Behavior Change Interventions: What works?

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- **What you already (should) know…**
  - Antibiotic stewardship is largely about behavioral change
- **What we will discuss…**
  - Drivers for incorporating systematized behavioral change science into antimicrobial stewardship
  - Examples of psychological principles of human behavioral science and implications for stewardship
  - Behavioral change taxonomy and resources
- **What you should be able to do…(objectives)**
  - Define four terms from the behavioral sciences literature that are relevant to antimicrobial stewardship efforts
  - Discuss interventions that have been shown to produce positive behavioral change in health care
  - Identify which interventions are most likely to be beneficial in your practice setting

POSITION STATEMENT
FROM THE INFECTIOUS DISEASES SOCIETY OF AMERICA

Hospital Pharmacists and Infectious Diseases Specialists

Clinical Infectious Diseases 1997; 25:802
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1058–4838/97/2504–0004$03.00

"The training and daily activities of clinical pharmacists do not provide them with the expertise and knowledge needed to interpret the adequacy and significance of historical, physical, laboratory, and radiographic findings for individual patients, which are required for advising patient-specific therapy."

Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship

Clinical Infectious Diseases 2007; 44:000–000
© 2006 by the Infectious Diseases Society of America. All rights reserved.
1058-4838/2007/4402-00XX$15.00

"The core members of a comprehensive antimicrobial management program include an infectious diseases physician and a clinical pharmacist with infectious diseases training."

Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America

Clinical Infectious Diseases® 2016;62(10):e51–e77
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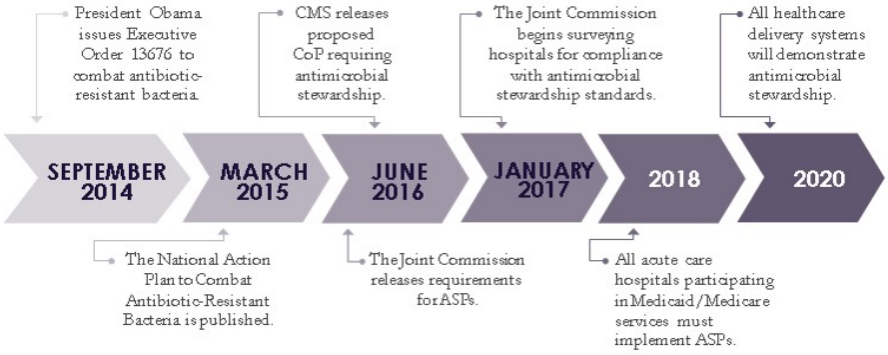
DOI: 10.1093/cid/ciw118

"Evidence-based guidelines for implementation and measurement of antibiotic stewardship interventions in inpatient populations….were prepared by a multidisciplinary expert panel…[including] clinicians and investigators representing internal medicine, emergency medicine, microbiology, critical care, surgery, epidemiology, pharmacy, and adult and pediatric infectious diseases specialties."

Figure. National Timeline for Implementing Antimicrobial Stewardship Programs



ASPs, antimicrobial stewardship programs; CMS, Centers for Medicare & Medicaid Services; CoP, Conditions of participation

Kassmalli Z. *Contagion Live*.

Credit: Stringer/Reuters/Zuma

An audit and feedback day?

http://gifsoup.com/view/3422604/whack-a-mole.html

Tools for the next phase of stewardship

- New diagnostics
- New drugs
- Shorter durations
- Tele-stewardship
- ***Formal* application of psychological & behavioral science**

MINDSET MATTERS (why is stewardship so hard?)

Take the bet?

Gain $150

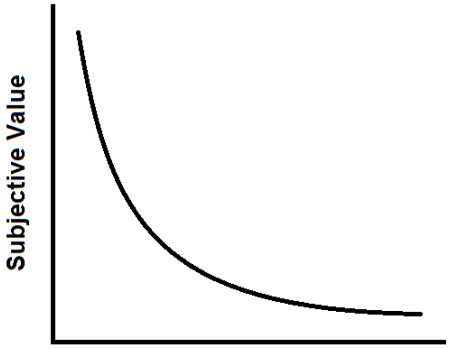
Lose $100

- ***Loss aversion***: preference for avoiding losses > gaining gains

After Novemsky and Kahnemann. *J Marketing Res* 2005;119-128
Images: wikimedia commons

Take the money now or later?

Now



Tomorrow?
A week?
A month?
A year?

- ***Future discounting***: ”cost” willing to pay to have “it” sooner

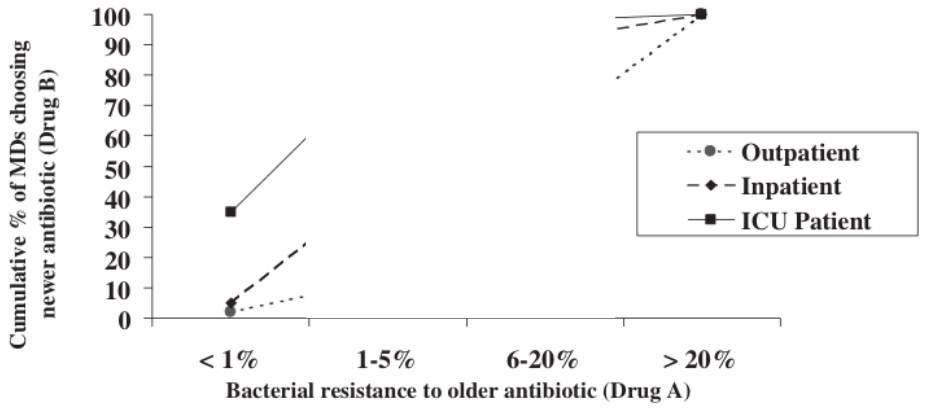
After Rachlin, et al. *J Exp Anal Behavior* 1991;55:233-244
Images: wikimedia commons

Loss Aversion?

Themes and Illustrative Quotations Identified from Semi-structured Interviews of 30 Inpatient Physicians

	Theme	Illustrative Quotation
ic overuse is recognized but y accepted.	Antibiotic overuse is driven by anxiety and/or diagnostic uncertainty.	(1) "I know that there are instances when I have erred on the side of caution and given an antibiotic. If I was real anxious about it and thinking that if I give the antibiotic, I am playing it safe and covering just in case. In those instances, it is probably driven by fear" (2, resident interview). (2) "Just the thought of not covering some resistant organism or more pathogenic organism, even though I do not have any definitive objective evidence, always makes me quite anxious" (9, staff interview). (3) "When turning over a patient to another colleague coming on, you do not want it to seem like you are undertreating the patient or did not recognize someone who was more ill" (12, resident interview). (4) "Being in a hospital setting, I feel like most of us initially err on the side of caution and treat

Livorsi D, et al. ICHE 2015;36:1065-1072



Metlay JP, et al. *Med Decis Making* 2002;22:498-505.

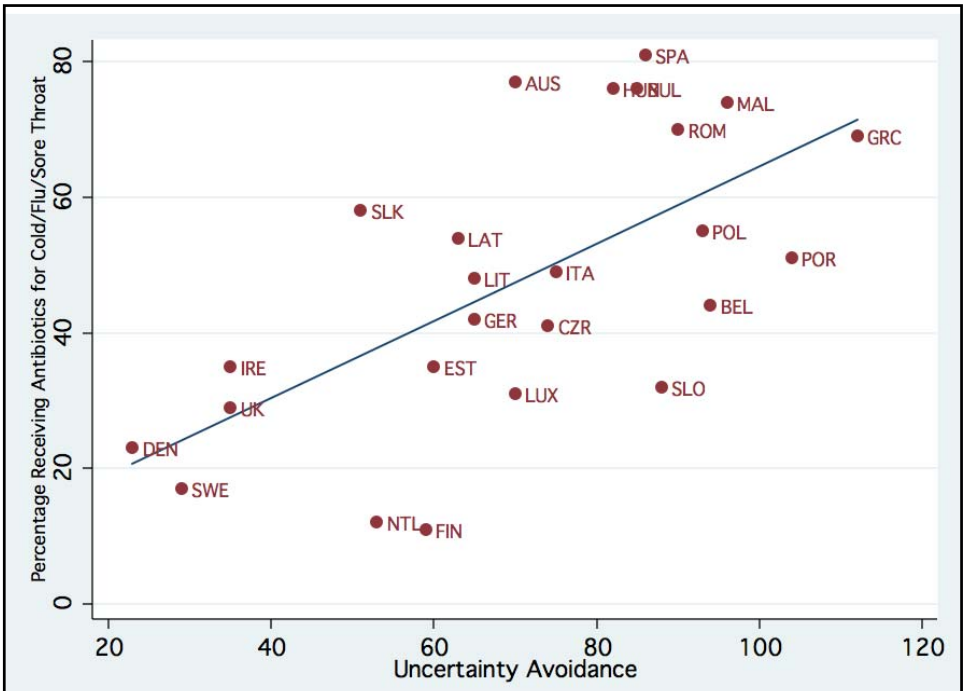
Statement	% Agree (IM/ID)
"Antibiotic resistance is a major public health problem"	82/94

Metlay JP, et al. *J Gen Intern Med.* 2002;17:87-94.

Future Discounting?

Factor	Mean Rank
Efficacy of the drug in treating community-acquired pneumonia	1.6
Patient severity of illness	3.1
Previous experience and knowledge about the drug	4.1
Potential side effects	4.4
Ease of use	4.6
Cost to patient	4.9
Risk of contributing to the problem of antibiotic resistance	5.3

Metlay JP, et al. *J Gen Intern Med.* 2002;17:87-94.

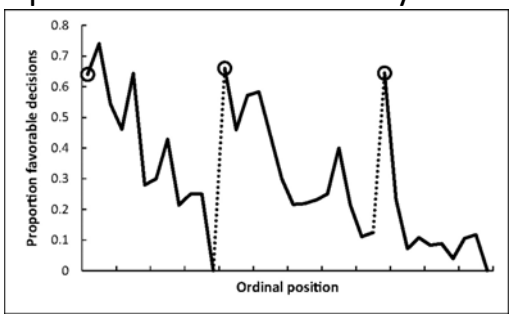


Borg MA. *J Antimicrob Chemother* 2012;67:763-768

DECISION-MAKING IS HARD

"Your future will be decided at… 4:30 PM"

- Study of parole decisions made by Israeli judges



- ***Decision fatigue***: deleterious effect of quantity of decisions on quality of decisions

Danziger S, et al. *PNAS.* 2016;108

More is better?

- Jam tasting booth at a grocery store

High-choice scenario:
3% purchased jam

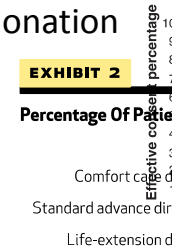
Low-choice scenario:
30% purchased jam

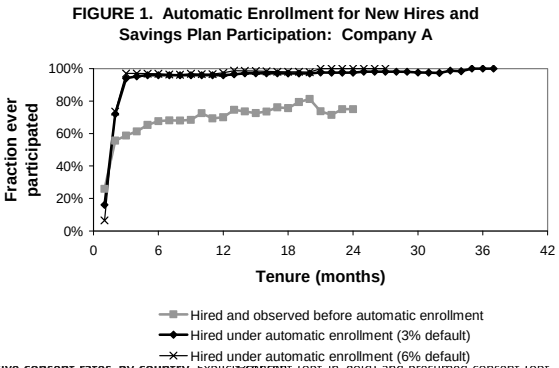
- ***Choice overload***: excessive number of options may be associated to demotivation and poor performance

Iyengar S, et al. *J Personal Social Psych.* 2000;79:995-1006

The Dominance of Defaults

- Investing
- Advance directives
- Organ donation





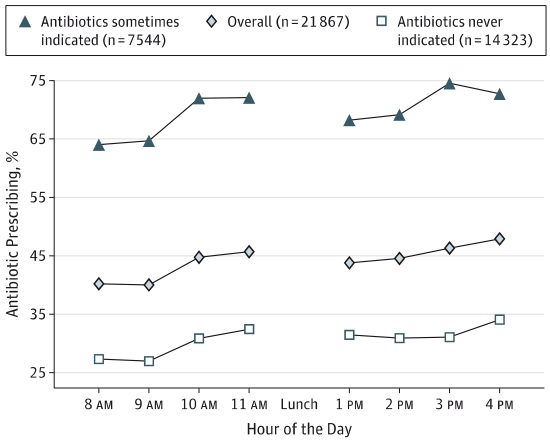
Effective consent rates, by country. Explicit consent (opt-in, gold) and presumed consent (opt-out, blue).

- ***Default bias***: tendency to stick with predetermined choices

Breashears J, et al. Nat Bureau Econ Res Working Paper 12009; Halpern SD, et al. *Health Aff* 2013;32:1-10; Johnson and Goldstein, *Science*, 2003;302:1338-1339

Decision Fatigue

Figure. Antibiotic Prescribing by Hour of the Day



Linder JA, et al. *JAMA Intern Med.* 2014;79:995-1006

"Nudging" Decisions

a

Antibiotic inappropriate vignette (Acute Bronchitis)

A 27-year-old woman with no known underlying lung disease presents with a 10-day history of cough that is productive of yellow nonbloody sputum. Her symptoms began with nasal congestion and a sore throat, but these initial symptoms resolved after a few days. Her remaining symptom is the cough which is less productive than it was several days ago. She denies any known sick contacts. Her cough does not occur in long fits, and there is no post-tussive emesis. On physical examination she is not in respiratory distress, afebrile, and has normal vital signs. Lung exam is normal.

OTC medications grouped:

Of the drug choices below, please indicate which drugs you would choose in treating this patient. You may select up to three options.

☐ albuterol inhaler

☐ an antibiotic of your choice

☐ robitussin with codeine

☐ tessalon perles

Over-the-counter drugs:
☐ cough lozenge ☐ cough spray ☐ cough syrup

OTC medications listed individually:

Of the drug choices below, please indicate which drugs you would choose in treating this patient. You may select up to three options.

☐ cough lozenge

☐ cough spray

☐ cough syrup

Prescription drugs:
☐ albuterol inhaler ☐ an antibiotic of your choice ☐ robitussin with codeine ☐ tessalon merles

Tannenbaum D, et al. *J Gen Intern Med.* 2014;30:298-304

"Nudging" Decisions

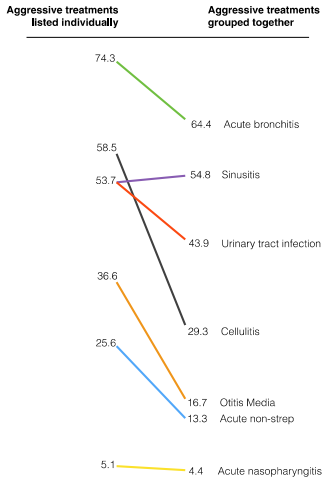
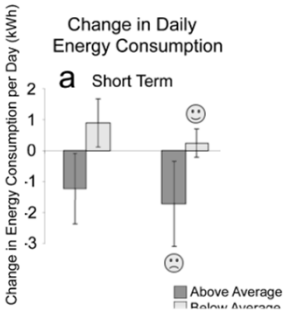


Fig. 2. Percentage of providers choosing aggressive treatment options (i.e., prescription drugs for antibiotic-inappropriate vignettes and broad-spectrum antibiotics for antibiotic-appropriate vignettes) as a function of menu partition

Tannenbaum D, et al. *J Gen Intern Med.* 2014;30:298-304

EVERYBODY WANTS TO BE COOL

Soy un perdedor…



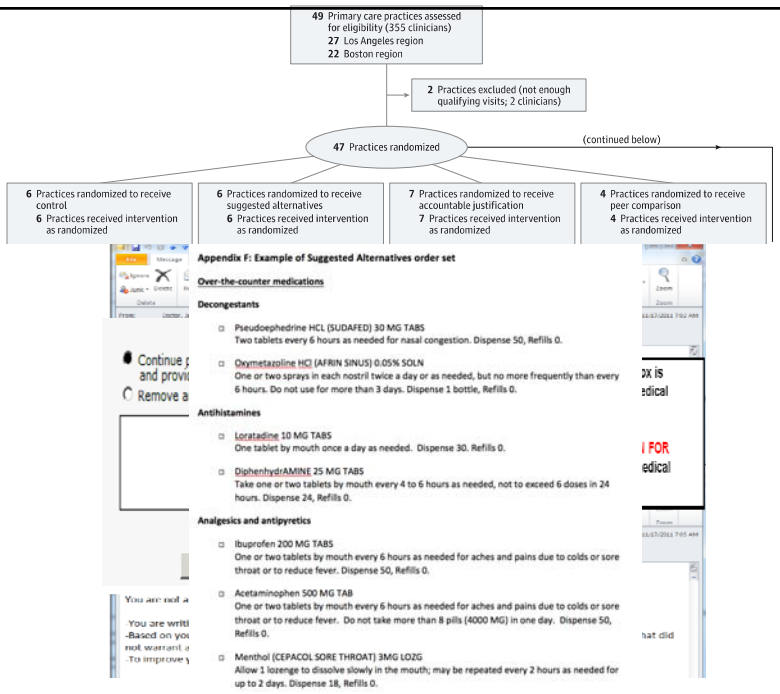
- ***Social norms***: effect of providing peer data on behaviors

MacDougall C. Pacific Gas and Electric
Schultz PW, et al. *Psych Sci* 2007;18:429-43

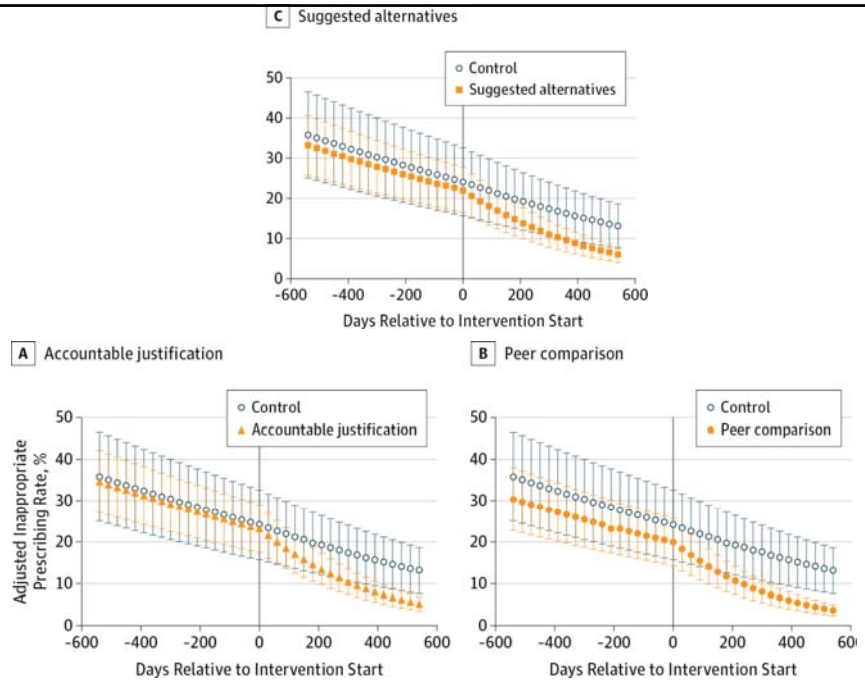
Tweet yourself thin?

- Subanalysis of weight loss intervention found -0.5% weight loss for every 10 tweets ($p<0.001$)
- ***Accountability***: sharing an action or commitment may impact behavior

Turner-McGrievy GM, et al. *Transl Behav Med* 2013;3:287-294



Meeker D, et al. *JAMA* 2016;315:562-570



Meeker D, et al. *JAMA* 2016;315:562-570

BEYOND THE BESTSELLERS: BEHAVIORAL SCIENCE FOR NON-BEHAVIORAL SCIENCE SCIENTISTS

Journal of Antimicrobial Chemotherapy (2003) **52**, 764–771
DOI: 10.1093/jac/dkg460
Advance Access publication 16 October 2003

JAC

Room for improvement: a systematic review of the quality of evaluations of interventions to improve hospital antibiotic prescribing

Craig Ramsay[1], Erwin Brown[2], Giles Hartman[3] and Peter Davey[4]*

***Conclusions:** The majority of evaluations used fundamentally flawed methodology. There is limited evidence of improvement over time. These problems could be resolved if researchers and referees of protocols or manuscripts implemented the EPOC methodology.*

Review

International Journal of Antimicrobial Agents 45 (2015) 203–212

Time for action—Improving the design and reporting of behaviour change interventions for antimicrobial stewardship in hospitals: Early findings from a systematic review

Peter Davey[a,*], Claire Peden[a], Esmita Charani[b], Charis Marwick[a], Susan Michie[c]

"In conclusion, both the content and reporting of interventions for antimicrobial stewardship fell short of scientific principles and practices. There is a strong evidence base regarding BCTs in other contexts that should be applied to antimicrobial stewardship now if we are to further our understanding of what works, for whom, why and in what contexts."

Where do I start?

HEALTH TECHNOLOGY ASSESSMENT

VOLUME 19 ISSUE 99 NOVEMBER 2015
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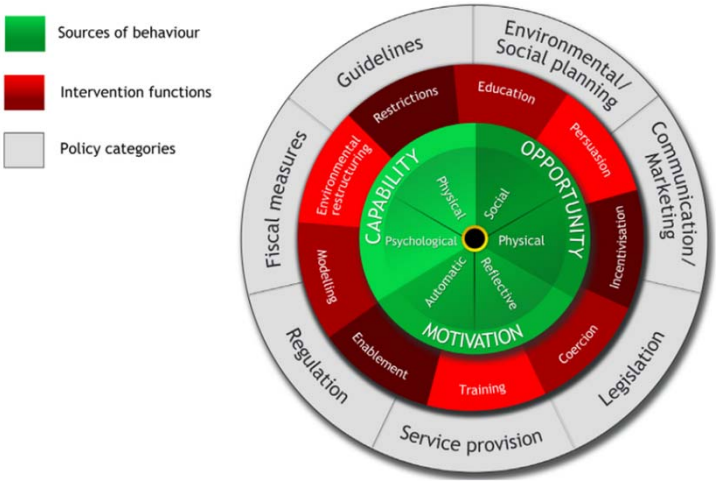
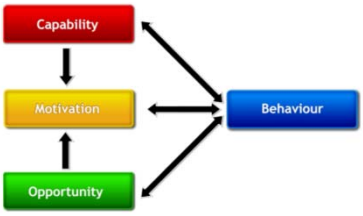
Behaviour change techniques: the development and evaluation of a taxonomic method for reporting and describing behaviour change interventions (a suite of five studies involving consensus methods, randomised controlled trials and analysis of qualitative data)

Susan Michie, Caroline E Wood, Marie Johnston, Charles Abraham, Jill J Francis and Wendy Hardeman

Behavior Change Wheel



Michie S, etl Al. *Implementation Science* 2011;6:42
http://www.behaviourchangewheel.com/



Interventions	Definition
Education	Increasing knowledge or understanding
Persuasion	Using communication to induce positive or negative feelings or stimulate action
Incentivisation	Creating expectation of reward
Coercion	Creating expectation of punishment or cost
Training	Imparting skills
Restriction	Using rules to reduce the opportunity to engage in the target behaviour (or to increase the target behaviour by reducing the opportunity to engage in competing behaviours)
Environmental restructuring	Changing the physical or social context
Modelling	Providing an example for people to aspire to or imitate
Enablement	Increasing means/reducing barriers to increase capability or opportunity[1]
Policies	
Communication/ marketing	Using print, electronic, telephonic or broadcast media
Guidelines	Creating documents that recommend or mandate practice. This includes all changes to service provision
Fiscal	Using the tax system to reduce or increase the financial cost
Regulation	Establishing rules or principles of behaviour or practice
Legislation	Making or changing laws
Environmental/ social planning	Designing and/or controlling the physical or social environment
Service provision	Delivering a service

Michie S, etl Al. *Implementation Science* 2011;6:42
http://www.behaviourchangewheel.com/

Table 2 Links between the components of the 'COM-B' model of behaviour and the intervention functions

Model of behaviour: sources	Education	Persuasion	Incentivisation	Coercion	Training	Restriction	Environmental restructuring	Modelling	Enablement
C-Ph					√				√
C-Ps	√				√				√
M-Re	√	√	√	√					
M-Au		√	√	√			√	√	√
O-Ph						√	√		√
O-So						√	√		√

Michie S, etl Al. *Implementation Science* 2011;6:42
http://www.behaviourchangewheel.com/