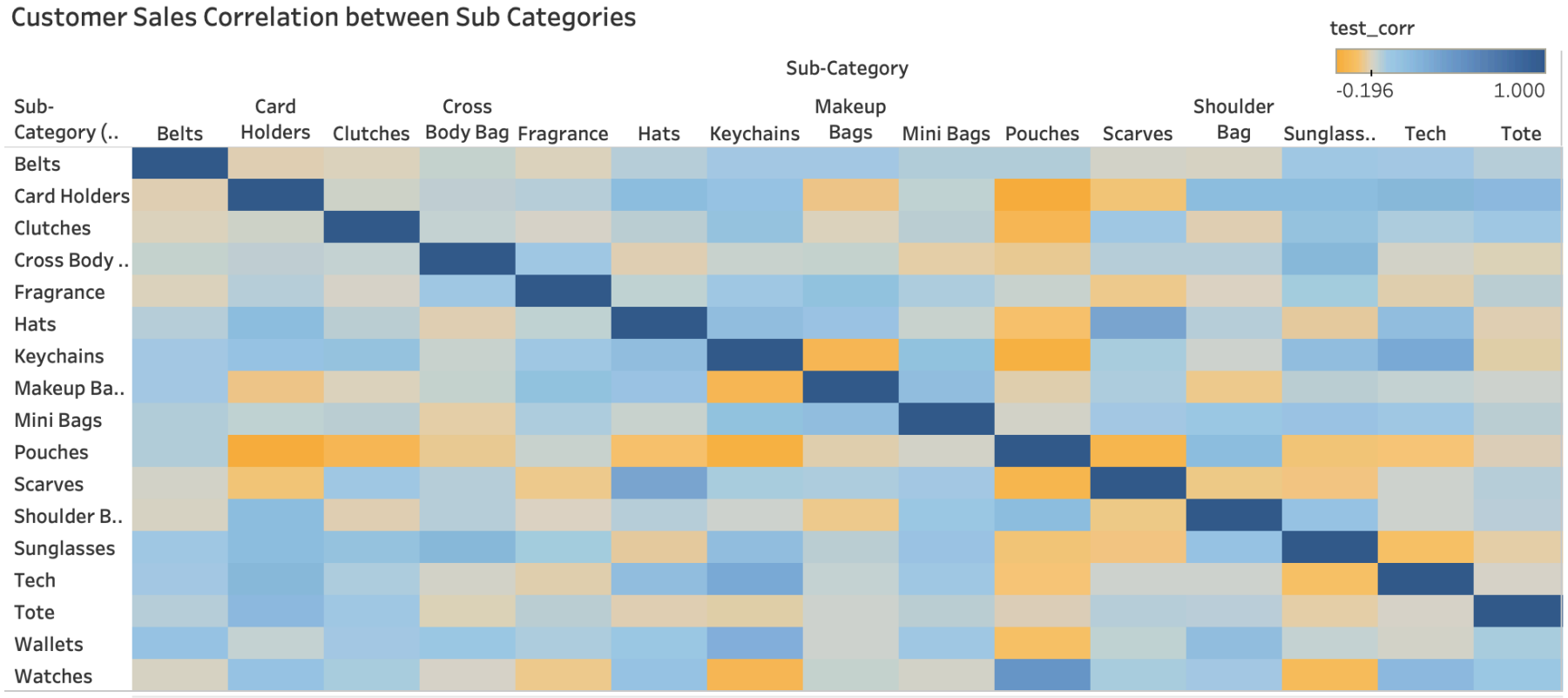
Total Spend	TV	Magazine	Paid Search	Display	Facebook	WeChat	Total Sales	Efficiency
$623,337	$195,672	$74,810	$246,681	$60,278	$33,501	$12,392	**$4,798,215**	**7.70**

What should we do about marketing in 2018 to fix the problem?
Optimize spending **for 2018** & Prediction

Without increasing marketing spend, marketing sales is increased by 36%, efficiency is increased by 37%, projected sales next year (2018) will be ~$13.4m.

Last Point

- Why is **Paid Search** the least efficient but model chooses **Paid Search** over **National TV**?
- Why didn't the optimization just minimize the one with lowest efficiency (ROI)?
- Because efficiency only says about **overall** ROI, but TV activity experiences significant decaying effect, so a lot of TV activity impact extends into 2019.
- Whereas Paid Search activity doesn't decay into longer time range.
- **To maximize 2018 sales, Paid Search would outperform TV, but if we include 2019 sales TV is more efficient.**
- To maximize 2018 & 2019 sales, I would recommend balance Paid Search and TV budget instead.



Other recommendations

Appendix 1
Model details

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Residuals:
     Min       1Q   Median       3Q      Max
-11469.9  -1119.9     22.4   1276.2  11502.5

Coefficients:
                                              Estimate Std. Error t value Pr(>|t|)
(Intercept)                                 1.469e+05  5.523e+03  26.589  < 2e-16 ***
CCI                                         1.253e+02  4.251e+01   2.949  0.00358 **
Sales.Event                                 2.792e+04  6.079e+02  45.939  < 2e-16 ***
July.4th                                    1.214e+05  1.484e+03  81.780  < 2e-16 ***
Black.Friday                                2.289e+05  1.589e+03 144.095  < 2e-16 ***
Comp.Media.Spend                           -4.685e-01  2.896e-02 -16.178  < 2e-16 ***
National.TV.GRPs.lag.2.power.2.decay.2      1.966e+03  1.195e+02  16.450  < 2e-16 ***
Paid.Search.lag.1.power.1.decay.1           3.151e-02  4.786e-03   6.583 4.13e-10 ***
Wechat.lag.1.power.1.decay.1                1.112e+01  8.950e-01  12.428  < 2e-16 ***
Magazine.GRPs.lag.1.power.1.decay.1         1.618e+03  8.974e+01  18.030  < 2e-16 ***
Display.lag.1.power.1.decay.1               2.134e-02  2.815e-03   7.581 1.34e-12 ***
Facebook.Impressions.lag.2.power.2.decay.2  4.924e-04  1.388e-05  35.464  < 2e-16 ***
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 2750 on 196 degrees of freedom
Multiple R-squared:  0.9965,    Adjusted R-squared:  0.9963
F-statistic:  5087 on 11 and 196 DF,  p-value: < 2.2e-16
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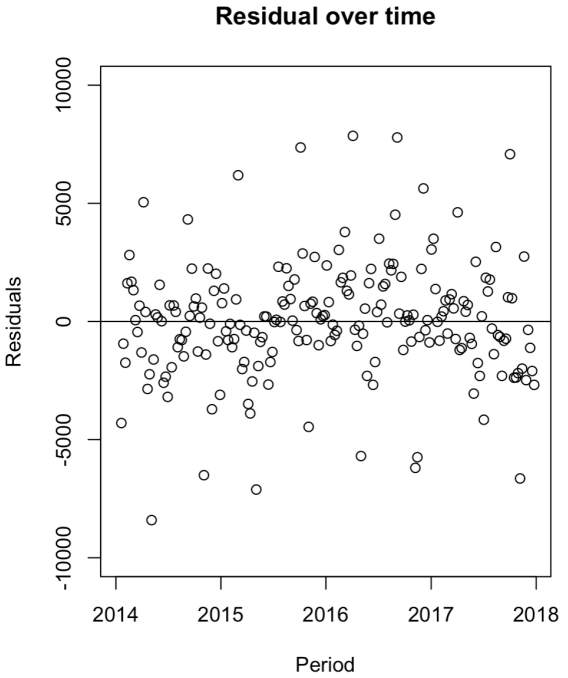

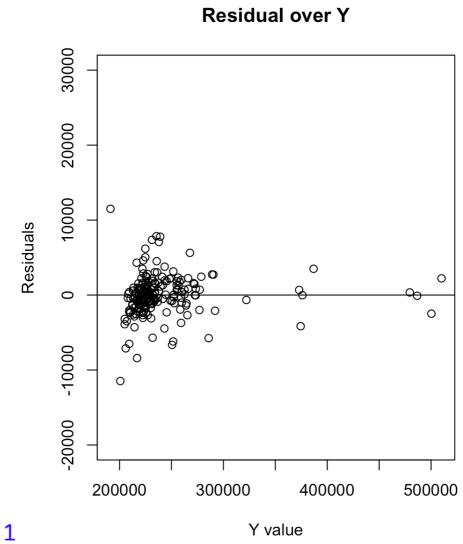

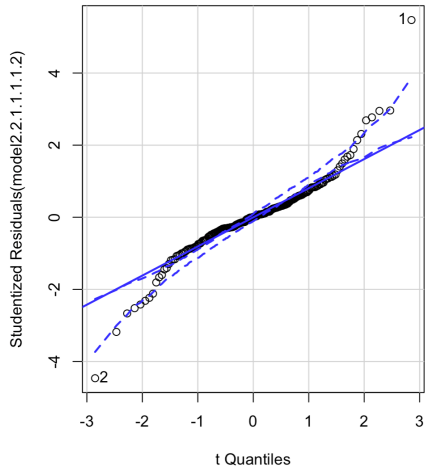


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              Black.Friday           Comp.Media.Spend National.TV.GRPs.lag.2.power.2.decay.2
                 1.309553                   1.216665                   1.292833
Paid.Search.lag.1.power.1.decay.1 Wechat.lag.1.power.1.decay.1 Magazine.GRPs.lag.1.power.1.decay.1
                 1.030435                   2.701058                   1.177814
Display.lag.1.power.1.decay.1 Facebook.Impressions.lag.2.power.2.decay.2
                 1.011372                   1.496791
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