

HIMSS ANNUAL CONFERENCE & EXHIBITION FEB 19-23, 2017 ORLANDO ORANGE COUNTY CONVENTION CENTER

Motivational Psychology for Digital Health Interventions

Session 214, February 22, 2017 Amy Bucher, Ph.D., Behavior Change Design Director, Mad*Pow @amybphd



Speaker Introduction

Amy Bucher, Ph.D.
Behavior Change Design Director
Mad*Pow









Conflict of Interest

Amy Bucher, Ph.D.

Salary: CVS Health (ended April 2016)

Ownership Interest (stocks, stock options or other ownership interest excluding diversified mutual funds): Stock holder in Johnson & Johnson







Agenda

- The digital health challenge
- How does motivation work?
- Applying motivation to design
 - Challenges
 - Successes
- Recommendations for infusing behavior science into intervention design







Learning Objectives

- Describe the main universal human needs of autonomy, competence, and relatedness that drive intrinsic motivation to engage with interventions and health behavior change
- Describe how the tenets of self-determination theory would influence the design of concrete features, functionality, and language in digital health interventions if applied to enhance patient engagement and outcomes
- Evaluate digital health interventions using the framework of selfdetermination theory to determine their ability to engage users and drive lasting behavior change







Realizing the Value of Motivational **Psychology in Digital Health Interventions**

	Engagement	Adherence (To medication, treatment)	Health Outcomes	
Satisfaction	Х	X	X	
Treatment/ Clinical	х	x	x	
Prevention & Patient Education	х	x	x	
Savings	Powered by sca	X		
	Leading	Lagging		

Lagging







The digital health challenge







The Digital Health Explosion

Mobile health revenues have soared from \$104 million in 2010¹ to a projected \$77 billion in 2017²

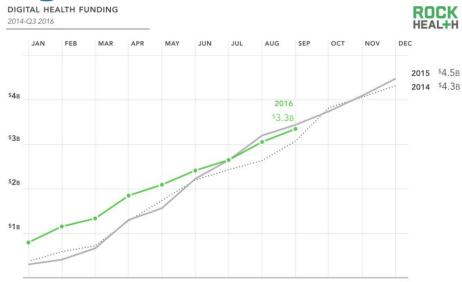
- 1. Research2Guidance; http://www.mhealthshare.com/mfactsheet.htm
- 2. Garter; http://www.lifehealthpro.com/2016/12/25/a-jaw-dropping-sum-mobile-app-revenue-in-2017-info







And investment in digital health remains high









The Promise of Digital Health

Meta-analyses and RCTs show outcomes from use of digital health interventions:

- Improved cardiovascular outcomes:
 - Blood pressure
 - Total cholesterol
 - LDL/HDL ratio
- Reduced weight
- Reduced fasting glucose in people with Type 2 diabetes
- Improvements in low back pain

Widmer, R. J., et al. (2015). Digital health interventions for the prevention of cardiovascular disease: A systematic review and meta-analysis. *Mayo Clinic Proceedings*, *90(4)*, 469-480. Simons, L. P. A., et al. (2016). Intensive lifestyle (e) support to reverse diabetes-2. *BLED 2016 Proceedings*, Paper 24. Retrieved from http://aisel.aisnet.org/cgi/viewcontent.cgi?article=1023&context=bled2016

Irvine, A. B., et al. (2015). Mobile-web app to self-manage low back pain: Randomized clinical trial. Journal of Medical Internet Research, 17(1), e1.







But engagement is low . . .







People Don't Participate in Health And Wellness Programs At Work

- Fewer than ½ of employees complete wellness screenings and HRAs when offered
- Just 10% of eligible participants enroll in employer-based weight loss interventions
- Participation in disease management programs is around 16% for eligible employees
- Only 7% of eligible employees participate in smoking cessation programs

Mattke, S., Liu, H., Caloyeras, J. P., Huang, C. Y., Van Busum, K. R., Khodyakov, D., & Shier, V. (2013). Workplace wellness programs study. *Rand Corporation*.





http://www.gallup.com/businessjournal/168995/why-workplace-wellness-program-isn-working.aspx





And industry attempts to engage users are counter-productive

2013

81% of employers surveyed offer incentives for participation in wellness programs

offer incentives for disease management programs

2016

90% of employers surveyed offer incentives for participation in wellness programs

36% offer these incentives to spouses as well as

PwC Health and Well-being Touchstone Survey Results, 2016



We need to rethink how we engage people in their health.







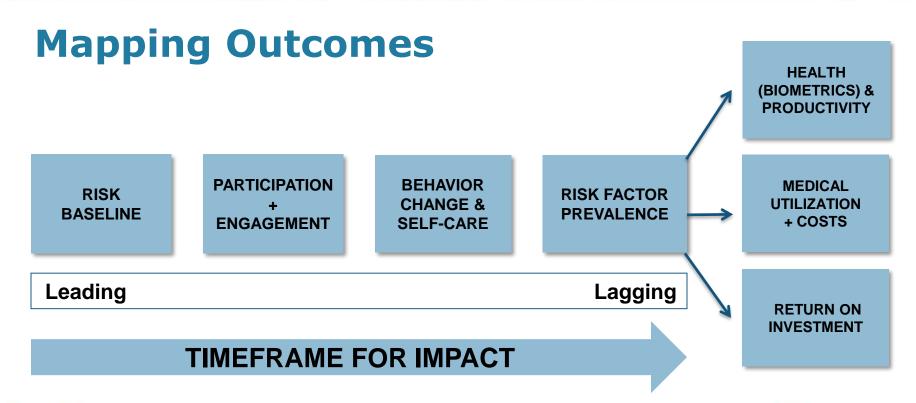
Why engagement matters:

Outcomes
=
Efficacy
X
Participation















Defining your behaviors

	New behavior	Familiar behavior	Increase behavior	Decrease behavior	Stop behavior
One time	Enroll in health plan	Call doctor for appointment	Sleep an extra hour when sick	Limit liquids the night before a scan	Don't eat dessert tonight
Period of time	Log symptoms and triggers to help with diagnosis	Take medication for an acute condition	Drink more water during hot weather periods	Limit activity while recovering from injury	Stop drinking while on antibiotics
From now on	Check blood sugar five or more times a day	Take medication for a chronic condition	Get regular exercise	Limit saturated fats in diet	Quit smoking







Applying the psychology of motivation

- What is motivation?
- Motivational quality
- Levers of motivation







Motivation:

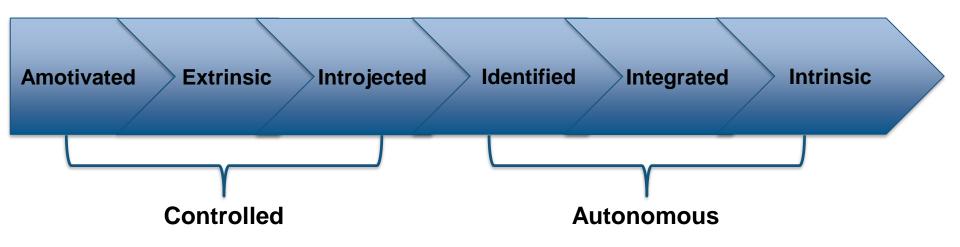
Desire with velocity







The Spectrum of Motivational Quality

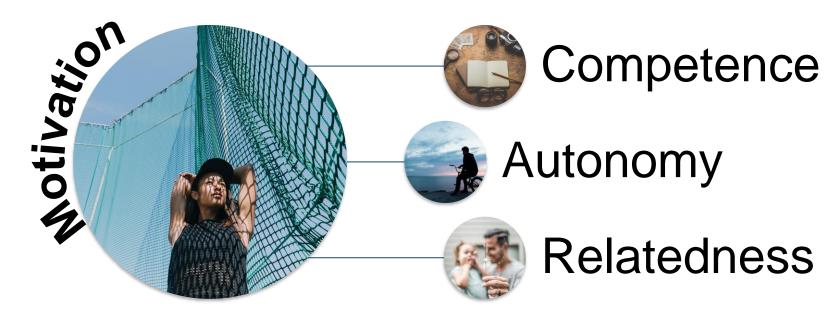








Pushing People Along The Spectrum









Competence

Goal statement: "I am learning, growing, and succeeding."







Enhance User Ability

- Organ donation
- 401k contributions
- Mammogram appointments









Effects of Baselines on Airline Pilot Behavior

	Before	After	Change
Monitoring Only	31%	48%	+17%
Feedback	31%	52%	+21%
Personal Target	31%	53%	+22%
Charity Donation	31%	51%	+20%



Gosnell, G. K., List, J. A., & Metcalfe, R. (working paper). A new approach to an age-old problem: Solving externalities by incenting workers directly. NBER Working Paper No. 22316. June 2016. JEL No. D01.J3,Q5,R4. Retrieved June 29, 2016 from http://papers.nber.org/tmp/821-w22316.pdf





BRIGHTEST MINDS



2x weight loss in people who track food 6+ days per week vs. people who track less than 1¹

18% of successful dieters kept a calorie diary, vs. 8% of unsuccessful dieters²

People using pedometers keep their physical activity at **27%** above baseline levels³

Bravata, D. M., et al. (2007). Using pedometers to increase physical activity and improve health: A systematic review. Journal of the American Medical Association, 298(19), 2296-



^{1.} Hollis, J. F. et al. (2008). Weight loss during the intensive intervention phase of the weight-loss maintenance trial. American Journal of Preventative Medicine, 32(5), 118-126.

^{2.} Kruger, J., Blanck, H. M., & Gillespie, C. (2006). Dietary and physical activity behaviors among adults successful at weight loss maintenance. *International Journal of Behavioral Nutrition and Physical Activity*, 3.

of doctors in Ohio agreed that pain medications are overprescribed because of a focus on HCAHPS scores

Making pain a vital sign caused the opioid crisis. Here's how.

THOMAS D. GUASTAVINO, MD | PHYSICIAN | OCTOBER 6, 2016

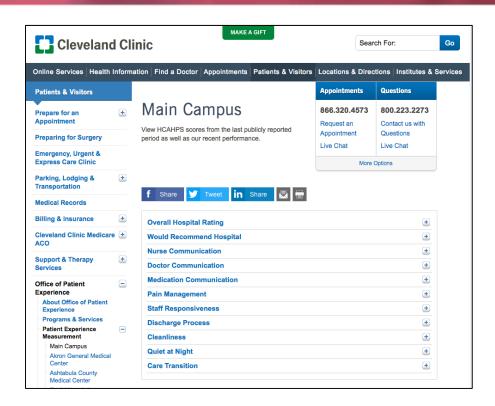
JUL 06 MORE ON PHARMACY

To combat opioid epidemic, HHS moves to remove pain management questions from HCAHPS surveys

Many clinicians report feeling pressure to overprescribe opioids because scores on the pain management questions are tied to Medicare payments.

BRIGHTEST MINDS

FEEDBACK CALIBRATES PERFORMANCE





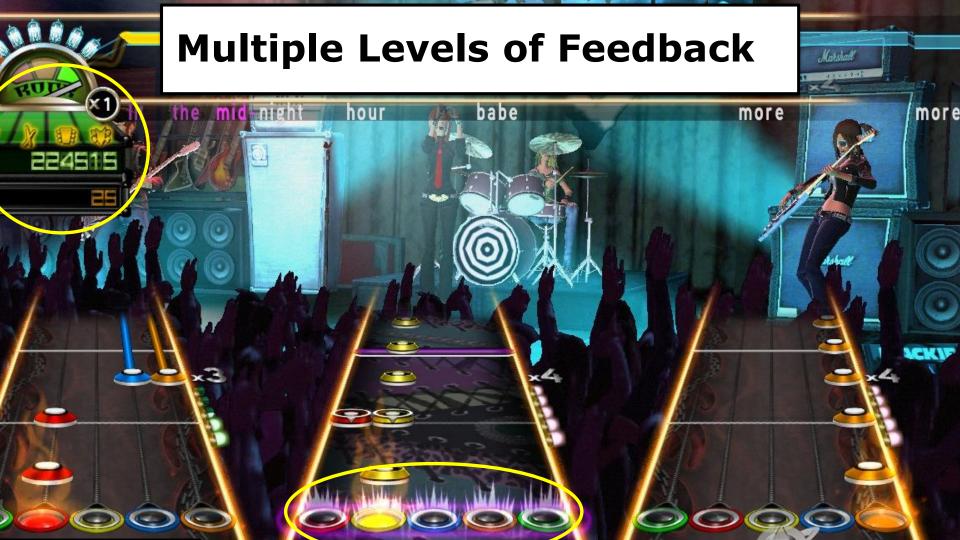


BRIGHTEST MINDS











MULTIPLE LEVELS OF FEEDBACK





Dartmouth-Hitchcock ImagineCare http://info.imaginecare.com/







Ask a question

Setup

TurboTax 🗸



●●●□□ Verizon ▼

\$0









Personal Income

Deductions & Crec

Other Tax Situation

Federal Review

Error Check





File



http://www.turbotax.com

Provide

Help

TurboTax

Just-In-Time

Let's get an idea of your financial picture

We'll also get to other changes and situations in a bit

Tell us if any of these applied to you or your better half in 2014.

























Badges as Feedback Mechanisms







BRIGHTEST MINDS

"One reported reason for ending these badges is precisely what would be predicted by selfdetermination theory: users began to 'game' the system, looking to circumvent the health behavior simply to get the badge."







BRIGHTEST MINDS

The Starbucks Mobile App

22%

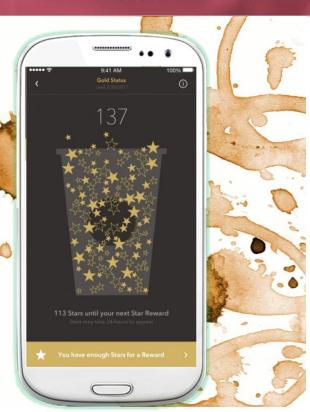
of transactions

in

December 2015¹

8 million

mobile transactions per month





http://www.bizjournals.com/seattle/news/2016/04/21/starbucks-posts-highest-revenue-of-any-non-holiday.html, retrieved May 10, 2016

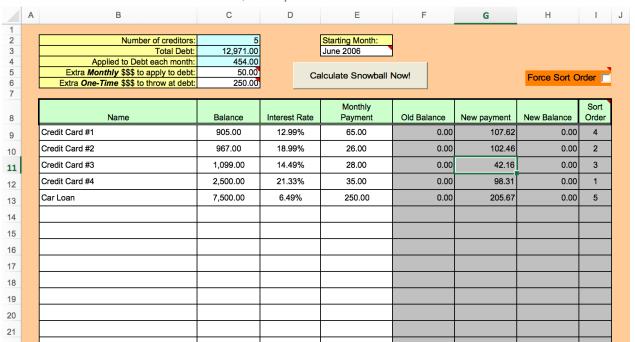




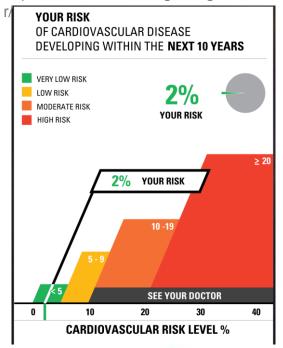


What If?

Basic Snowball Debt Calculator, Debtpro.co



http://www.vizhealth.org/using/calculato





Task Order Matters

Time-consuming, draining tasks? Go hard to easy

Learning, growthoriented tasks? Goeasy to hard





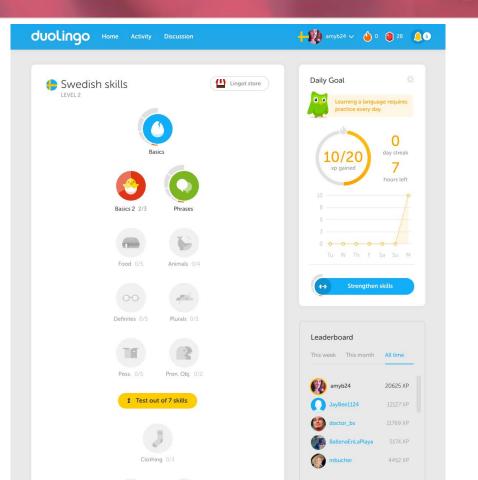


BRIGHTEST MINDS



Duolingo http://duolingo.com











Does it work?



34 Hours of Duolingo





1 University Semester







Competence Rules of Thumb

- **Measure** baseline performance
- Offer relevant feedback at multiple levels
- Make developmentally appropriate demands
- Create optimal challenge







Question 1: Which of the following is a way in which a digital health intervention can support a user's sense of competence?

- A. Meaningful choice
- **B.**Social connections
- C.Timely feedback
- D.Single sign-on (SSO)







Question 1: Which of the following is a way in which a digital health intervention can support a user's sense of competence?

A. Meaningful choice

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C.Timely feedback

D.Single sign-on (SSO)







Autonomy

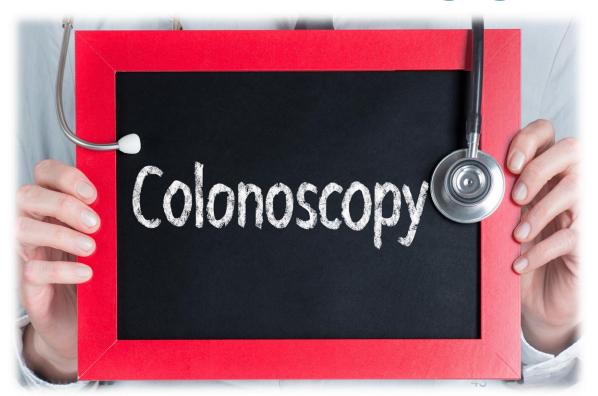
Goal statement: "I can make my own meaningful choices."







Shared Rules of Engagement



Patients educated about colonoscopy via Emmi Solutions intervention before undergoing one had better outcomes:

- 18% less sedation medication
- 14% decrease in procedure duration
- 11% more knowledgeable





Step 1 of 2

Create a new medical records order

Add each care provider you want to get information from to the list below. When you submit this order, PatientBank will create requests for medical records and send them to the care providers on your behalf.

Set Clear Expectations

Care Provider 😯	Requested information ?	Expected delivery ?	Fee 🕜
Gayethri Narayanswamy Edit Delete	All records	20 days	\$30
Total: 1 care provider			\$30

+ Add another care provider

Proceed to checkout





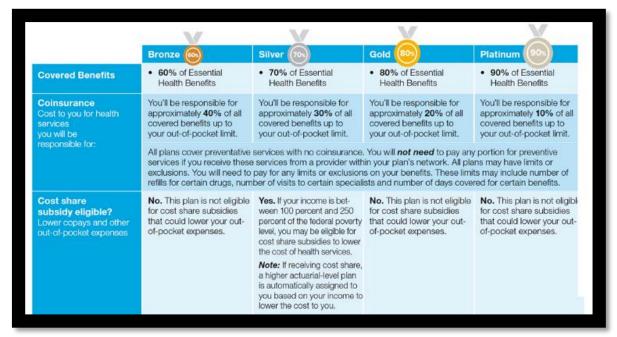
Minimize External Pressure

- Calibrate reward amounts
- Tie rewards to meaningful behaviors
- Consider non-financial rewards when possible, preferably goal-consistent





BRIGHTEST MINDS



Structure Meaningful Choice

Aflac

https://www.aflac.com/docs/health-care-reform/compare-plan-options.pdf





Experience the difference with Runkeeper Go.

Emphasize the **benefits** to the preferred choice

Show what's **missing** from the non-preferred choice

Use design to create visual appeal



Basic

\$0 / Month

- ✓ Track & log activities
- ✓ Basic stats

Progress Insights

Compare workouts

Prescribed workouts

Premium training plans

Weather insights

Live Tracking



\$9.99 USD / Month or \$39.99 USD / Year

- ✓ Track & log activities
- ✓ Basic stats
- ✓ Progress Insights
- ✓ Compare workouts
- Prescribed workouts
- Premium training plans
- Weather insights
- Live Tracking

Upgrade to Go

BRIGHTEST MINDS



Personal Choice

Grow the life you want.

Decide What's Important

Grow a tree that reminds you of what's important in life—and why. You choose the areas of life that deserve your focus, attention and time right now.

Discover Your Motivation

Nurture your tree with personalized images, music, motivational messages and connections with supportive friends—whatever inspires you the most.

Take Meaningful Action

Keep your tree green and healthy by taking small actions that support what's important to you, and by building habits that lead to meaningful daily progress.







The Autonomy Challenge

How can we offer people meaningful choice within a clinical protocol?







The Secret to Weight Loss

□ CALORIES IN

1 CALORIES OUT

No Choice

Choice of how to influence calories:

- Type of diet to try
- Type of exercise to try

Choices within the program:

- Weight Watchers
- 21-Day Fix
- Jenny Craig







Value-Consistent Framing

What is something you value or believe?

I believe in taking care of my family and modeling good behavior for my kids

What behaviors are you trying to change?

I want to quit smoking

How does that behavior support your value?

I'll have more energy for my kids & they'll worry less about my health







Universal Core Values

- Commitment to something greater than oneself
- Self-respect (with humility, self-discipline, and acceptance of personal responsibility)
- Respect and caring for others
- Caring for other living things and the environment







Autonomy Rules of Thumb

- Establish shared rules of engagement for informed decision-making
- Minimize external pressure
- Provide maximum choice where possible
- Tie behaviors to meaningful values or goals







Question 2: Which of the following features in a digital intervention would best support a user's sense of autonomy?

- A. Provide normative feedback
- B. Allow the user to set his own goal
- C.Allow the user to customize the dashboard
- D.Suggest activities for the user to try







Question 2: Which of the following features in a digital intervention would best support a user's sense of autonomy?

- A. Provide normative feedback
- **B.Allow** the user to set his own goal
- C.Allow the user to customize the dashboard
- D.Suggest activities for the user to try







Relatedness

Goal statement: "I am part of something bigger than myself."







Harlow



Maslow SELF-**ACTUALIZATION** SELF-ESTEEM **SAFETY** employment, resources, health PHYSIOLOGICAL NEEDS Breathing, food, water, homeostasis, excretion







Ostracism Hurts



Player 1



Player 3



Player 2





BRIGHTEST

Relatedness & Social Networking







BRIGHTEST MINDS

He also "cooked" for me, meaning frozen pizza and box mac n cheese. It it's the

@mottslady89 Points for effort. At least pizza was

Social Media Strategy

Reactive ———

Candice ©canduznard · Nov 4

My @DiGiornoPizza is no good but I'm too hungry to stop eating. It's normally so delicious ∰#biggiriprobs

DiGiorno Pizza

© DiGiornoPizza

© Canduznard That's not what we like to hear,

Candice! Send a DM our way so we can make it up to you.

⇒ Send a private message

8:26 PM - 4 Nov 2016

involved...

Amy Michelle @mottslady89 · 2h

DiGiorno Pizza

@DiGiornoPizza



Proactive



Follow



Express Warmth In Your Words









Convey Involvement



Pokémon Go





Big Brothers Big Sisters



Normative Feedback Says You Belong



Appreciate Your Body

Home » Weight Management » Being Comfortable in Your Own Skin » Appreciate Your Body

Our culture focuses so much on how our bodies look that we sometimes lose sight of what our bodies do. Our bodies allow us to do amazing things every day. Not sure what counts as "amazing"?

Check this out:

· Getting around and doing stuff.

Whether you are cooking a meal, helping a friend get settled in her new place, or changing a flat tire, your body helps you carry out your daily activities and do the things you want to do. Remember to appreciate all the "little things" your body helps you do every



· Your body as repair shop.

Your body has an amazing capacity to heal. From everyday cuts and bruises to more serious injuries, our bodies can recover from all kinds of things without us doing anything. And, even when our bodies need medicines or other treatments to help us heal, they still manage to keep everything going while we recover.

· The power of touch.

Whether you're giving your main squeeze a quick kiss, giving a friend a comforting pat, or greeting your kids with a hug, your touch is powerful! Research shows that touch helps lower blood pressure, soothe anxiety, and release feel-good hormones.

Focusing on the powerful things your body can do is one way to break the cycle of negative body image.

Finding your inner judge on constant auto play with negative messages about how you look? You would never let your BFF get away with talking about herself like that. If your friend's inner judge was on overdrive, what would you tell her? Maybe you'd remind her about her fantastic sense of humor or how important her friendship is to you. Challenge your inner judge by reminding yourself of all of your amazing qualities! The next time your inner judge gets out of control, remind her (and yourself) of all your good qualities.





http://women.smokefree.gov/



"1st of November will be my 5 months guit. I was a chain smoker 60+ a day and more on weekends and had smoked for 37 years. My guit was a nightmare that I never want to go through again. I'm enjoying the freedom, the removal of the shackles and chains. Nowadays I hardly think about smoking and have maybe 2 - 3 cravings a week. Life if good." ~Smokefree









Normative Feedback: A Delicate Balance

Recent research shows that many people may try to quit smoking **more than thirty times** before they finally quit for good.

"It's ok . . . Everyone has trouble quitting so I don't need to try that hard."

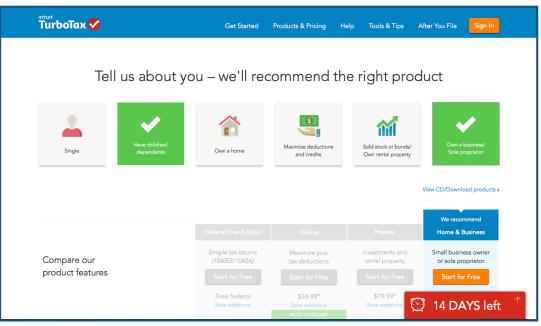
"I'm not alone in this struggle; other people have succeeded and so can I."







Start a Relationship



- Learn & triage
- Remember over time

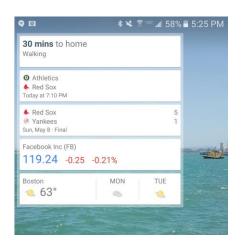
TurboTax http://www.turbotax.com

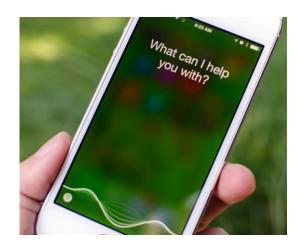






Personalization Creates a Relationship









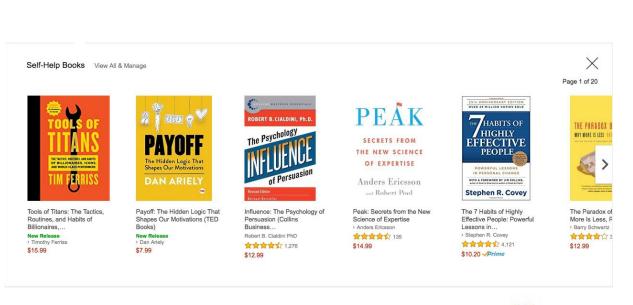




Amazon: Leader in Personalization



Connect to the internet with the Alexa App









Everything Is Better With Friends









Relatedness Rules of Thumb

- Be responsive and proactive with social media
- Communicate warmth
- Create a sense of involvement
- Convey belongingness
- Facilitate social connections







Question 3: Some studies have shown that digital interventions built from a motivational design framework are more likely to lead to user adherence with prescribed medications and other treatments.

A. True

B. False







Question 3: Some studies have shown that digital interventions built from a motivational design framework are more likely to lead to user adherence with prescribed medications and other treatments.

A. True

B. False







Selected Outcomes

- 20% reduced hospital admissions¹
- \$382 reduced medical claims¹
- 33% lower rate of increase in medical costs²
- 24% higher satisfaction with health plan³
- 8 consecutive years of positive return on investment (ROI) ranging from a low of 1.16:1 to a high of 2.83:1⁴
- Sustained improvements in aggregate mental and physical health metrics⁵
- 1. Schwartz et al., (2010). The impact of an online disease management program on medical costs among health plan members. *American Journal of Health Promotion*, 25(2), 126-133.
- 2. Williams, L. C., & Day, B. T. (2011). Medical cost savings for web-based wellness program participants from employers engaged in health promotion activities. *American Journal of Health Promotion*, 25 (4), 272-280.
- 3. Rothert, K., & Strecher, V. J. (2006). Web-based weight management programs in an integrated health care setting: A randomized, controlled trial. *Obesity*,14(2), 266-272.
- 4. Schwartz, S. M., et al. (2013). Sustained economic value of a wellness and disease prevention program: An 8-year longitudinal evaluation. *Population Health Management*, 17(2), 90-99.
- 5. No. J. Y. Y., et al. (2012). Self-determination theory applied to health contexts: A meta-analysis. Perspectives on Psychological Science, 7(4), 325-340.





Digital Health Intervention Selection Pre-Work

- Define key outcomes of interest
 - How will you measure them?
 - How often?
 - What are leading and lagging indicators of success?
- Understand the evidence base in your area of interest
 - Do the interventions you're considering draw on the evidence base?
 - What success metrics already exist?







The Digital Health Motivation Scorecard

	Does the intervention	No	Yes
A	Help users understand health behaviors in terms of values or goals?		
A	Offer users choices within the experience?		
C	Break complicated behaviors into easier steps that people can accomplish?		
C	Offer resources and support when needed?		
С	Help people view their progress?		
С	Provide meaningful, actionable feedback in a timely manner?		
R	Connect users, either socially or psychologically?		
R	Reflect an understanding of users over time?		







Realizing the Value of Motivational Psychology in Digital Health Interventions

	Engagement	Adherence (To medication, treatment)	Health Outcomes
Satisfaction	Х	X	X
Treatment/ Clinical	х	х	x
Prevention & Patient Education	x	x	x
Savings	Powered by scalable technology		X
	Leading Lag		gging







Questions?

- Contact Amy Bucher, Ph.D.
 - abucher@madpow.net
 - @amybphd
 - Linkedin.com/in/amybucher

Please complete online session evaluation





