### A Appendix - Not intended for publication

#### A.1 Phase 1 Recruitment Email:

Howdy "Student's Name",

Did you know that the average person spends about 50 minutes a day on Facebook? Over an individual's lifetime, this will amount to 5 or more years.

To date, the impact of this usage is unclear. Texas A&M's Department of Economics is seeking current TAMU students who are Facebook users to participate in a research study. You are receiving this email because you are on A&M's email list. Our team is examining the effects of Facebook on everyday life, and we are looking for students to help us out.

If you have an active Facebook account, you may be eligible to participate in this paid research study. In an unusual turn of events, we are asking **you** to tell us how much money you would need to be paid to stay off Facebook for a week. Please note that if selected for this study, staying off Facebook for one week will be a part of the protocol.

Participation in this study involves:

- Cash payouts based on an auction
- Coming to the Evans Library on main campus to complete two surveys
- · The potential to be without Facebook for a week

If you are interested in participating in this study, please click the link below for more information. <u>Take the survey</u>

If you have any questions or would like more information about this study, please contact the research team by email at <u>rpetrie@tamu.edu</u>.

Thank you,

Prof. Ragan Petrie TAMU Department of Economics 3035 Allen Building, College Station, TX 77845

Study Title: The Behavioral Effects of Social Media IRB2017-0189M

Follow the link to opt out of future emails: Click here to unsubscribe

### A.2 Phase 1 Survey:

TEXAS A&M
We want to analyze the effects of social media on individual behavior including the value individuals place on social media, its' effects on social awareness, consumption behavior, expectations about the future, and general well-being.
This survey, which will take no more than 5 minutes, has two objectives. First, you will help us learn about the value of social media. Second, this survey will help us determine participation for an experiment in which we will randomly require that half of the group not use their Facebook accounts for one week.
In this survey we will collect basic demographic information and pre-select participants for this experiment.
We will collect email addresses of those pre-selected to participate. This information will be used to contact chosen participants and to match the data collected in this short survey with two additional surveys that will be conducted during the experimental sessions. After the match, email addresses will be destroyed.
If you have any questions about this study, please contact Dr. Ragan Petrie and the research team at rpetrie@tamu.edu.
IRB2017-0189M
Would you like to be considered as a participant in this experiment?
Yes
No
>>

If no, the next screen shows



If yes, the next screen shows

TEXAS A&M
Thank you for your interest in helping us learn more about the effects of social media. Before continuing, please tell us a little bit about yourself.
What is your gender?
Male
Female
What is your age in years? Please round up.
Which college are you currently enrolled in?
What is your major?
Did you live in the United States when you were 15 years old?
No
>>
$\prod_{u \in v} \left  \begin{array}{c} TEXAS \\ TEXAS \\ u \in v \\ v \in v \\ s \\ i \\ t \\ v \\ s \\ i \\ t \\ v \\ s \\ s \\ i \\ t \\ v \\ s \\ s \\ s \\ t \\ v \\ s \\ s$
What was the zip code of your address when you were 15 years old?

>>

>>



What country did you live in when you were 15 years old?

## TEXAS A&M

Do you have an active Facebook account?

Yes

◎ No

>>

# TEXAS A&M

Let's play a game!

Please think carefully about your value of the time you spend on Facebook over a week. You will be asked to enter this value later.

Afterwards, we will present a counter-offer! This counter-offer will be randomly drawn from an interval of \$5 to a maximum that is our most reasonable estimate of Facebook's value over a week.

If our counter-offer is greater than or equal to your valuation YOU WILL BE CONSIDERED TO PARTICIPATE IN THE EXPERIMENT. We will randomly select the final participants from this group. FINAL PARTICIPANTS will be paid the value of our random counter-offer.

If our counter-offer is lower than your valuation we will not be able to compensate you fairly. YOU WILL NOT BE CONSIDERED TO PARTICIPATE IN THE EXPERIMENT.

The next screen provides examples.

>>

# $\mathbf{F}_{*} \mid \mathbf{TEXAS}_{U \ N \ I \ V \ E \ R \ S \ I \ T \ Y}$

Please read the following examples of this game:

1) Mary values her weekly time on Facebook at \$20. She enters this value in the following screen and clicks next. Then she receives our random counter-offer of \$15. Since our counter-offer is lower than her valuation, she will not be considered to participate.

2) John values his weekly time on Facebook at \$8. He enters this value in the following screen and clicks next. Then he receives our random counter-offer of \$10. Since our counter-offer is higher than his valuation, he will be considered as a potential participant. If John is selected to participate he will be paid \$10, the value of our counter-offer, at the end of the experiment.

Click next to continue.



$\prod_{u \in V} \left  \begin{array}{c} TEXAS A \& M \\ U & V & U & V \\ U & V & U & V \\ \end{array} \right  $	
What is the value of your weekly time on Facebook? (Please enter a dollar amount)	
Click next to get your random counter-offer!	
	>>

<sup>†</sup>The screen above represents the WTP setting. Half of the subjects received this wording while the other half were asked "How much money would you need to be given to stop using Facebook for a week?", which reflects the WTA setting.

Our counter offer is \$	0.	
Congratulations! You	nave been pre-selected to participate in t	his experiment.
On Thursday, April 20	we will send you an email if you are ran	domly selected as a final participant.
f selected, we will fur email you the exact ti At most you will spen he experiment.	her explain the details of the experiment he and room number. There will be a sec 1 hour between the two sessions. You v	on Monday, April 24, at Evans Library. We will ond session on Monday, May 1, at Evans Library. vill be paid \$10 - our counter-offer - at the end of
Remember, we will ra neans for one week.	ndomly require that half of the final partic	ipants do not use their Facebook accounts by any
Please enter your pre	erred email address below:	

For the case where the counter offer is less than the valuation:



## A.3 News Quiz

A1	Read the following list of events. Did these events happen in the previous week?			
		Definitely happened	I do not know	Definitely did not happened
A11	Serena Williams, the best women's tennis player, is expecting her first child and will not play again until next year.			
A12	Thousands of people gathered in the rain Saturday on the soggy grounds of the Washington Monument to turn Earth Day into an homage to science.			
A13	Facebook killer, Steve Stephens, was arrested in Ohio.			
A14	Vice President Mike Pence visited the demilitarized zone as the U.S. kept its options open on North Korea.			
A15	Stanford University, said that it would permit the conservative author Ann Coulter to speak on campus in early May, just one day after it canceled her appearance.			
A16	MSNBC analyst calls for ISIS to bomb Trump property.			
A17	General Motors has become the latest multinational company to pull out of Venezuela after it says government authorities illegally seized its plant there.			

#### News Quiz in phase 2 (before treatment)

#### News Quiz in phase 3 (after treatment)

A1	Read the following list of events. Did these events happen in the previous week?			
		Definitely happened	I do not know	Definitely did not happened
A11	Bulls bow out of playoffs with blowout loss to Celtics in Game 6.			
A12	Federal agencies take actions to implement President Trump's order to strip fund from municipal governments that refuse to cooperate fully with immigration agents.			
A13	Obama begins new phase of public life with Chicago visit.			
A14	Tens of thousands of people protested the president's rollback of rules protecting the environment.			
A15	President Trump has instructed his advisers to keep the corporate tax rate close to 30 percent.			
A16	In France's most consequential election in recent history, voters on Sunday chose Emmanuel Macron and Marine Le Pen to go to a runoff to determine the next president.			
A17	Trump wants to send astronauts to Mars during his presidency.			

## A.4 Survey Questionnaire

Date: <u>May 1, 2017</u> Time: PM

UIN	Please enter your TAMU UIN:					Please enter your TAMU Email:				
N1	How much time did you spend reading or watching the news per day last week?									
	<ul> <li>Less than 15 min</li> <li>More than 15 minutes but less than 30 minutes</li> <li>More than 30 minutes but less than 1 hours</li> <li>More than 1 hour but less than 2 hours</li> <li>More than 2 hours</li> </ul>									
N2	2 Please indicate how frequently you used the following types of news media <u>last week</u> . Please answer on a scale of 1 to 7, where 7 is a type of media that you used frequently, and 1 is a type of media you used infrequently.									
		◀ Not at all					All o	of the time 🕨		
		1	2	3	4	5	6	7		
N21	Cable TV									
N22	Paper news									
N23	Radio									
N24	Online news									
N25	Social media									
N26	News feed									
N27	Other 1:									
N28	Other 2:									
N3	Please indicate how frequently 7 is a method you used frequent	you used the fol ly, and 1 is a m	llowing metho ethod you use	ls to obtain nev d infrequently.	ws <u>last we</u> e	e <u>k</u> . Please answer	on a scale of 1	to 7, where		
		◀ Not at all					All o	of the time 🕨		
		1	2	3	4	5	6	7		
N31	Watch									
N32	Read									
N33	Listen									

N4	List the top 3 news outlets/sources you	got your new	s from <u>last w</u>	eek.				
	1st Choice:	2nd C	hoice:		3	rd Choice:		
N5	What type of news did you frequently used frequently, and 1 is a type you us	read, watch o ed infrequentl	r listen to <u>las</u> y.	<u>t week</u> ? Pleas	e answer on a	scale of 1 to ?	7, where 7 is a	type you
		◀ Not at all					All o	f the time 🕨
		1	2	3	4	5	6	7
N51	Political							
N52	Sports							
N53	Business							
N54	International							
N55	Local news							
N56	Culture							
N57	Science							
N58	Weather							
N6	For the following sources, indicate how you used frequently, and 1 is a source	v frequently y you used infre	ou used each quently.	<u>last week</u> . Ple	ease answer o	n a scale of 1	to 7 where 7 is	s a source
		◀ Not at all					All o	f the time 🕨
		1	2	3	4	5	6	7
N61	Battalion							
N62	KBTX							
N63	MSC website							
N64	Local radio							
N65	Local newspaper							
N66	National newspaper							
N67	Online news							
N68	Online social network							
31.00				-				

M1	A1 Last week, how much time did you spend <u>each day</u> doing the following activities?										
M11	Sitting in a library on campus	Hours	M17	Attending class	Hours						
M12	Studying	Hours	M18	Sleeping (average number of hours per night)	Hours						
M13	Working for pay	Hours	M19	Attending a party or social event (fill in for time you spent in total last week)	Hours						
M14	Exercising	Hours	M110	At what time do you typically go to bed?	□						
M15	Hanging out with friends	Hours	M111	At what time do you typically wake up?	□						
M16	Reading news	Hours									
M2	M2 Last week, how much time did you spend <u>each day</u> on the following types of social media?										
M21	Facebook	Hours	M27	Vimeo	Hours						
M22	Instagram	Hours	M28	YouTube	Hours						
M23	Twitter	Hours	M29	Other 1:	Hours						
M24	Tumblr	Hours	M210	Other2:	Hours						
M25	Snapchat	Hours									
M3	How many friends do you have	on Facebook? (Feel f	ree to op	en your FB account to check)							
M4	How many followers do you have	e on Instagram?									
M5	How many followers do you hav	e on Tumblr?									
M6	How many followers do you hav	e on Twitter?									

F1	How often do you do t	he following on ]	Facebook?					
		Never	Rarely	1-2 times per month	Once a week	2-4 times per week	Once a day	Several times per day
F11	Open up FB to check your news feed							
F12	Read news feed content							
F13	Post pictures							
F14	Post comments							
F4	When you are on Face	book, how often	do you feel the f	ollowing?				
		Never	Rarely	Someti	mes Fre	quently	Often	All the time
F41	Envy/jealousy							
F42	Happiness							
F43	Misery							
F44	Satisfaction							
F45	Connected with friends							
F46	Up to date on my friends' activities							
F47	Lonely							
F48	Annoyed							
F49	Inspired							

Please think a	about	what y	you d	id last	week	as you	answer	the	following	questions.	

C1	(1-Strongly agree, 2-Agree, 3-Neither agree nor disagree, 4-Disagree, 5-Strongly disagree)								
		1	2	3	4	5			
C11	I ate out less than I normally do								
C12	I did less impulse buying than usual								
C13	I saved more money than I usually do								
C14	I ate healthier than usual								
C15	I exercised more than usual								
C2	(1-Strongly agree, 2-Agree, 3-Neither agree nor disagree, 4-Disagree, 5-Strongly disagree)								
		1	2	3	4	5			
C21	I wasted less time than I normally do								
C22	I achieved more than I normally do								
C23	I spent more time studying and doing school related work								
C24	I was not late for classes, meetings or work								
C25	I was able to meet deadlines without rushing at the last minute.								
C26	I was able to prevent distractions from achieving high priority tasks.								
C27	I discontinued any wasteful or unprofitable activities or routines.								
C28	I had time to relax and be with friends								
C29	I procrastinated less than I normally do								
C210	I partied a lot								

Please think about what you are going to do this coming week as you answer the following questions.

C3	(1-Strongly agree, 2-Agree, 3-Neither agree nor disagree, 4-Disagree, 5-Strongly disagree)								
		1	2	3	4	5			
C33	I expect to spend less on eating out and hanging out with friends								
C34	I expect to save more money								
C35	I will cut down on my impulse buying								
C36	I will spend more time studying								
C37	I will eat more healthy food								
C38	I will exercise more than I normally do								

_											
<b>S</b> 1	Overall, how	v satisfied	are you with	life as a wh	ole?						
	◄ Not at all	satisfied								Completely	satisfied 🕨
	0	1	2	3	4	5	6	7	8	9	10
S2	Overall, to	what exten	t do you feel	the things y	ou do in you	ır life are wo	orth while ?				
	◄ Not at all	worthwhil	e							Very wo	rthwhile 🕨
1	0	1	2	3	4	5	6	7	8	9	10
<b>S</b> 3	How happy	are you?									
	<b>▲</b> Very unh	арру								Ver	y happy 🕨
1	0	1	2	3	4	5	6	7	8	9	10
<b>S4</b>	How often d	lo you wori	y?								
	◄ Never									All of	the time 🕨
1	0	1	2	3	4	5	6	7	8	9	10
S5	How often d	lo you feel	depressed?								
	◄ Never									All of	the time 🕨
	0	1	2	3	4	5	6	7	8	9	10
1											

D1	What is your race?			
	<ul> <li>□ White</li> <li>□ Black/ African American</li> <li>□ American Indian/ Alaskan Native</li> </ul>	<ul> <li>Asian</li> <li>Native Hawaiian/ Other Pacific Islander</li> <li>Other:</li> </ul>		
D2	What is your ethnicity?	Hispanic/ Latino	Not Hispanic/ Latino	

01	Is there anything else you would like to tell the research team?

### A.5 Additional Results



Figure A.5.1: Facebook Negative Emotions

Figure A.5.2: Change in Reported Depression and Change in the Value of Facebook between Phase 2 survey and Phase 3 survey



	Ineligible	Eligible	P-value	Eligible (Show)	Eligible (No-Show)	P-value
Value of Facebook	85.35 (119.88)	27.11 $(12.72)$	0.000	28.97 (12.98)	26.33 (12.55)	0.025
Offer	15.04 (5.19)	10.16 (4.46)	0.000	16.90 (5.14)	14.26 (5.01)	0.000
Woman	$\begin{array}{c} 0.60 \\ (0.49) \end{array}$	$\begin{array}{c} 0.59 \\ (0.49) \end{array}$	0.720	$0.65 \\ (0.48)$	$0.57 \\ (0.50)$	0.089
Age	20.77 (1.65)	20.55 (1.68)	0.009	20.59 (1.99)	20.53 (1.53)	0.693
Income (\$)	67,204 (55,192)	$71,761 \\ (68,778)$	0.109	69,509 (63,207)	72,286 (71,032)	0.512
N	1,207	562		167	395	

Table A.5.1: Descriptive Statistics by Survey Phases

This table presents the means for eligible and ineligible participants from the Phase 1 survey and for the eligible participants that showed up to complete the Phase 2 survey and those that were eligible but did not show up for phase 2. The p-values represents the difference of means for each group. Standard deviations are in parentheses.

	Treatment	Control	P-value
Value of Facebook	28.42 (11.27)	29.43 (14.33)	0.618
Woman	$0.57 \\ (0.50)$	$0.711 \\ (0.46)$	0.060
Age	$20.69 \\ (2.41)$	$20.51 \\ (1.56)$	0.569
Income(\$)	67,900 (55,988)	75,986 (68,904)	0.482
N	77	90	

Table A.5.2: Facebook Restriction - Balance of Covariates

The first two columns present the means of different observables characteristics for the Facebook restriction treatment group and the no restriction control group. Columns 3 presents the p-values of the difference of means between these groups. Standard deviations are in parentheses.

	Mean	Median	Std. Dev.
Daily Time Reading or Watching News $(1-5)^1$	2.15	2	1.19
Frequency of Use $(1-7)^2$			
Cable TV	1.93	1	1.49
Paper News	1.31	1	0.67
Radio	2.46	2	1.66
Online News	4.55	5	1.73
Social Media	5.60	6	1.56
News Feed	4.14	4	1.99
Political Nature of Preferred News $(1-5)^3$	2.81	3	0.97
Daily Social Media Usage $(hours)^4$			
Facebook	1.87	1	2.21
Instagram	1.28	1	1.60
Twitter	0.86	0	2.06
Tumblr	0.35	0	1.57
Snapchat	1.95	1	3.02
Vimeo	0.03	0	0.16
YouTube	1.85	1	2.65
Social Media Friends and Followers $(number)^5$			
Facebook	640.99	538	442.04
Instagram	452.36	350	511.77
Tumblr	87.32	0	571.74
Twitter	182.12	0	333.80
Subjective Well-Being $(0-10)^6$			
Satisfied with life	7.15	8	1.92
Things in life are worthwhile	7.37	8	1.88
How happy are you	7.17	8	2.12
How often do you worry	6.79	7	2.33
How often do you feel depressed	3.40	3	2.63

Table A.5.3:	Phase 2	Survey -	Summary	Statistics
10010 11.0.0.	1 110000 2	× ar vej	Sammary	0000000000

Notes: <sup>1</sup>Responses to the question "How much time did you spend reading or watching the news per day last week?" Response options: 1) Less than 15 min, 2) More than 15 minutes but less than 30 minutes, 3) More than 30 minutes but less than 1 hour, 4) More than 1 hour but less than 2 hours, and 5) More than 2 hours. N=167 obs. <sup>2</sup>Responses to the question "Please indicate how frequently you used the following types of news media last week." Scale was from 1 to 7 where 1 indicates "Not at all" and 7 indicates "All of the time." N=167 obs. <sup>3</sup>List top news outlets/sources from the previous week. We categorized each 1st choice as either being 1) Left, 2) Left-Center, 3) Center, 4) Right-Center, or 5) Right based on www.allsides.com. N=57 obs. <sup>4</sup>Time spent each say on various social media platforms. <sup>5</sup>How many friends and followers on various social media platforms. <sup>6</sup>Subjective well-being questions, with 0 indicating "never and" 10 "very/always."

Table A.5.4: Correlations between the Value of Facebook and User's Characteristics

	Value of Facebook	High Time	High Engage	Depressed	High Negative	High Friends in Facebook	High Friends in other Social Media
Value of Facebook	1.00						
High Time	0.23***	1.00					
High Engage	0.20**	0.32***	1.00				
Depressed	-0.11	0.23***	0.05	1.00			
High Negative	-0.06	0.17**	0.09	0.32***	1.00		
High Friends on Facebook	0.06	0.10	0.21***	-0.02	0.01	1.00	
High Friends on other Social Media	0.17**	0.18**	0.38***	-0.10	0.01	0.42***	1.00

\* p < 0.1 \*\* p < 0.05 \*\*\* p < 0.01

This table presents the Pearson correlation coefficients between the stated value of Facebook and characteristics of its users based on Phase 2 survey responses. High Time refers to individuals who on average use Facebook for more than one hour per day; High Engage refers to individuals who post pictures and comments on Facebook at least once or twice per month; Depressed refers to individuals who reported feeling depressed above the reported median value; High Negative refers to individuals who are above the median of the factor index that combines measures of feeling envy, misery, lonely and annoyed while on Facebook; High Friends in Facebook refers to individuals who have more than 564 friends in 564 friends in other Social Media refers to individuals who have more than 529 friends in Facebook (median number of friends); and High Friends in other Social Media refers to individuals who have more than 529 friends in Facebook (median number of friends).

#### Table A.5.5: Distribution Shift Tests

	Equality	FSD C-T	SSD C-T	FSD T-C	SSD T-C
Facebook Use	0.00***	0.00***	0.00***	0.93	1.00
News Media Index -Traditional Media	0.41	0.22	0.10*	0.60	0.57
News Media Index -Social Media	$0.00^{***}$	$0.00^{***}$	$0.00^{***}$	0.94	1.00
News Consumption Index	$0.07^{*}$	$0.04^{**}$	$0.00^{***}$	0.95	0.75
Probability Right Answer - Mainstream News	0.37	0.77	0.80	0.18	0.23
Probability Wrong Answer - Mainstream News	0.61	0.70	0.55	0.33	0.34
Probability Not Sure Answer - Mainstream News	0.55	0.29	0.21	0.58	0.51
Probability Right Answer - Skewed News	$0.01^{***}$	0.01***	$0.01^{***}$	0.54	0.99
Probability Wrong Answer - Skewed News	0.46	0.50	0.75	0.23	0.23
Probability Not Sure Answer - Skewed News	0.37	0.51	0.81	0.19	0.19
Overall Satisfaction	0.25	0.11	0.20	0.58	0.76
Life is Worthwhile	0.28	0.14	$0.09^{*}$	0.62	0.79
Feel Happy	0.17	$0.09^{*}$	0.11	0.93	0.82
Worry	0.21	0.90	0.79	$0.10^{*}$	0.11
Feel Depressed	0.32	0.16	0.22	0.91	0.98
Consumption Index	0.03**	0.97	0.89	0.01**	0.00***
Productive Time Index	0.10	0.97	0.90	$0.05^{*}$	0.02**
Efficient Time Index	0.10*	0.98	0.90	$0.05^{*}$	$0.01^{***}$
Expected Consumption Index	$0.07^{*}$	0.79	0.63	0.03**	0.01***
Value of Facebook	0.47	0.70	0.99	0.25	0.14

\* p < 0.1 \*\* p < 0.05 \*\*\* p < 0.01

This table presents the bootstrap p-values of Kolmogorov-Smirnov statistics that test for equality of distributions, first order stochastic dominance and second order stochastic dominance between treatment and control after a one week Facebook restriction. In column 1 the null hypothesis is that the distributions are the same, in column 2 the null hypothesis is that the treatment group first order stochastic dominates the control group, in column 3 the null hypothesis is that the treatment group second order stochastic dominates the control group, in column 4 the null hypothesis is that the control group first order stochastic dominates the treatment group, and in column 5 the null hypothesis is that the control group first order stochastic dominates the treatment group. First order stochastic dominates the treatment group. First order stochastic dominates the treatment group. First order stochastic dominates the treatment group.

	Unadjusted P-value	FDR Adjusted P-value
Facebook Use	0.000***	0.000***
News Media Index - Traditional Media	0.785	1.000
News Media Index - Social Media	$0.000^{***}$	$0.000^{***}$
News Consumption Index	$0.004^{***}$	0.027**
Probability Right Answer - Mainstream News	0.826	1.000
Probability Wrong Answer - Mainstream News	0.926	1.000
Probability Not Sure Answer - Mainstream News	0.885	1.000
Probability Right Answer - Skewed News	$0.006^{***}$	$0.030^{**}$
Probability Wrong Answer - Skewed News	0.458	0.723
Probability Not Sure Answer - Skewed News	$0.022^{**}$	$0.052^{*}$
Overall Satisfaction	0.993	1.000
Life is Worthwhile	0.845	1.000
Feel Happy	0.893	1.000
Worry	0.139	0.228
Depressed	$0.014^{**}$	0.048**
Consumption Index	0 020**	0.057*
Productive Time Index	0.020	0.091
Efficient Time Index	0.346	0.530
Expected Consumption Index	0.540	0.550
Experied Consumption Index	0.004	0.140
Value of Facebook	0.068*	0.125

Table A.5.6: Adjustments for Multiple Comparisons

\* p < 0.1 \*\* p < 0.05 \*\*\* p < 0.01

This table shows how the significance of the main results changes when we control for multiple comparisons. The table present the unadjusted p-values of our main estimates (Column 1) and their corresponding values adjusted for multiple comparisons (Column 2). We apply a false discovery rate control as described in Anderson (2008).