Efficient Allocation of Public Health and Behavior Change Resources: The "Difficulty by Motivation" Matrix

See also Galea and Vaughan, p. 17.

Public health resources are precious and finite, and they must be judiciously employed. Thus, determining which interventions to use and for whom is a matter of considerable public health consequence. Yet, so-called precision public health has received far less attention than precision medicine.

We propose a framework, the "Difficulty by Motivation" matrix (Figure 1a), that can help program planners and clinicians better allocate our population health resources. As shown in Figure 1a, the matrix comprises two dimensions: (1) the x-axis, which maps inherent properties of the target behavior change, with those on the left being relatively simple, low-energy behaviors such as seat belt use, single-shot behaviors such as vaccinations, and most screening tests, and those on the right being more difficult, complex, ongoing, and energy-intensive changes such as controlling addictive behaviors and managing chronic diseases; and (2) the y-axis, which addresses the individual-level factors of motivation and readiness. The lower part of the y-axis represents individuals who exhibit low readiness or poor-quality motivation, whereas the upper end represents individuals with higher quality motivation. These concepts are rooted in self-determination theory, which delineates three classes of motivation: amotivation, controlled motivation, and autonomous motivation.[1]

At the bottom of the y-axis, the amotivated individual does not consider change, perhaps because of other pressing life issues, depression, low perceived competence, being naïve to treatment options, or simply disinterest in change. In turn, controlled motivation does carry psychological energy but is considered lower quality both because it may not be sustained and because it is associated with lower well-being.[2] It can be based on purely extrinsic reasons such as rewards or "punishments" (e.g., financial gains or losses, legal constraints, pressure from others), all of which are likely to be experienced as controlling. Controlled motivation also includes "pressure from within," when internalized feelings of shame, guilt, and negative social comparison drive the behavior. Controlled motivation, whether it comes from outside or inside the patient, can instill change, but it comes at a price, both psychologically and behaviorally.[3] The autonomously motivated individuals represented at the top of the y-axis not only see the importance of the behavior but connect change with their core values and beliefs. These individuals feel volitional and competent, and have identified meaningful reasons for change. They are ready to take action and persist when faced with obstacles. Maintenance of health behavior from this perspective can be conceptualized as the ability to continue the behavior with little or no added energy or effort.

The "Difficulty by Motivation" matrix can help efficiently guide intervention allocation. Consider Quadrant 1 (Q1) in Figure 1b. Difficult changes among inadequately motivated individuals may require different and more intensive interventions than those in other quadrants. The goal for those in Q1 is to build a stronger and higher quality "why" prior to beginning the "how" phase. For Q1 individuals, moving to action planning would likely be premature, and even counterproductive. Strategies for Q1 individuals may include "high touch" interventions such as motivational interviewing and other clinical services, perhaps requiring multiple contacts. Conversely, those in Q4 face more simple changes and are already energized. Those falling into Q4 may be good candidates (at least initially) for, and generally be more responsive to, environmental and policy initiatives. On the individual level, interventions for Q4 may include e-health programs or "nudging" strategies such as text reminders or financial incentives. The latter can be tricky, as there is concern that financial incentives could "contaminate" or cancel out development of more autonomous motives or inherent enjoyment. Perhaps this is less likely for those who are otherwise adequately motivated.[4]

For individuals falling into Q2 and Q3, the choice of initial intervention may be more nuanced and iterative. Our current thinking is that motivation trumps difficulty. That is, looking at Q2, even for relatively simple behaviors, if the person exhibits resistance (e.g., a parent who is strongly against vaccination), we suggest that a motivational intervention may be needed to overcome the person's concerns. However, given the relative simplicity of the behavior change, intensity of the intervention may still be less than for Q1. It may be accomplished with e-health instead of interpersonal approaches.

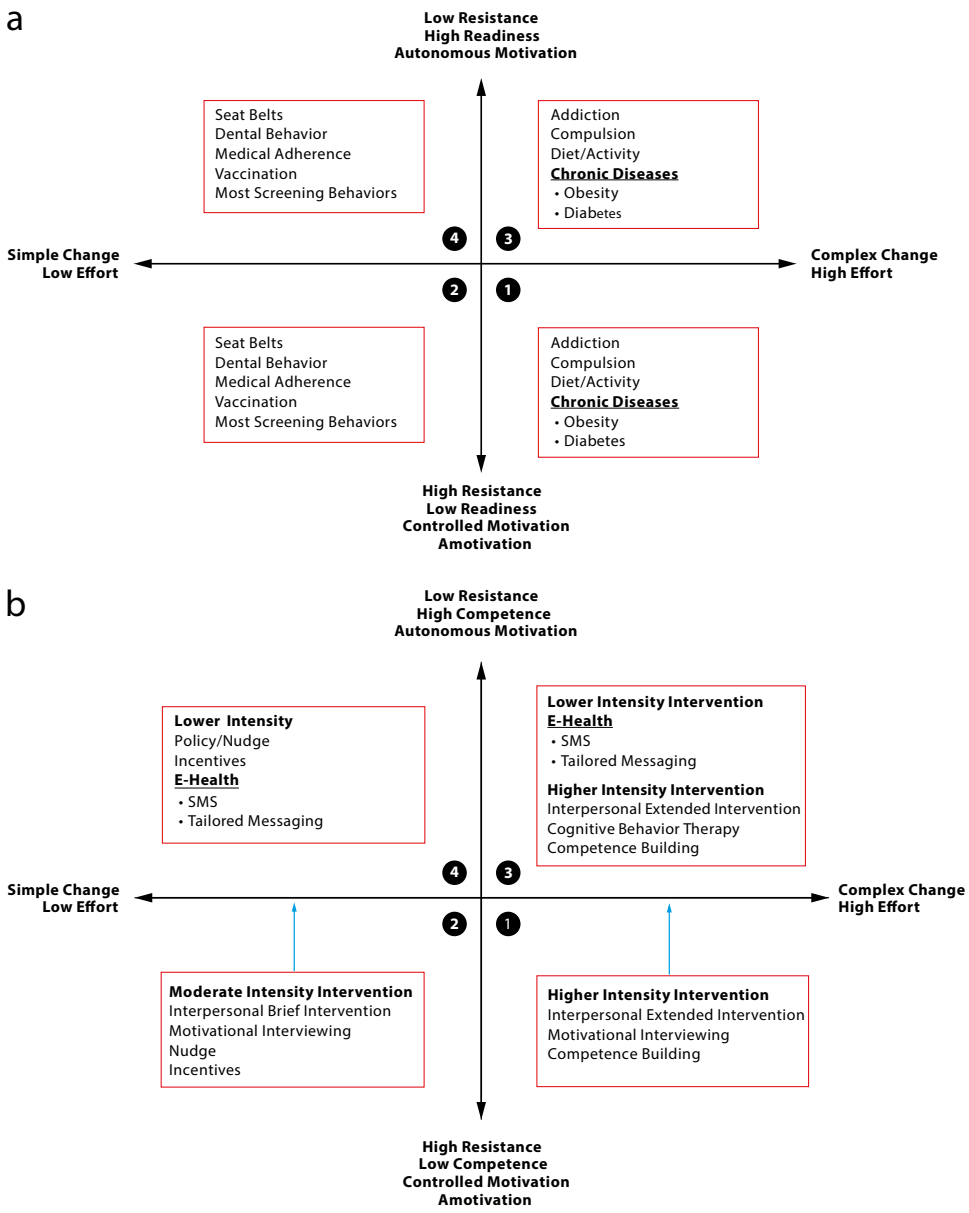
ABOUT THE AUTHORS

Ken Resnicow is with the Department of Health Behavior & Health Education, University of Michigan School of Public Health, Ann Arbor. Pedro J. Teixeira, is with the Faculdade de Motricidade Humana, Universidade de Lisboa, CIPER, Lisbon, Portugal. Geoffrey C. Williams is with the University of Rochester School of Medicine, Rochester, NY.

Correspondence should be sent to Ken Resnicow (e-mail: kresnic@umich.edu). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints" link.

This editorial was accepted October 14, 2016.

doi: 10.2105/AJPH.2016.303526



Note. SMS = short message service (text messaging).

FIGURE 1—The "Difficulty by Motivation" Matrix for (a) Behaviors and (b) Interventions

Individuals can move across the matrix. For example, once Q1 individuals become adequately motivated, they can move up to Q3, where a more action-oriented intervention may be employed. Finally, we should acknowledge that many people trying to stop smoking, lose weight, or become more active often initiate the desired change multiple times before being successful. For some outcomes, this may be a negative predictor of success (e.g., for weight loss).[5] The number of times someone has tried to change may also guide which intervention is done for that particular change attempt.

Two additional factors to consider when selecting appropriate interventions are perceived competence and self-efficacy.[6] Addressing competence and efficacy may be most relevant for difficult changes. Competence may be a critical intervention target for complex behaviors, such as quitting smoking; however, it may be less critical for more simple or single-shot behaviors, such as getting a screening test. Assessing subjective perceptions of difficulty and competence may allow for even more precise intervention matching. Consider a former high-level athlete who is currently sedentary and for whom increasing physical activity might not be perceived as particularly difficult. This person may be best served by an intervention that focuses more on building meaning than competence. Conversely, someone who has never been able to exercise regularly or finds exercise difficult (and who may even have high-quality motivation) might need an intervention that addresses competence building. An additional consideration is access, cost, and "opportunity" for the target behavior change. These factors would also need to be considered when estimating how complex or difficult a certain behavior change might be. Perceived competence and self-efficacy could be diminished in the face of financial constraints, limited access, or a physical or social environment that creates substantial barriers for change.

LIMITATIONS AND FUTURE DIRECTIONS

We have assumed that more intensive, interpersonal methods are needed to build motivation. But it may turn out, for example, that creative e-health interventions can be effective in building motivation even for the resistant. There are probably considerable individual differences in the difficulty dimension for specific behavior changes. Measuring subjective difficulty and perceived competence may be needed to allow for more precise intervention matching. Genetic variation, environmental

factors, and epigenetic changes may also contribute to these differences, creating other dimensions to the matrix. We have also presented interventions as discrete, but individuals can be exposed to compound interventions, which may include both an in-person counseling component and an e-health component or a program that contains both a "why" and a "how" component. Finally, we have focused largely on individual-level interventions, knowing that policy and environment can play an important role, particularly for simpler changes among motivated individuals.

Our initial thinking draws heavily from self-determination theory. Incorporating constructs from other models may be helpful in improving the utility of the matrix, and we welcome such additions. Also, to be optimally efficient, our model requires that a full array of interventions are available for each of the quadrants; currently, this is far from the case. Differential availability could potentially exacerbate health disparities, if certain types of interventions are not available for low-income or uninsured populations. Despite these limitations, we hope the matrix can provide a useful framework to husband our cherished public health resources and contribute to a public health of consequence. AJPH

Ken Resnicow, PhD
Pedro J. Teixeira, PhD
Geoffrey C. Williams, MD, PhD

CONTRIBUTORS

All authors contributed equally to this editorial.

ACKNOWLEDGMENTS

G. C. Williams is a consultant with Pfizer (honorarium) and a previous stockholder–Medical Director of Self-Determined Health, Inc., Celebration, FL.

REFERENCES

1. Deci E, Ryan R. The "what" and "why" of goal pursuits: human needs and the self-determination of behavior. *Psychol Inq*. 2000;11(4):227–268.

2. Teixeira PJ, Carraca EV, Markland D, Silva MN, Ryan RM. Exercise, physical activity, and self-determination theory: a systematic review. *Int J Behav Nutr Phys Act*. 2012;9:78.

3. Ryan RM, Patrick H, Deci EL, Williams GC. Facilitating health behaviour change and its maintenance: interventions based on self-determination theory. *Eur Health Psychol*. 2008;10:2–5.

4. Moller AC, Buscemi J, McFadden HG, Hedeker D, Spring B. Financial motivation undermines potential enjoyment in an intensive diet and activity intervention. *J Behav Med*. 2014;37(5):819–827.

5. Teixeira PJ, Going SB, Sardinha LB, Lohman TG. A review of psychosocial pre-treatment predictors of weight control. *Obes Rev*. 2005;6(1):43–65.

6. Williams GC, Niemiec CP, Patrick H, et al. The importance of supporting autonomy and perceived competence in facilitating long-term tobacco abstinence. *Ann Behav Med*. 2009;37(3):315–324.