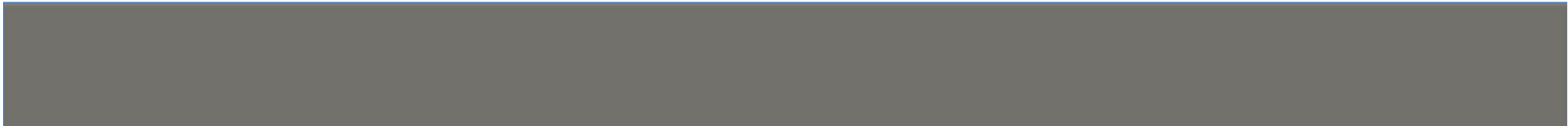


# Encouraging Broker and Adviser Background Checks: A Randomized Study on Twitter

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U.S. Securities and Exchange Commission  
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# Research Question

- How can we encourage retail investors to check the backgrounds of their broker advisors or registered investment advisers online?
  - A small fraction of US investors are aware of regulatory websites (i.e., FINRA's BrokerCheck and the SEC's IAPD) which enable background checks of retail intermediaries.
  - FINRA's 2015 US investor survey found that only 7% of investors have ever used BrokerCheck, while 16% of investors were aware of it.

# Financial Market Impact of Twitter

- A number of studies document that tweets can have an impact on pricing and trading volume in financial markets:
  - **Twitter Sentiment:** Bollen, et al. (2010), Mao, Counts, and Bollen (2015), Oliveira, Cortez, and Areal (2017), and Cookson and Niessner (2019).
  - **Twitter Activity:** Mao, Wang, Wei, and Liu (2012) and Gu and Chen (2018).

# Related Studies

- A number of studies find effects from behavioral messaging primarily from the emphasis of social norms or peer comparisons, e.g.:
  - Schultz (1999), Cialdini and Goldstein (2004), Alcott (2009), Gerber, Green, and Larimer (2008), Beshears, Choi, Laibson, Madrian, and Milkman (2015), Hallsworth, List, Metcalfe, and Vlaev (2017), Verhallen, Brügger, Post, and Odekerken-Schröder (2018).
- Other research shows limited effect from behavioral messaging, e.g.:
  - Bauer, Eberhardt, and Smeets (2018), Chong, Karlan, Shapiro, and Zinman (World Bank Economic Review, 2015)
  - Bhargava and Manoli (AER 2015) find ineffective messaging emphasizing social benefits and overcoming stigma, respectively. SBST (2015) reports limited impact from peer comparisons in US tax payments.

# Tweet List

Messages tweeted through SEC\_DERA, then retweeted through either SEC\_News or SEC investor Ed along four main themes:

General info:

1. Did you know? You can check the background of your investment professional here: [investor.gov](http://investor.gov).

Aspiration:

2. Smart investors do their homework and check their investment professional's background. Check on yours: [investor.gov](http://investor.gov).

# Tweet List

## Mistrust:

3. Studies suggest that 1 in 14 investment professionals have a record of misconduct! Check on yours: [investor.gov](https://investor.gov).
4. Fraud is often conducted by unregistered investment professionals! Check that yours is registered here: [investor.gov](https://investor.gov).

## Loss aversion:

5. Avoid losing money to misconduct by an unlicensed investment professional! Check that yours is licensed here: [investor.gov](https://investor.gov).

# Timing

- Automatic tweets by SEC\_DERA 2 PM then manual retweets around 2:30 PM every weekday (Mon-Fri).
- Data collected at 2 PM for each tweet the following day (Tues-Sat).
- Dependent variable(s): clicks on the tweet link, engagements (link clicks, detail & profile expands, retweets, likes, replies, follows), and impressions.



# Tweet Order

Tweets deployed in randomized order each week for five weeks.

- Phase 1 through SEC\_News (Jan 22<sup>nd</sup> – Feb 23<sup>rd</sup>, 2018):

Week #	Mon	Tues	Wed	Thurs	Fri
1	2	3	1	4	5
2	4	1	2	5	3
3	3	4	5	2	1
4	1	5	4	3	2
5	5	2	3	1	4

1.) Did you know? You can check the background of your investment professional here: 2.) Smart investors do their homework and check their investment professional's background. 3.) Studies suggest that 1 in 14 investment professionals have a record of misconduct! 4.) Fraud is often conducted by unregistered investment professionals! 5.) Avoid losing money to misconduct by an unlicensed investment professional!

# Tweet Order

- Phase 2 through SEC Investor Ed (April 2<sup>nd</sup> – May 4<sup>th</sup> plus June 11<sup>th</sup>-15<sup>th</sup>, 2018):

Week #	Mon	Tues	Wed	Thurs	Fri
1	3	2	4	5	1
2	4	5	2	1	3
<del>3</del>	<del>1</del>	<del>4</del>	<del>5</del>	<del>3</del>	<del>2</del>
4	2	3	1	4	5
5	5	1	3	2	4
6	1	4	5	3	2

- Week 3 omitted while week 6 added because of retweet error.

# Hypotheses

- **Hypothesis 1 (behavioral messaging):**

Tweets 2 through 5 should draw more link clicks than tweet 1.

- **Hypothesis 2 (message fatigue):**

Tweets during week 1 should draw the highest average impressions and engagements, while tweets during week 5 should draw the lowest.

# Results by Tweet: Phase 1

	Differences from Tweet 1		
Tweet	Links Clicks	Engagements	Impressions
2	-0.000208**	-0.000187	0.004506
	0.027	0.151	0.677
3	-0.000191**	-0.000024	0.002057
	0.039	0.450	0.580
4	-0.000159*	-0.000028	0.006883
	0.074	0.443	0.763
5	-0.000204**	-0.000094	-0.001911
	0.030	0.305	0.415

1.) Did you know? You can check the background of your investment professional here:

2.) Smart investors do their homework and check their investment professional's background.

3.) Studies suggest that 1 in 14 investment professionals have a record of misconduct!

4.) Fraud is often conducted by unregistered investment professionals!

5.) Avoid losing money to misconduct by an unlicensed investment professional!

# Results by Tweet: Phase 2

	Differences from Tweet 1		
Tweet	Links Clicks	Engagements	Impressions
2	-0.000121	0.000000	-0.002246
	0.125	0.500	0.435
3	-0.000046	0.000072	0.002180
	0.332	0.566	0.572
4	0.000001	0.000501	0.039115
	0.513	0.883	0.963
5	-0.000227**	0.000047	-0.001174
	0.012	0.543	0.467

1.) Did you know? You can check the background of your investment professional here:

2.) Smart investors do their homework and check their investment professional's background.

3.) Studies suggest that 1 in 14 investment professionals have a record of misconduct!

4.) Fraud is often conducted by unregistered investment professionals!

5.) Avoid losing money to misconduct by an unlicensed investment professional!

# Min/Max by Tweet: Phase 1

	Maximum		
	Links	Engagements	Impressions
Tweet #	1	1	4
Value	0.0993*	0.197	23.9
P-val	0.0713	0.9365	0.8685

	Minimum		
	Links	Engagements	Impressions
Tweet #	2	2	5
Value	0.0578	0.159	22.2
P-val	0.8205	0.6543	0.8803

1.) Did you know? You can check the background of your investment professional here:

2.) Smart investors do their homework and check their investment professional's background.

3.) Studies suggest that 1 in 14 investment professionals have a record of misconduct!

4.) Fraud is often conducted by unregistered investment professionals!

5.) Avoid losing money to misconduct by an unlicensed investment professional!

# Min/Max by Tweet: Phase 2

	Maximum		
	Links	Engagements	Impressions
Tweet #	4	4	4
Value	0.0759	0.313	34.0
P-val	0.5127	0.9799	0.123

	Minimum		
	Links	Engagements	Impressions
Tweet #	5	2	2
Value	0.0304**	0.212	25.8
P-val	0.039	0.9799	0.7837

1.) Did you know? You can check the background of your investment professional here:

2.) Smart investors do their homework and check their investment professional's background.

3.) Studies suggest that 1 in 14 investment professionals have a record of misconduct!

4.) Fraud is often conducted by unregistered investment professionals!

5.) Avoid losing money to misconduct by an unlicensed investment professional!

# Findings by Tweet

- **Tweet 1** (“Did you know? You can check the background...”) and **Tweet 4** (“Fraud is often conducted by unregistered...”) were the most popular for both phases.
  - Only tweet 1 was statistically significant as the maximum in terms of *link clicks* in phase 1.
- **Tweet 2** (“Smart investors do their homework...”) and **Tweet 5** (“Avoid losing money to misconduct...”) were the least popular for both phases.
  - Only tweet 5 was statistically significant as the minimum in terms of *link clicks* in phase 2.



# Min/Max by Day-of-Week: Phase 1

	Maximum		
	Links	Engagements	Impressions
Day	Monday	Monday	Monday
Value	0.0912	0.233*	25.3
P-val	0.273	0.0602	0.1634
	Minimum		
	Links	Engagements	Impressions
Day	Thursday	Thursday	Friday
Value	0.0504	0.155	20.0*
P-val	0.401	0.4811	0.0077

# Min/Max by Day-of-Week: Phase 2

	Maximum		
	Links	Engagements	Impressions
Day	Thursday	Thursday	Monday
Value	0.0757	0.276	35.1***
P-val	0.5515	0.9334	0.01
	Minimum		
	Links	Engagements	Impressions
Day	Tuesday	Friday	Friday
Value	0.0394	0.188	24.9
P-val	0.2508	0.6944	0.171

# Min/Max by Week: Phase 1

	Maximum		
	Links	Engagements	Impressions
Week #	1	1	3
Value	0.101**	0.227	24.6
P-val	0.04	0.1286	0.5038

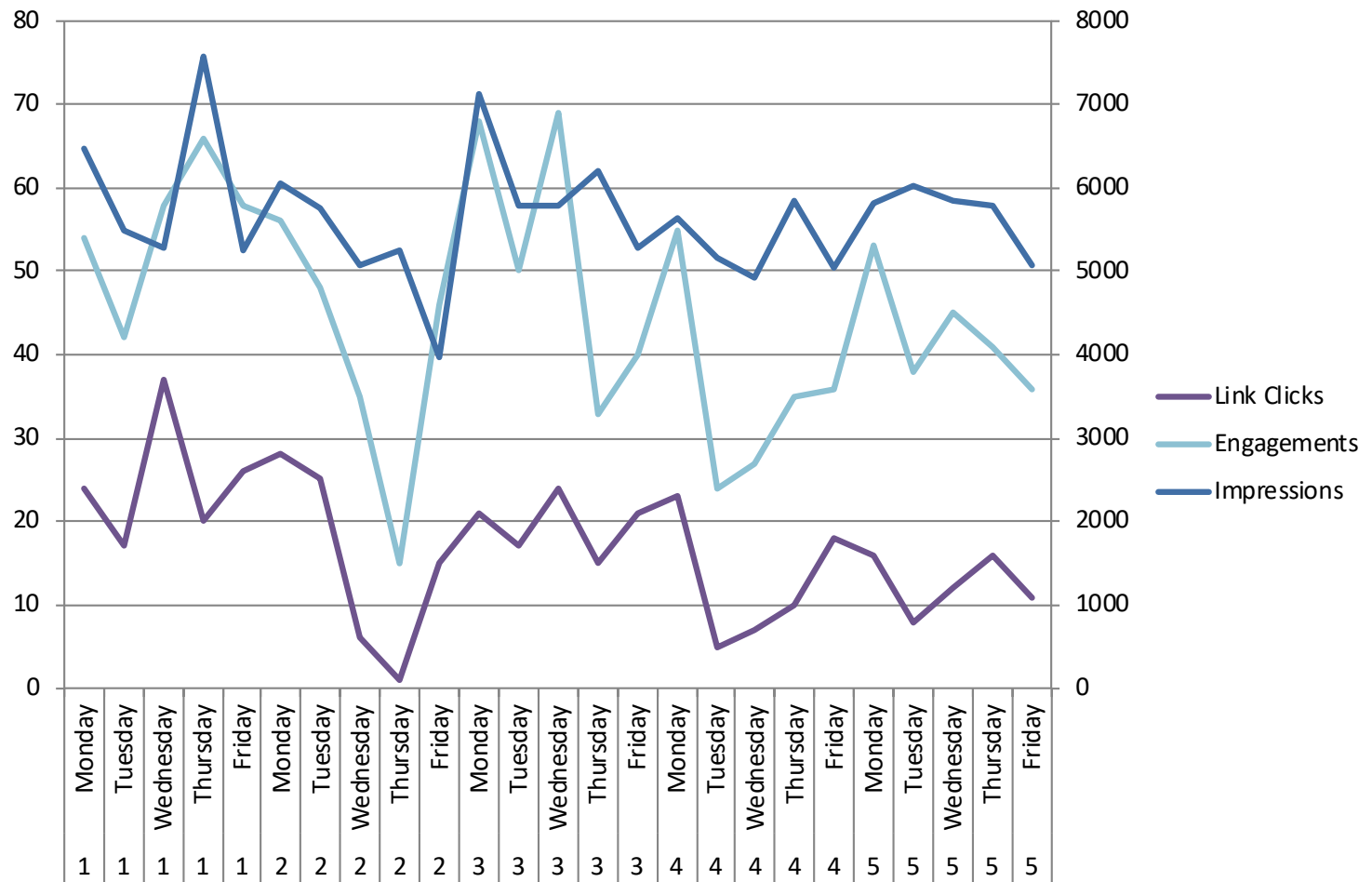
	Minimum		
	Links	Engagements	Impressions
Week #	5	4	2
Value	0.0511	0.144	21.3
P-val	0.4208	0.1925	0.3325

# Min/Max by Week: Phase 2

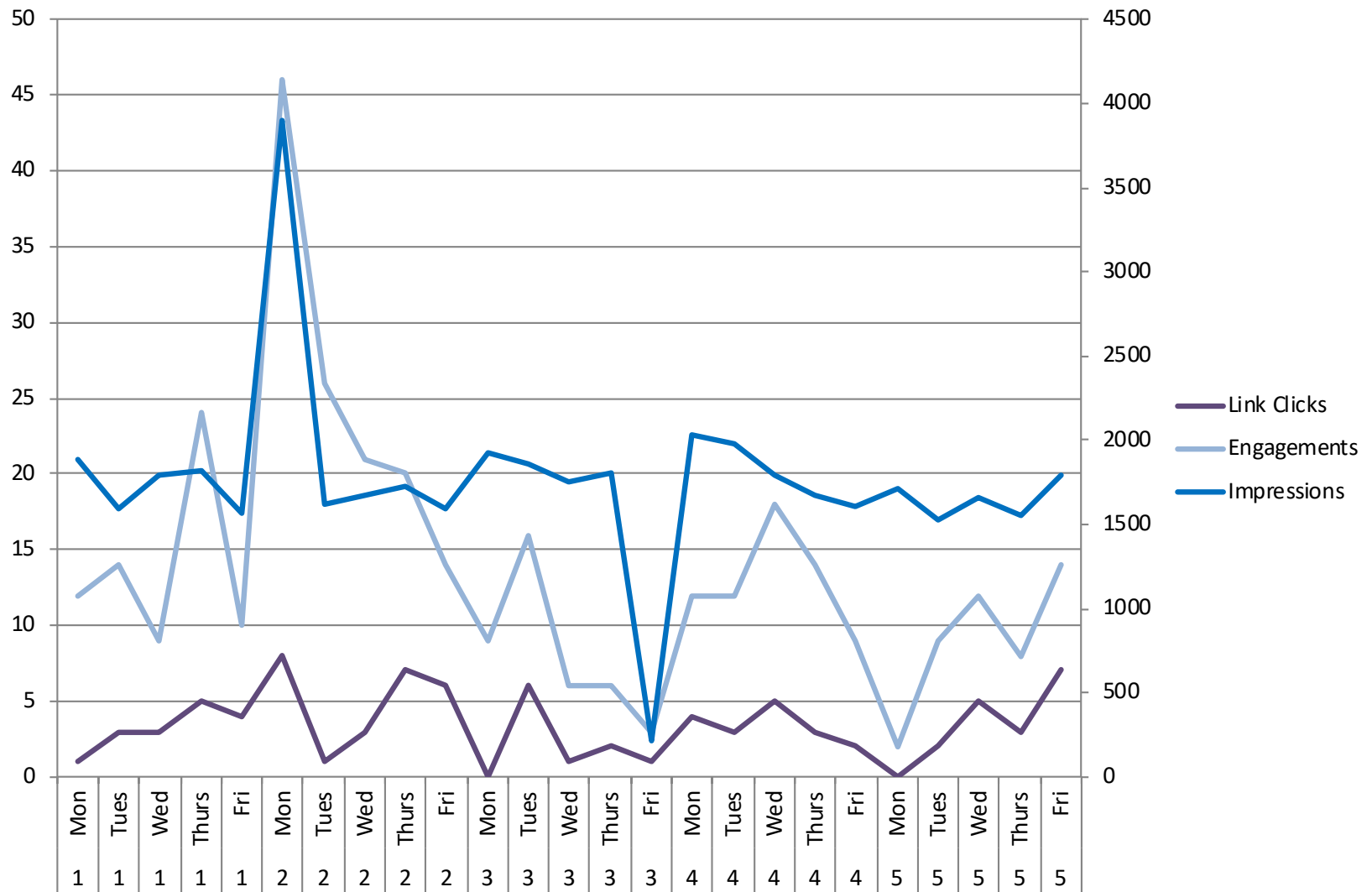
	Maximum		
	Links	Engagements	Impressions
Week #	2	2	2
Value	0.0763	0.387**	32.1
P-val	0.4574	0.0138	0.8449

	Minimum		
	Links	Engagements	Impressions
Week #	1	5	5
Value	0.0489	0.137**	25.1
P-val	0.8531	0.0228	0.3006

# Results over Time: Phase 1



# Results over Time: Phase 2

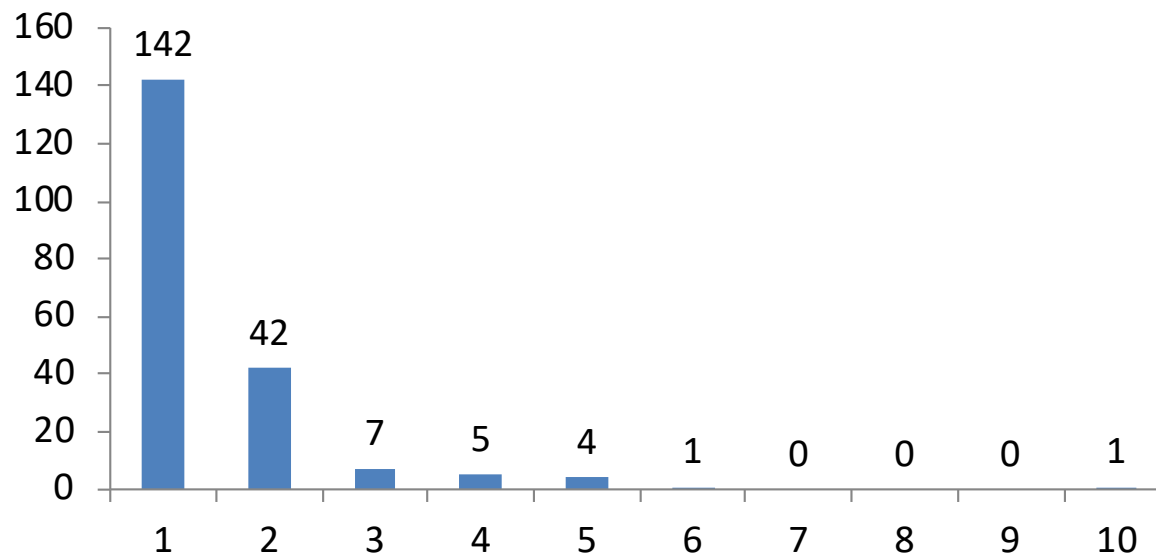


# Repeat Interactions

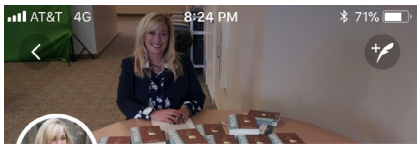
	Total Users	Mean Interactions	Median Interactions	95th Percentile Interactions	% of Users with One Interaction	% of Users Interacting in Both Phases
Phase 1	137	1.47	1	3.2	74%	
Phase 2	69	1.45	1	3.6	70%	
Combined	202	1.50	1	3.9	70%	2.5%

# Interaction Analysis

Frequency – Comments, Retweets, and Likes







### Elizabeth Guarino

@BestEverYou  
 Elizabeth Hamilton-Guarino | Founder/#CEO of #BestEverYou #Compliance4 & @FoodAllergyZone | @HayHouse Author of @PercolateBook | #TipsToBeYourBest

Portland, ME BestEverYou.com

70.1K Following 94.5K Followers

Tweets Tweets & replies Media Likes

Pinned Tweet

Elizabeth Guarino @Best... · 1/17/18  
 Happy Birthday Betty White who is 96 today! Love having her in my book #Percolate #bettywhite amazon.com/Percolate-Your...



### Yko de boer

@de\_yko  
 71 Following 17 Followers

Tweets Tweets & replies Media Likes

Yko de boer Retweeted

Gregory Mannarino @Greg... · 7/30/18  
 Despite the US Dollar getting punished today, Gold-which is priced in dollars, just went negative for the day. #RIGGED #FAKEMARKETS #GOLD

3 replies 10 retweets 36 likes

Yko de boer Retweeted

Michael J. Morrison @Offic... · 7/25/18  
 FLASHBACK: Obama threw a reporter out for asking a question he wasn't happy with and the rest of the media was cheering him on.

# Interacting Users

## Phase 1 (Retweeted by SEC News)

## Phase 2 (Retweeted by Investor Ed)

Row Labels	Com	Like	RT	Total	Row Labels	Com	Like	RT	Total
<b>Grand Total</b>	<b>29</b>	<b>124</b>	<b>78</b>	<b>231</b>	<b>Grand Total</b>	<b>14</b>	<b>58</b>	<b>47</b>	<b>120</b>
BestEverYou		10		10	_anthony_seger_			4	4
de_yko	6			6	disciples2424	2	2		4
ComplianceFour		5		5	simpleotc		2	2	4
Monetka_Easy_27	4		1	5	Utahsecurities			4	4
CryptoAdvice4u	3		1	4	StevenPGregory1		1	2	3
PaulVH87	4			4	StumpSurgeon		2	1	3
WolfieMcCarthy	4			4	AdamJMarquardt	1		1	2
AlGlory93	3			3	albaprona		2		2
CryptoLando	2		1	3	Captain_M0rgan3		1	1	2
marisastio	2		1	3	chris_MO88		1	1	2
vikas_dera		3		3	esgarchitect		1	1	2
_xCISXx_	1	1		2	FINRA		1	1	2
agurreamartinez		1	1	2	GarofoliSergio		1	1	2
AmericanBeastCo	1		1	2	glennitomer			2	2
aum_boi	2			2	GregoryLawUS		1	1	2
BeefEnt	1		1	2	IvanaBoastsky		1	1	2
DataAnalytics_1	2			2	LMatherne		1	1	2
drastichs	1		1	2	mwillis001		1	1	2
Georginayoung17	1		1	2	SamsonD50785243		1	1	2
Irelandia	1		1	2	SSEKLaw		1	1	2
jenijenicat	1		1	2	StocksMax		1	1	2
JustTradingHoy	1		1	2	aaronchall				1
KeithBean21	1	1		2	ALIJJJI		1		1
Lillyandpunpin	1		1	2	andretsc			1	1
MakerZoneShow	2			2	bitcoinbella_		1		1
MayaPhilipson	1		1	2	boringfileclerk	1			1
MikeSaville1			2	2	BruceWaves			1	1
MrFelt_	1		1	2	cre8factory		1		1
notarymary	1		1	2	dgveras		1		1
otavioemmert	2			2	EffingDope_NY		1		1
RippleLove_XRP	1		1	2	Enforce_Update			1	1
sc2Bren	1		1	2	Fernand68116863		1		1
ScareQuotePro	1		1	2	Foutis1		1		1
SiFuPeterson	1		1	2	GaryLeeMPG		1		1
starree		2		2	hokagedlabit		1		1
TamirGuy1			2	2	InvestorDeck		1		1
TheBudinGroup		1	1	2	JackEdwardsEsq			1	1
_anthony_seger_			1	1	JasonJRoque		1		1



### Anthony Seger

@\_anthony\_seger\_  
 Tree-of-Knowledge

swissvoc.com

128 Following 1,676 Followers

Tweets Tweets & replies Media Likes

Anthony Seger Retweeted

SwissVoC @SwissVoC · 12h  
 \* Cryptocurrencies Cybersecurity Technologies [ \$50 Billions PetaBytes Bayesian Nodes Trees ]

- \* Cybersecurity Probabilistic Merkelized
- \* Tokenization Cross Chains Transactions
- \* e-Institutions, e-Finance, e-Banking
- \* Massively Instant Real-Time
- \* Cybersecurity #Trillions Events



### percy gabriel II

@disciples2424

Toronto, Ontario

152 Following 31 Followers

Tweets Tweets & replies Media Likes

percy gabriel II @disciples... · 6/25/18  
 Sweet Sweet Episode. The Best, brought tears to my eyes. Great entertainment James Corden!!!

James Corden @JKCorden

Ok, so here it is. Quite possibly the best #CarpoolKaraoke we've done so far. I hope you like it. I'll never ever forget it. Take a breath and jump in you.tu.be/QjvzCTqkBDQx

# Conclusions

- There is some evidence that shorter, simpler calls to action worked best:
  1. The control tweet (“*Did you know? You can check the background...*”) and the registration/fraud tweet (“*Fraud is often conducted by unregistered...*”) may have worked the best.
  2. The aspirational tweet (“*Smart investors do their homework...*”) and the loss-aversion tweet (“*Avoid losing money to misconduct...*”) may have worked the worst.
- There is some evidence of greater (lower) engagement at the beginning (end) of the week. There appeared to be limited attrition in views and engagements over time.
- Many replies were negative and originated by spam-oriented accounts. Nonetheless, replies appeared to have a positive effect on link clicks.



BEHAVIORAL FINANCE FORUM

Slides Not Available

**How Do Humans Interact with Algorithms? Experimental Evidence from Health Insurance**  
*M. Kate Bundorf, Stanford University*

In Partnership with



#BeFiForum

# Session 2 discussion

Drew M. Anderson, RAND

# Information and advice: why it matters

Costly mistakes:

Paying high fees and interest rates to borrow

Undersaving for retirement

Investing suboptimally (e.g. not diversified)

Information preserves freedom of choice

(as opposed to bans and tighter regulation)

# The right advice is not always clear

Investopedia: Top 10 Most Common Financial Mistakes

4. Buying a new car

5. Spending too much on your house

Really?

Student loan “crisis”

Ignores that student loans finance a valuable investment for many

But sometimes advice is clear: [avoid fraud](#), [save on your prescriptions](#)

Clearly right  
advice is not  
always...



Sought



Found



Understood



Acted on



Our studies seek to solve these problems



They infer underlying problems without  
taking a stand directly

## Motivating questions in Ko et al.

Are people making the best choices for them?

Well, are they getting good guidance?

Do they know how to check they're getting good guidance?

If any of the above is "yes" then the tweets should have no effect.

But they do drive traffic.

So are people more persuaded by emotional frames? (no)



# Potential explanations and extensions

Fear of discovering they've done something wrong?

General fear of financial stuff that is easily triggered?

How do these differences in engagement relate to the differences caused by including a photo?

Related to Bundorf: Are the types who respond to this likely to be getting defrauded?

## Motivating questions in Bundorf et al.

Are people making the best choices for them?

Well, are they getting good guidance?

If the answer to either is "yes" then nobody will take up algorithmic advice, and nobody will change plans in response.

But people do respond and change plans.

So are they being taught about features they knew were important, or led to focus on different features? (both)

# Extensions

Is it ethical to keep withholding this service?  
What is the cost?

Should this service set smart defaults?

Related to Ko: Do people also exhibit inertia  
in choice of advisers/brokers?

# The power of technology

Broad (but shallow) experimentation on social media

vs.

Deep (but narrow) experimentation in administrative databases

Both studies can easily track interaction with the treatment.

What's next?