

Too big to fail:

A/B tests when you're betting the bank

Andrea Burbank (@arburbank)

November 4, 2014

Pinterest

#qconsf

March 19, 2013

holed up for 6 months

replace $\frac{2}{3}$ of the code

new features can't ship

desperately want to release

many things have changed

How did we get here?

What have we done so far?

What should we do **right now**?

<how we got here>





Rewrite the website

MAINTAINABLE

TESTABLE

ENCAPSULATED

Rewrite the website

EXTENSIBLE

MODULAR

COHESIVE

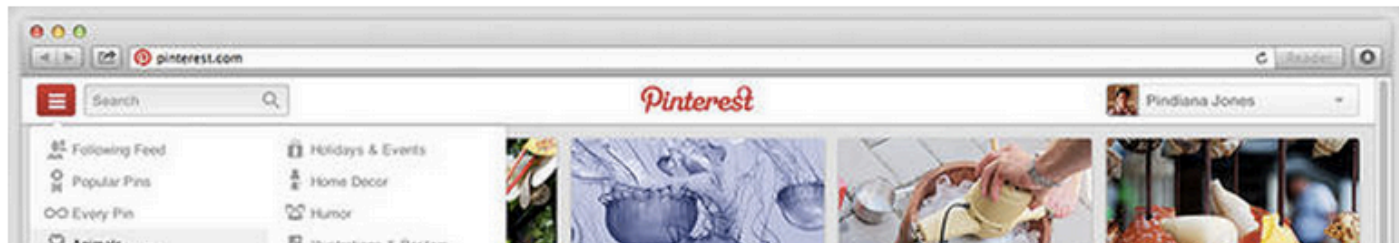
Pinterest tests new look with bigger pins, restructured navigation

The addicting social-networking site is mixing things up a bit to make its pins even more gripping.

by **Jennifer Van Grove** [@jbruin](#) / January 28, 2013 3:02 PM PST

Pinterest is readying a test that will alter the inspirational site with a tweaked navigation, bigger pins, and an overall faster site experience, the company announced Monday.

The **experimental Pinterest look** will roll out to a small group of people as the startup attempts to help its users get more information about pins they care about, a spokesperson told CNET. The company plans to release the design more widely once it works out the bugs.



moved all the buttons

rounded all the corners

replaced the categories menu

made the pins bigger

removed friends to follow

added related pins to closeup

got rid of the “add a pin” menu

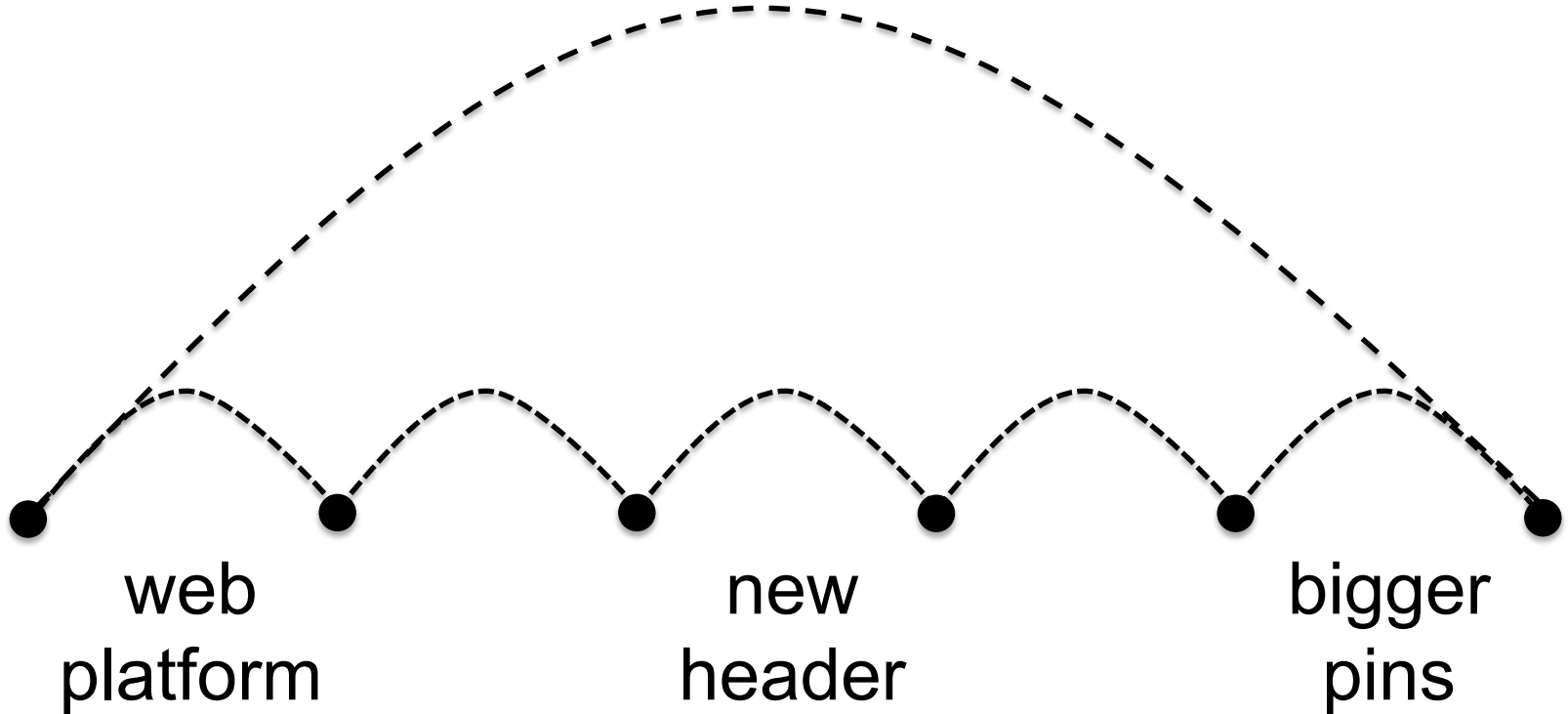
removed second-order attribution

renamed the Repin button

uncluttered the pin closeup

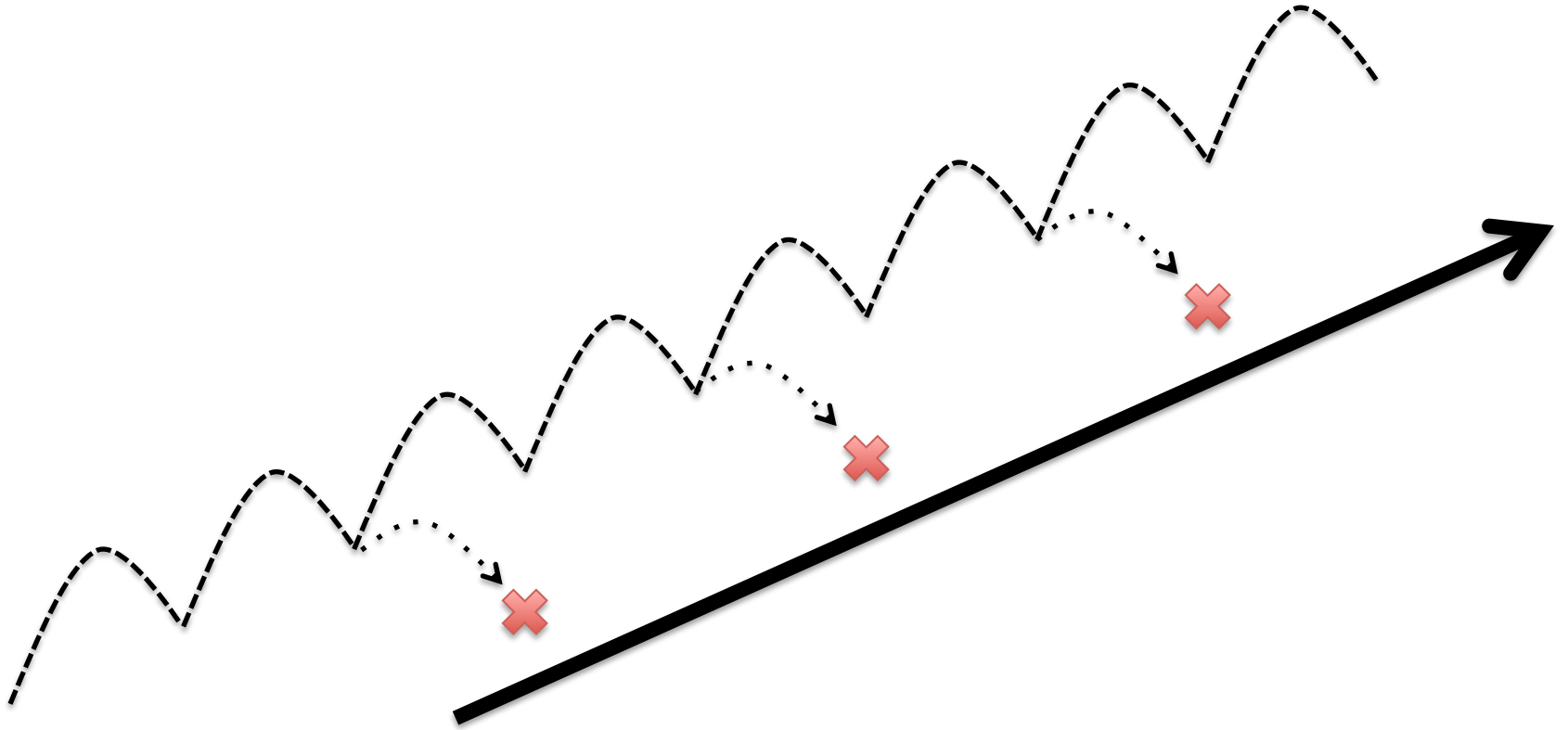
and much more

Why so much change at once?



“sometimes, don’t shoot
yourself in the foot.”

Advantages of incremental change

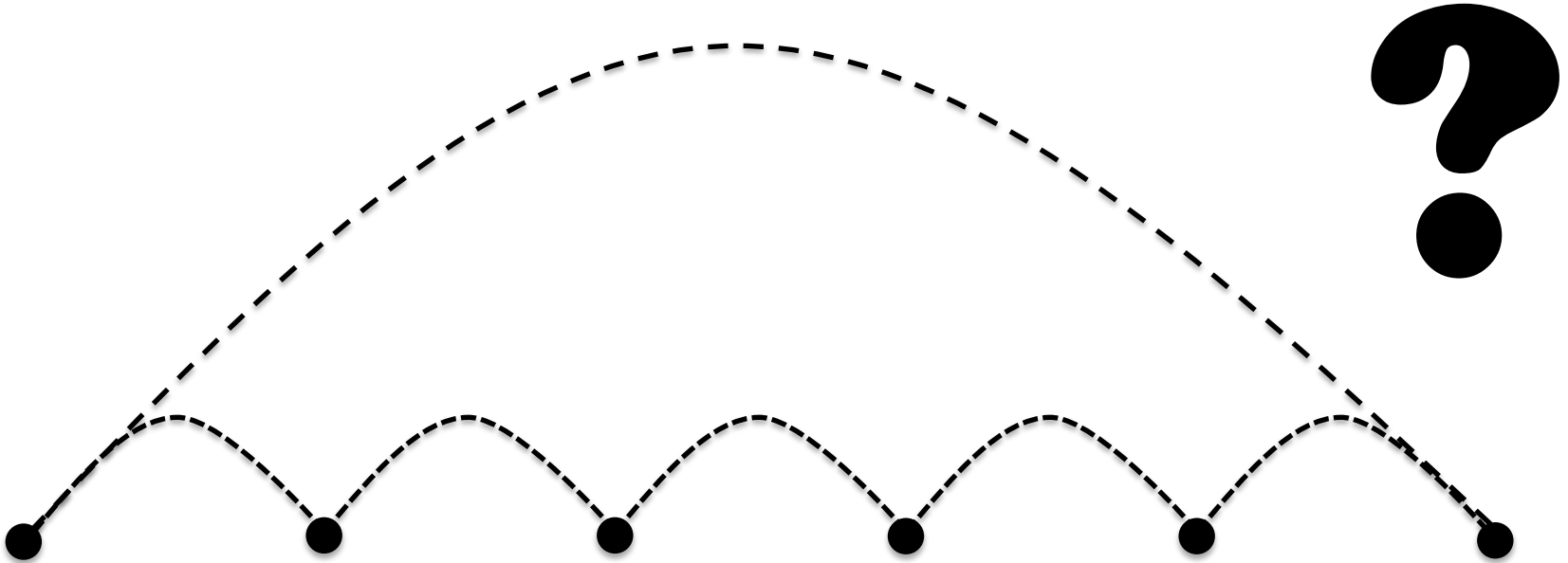


confidence

extensible learnings

focus your resources

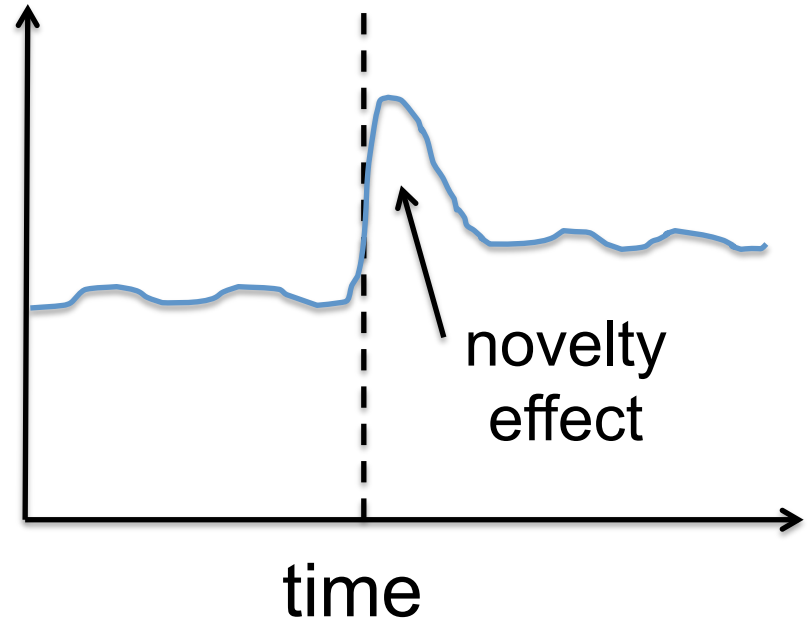
Incremental or all at once?



understand (and rebut) arguments
against incremental change

avoid our mistakes

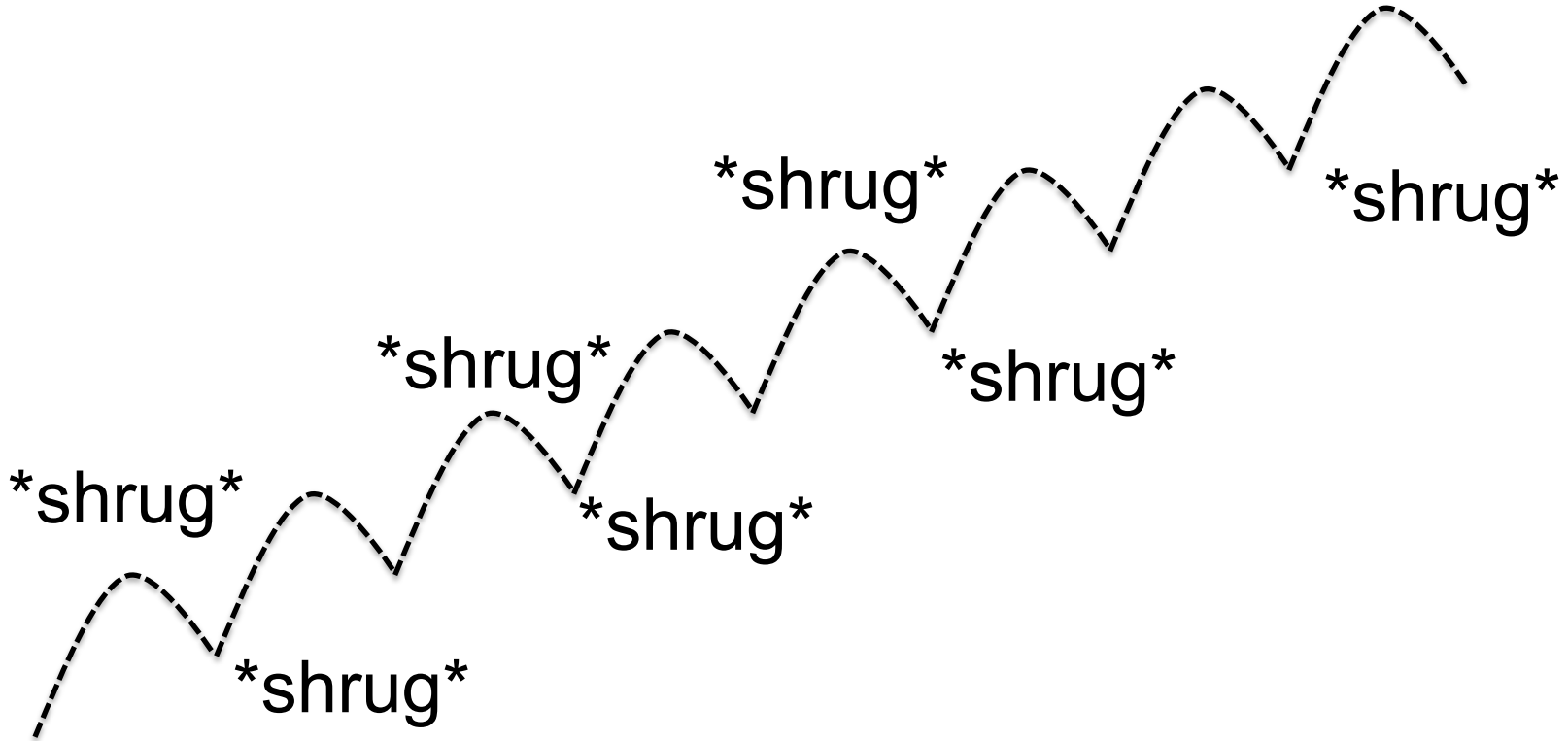
Cons of small changes #1: **time**



rebuttal #1: **time**

big changes will be slower than
you anticipated

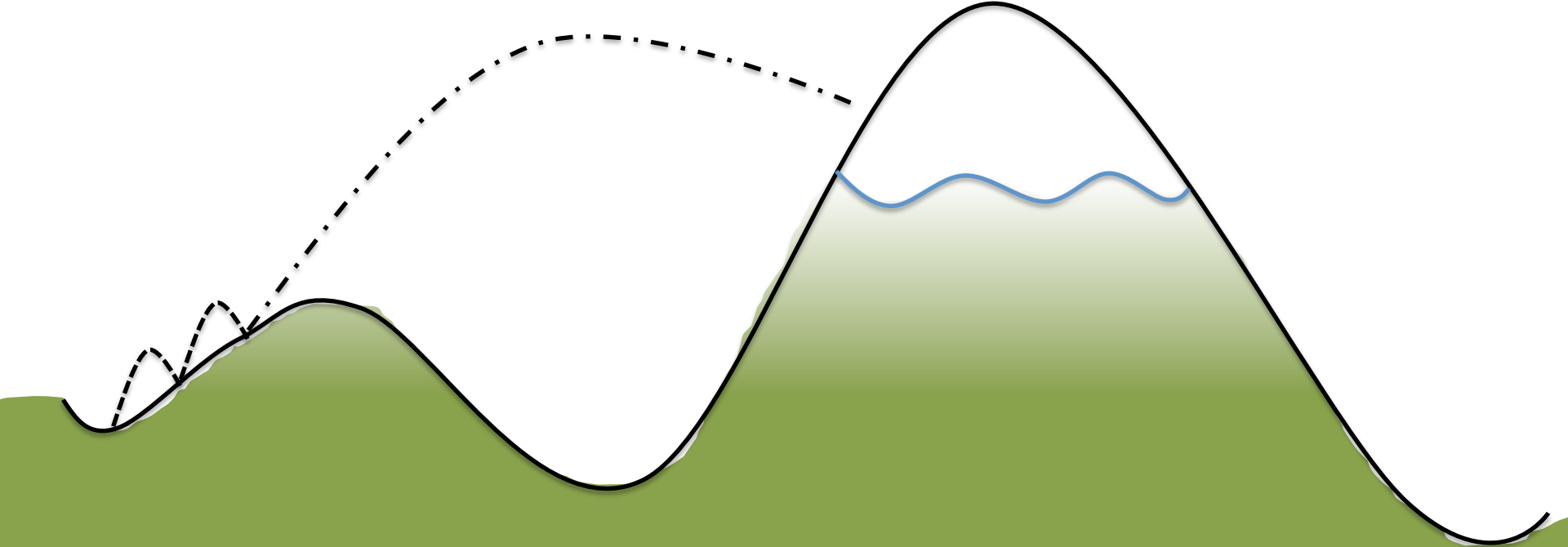
Cons of small changes #2: **psychology**



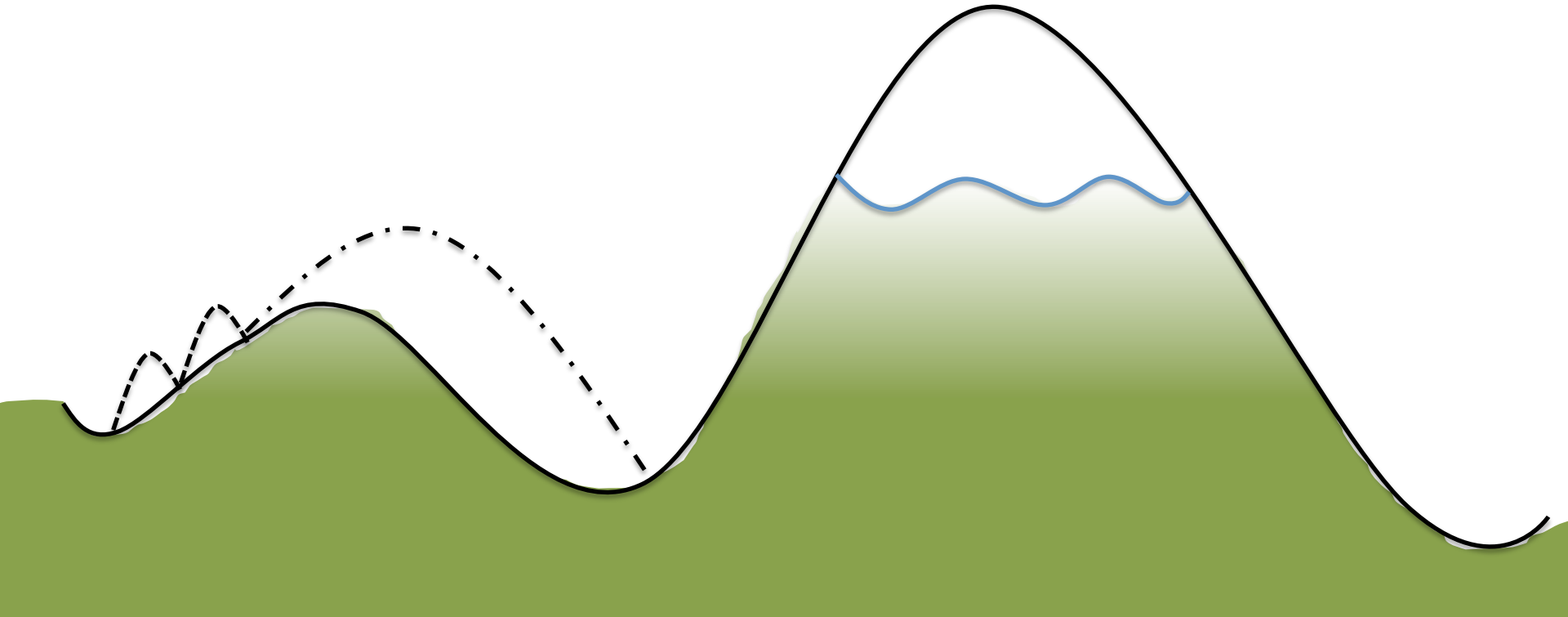
rebuttal #2: **psychology**

it's not “incremental change” –
it's faster learning

Cons of small changes #3: local maxima

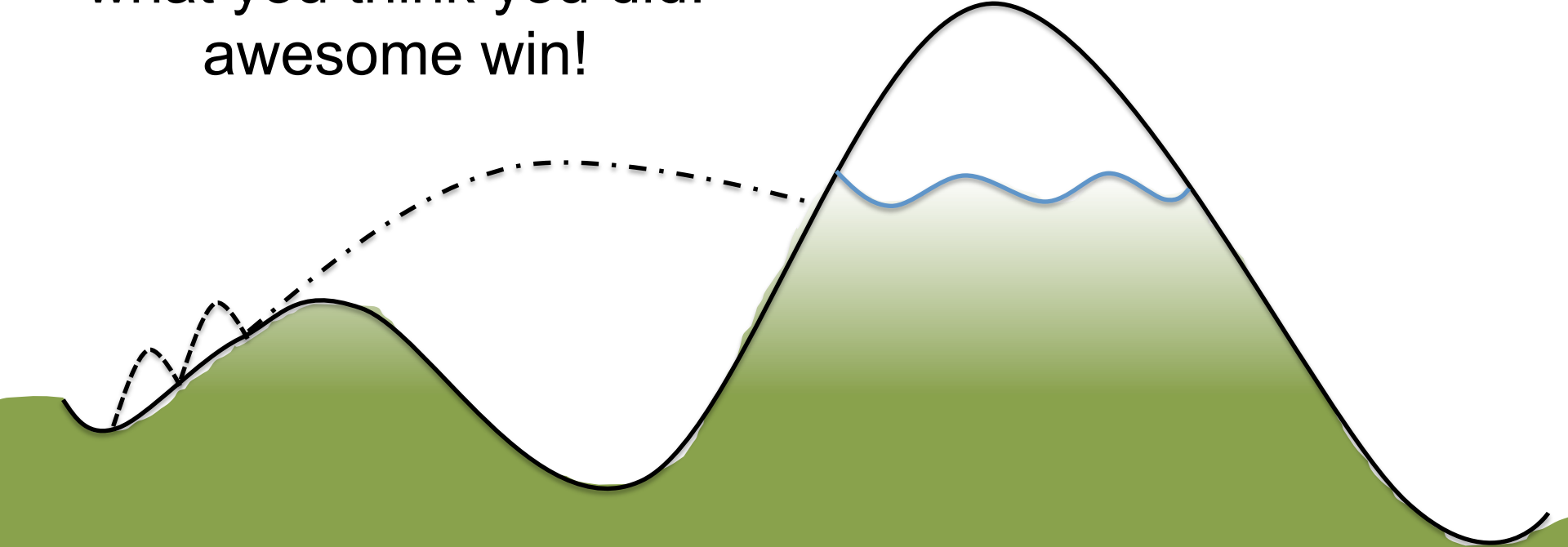


Cons of small changes #3: local maxima



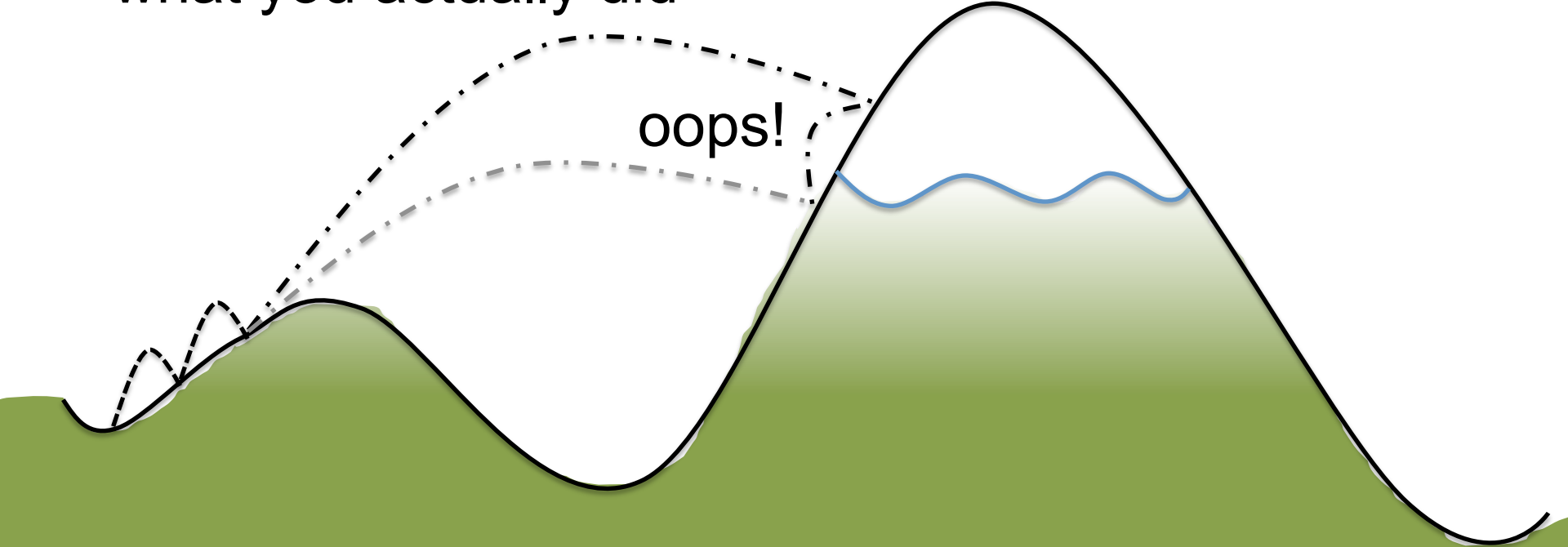
Cons of small changes #3: local maxima

what you think you did:
awesome win!



Cons of small changes #3: local maxima

what you actually did



rebuttal #3: **local maxima**

mountains and valleys
are neighbors

Incremental vs. all at once?

time

avoid false optimism: big changes take time too

psychology

help your organization embrace fast learning

local maxima

yes! but avoid the valley, and watch your step

a big leap



a small change

bing

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a \$10M change

bing

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Making a big change all at once

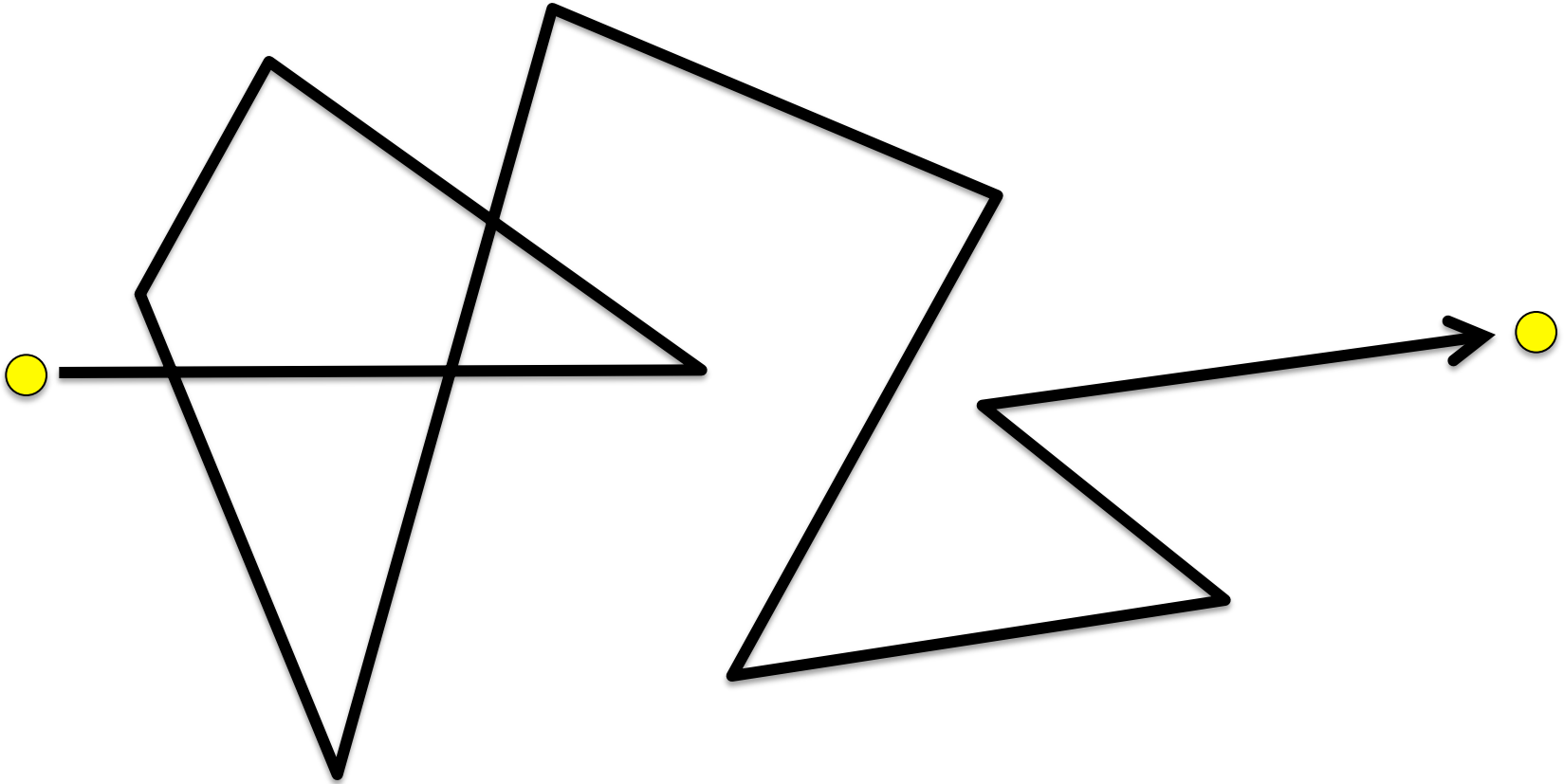
new = better!



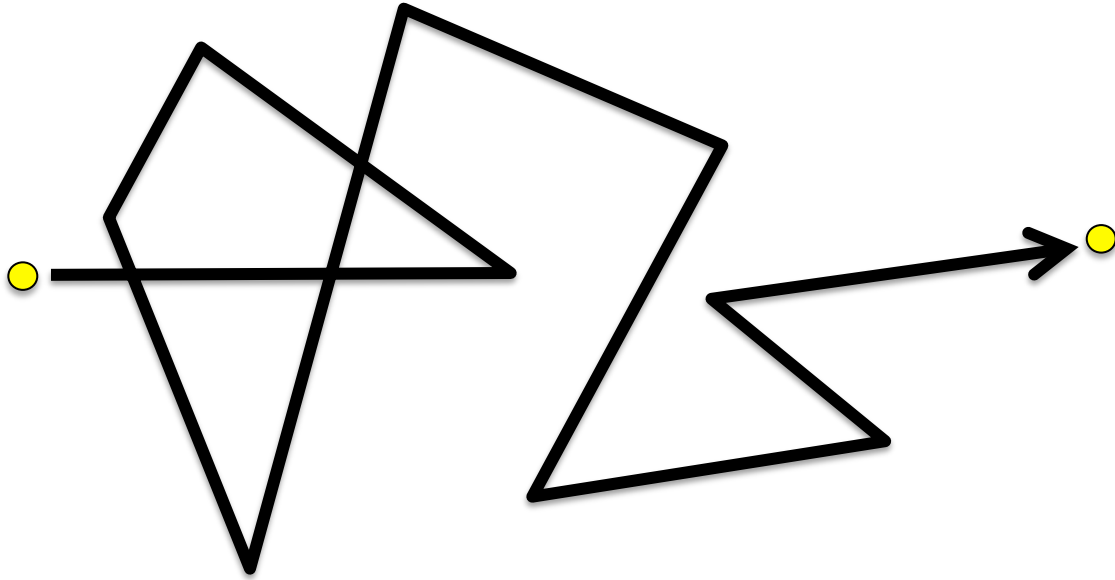
Making a big change all at once



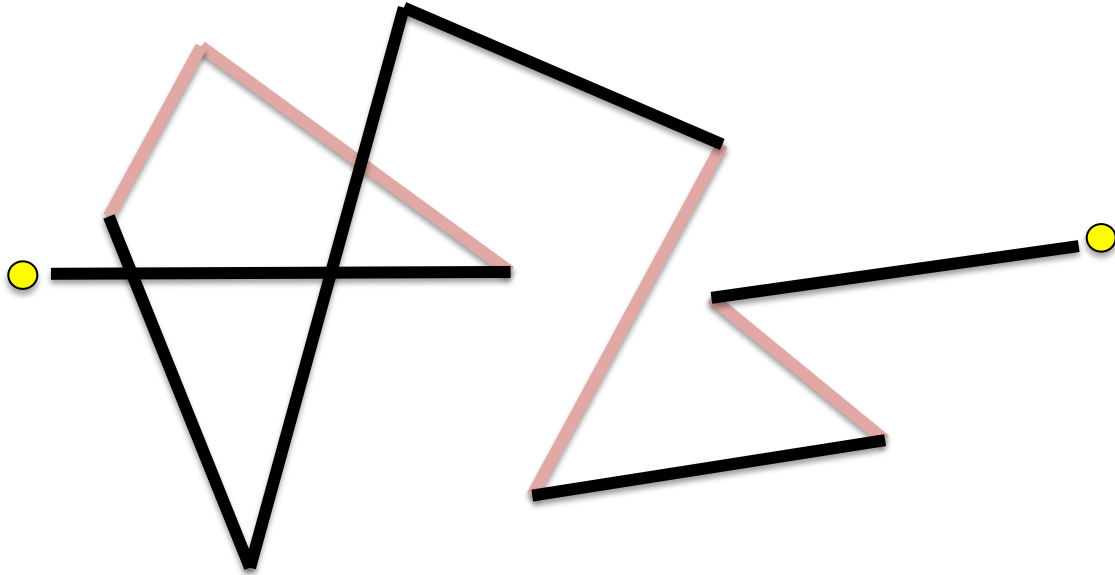
Making a big change all at once



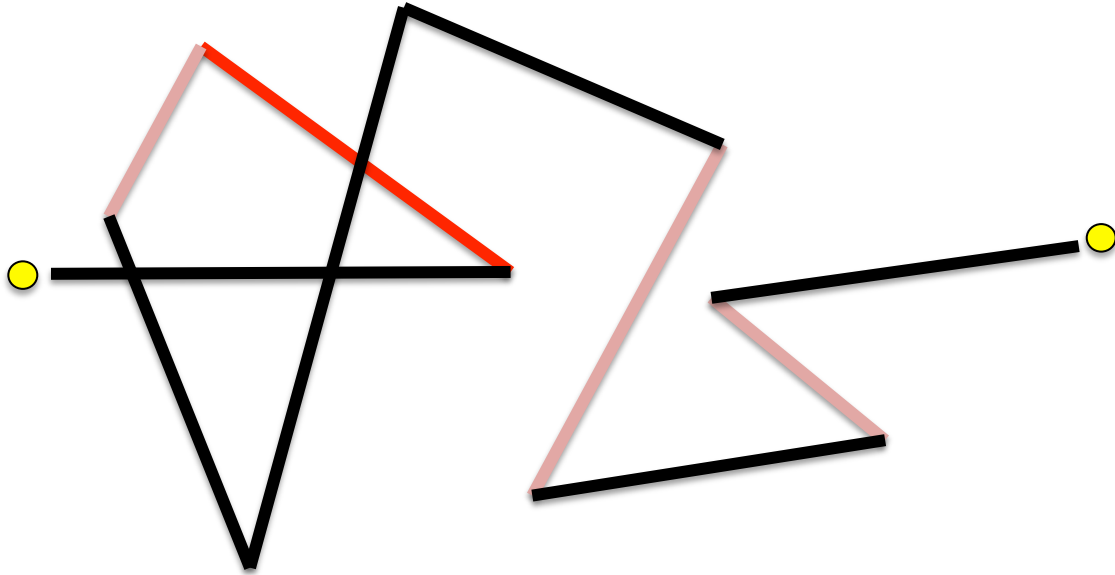
Making a big change all at once



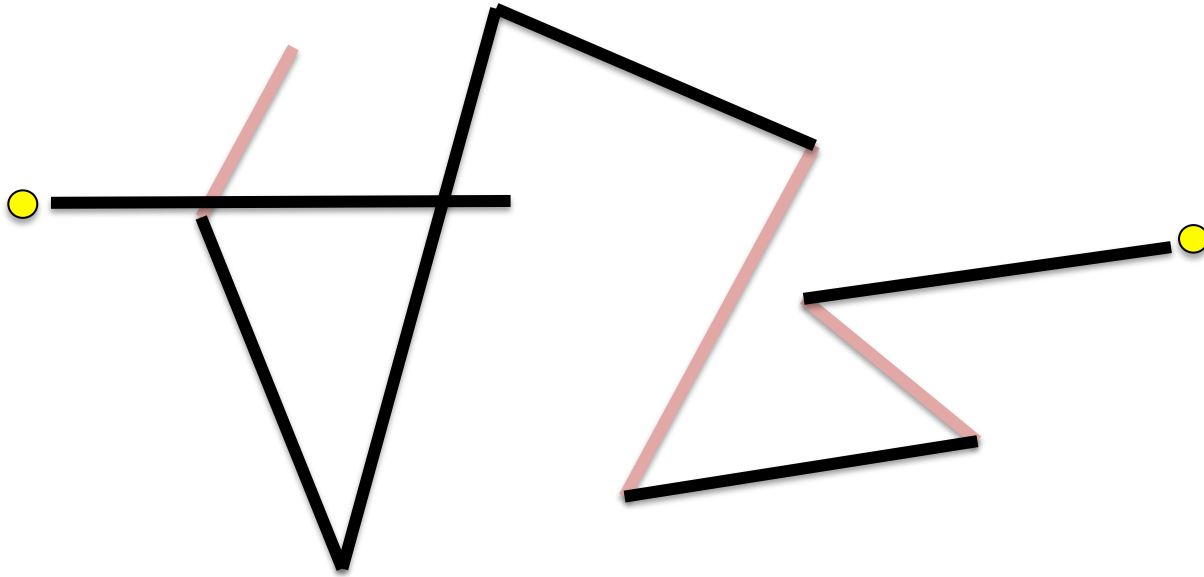
Making a big change all at once



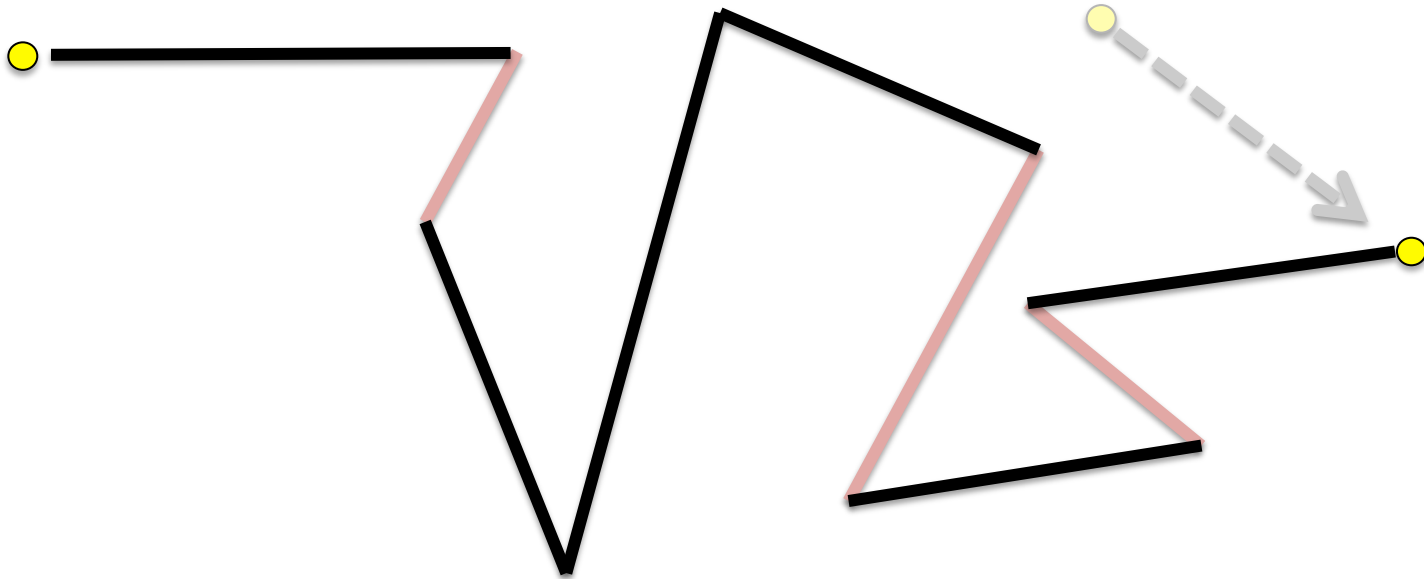
Making a big change all at once



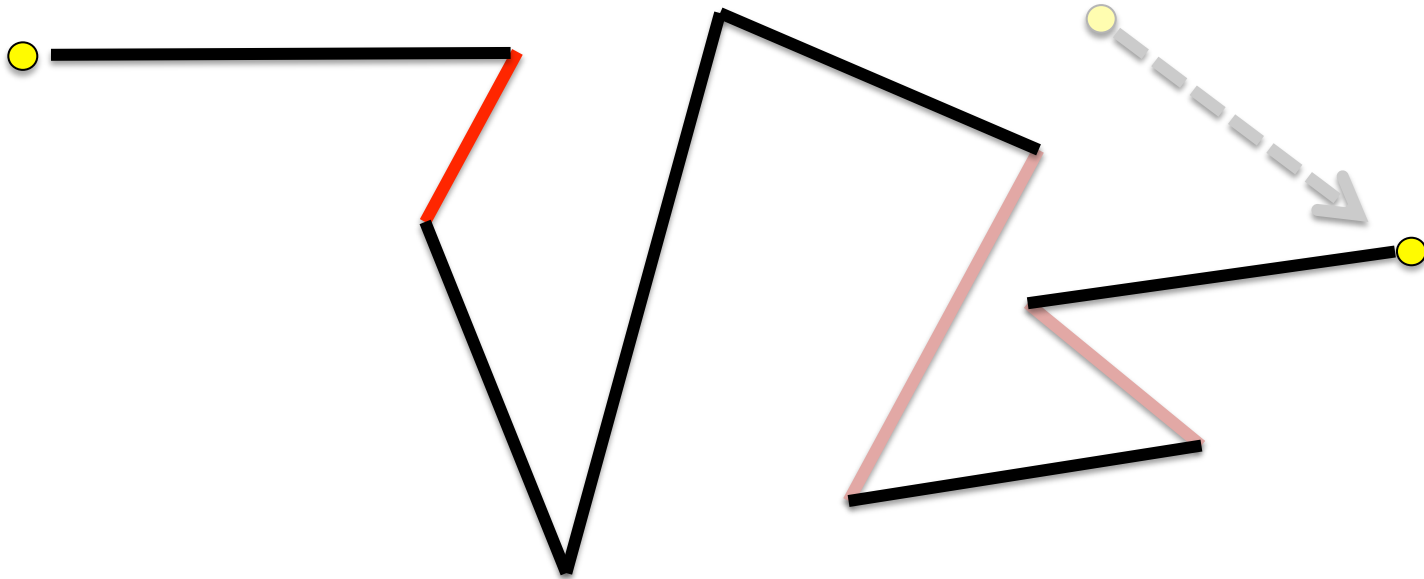
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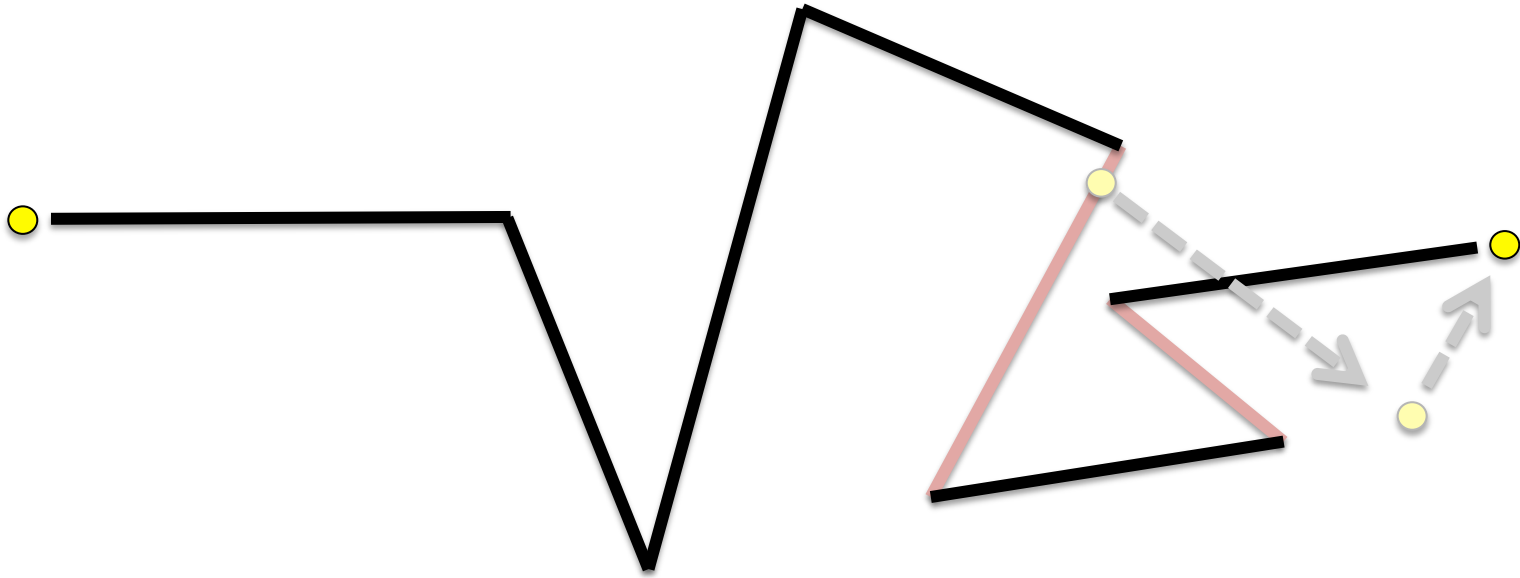
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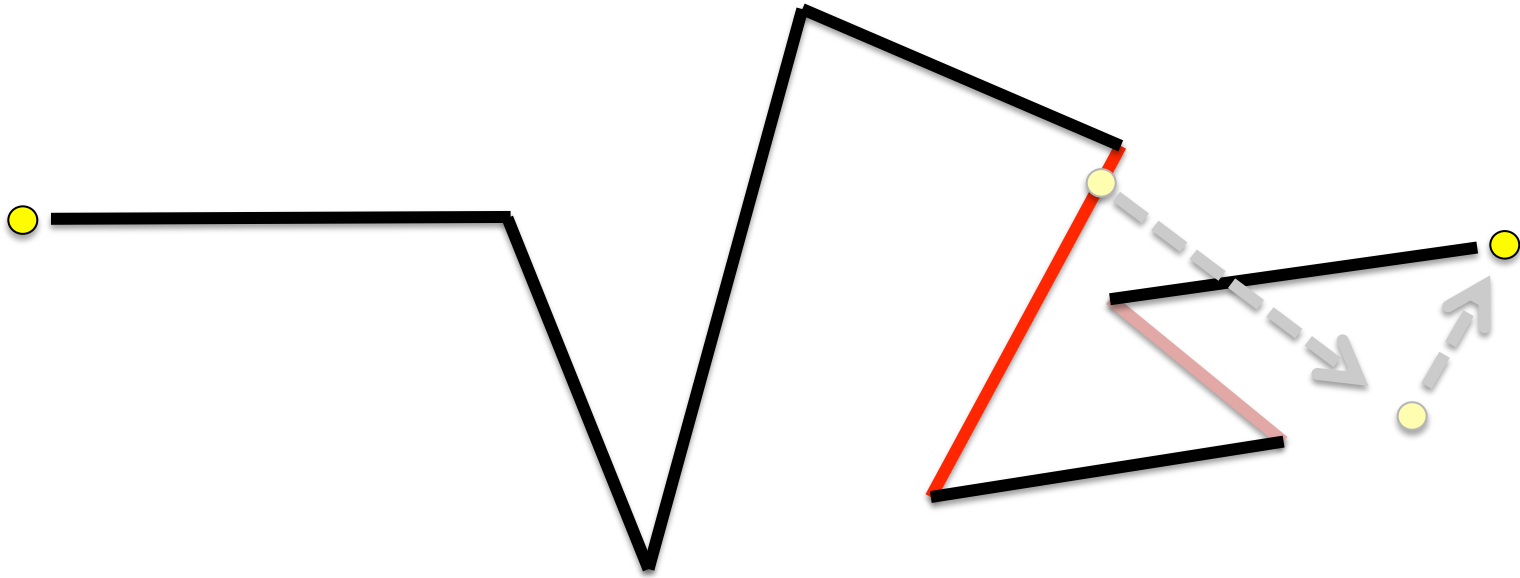
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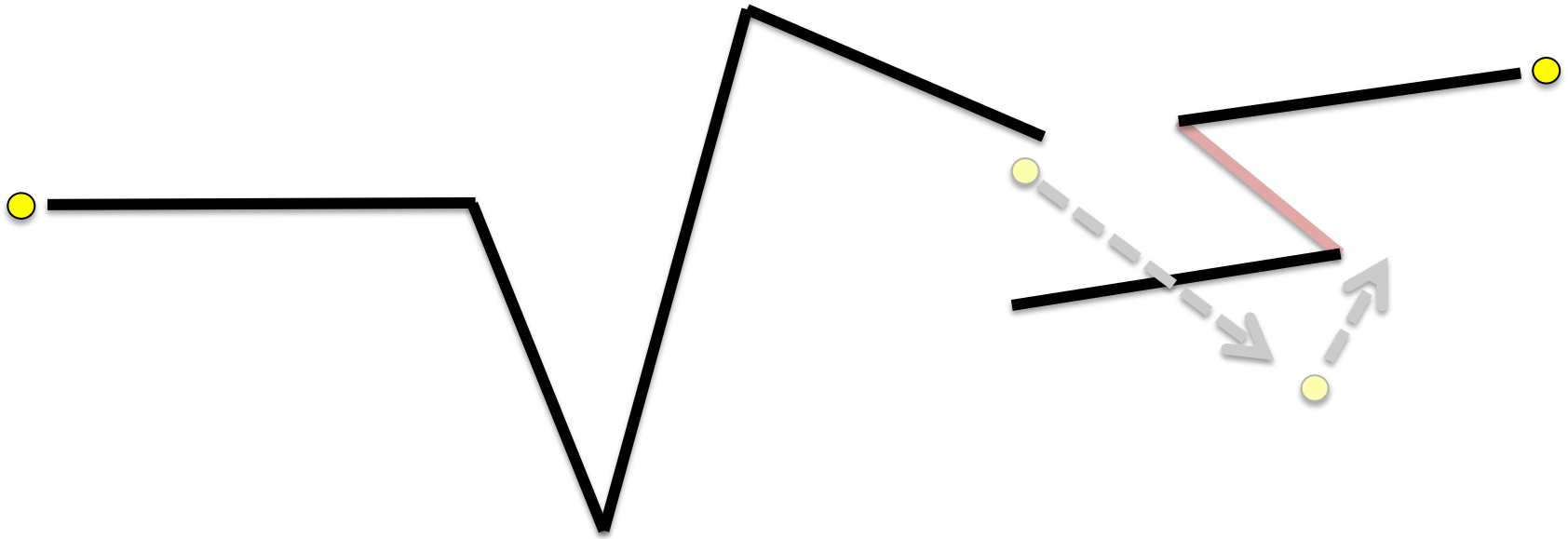
Making a big change all at once



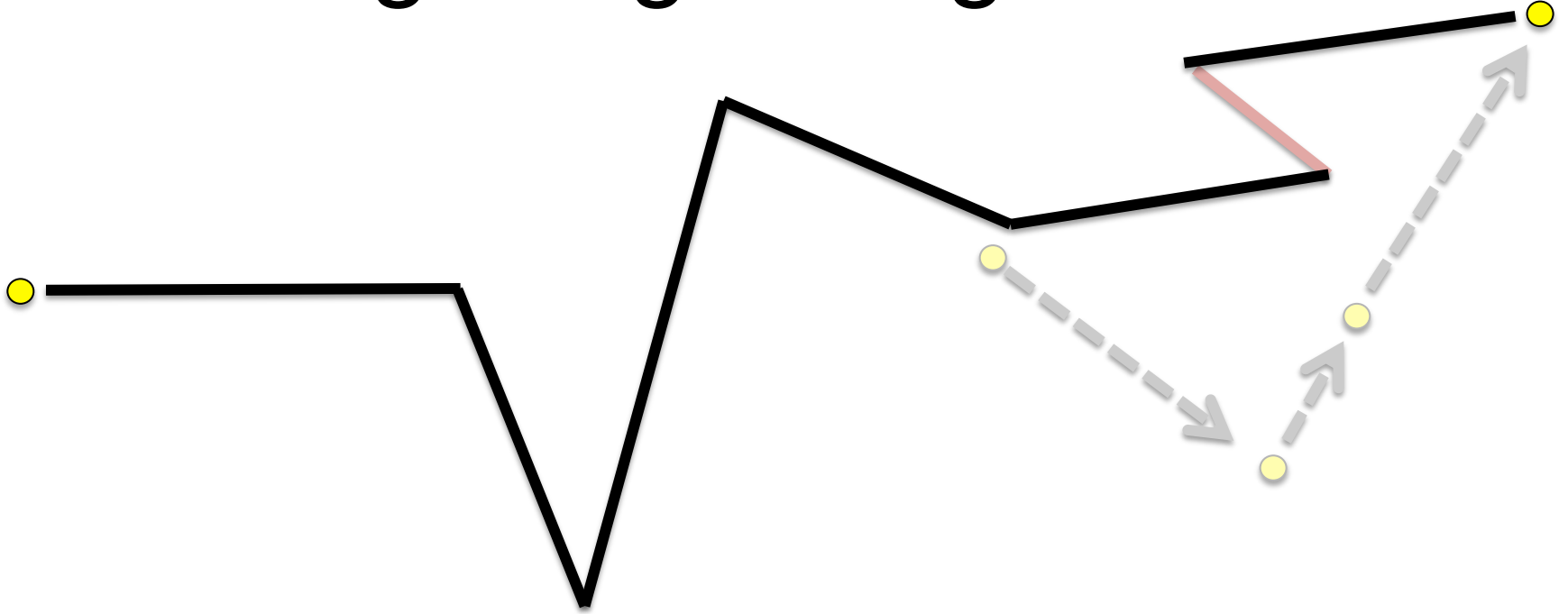
Making a big change all at once



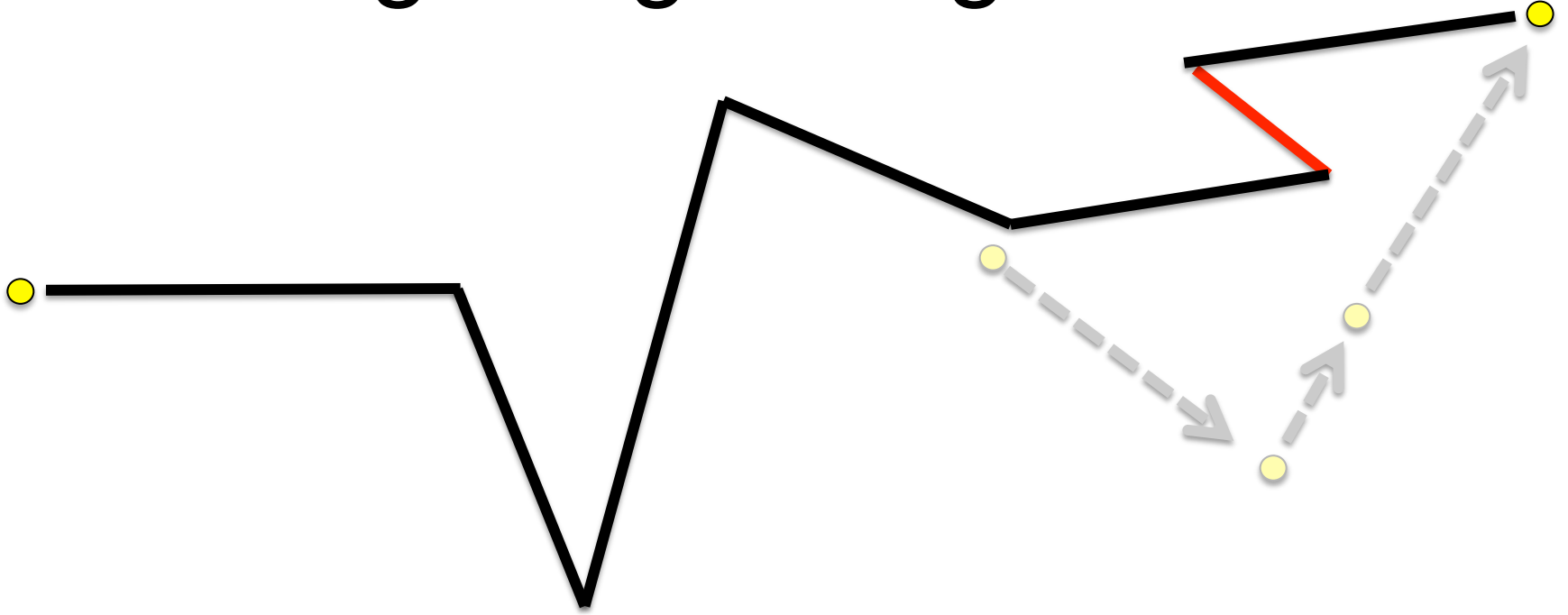
Making a big change all at once



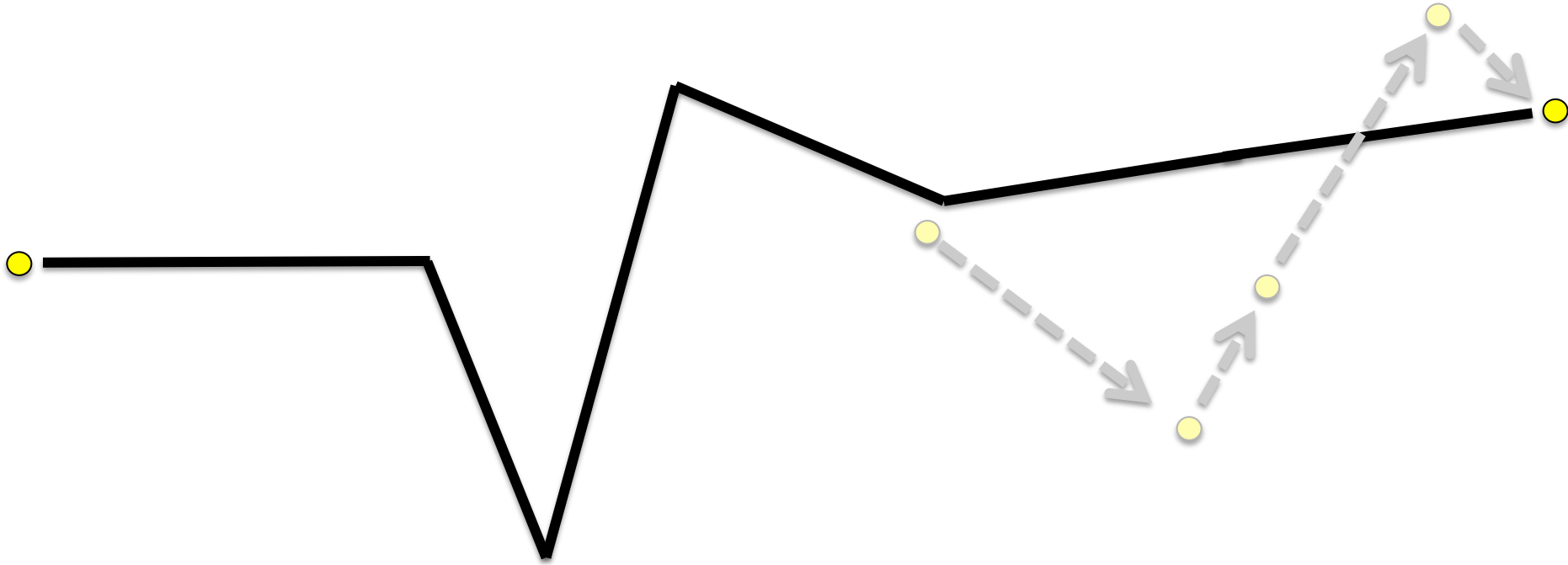
Making a big change all at once



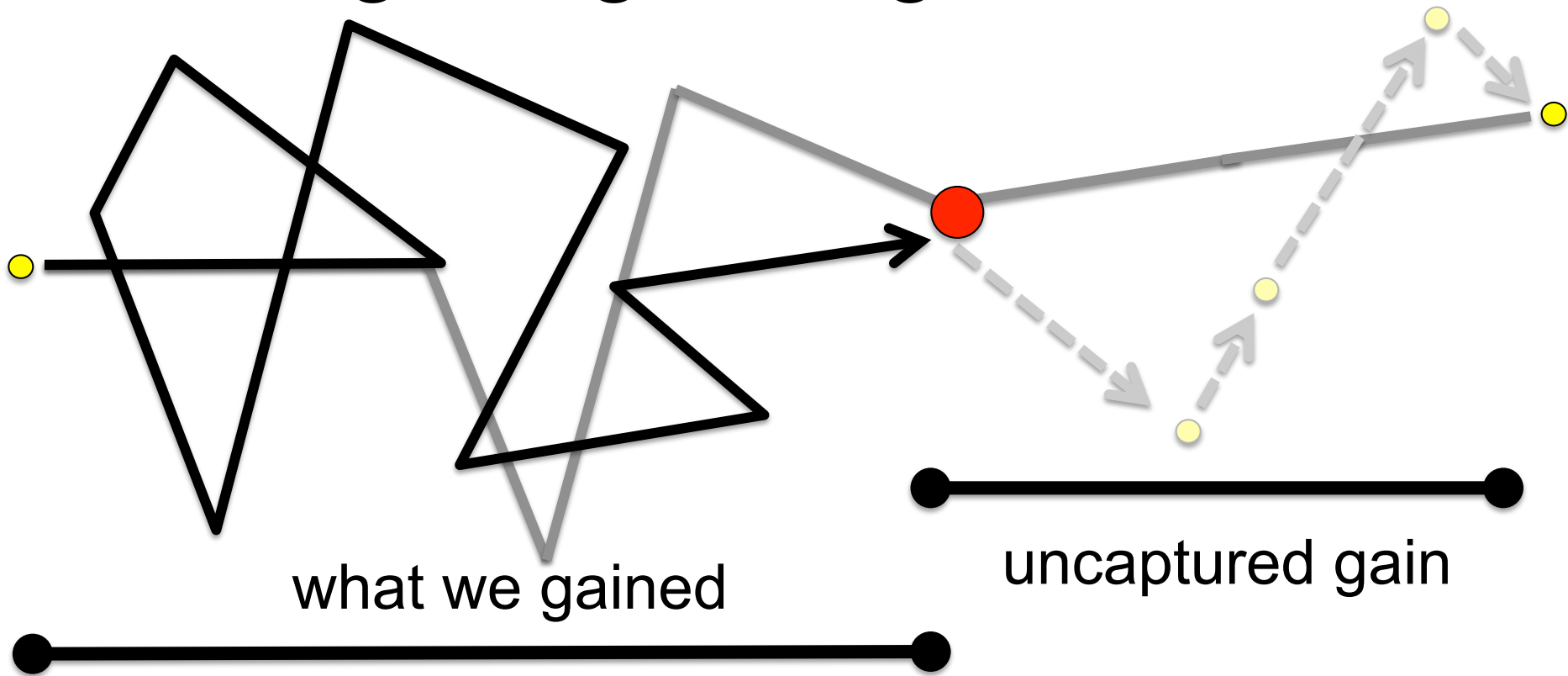
Making a big change all at once



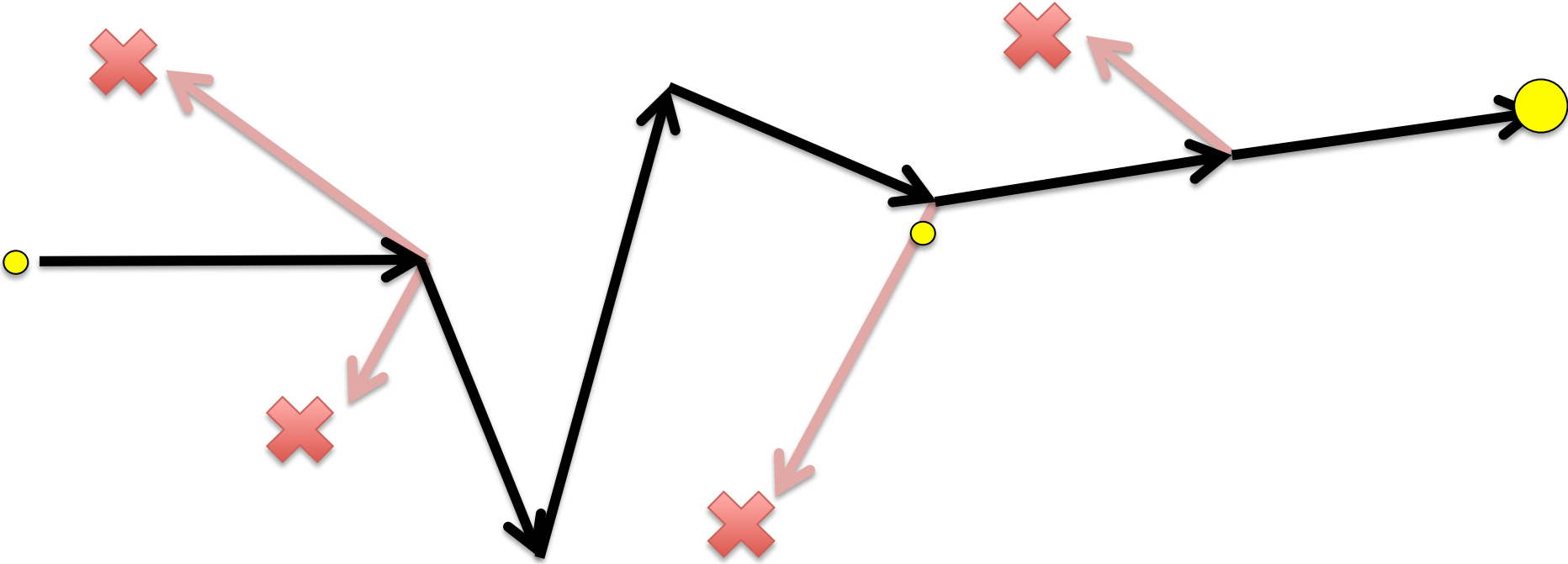
Making a big change all at once



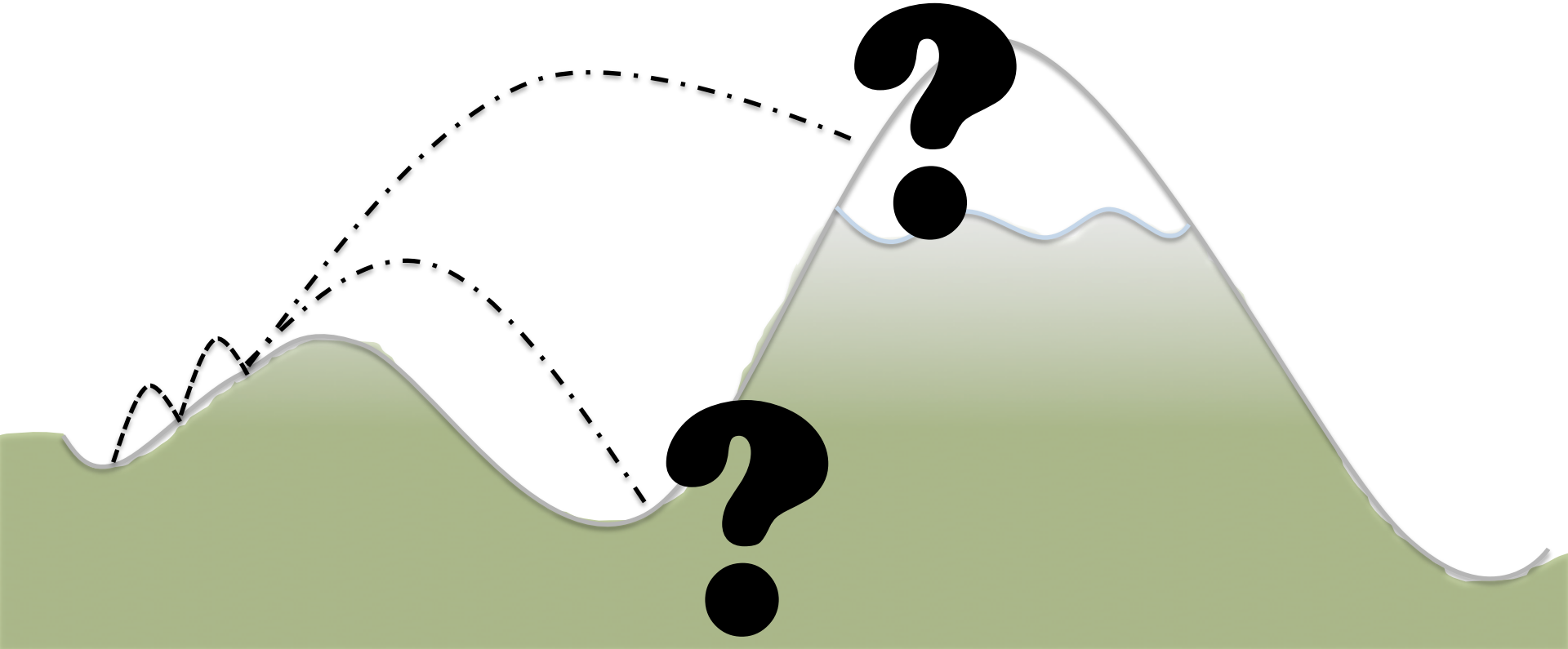
Making a big change all at once



Making a big change incrementally



Making the big leap



we always think it's a
huge leap **forward**
(but we're not always right)

</how we got here>

<what to do right now>

Introduction to *Pinterest*



Find Friends >

Invite Friends



I've often wondered how this could happen. How could a place so carefully, masterfully crafted be abandoned. Forgotten.

👍 7 ❤️ 6

Found in Abandoned Mansions



Little Italy, New York...I've walked the streets of Little Italy:ceeanne.

🇺🇸 by camgrape

👍 1

Found in Italy



Better late than never.

👍 5

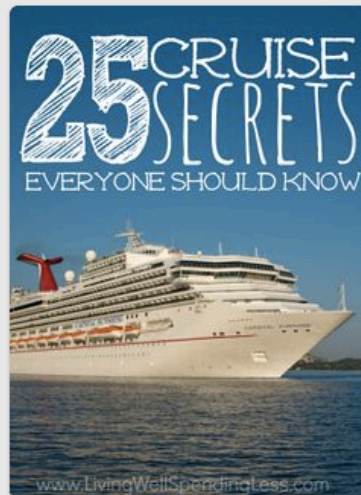
Found in Typography



Modern Architecture Rules! Chris Pardo Designs

👍 3

Found in Modern Architecture



from Living Well Spending Less®

25 Cruise Secrets Everyone Should Know

Want to get away? Cruising is not only relaxing, it is also one of the most cost-effective ways to travel! These 25 insider secrets can help you find the best deals, discover little-known tips & tricks, and help you make the most of your next cruise vacation.

👍 10 ❤️ 2

Found in Travel




Website redesign

- Rewrite entire website
- Modular design for faster development
- Consume our API

- Complete visual redesign




Jellypop Pinkie

 Anna Jackson-Jones onto American Eagle




Map ornaments from vacations, put the dates on the back.

 Betsy Waugaman via Laura Black Pate onto sewing projects




Christmas Cookies...

 Sarah Ireland via Misi V. onto holidays



OLSENS ANONYMOUS MARY KATE MK OLSEN FASHION STYLE BLOG QUILTED LEATHER JACKET GREY SHIRT LONG BLOND HAIR WHITE CLUTCH BALenciAGA GLADIATOR WEDGE SANDAL

 Natalia Namder via Krystle Morgan onto Fashion




Shadows

 Jules Le Masson Fletcher via Brent Heeb onto Photography Inspiration




peanut butter blossom = yummy old favorite

 Brandi Brent Bogart via Suza Marchetti onto Christmas



Black **E** by iloniti

 sarah mcco via Gabrielle Meehan onto Awesome




Vintage Cracker Jack prizes from the 60s and 70s

 Sarah Bergman via Melanie Miller onto Plastic Trash!



Here's to having a great friend by your side as you loose your shit. Because going crazy alone is just not as much fun. @K . Doss

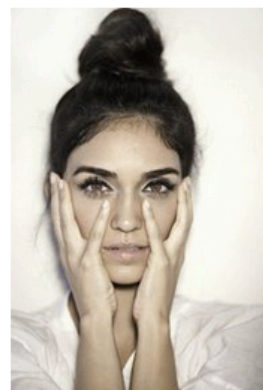
 Danielle Rogers via Charlsa McCachren onto Funny things



HOW ARE WE LEARNING???



Aislenn K onto Where to



Thick liner and lashes, bold brow and top knot. Perfection.





Search



Andrea



10 Hairstyles For Shoulder Length Hair

..Click To See More..

from STYLECRAZE

Best Hairstyles For Shoulder Length Hair – My Top 10

Top 10 Hairstyles For Shoulder Length Hair

Alec Soto Hair



Gorgeous Front Porch!



Lee Harrison-Acquaro home

OMBRE WINE BOTTLE CENTERPIECE



Cream Cheese Peppermint Dip | Safeway - Sweet and creamy peppermint dip served with chocolate-covered pretzels and chocolate graham crackers make an unexpected holiday dessert dip! Mix cream cheese, ricotta, powdered sugar and peppermint extract in a bowl on high for 2 minutes. Chill for 30 minutes before serving and then garnish with crushed peppermint candies or peppermint bark.

146 7



Safeway Safeway Culinary Creations

Promoted Pin



"Feel the sunlight on my face You have brought me through this place." -Barlow Girl



Megan Bay Clothing



from Trover

Goreme, Nevşehir, Turkey — by Ana Patrascu


Cappadocia, Turkey




Holly Rosendahl Istanbul



Why ^{NOT} run an experiment?

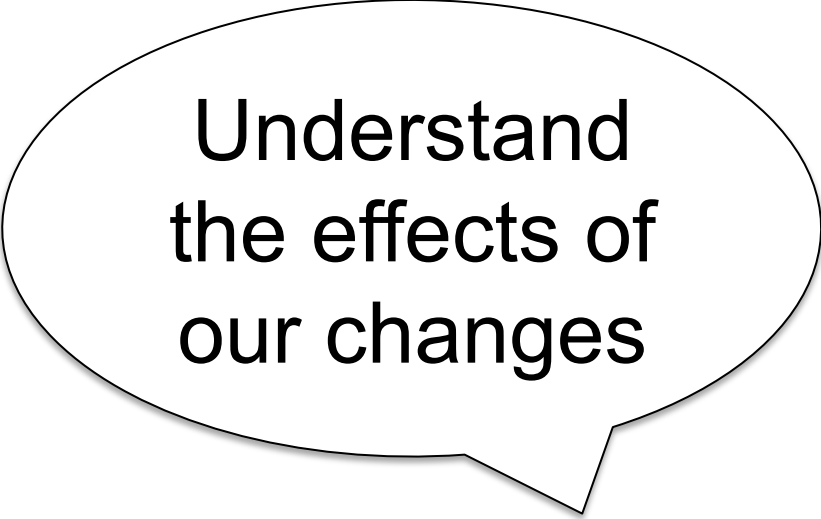


We've already
told the press
about it!



We know we'll ship
– we can't go back
to the old design
now!

Why run an experiment?

A white speech bubble with a black outline and a drop shadow, containing the text 'Understand the effects of our changes'.

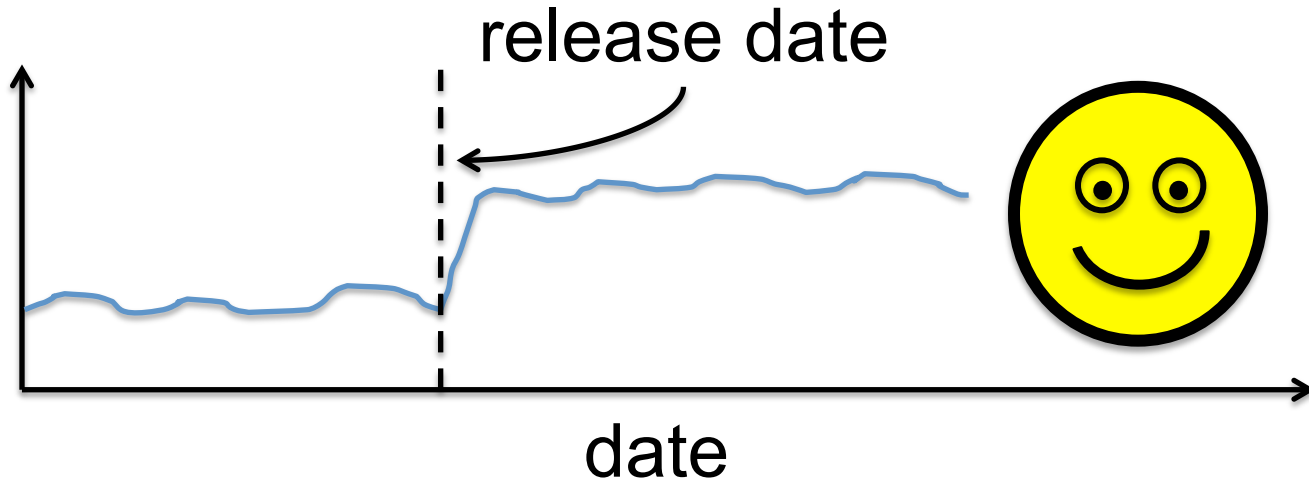
Understand
the effects of
our changes

A white speech bubble with a black outline and a drop shadow, containing the text 'Identify and fix bugs'.

Identify and
fix bugs

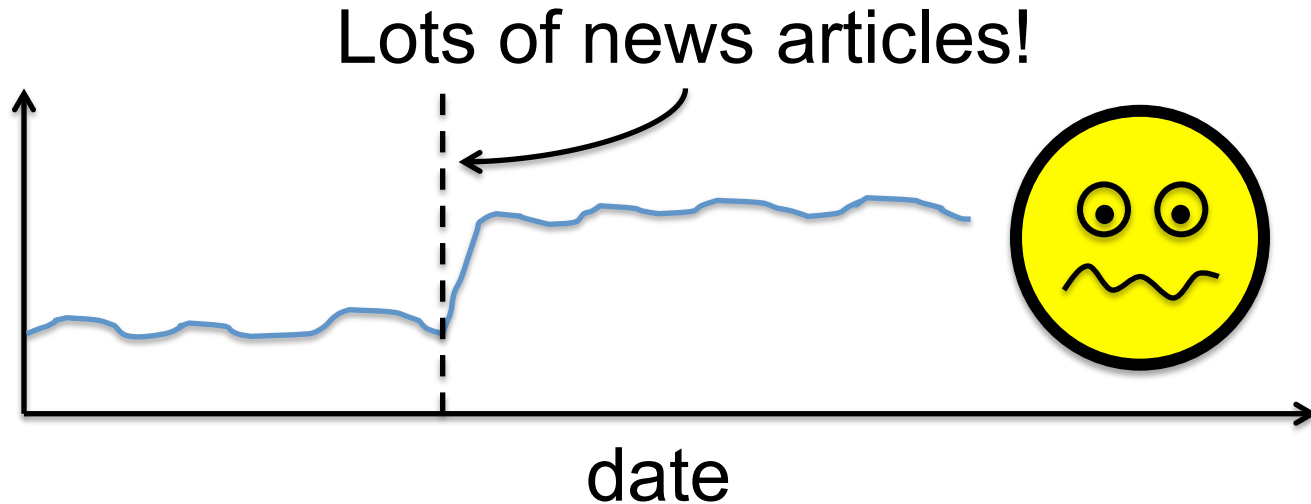
Option #1: Just ship it

- Release the new site.
- Watch metrics trend to evaluate success.



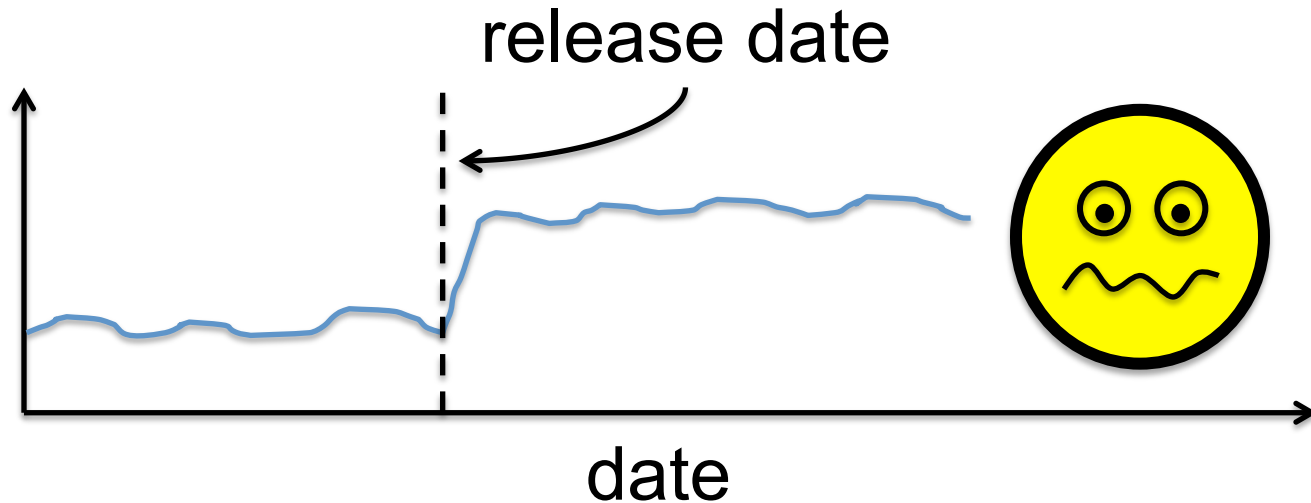
Option #1: Just ship it

- But: other factors may be responsible



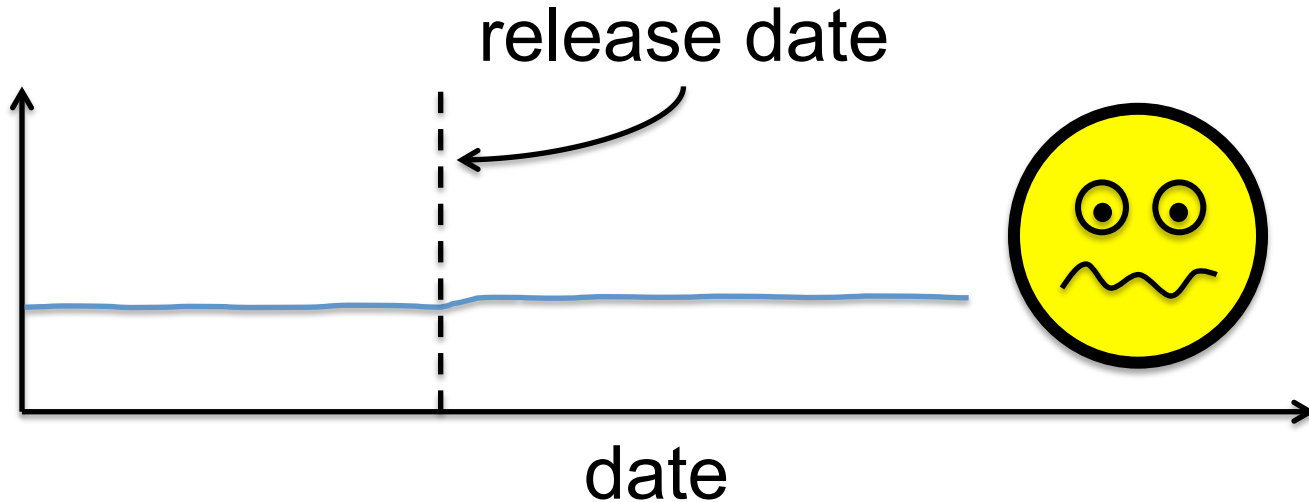
Option #1: Just ship it

- But: novelty effect could skew results



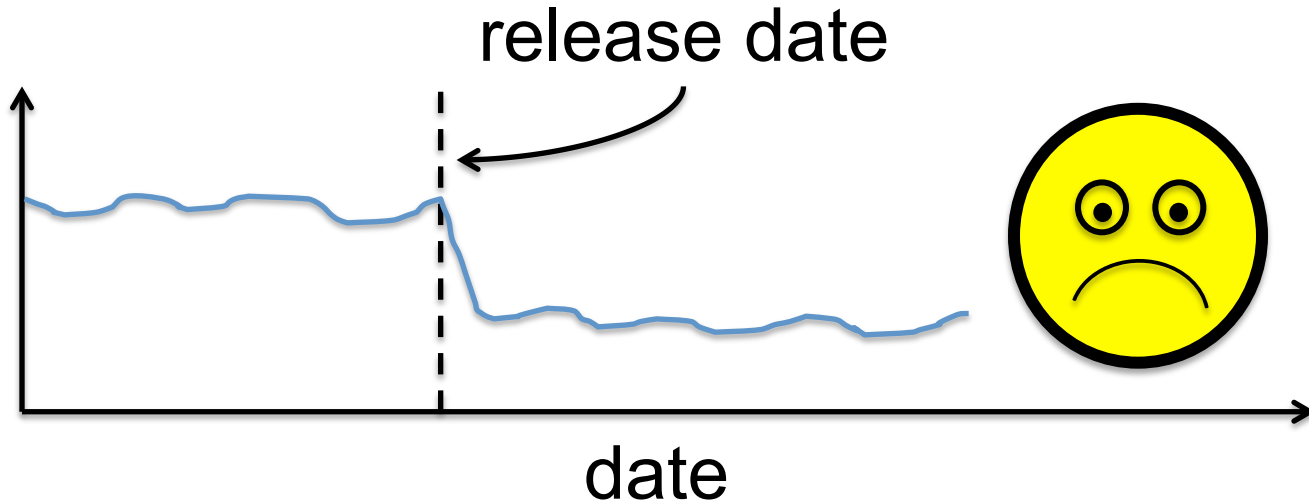
Option #1: Just ship it

- But: effect size may be too small



Option #1: Just ship it

- But: anything you find is too late!



Option #1: Just ship it



Options for the big release

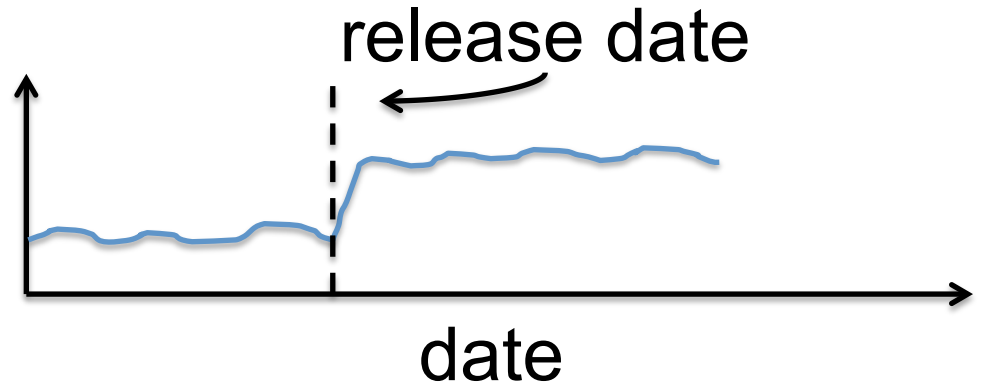
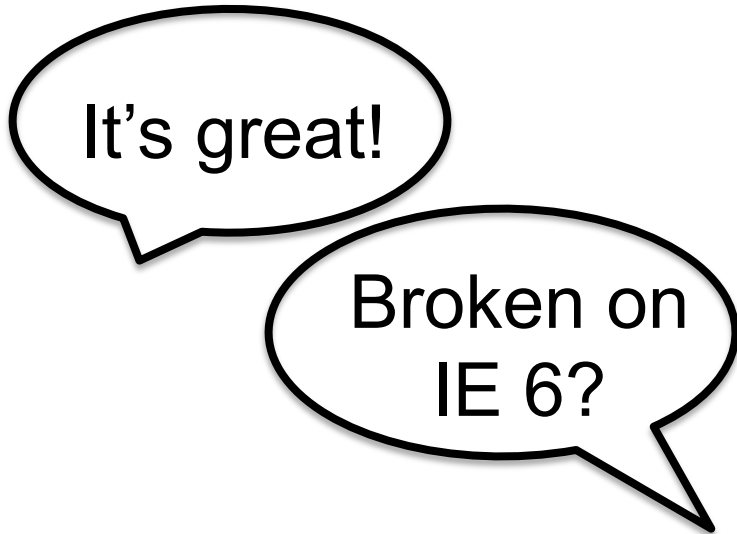


- ~~Just ship it~~ 🤪
- **Allow users to opt in**



Option #2: Let users opt in

- Let users opt in. Listen to their feedback.
- Watch metrics trends too.



See

Option #2: Let users opt in

Preview our new look



We're testing out a more visual design with bigger pins. We'd love to know what you think!

[Learn more](#)

No Thanks

Preview



Lucerne, Switzerland submitted by: itslikequack, thanks!



Abi Harris onto Places I Want To Visit 🇺🇸



Glacier "Perito Moreno" in Argentina. (source:...



Abi Harris onto Places I Want To Visit 🇺🇸



Brooklyn Bridge, NYC
Travis Feldman Photo



Abi Harris onto Places I Want To Visit 🇺🇸

News

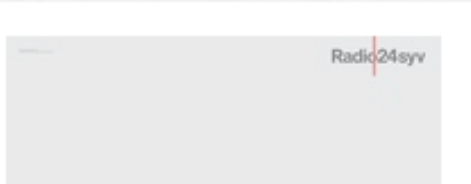
[See all](#)

Cool Stuff

Your pin from **Random Wants & Desires** was repinned here:



We search for life on other planets and in other regions



Radio24syv



Option #2: Let users opt in



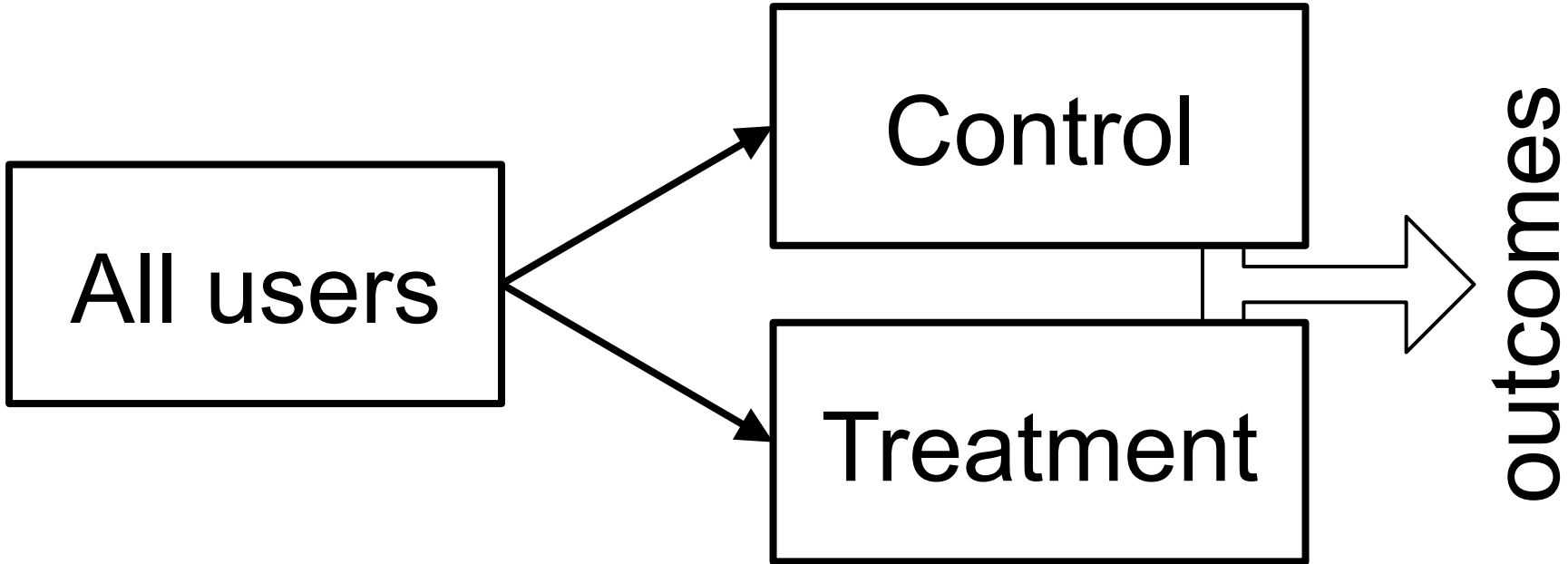
Options for the big release

LEARN MORE

- ~~Just ship it~~ 🤪
- (Allow users to opt in) 📞
- **Run an opt-in experiment**

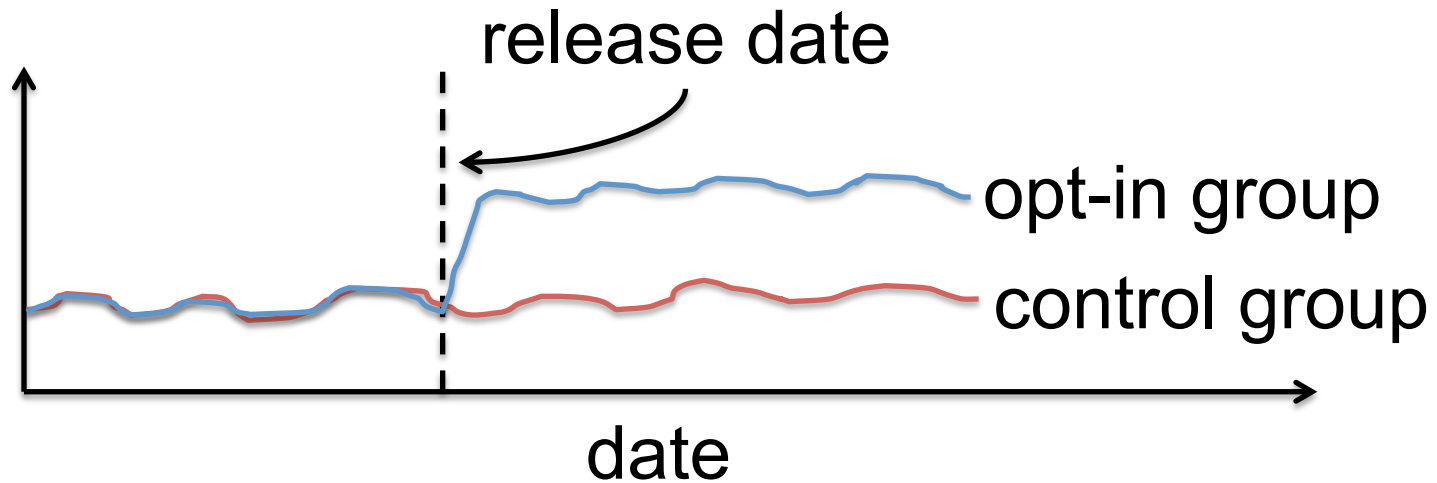
GO FASTER

Option #3: Run an opt-in experiment



Option #3: Run an opt-in experiment

- Allow a random group of users to opt in
- Compare metrics to a control group



Challenges of opt-in: dilution

- Dilution decreases signal : noise ratio



a person in your
experiment

Challenges of opt-in: dilution

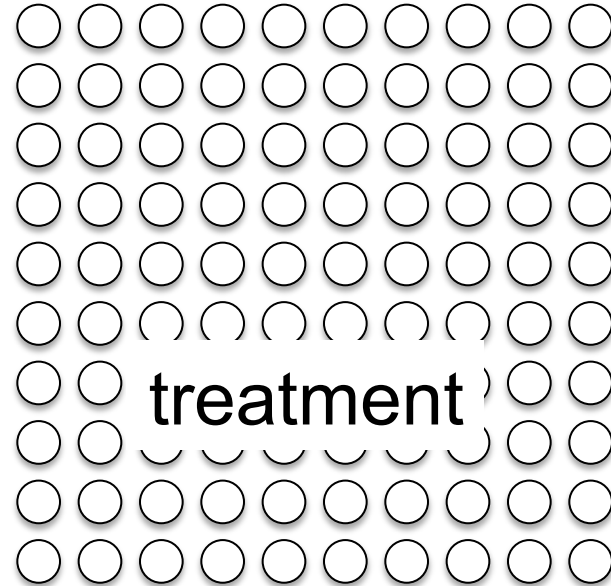
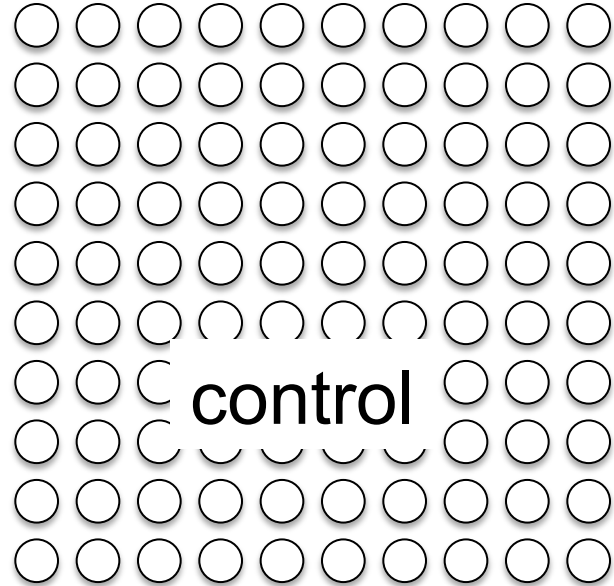
- Dilution decreases signal : noise ratio



a happy person in
your experiment

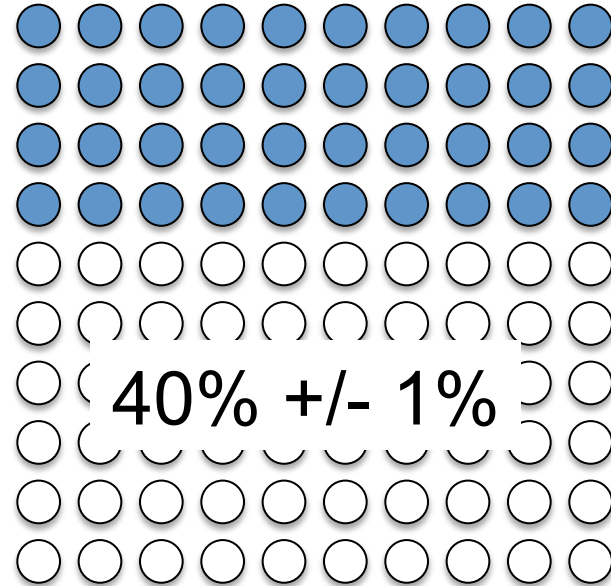
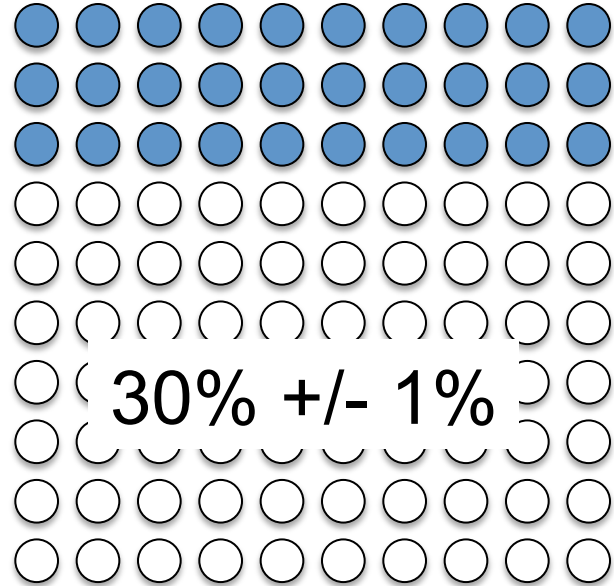
Challenges of opt-in: dilution

- Dilution decreases signal : noise ratio



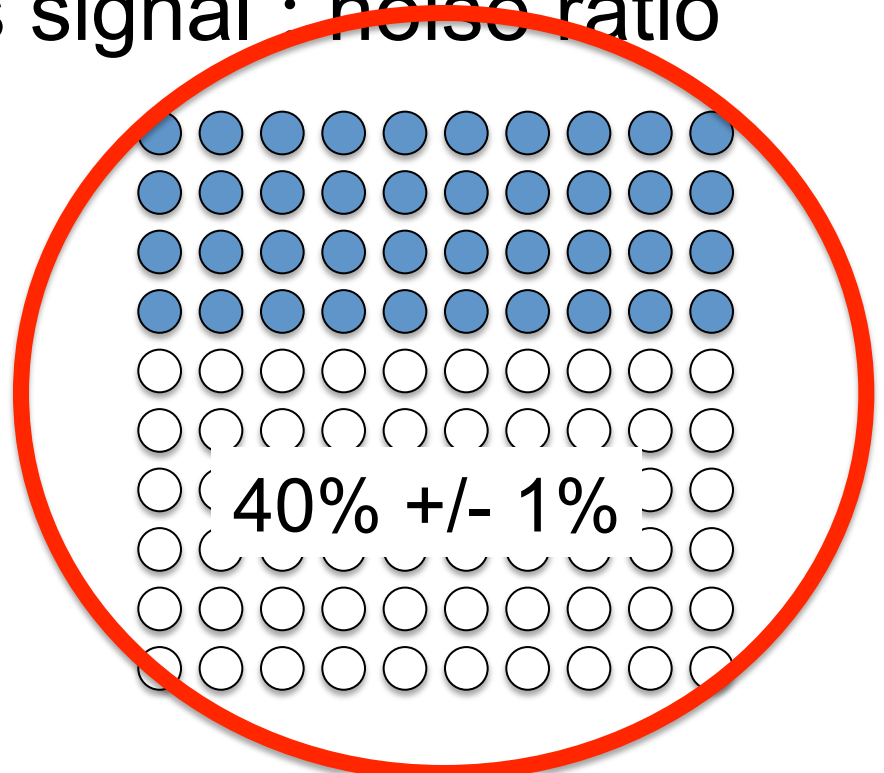
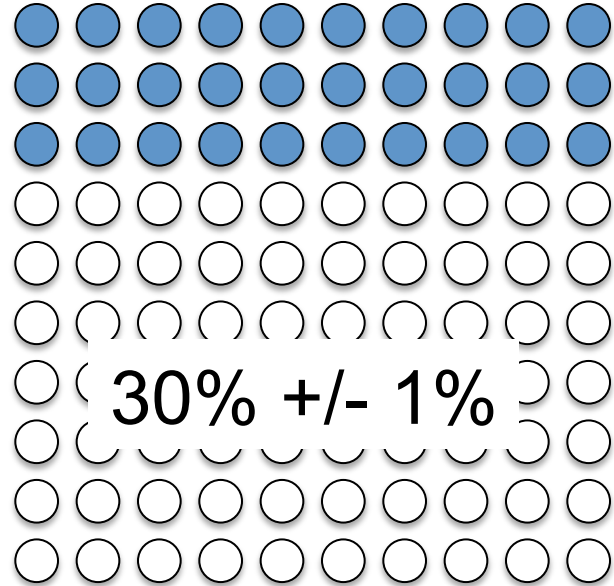
Challenges of opt-in: dilution

- Dilution decreases signal : noise ratio



Challenges of opt-in: dilution

- Dilution decreases signal · noise ratio



Challenges of opt-in: dilution

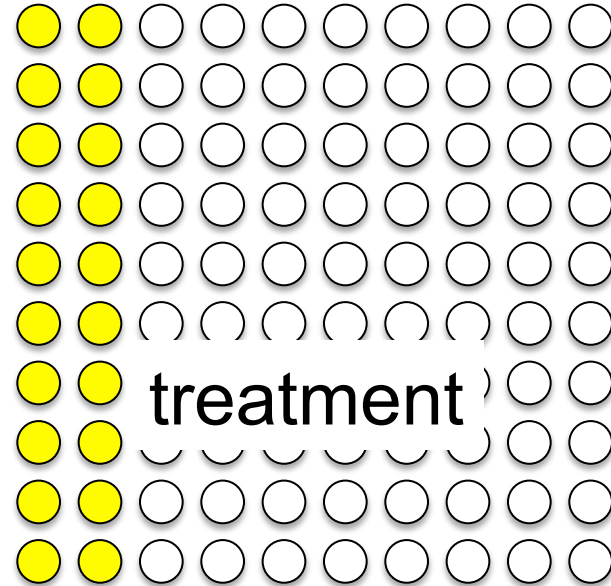
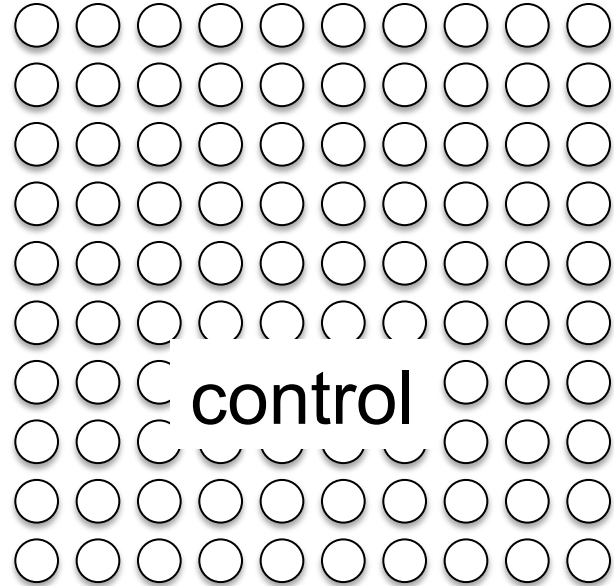
- Dilution decreases signal : noise ratio



a person who
opted into the new
website

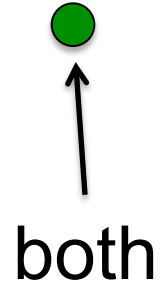
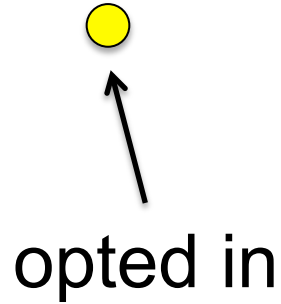
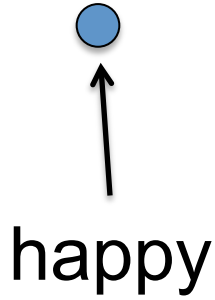
Challenges of opt-in: dilution

- Dilution decreases signal : noise ratio



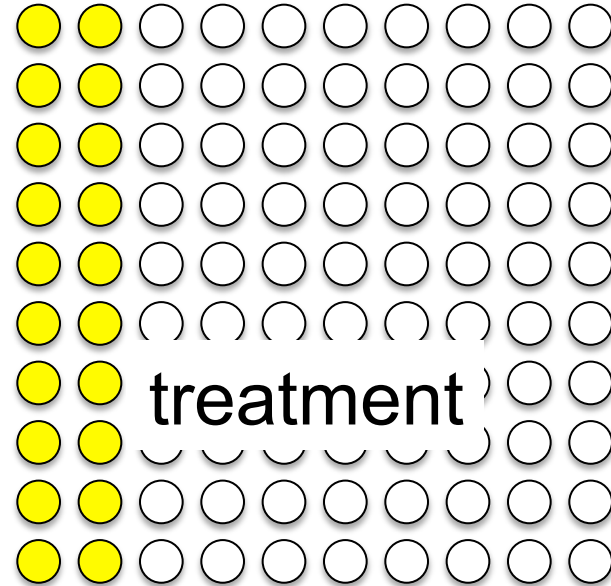
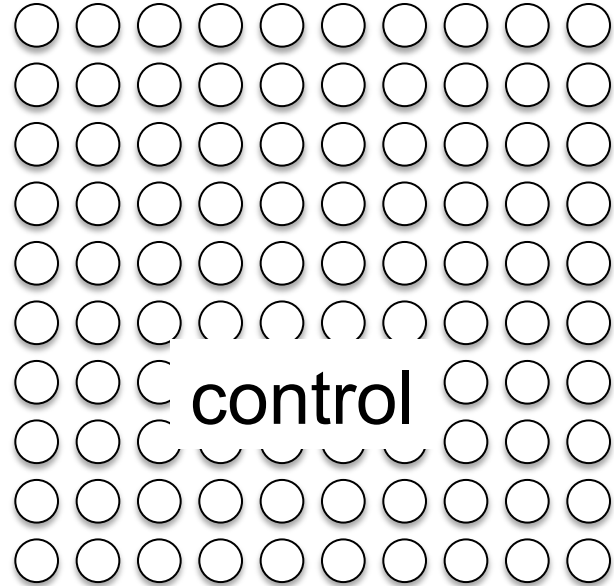
Challenges of opt-in: dilution

- Dilution decreases signal : noise ratio



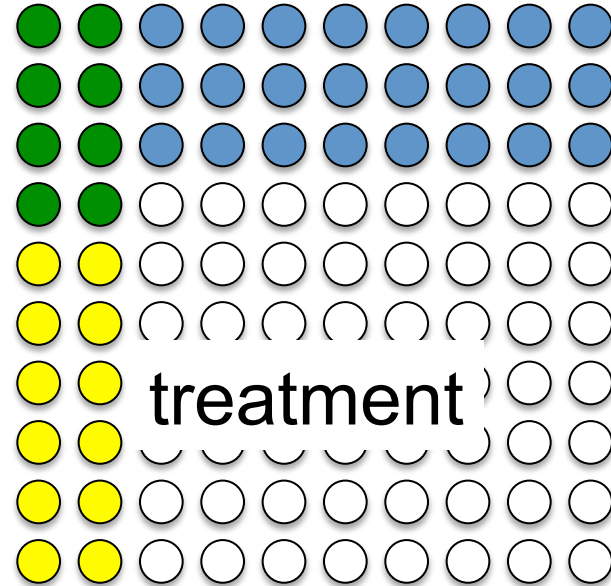
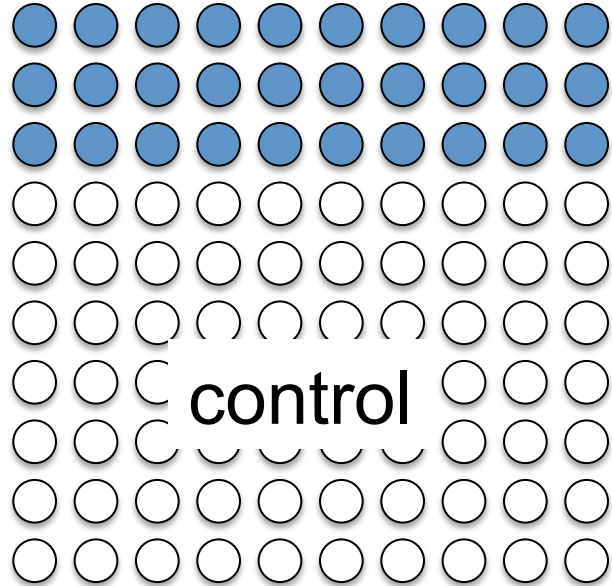
Challenges of opt-in: dilution

- Dilution decreases signal : noise ratio



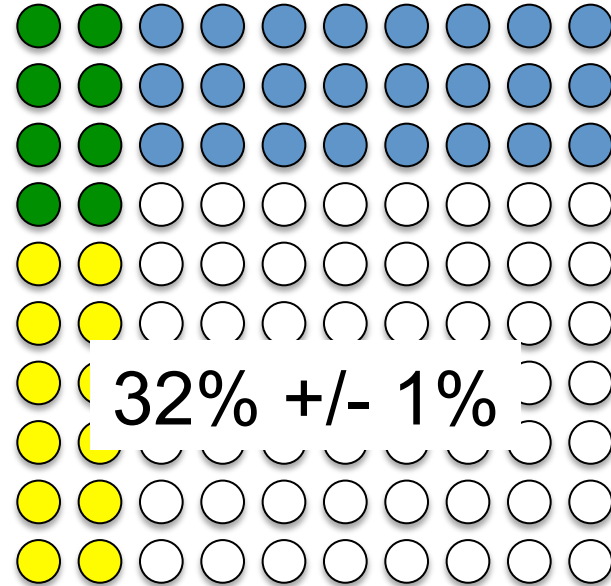
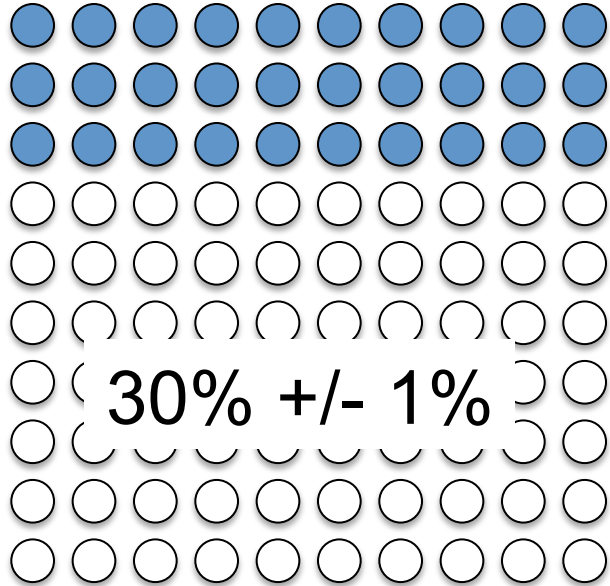
Challenges of opt-in: dilution

- Dilution decreases signal : noise ratio



Challenges of opt-in: dilution

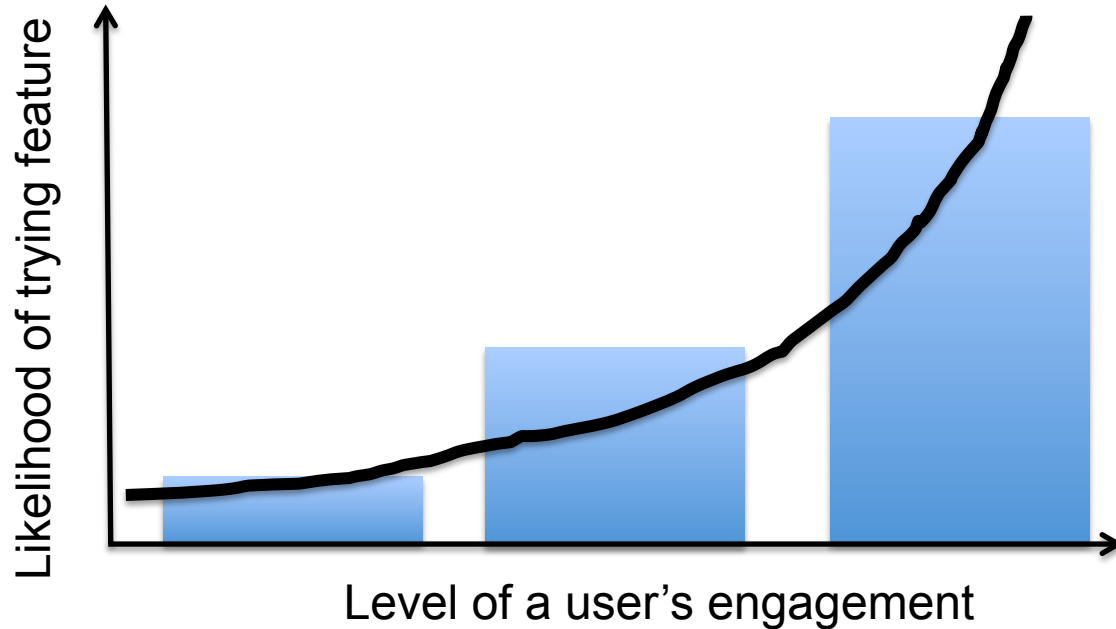
- Dilution decreases signal : noise ratio



dilution of results =
may not be able to measure

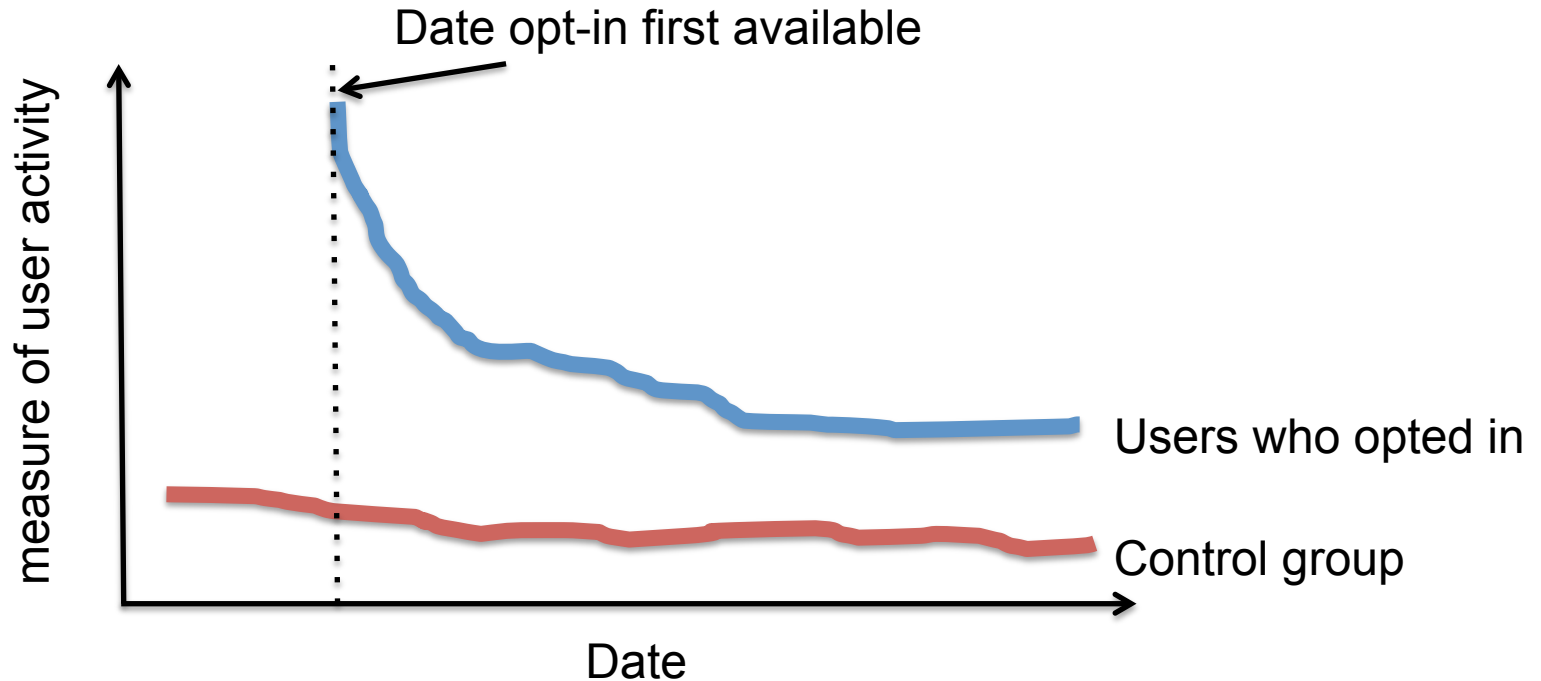
Challenges of opt-in: selection bias

- Engaged = more likely to try new features



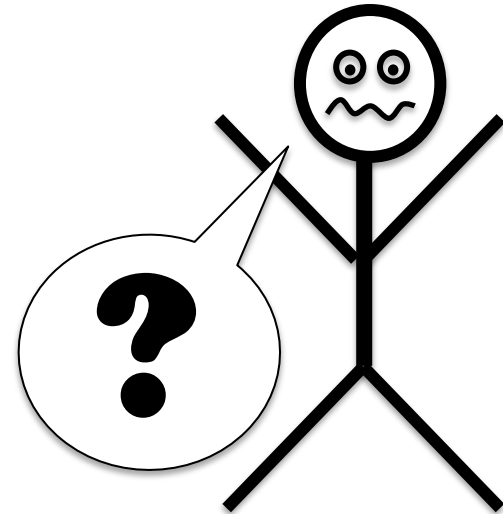
Challenges of opt-in: selection bias

- Users who opt in differ from those who don't



Challenges of opt-in: selection bias

- Users who opt in differ from those who don't



Option #3: Run an opt-in experiment

Data is skewed by:

- Dilution
- Selection bias



Options for the big release

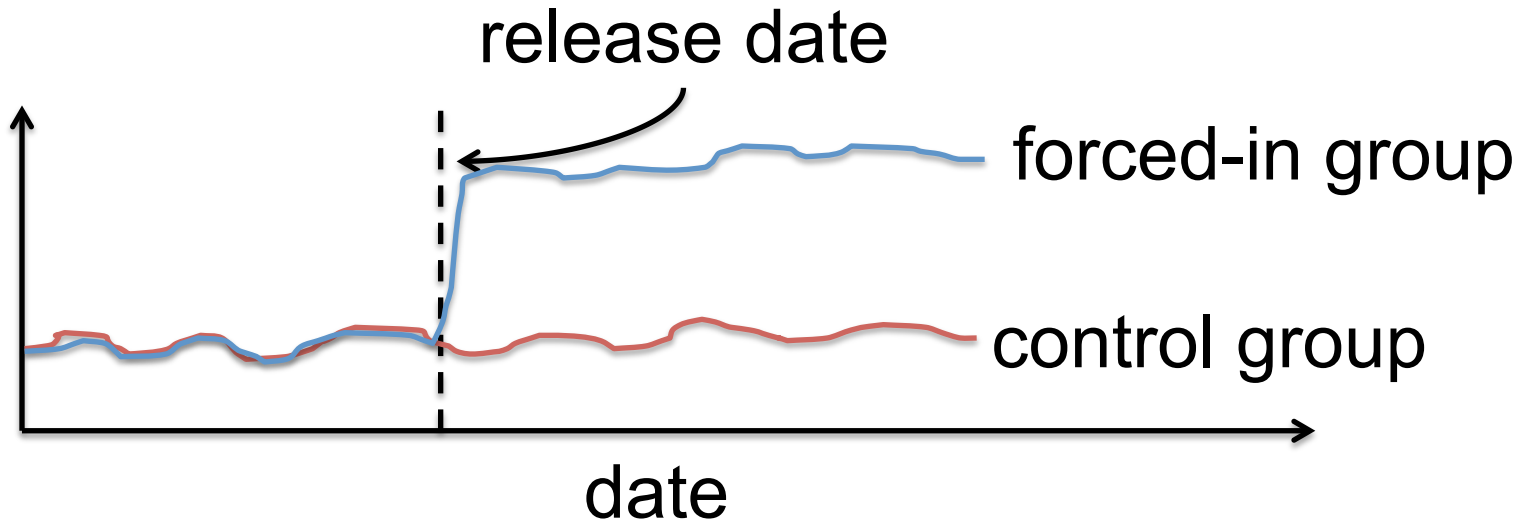
LEARN MORE

- ~~Just ship it~~ 🤪
- (Allow users to opt in) 📞
- ~~Run an opt-in experiment~~ 📌❤️📌
- **Run a forced-in experiment**

GO FASTER

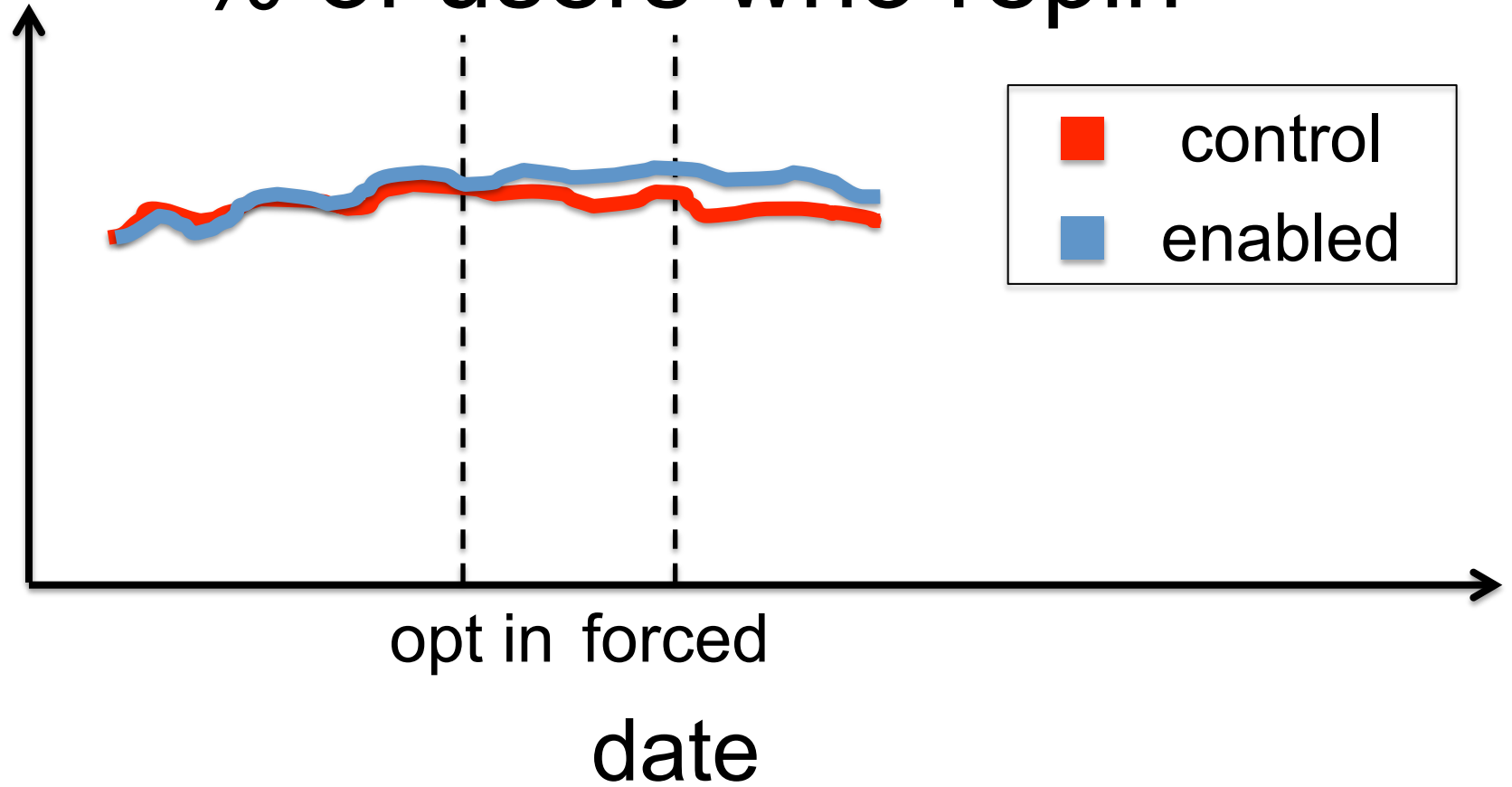
Option #4: Run an forced-in experiment

- Force some users into the new design
- Compare metrics to a control group



April 3, 2013

% of users who repin



“It’s not an experiment if you know it’s going to work.”

– Jeff Bezos

“My experiment will be hugely successful.”

– every feature owner ever

even optimists need a
contingency plan

should we ship today?

how about now?

or now?

DENZEL LAUNCH

Pin creates, comments and user / board follows are still down. Everything else is up or neutral.



XX%

% web users in Denzel

EXISTING USERS

Pin create	
Board follow	
User follow	
Comments	
Likes	
Click through	
Board create	
Repin	

NEW USERS

Board follow	
User follow	
Pin create	
Board create	
Got repinned	
Repins	
Likes	
Return visits	

April 10, 2013

DENZEL LAUNCH

Pin creates, comments and user / board follows are still down. Everything else is up or neutral.



XX%

% web users in Denzel

EXISTING USERS

NEW USERS

bad enough to
block shipping?

The diagram compares activities for existing and new users. Red arrows pointing down indicate activities that are down for existing users but up for new users. Green arrows pointing up indicate activities that are up for existing users but down for new users. Grey arrows indicate neutral status.

Activity	Existing Users	New Users
Pin create	Down	Up
Board follow	Down	Up
User follow	Down	Up
Comments	Down	Up
Likes	Up	Down
Click through	Up	Down
Board create	Up	Down
Repin	Up	Down
Board follow	Up	Down
User follow	Up	Down
Pin create	Up	Down
Board create	Up	Down
Get redirected	Up	Down
Return visits	Up	Down
Likes	Up	Down
Return visits	Neutral	Neutral

DENZEL LAUNCH

Pin creates, comments and user / board follows are still down. Everything else is up or neutral.



XX%

% web users in Denzel

EXISTING USERS

Pin create	↓
Board follow	↓
User follow	↓
Comments	↓
Likes	↑
Click through	↑
Board create	↑
Repin	↑

NEW USERS

Board follow	↓
User follow	↓
Pin create	↓
Board create	↑
Got repinned	↑
Repins	↑
Likes	↑
Return visits	↑

how bad is too bad?

DENZEL LAUNCH

Pin creates, comments and user / board follows are still down. Everything else is up or neutral.



XX%

% web users in Denzel

EXISTING USERS

Pin create

Board follow

User follow

Comments

Likes

Click through

Board create

Repin

NEW USERS

Board follow

User follow

Pin create

Board create

Got repinned

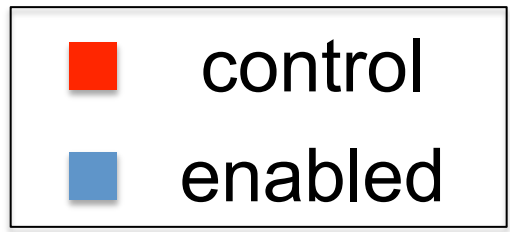
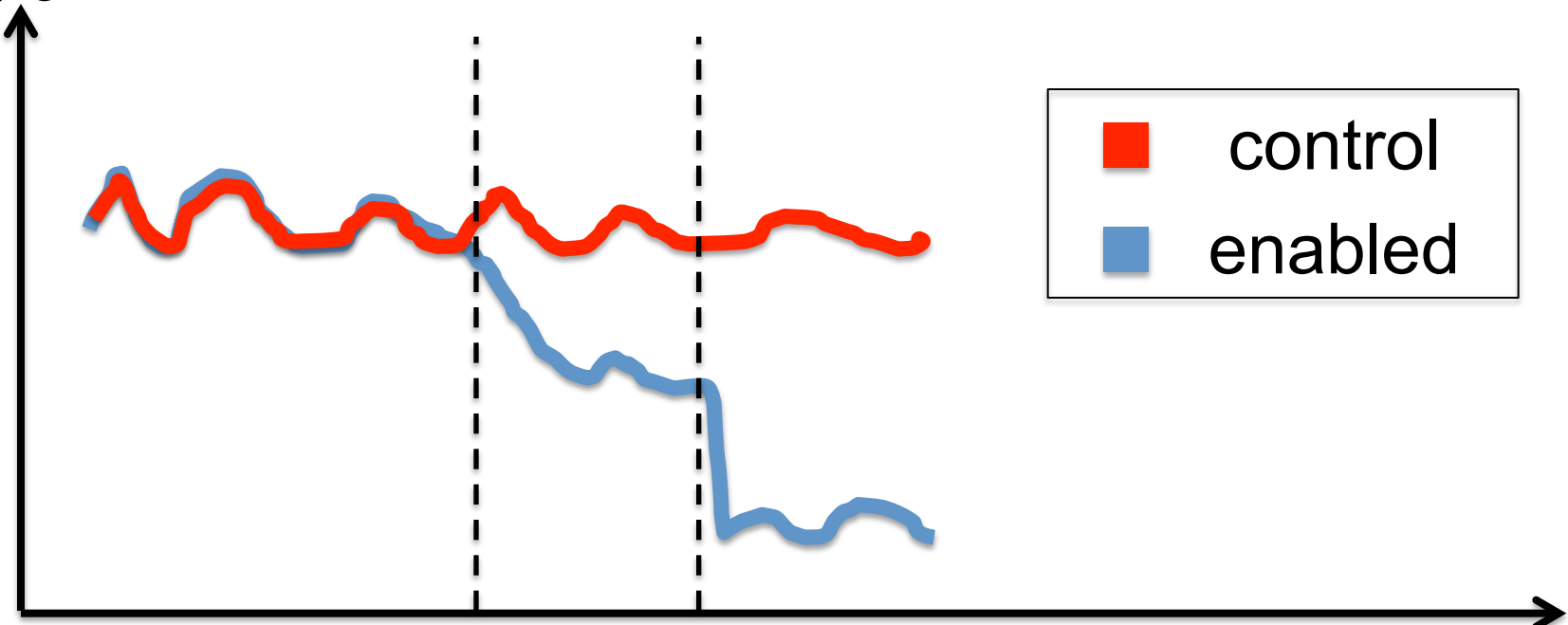
Repin

Likes

Return visits

we need to fix this
before we ship!

% of users who follow a board



opt in forced

date



[REDACTED]@pinterest.com> [Unsubscribe](#)

4/5/13



to team

As Ben mentioned in Q&A, initial data show that most of Denzel's key metrics are either neutral or positive except for board follows. Because the most reliable data we have is from the "new user" experiment and the "forced in existing user" experiment (both of which began this week), our data is still very early and we should be prepared for some fluctuation.

That aside, there are a few theories that we have as to why board follows are down. For example:

- **Closeup.** The board follow button on closeup in Classic is red and under the pin image whereas in Denzel the board follow button is gray and off to the right of the pin image (bottom part of the board preview module).
- **Repin dialog.** The repin dialog in Denzel doesn't have a board recommendation on repin success like Classic does.
- **Harder to find users to follow.** Finding people to follow obviously increases user follows, but it also increases board follows.
 - The "**pinned via**" meta data on the pin in grid helped people find pinners to follow but it's not in the Denzel pin grids.
 - Traffic to **category feeds** may be down due to the new navigation. People find new pinners to follow from the category feeds.


Theories about board follows

Coming soon! In a few weeks, everyone on Pinterest will get our new look.

Search

Patrick Lawrence via Litsa Jennifer
Repinned just now from Stuff Patrick needs to see

Follow



iPhone case- neat!

Add a comment...

Pinned onto the board
Steampunk

Follow

Like 0

Tweet

Embed

Report Pin

Email

This button doesn't exist in Denzel

Less prominent in Denzel?

Victorian Keyboard

Patrick Lawrence via Litsa Jennifer via SteamPunk

SMART UP!! iPhone case that prints your picture out with a golden camera girls love that!

See SteamPunk's iPhone

Blanca allen

Armed and Dangerous Steam Punk

Medium sized, high quality fabric. The cut this good is that you can't see the stitching. If you don't have to cut all the time. You can talk to make a small mark or make one. It's a great idea. It's a great idea.

Heather D Adams via SteamPunk

Heather McConnell via Cottonwood Interiors
Repinned 1 minute ago from COUNTRYSTYLE



Mudroom

Add a comment...

Pinned onto the board

Breezeway



Read Down



Originally pinned by
Cottonwood Interio.



Pinned via Pin It Button from
newlyweddiaries.bo...



Old design

Trish Wilson onto
Books Worth Reading

Pin It Like Share



Elizabeth Johnson • 1 year ago
mudroom breezeway to mudroom
Pinned from Tina Levisson.

Gabriel Trionfi • That's you!
Add a comment...

Also pinned to:

breezeway
Elizabeth Johnson

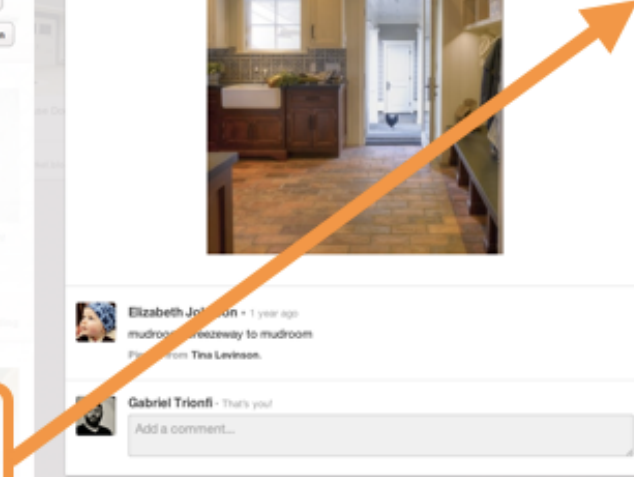


Follow Board

Other pins from
Houzz.com




New design



“It doesn’t matter how beautiful your theory is ... If it doesn’t agree with experiment, it’s wrong.”

– Richard Feynman

Pin it Like Website Share



Photography Jason Wilson

Follow board


cargocollective.com

Jason Wilson · 23 min ago
Class aptent tacit sociosqu ad litora torquent conubia nostra, pernice pharetra scelerisque tempus. Inetorum luctus risibula vitae antesis.
Pinned from Sarah Wilson. Original source cargocollective.com

Trey Radcliff · 3 min ago
Vestibulum sed orci in ipsum accumsan consequat ac eu augue. Nunc dignis simpulose justo scelerisque turpis eget augue etiamend tristique.

Sarah Barber · That's you!
Add a comment...










Pinned with




Show likes and repins

Sarah Barber · That's you!
Add a comment...

27 Repins [See all repins](#)

 Landscapes Trey Radcliff	 Unreal Reality Sarah Wilson	 Denzel Memories Connor Montgomery
 Mountain Landscapes Evan Sharp	 Inspiration for Painting Danna Samal	 Inspiration / Photo Jung Lee
 Natural Beauty Susan Diane	 Beautiful Landscapes Scarlett Alice	 Future Adventures Sophia Wilson

26 Likes [See all likes](#)



Show related boards

Pin it Like Website Share

Jason Wilson · 23 min ago
Class aptent tacit sociosque ad litora torquent conubia nostra, pernice pharetra scelerisque tempus. Inetorum luctus risibula vitae antesis.

Pinned from Sarah Wilson. Original source: [cargocollective.com](#)

Trey Radcliff · 3 min ago
Vestibulum sed orci in ipsum accumsan consequat ac eu augue. Nunc dignis simpulose justo scelerisque turpis eget augue eleifend tristique.

Sarah Barber · That's you!
Add a comment...

Photography
Jason Wilson
Follow board

cargocollective.com

Also pinned to [See all boards](#)

My Photography
Jason Wilson
Follow

Strike and Shade
Justin Edmund
Follow

Geometry
Neta Kitch
Follow

Strike and Shade
Tatyana Ponomarevskaya
Follow

Pinned with


Pin art et amet enim conse...
quar'lectus que et du.

Pin art et amet enim conse...
quar'lectus que et du.


Pin art et amet enim conse...
quar'lectus que et du.

Pin art et amet enim conse...
quar'lectus que et du.

Pin it Like Website Share




Photography Jason Wilson



Follow board

cargocollective.com



Jason Wilson • 23 min ago
Class aptent tacit sociosqu ac litora torquent conubia nostra, perneque scelerisque tempus. Inetorum luctus risibus vitae antesit.

Pinned from Sarah Wilson. Original source cargocollective.com

Trey Radcliff • 3 min ago
Vestibulum sed orci in ipsum accumsan consequat ac eu augue. Nunc dignis simpulso justo scelerisque turpis eget augue eleifend tristique.

Sarah Barber • That's you!
Add a comment...

Show board & user under closeup



Repinned onto **Outdoor Living** Follow

Repinned from **Kersten Pietrowski** Follow

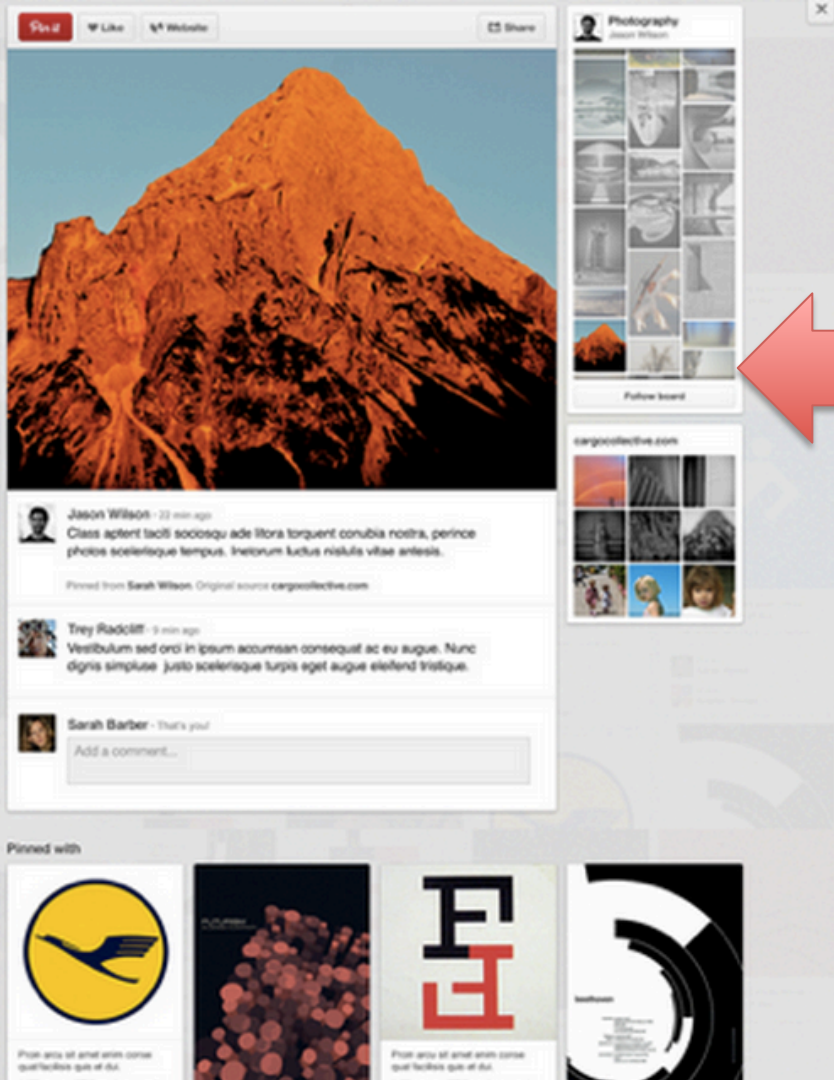
Lindsay Ledford • 10 minutes ago
nice porch love the crate and pillows

Pinned with



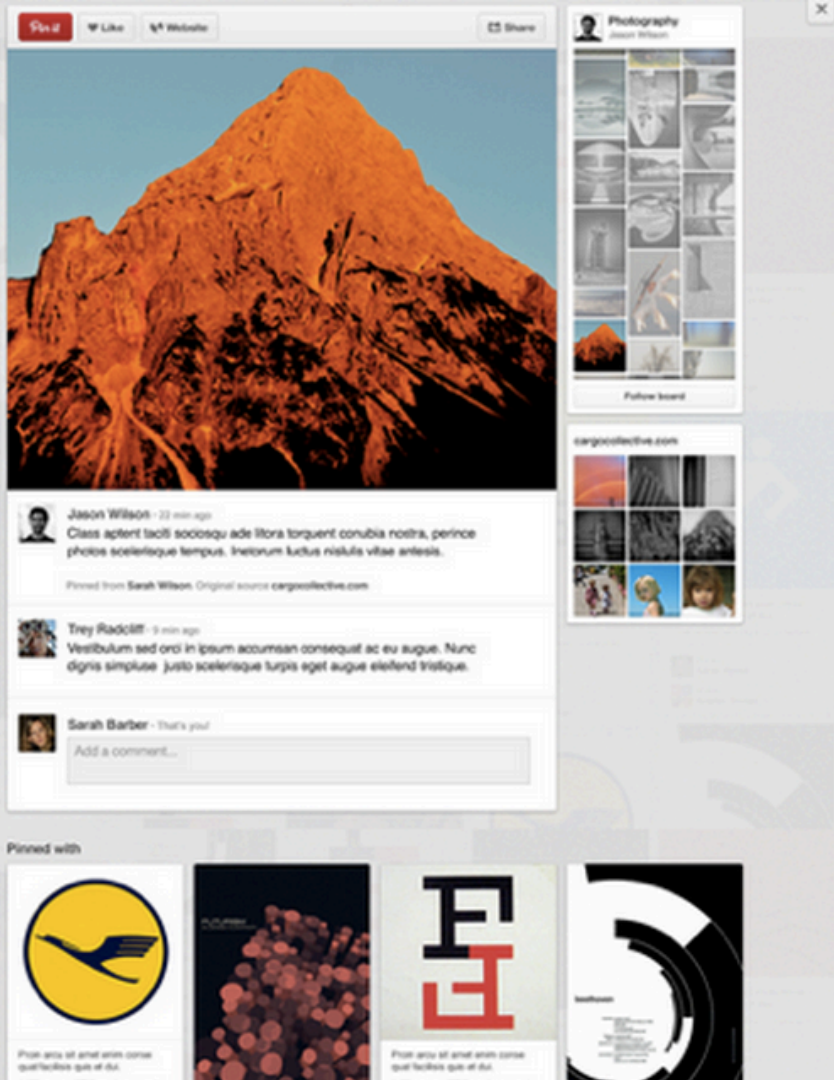
Pin area et amet enim conse
quatinibus que et du.

Pin area et amet enim conse
quatinibus que et du.

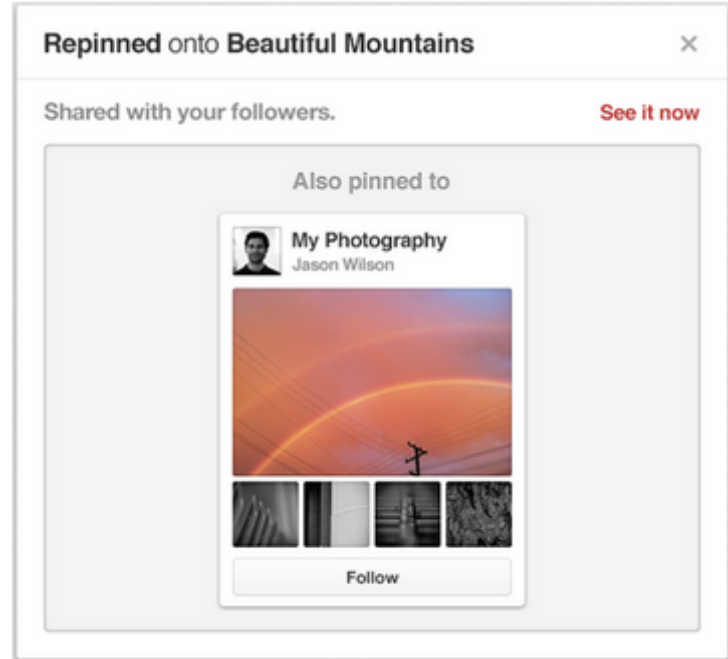


Red follow button
on sidebar

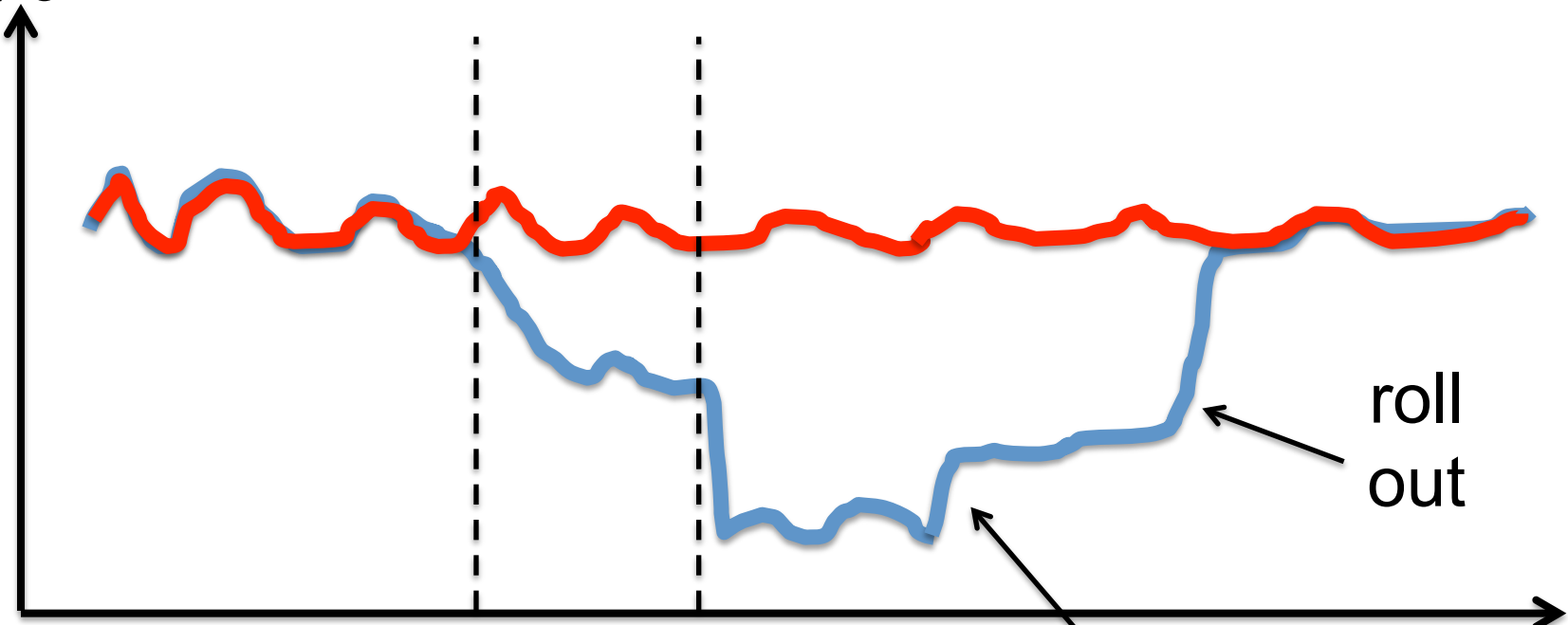




Board suggestion after repin



% of users who follow a board



opt in forced

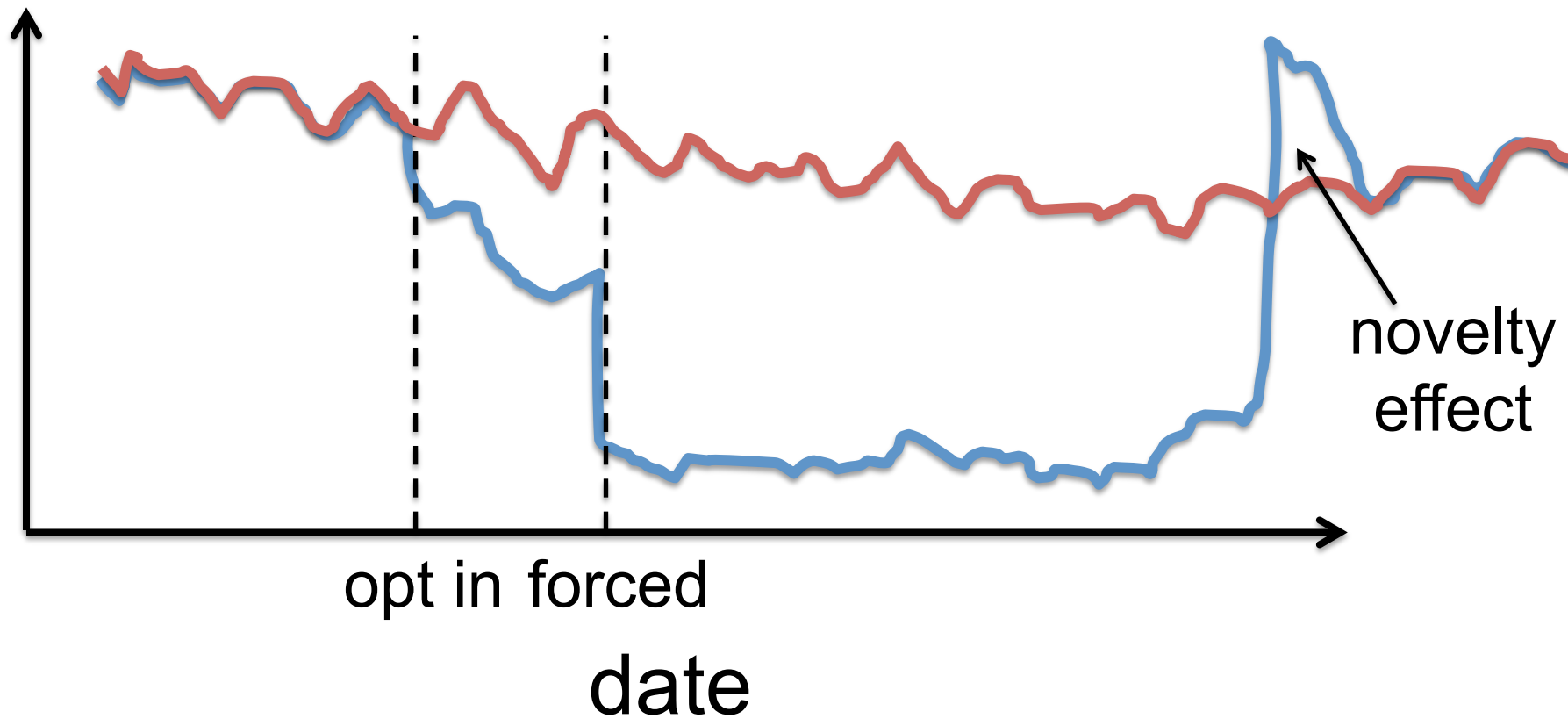
date

experiment on follows

roll out

should we ship now?

% of users who follow a user



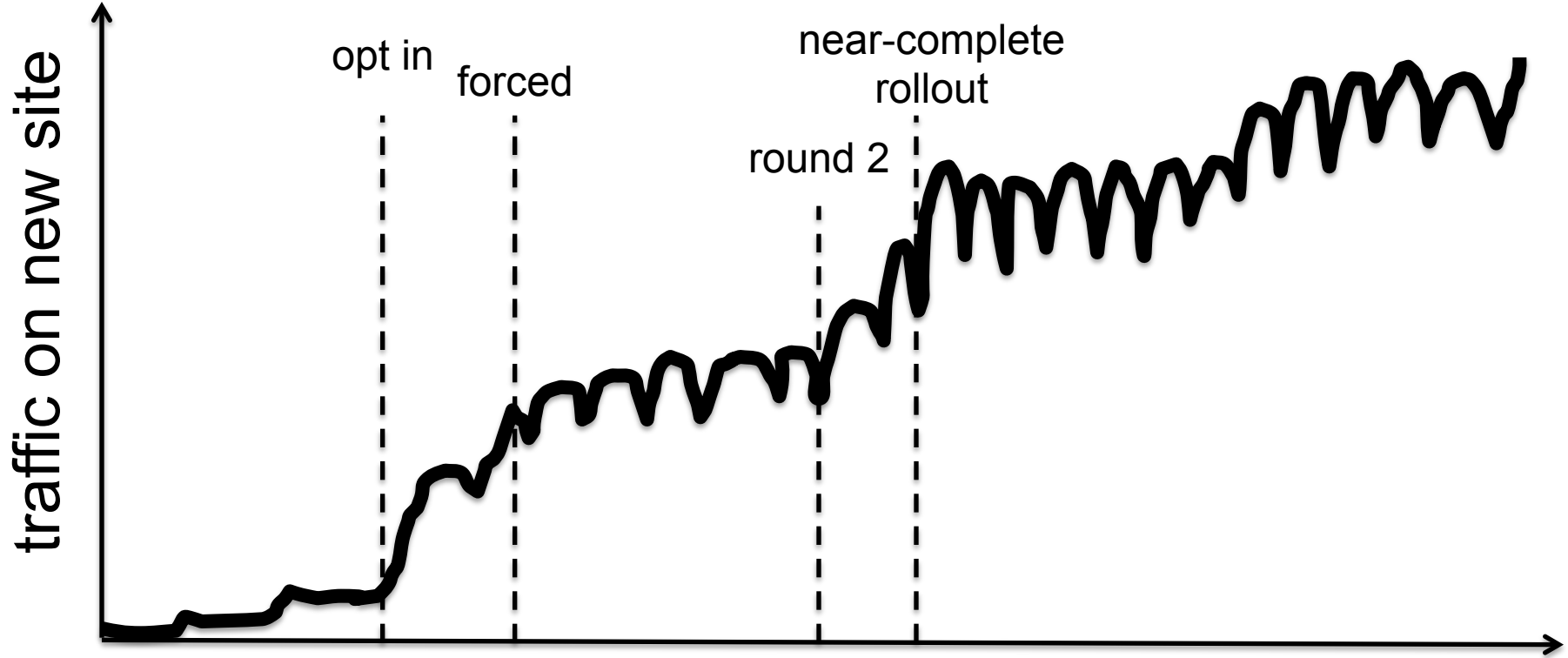
should we ship now?

a controlled experiment
gives you
disaster avoidance

a controlled experiment
gives you
accurate forecasting

a controlled experiment
gives you
confidence

Roll out with confidence



AND THEY LIVED

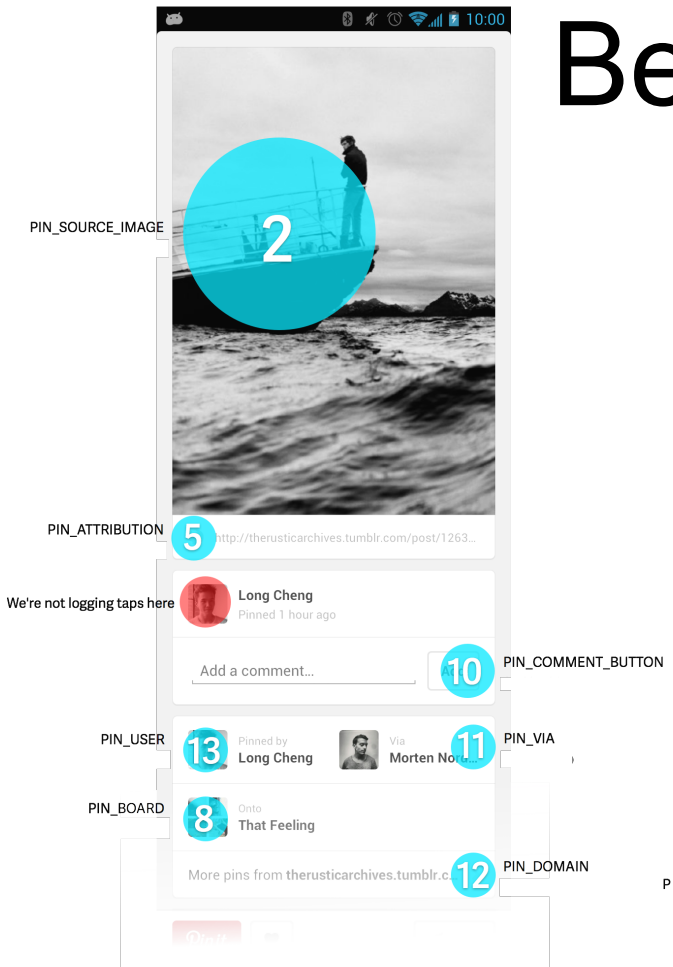
Happily ever after



Epilogue

Better logging

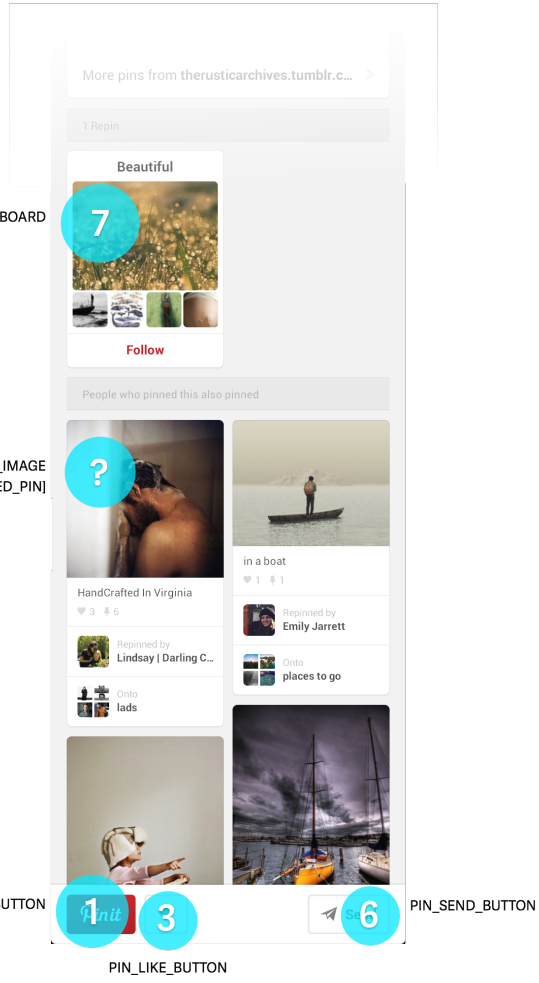
where
users
click



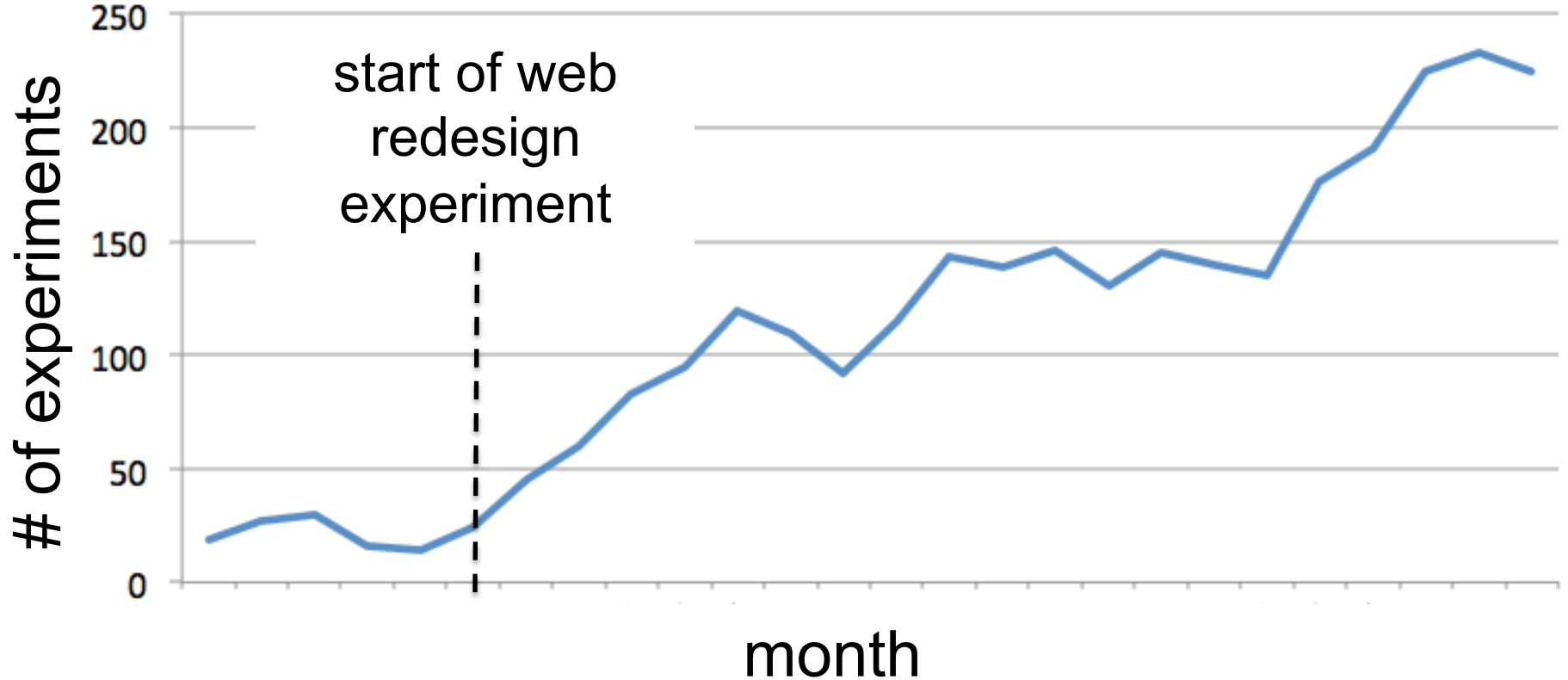
REPIN_SUGGESTED_BOARD

PIN_SOURCE_IMAGE
[FLOWED_PIN]

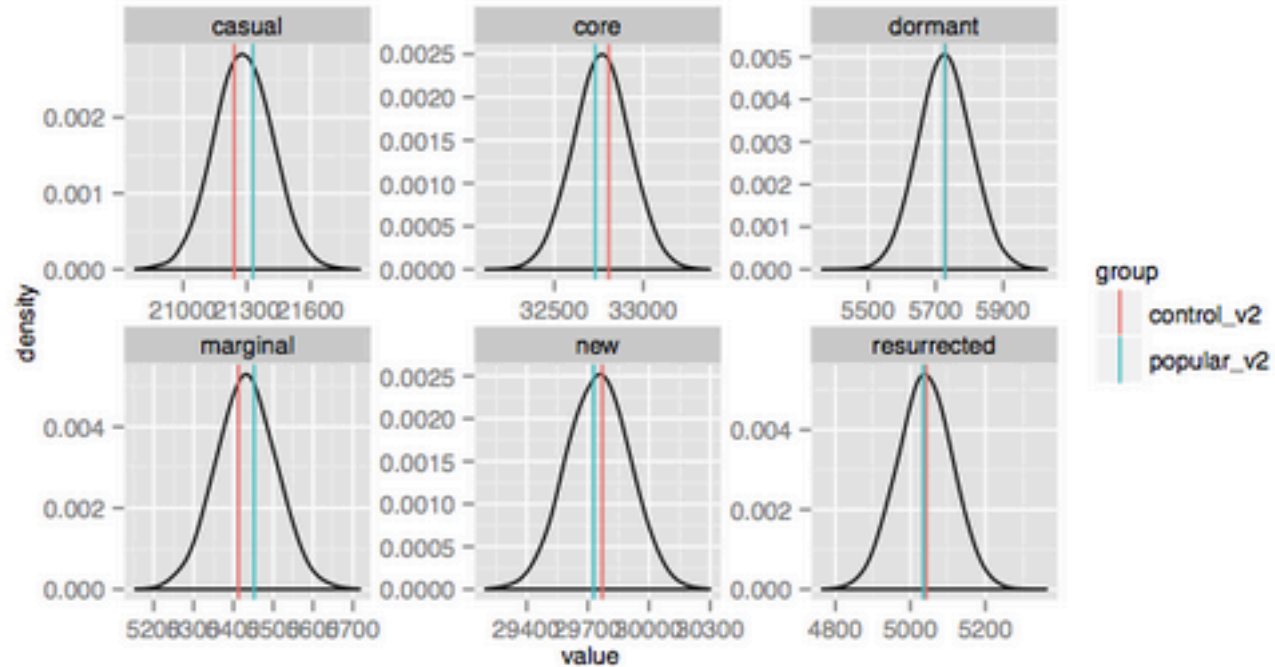
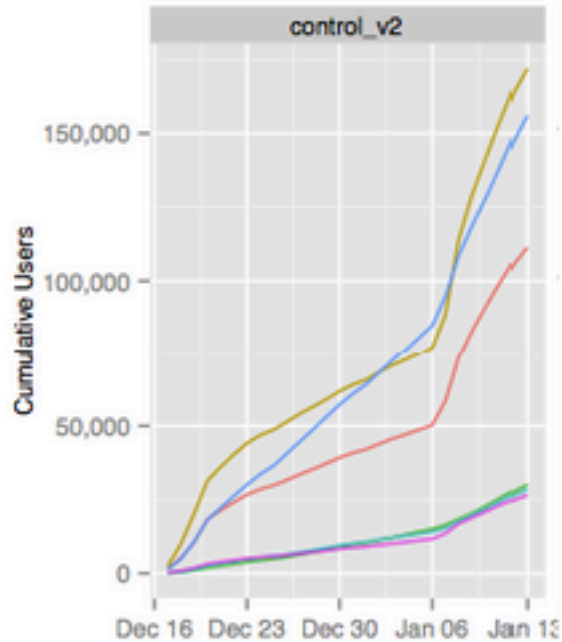
PIN_REPIN_BUTTON



More experimentation



Automated diagnostic tools



Experiment process



hypotheses



decision
criteria

Lessons from our
grand experiment

be prepared:
your org will propose big changes

**help your company
decide when to go big**

consider the tradeoffs:

less time testing, but more confusion

consider the tradeoffs:

incremental change = fast learning

**help your company
learn from big changes**

measure the big bets:
find mountains, not valleys

measure the big bets:
run a controlled trial

measure the big bets:
avoid the opt-in trap

**help your company
become more data-driven**

learn from your big bets:
value of experiments & data

help your company
think

Lessons from our grand experiment

be prepared: your org will propose and ship big things that are hard to learn from

understand the tradeoffs of rejecting incremental change

run an experiment to learn, and to avoid the valleys

randomize all users and measure predefined success criteria

expect high cost and high stakes, but extract high benefit

Thanks!

Questions?

References

- www.infoq.com/presentations/ab-testing-pinterest
- www.pinterest.com/burbsie11/ab-testing/
- about.pinterest.com/en/careers