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Behavioral Phenotyping in Health Promotion Embracing or Avoiding Failure

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Many employers have campaigns that incentivize employees to track their weight, blood pressure, and cholesterol. These initiatives make sense based on a theory that self-monitoring not only keeps people focused on their health but also gives them metrics and goals for regulating their behavior. When an employee steps on a scale and sees that he gained weight in the last week, he might reflect on how he changed his snacking habits or may become motivated to increase his physical activity.

An alternative possibility has received less attention. Rather than increase resolve to overcome failures, some individuals with a discouraging weigh-in might instead lose motivation. Others may be so concerned about acknowledging weight gain that they will not step on a scale in the first place.

Many approaches to patient engagement highlight the benefits of feedback and self-monitoring as if most individuals naturally increase resolve when they encounter failure. These programs are premised on the view that patients are eager to meet challenges with renewed effort. These programs largely ignore individuals who, when they experience the same signal, become demoralized and avoidant. In actively avoiding worrisome feedback—whether real or anticipated—these individuals disengage from otherwise beneficial programs or clinical care when monitoring is emphasized, and as a result, they do not benefit from monitoring and might be harmed.

Lack of benefit from self-monitoring has been reported in trials of glucose self-monitoring,^{1,2} including a recent trial that randomized 450 individuals with type 2 diabetes to (1) no self-monitoring; (2) standard self-monitoring; and (3) enhanced self-monitoring with tailored feedback.¹ Neither form of self-monitoring improved glycemic control, and for

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some patients, it may have worsened quality of life. Furthermore, nearly 50% of patients stopped glucose monitoring by the end of the 12-month study; patients who received enhanced feedback had the greatest attrition. This phenomenon may help explain why there has been little overall improvement in the hemoglobin A_{1c} levels of many patients with type 2 diabetes despite myriad new drugs and monitoring devices.

It is easy to blame attrition on the usual loss of interest or motivation that typically occurs in many programs. But the act of monitoring might make some patients become discouraged or avoidant. Some people may want to avoid the shame of failure,³ which may be exacerbated by reinforcing interventions of feedback as in the diabetes study. Alternatively, some patients might attribute failure—accurately or not—to circumstances out of their control, and frequent negative feedback can augment a sense of futility.⁴

The behavioral science literature affirms that when failure occurs, individuals have 2 types of reactions: emotional (How do I feel about this failure?) and cognitive (What caused this failure?) (Figure).⁴ Some individuals react with emotions of despair or believe that the failure was out of their control. Given the same failure, others might feel only mild regret and a sense that they can correct course. When failure appears devastating and inevitable, avoidance behavior prevails.

It may be possible to intervene on these underlying mechanisms to modify the way individuals react to failure. Boosting patients' emotions by providing unexpected compliments or affirmation after they experience failure has improved adherence to antihypertensive medications and increased physical activity among patients undergoing percutaneous coronary intervention (n = 756).⁵ In one study, sedentary older adults (n = 46) who had difficulty increasing their daily steps increased their walking by 25% when health educators coached them to see these failures as within their control rather than the result of inevitable processes like aging.⁶ These 2 strategies, positive affect induction and attribution retraining, have been tested in the fields of psychology and education but seldom in health promotion.

Avoidance behavior may reflect a generalized trait or a transient state. Early studies show that those with depression or low self-esteem are more likely to demonstrate avoidance, which makes sense given the link to emotions like shame or hopelessness. On the other hand, any individual has the potential to become avoidant given the right circumstances. Failure predisposes to avoidance based on a pervasive human tendency to ignore unpleasant information; for instance, many individuals check their 401k accounts less often when the stock market is doing poorly; people do not weigh themselves when they suspect that they are getting heavier.³ It is worrisome that monitoring might discourage precisely those struggling individuals with the greatest need for health promotion.

Much of the effort to advance the health of patients or employees is based on the idea that information is power: if patients only knew their blood pressure was high, then they would take action to reduce it. Technology, such as wearable tracking devices and point-of-care testing, helps to make this information more accessible. Yet for these approaches to be effective, health behavior research needs to close 3 knowledge gaps.

First, it is important to understand who benefits from monitoring, who does not, and why. To do this, researchers must measure baseline variables in trials of monitoring interventions that might identify predictors of response. These variables remain undefined but are unlikely to be the sociodemographic characteristics that are always measured, like age, sex, and race. Measures such as determination, resilience, and coping style may be better predictors of how individuals react to failure.

Second, individuals who design health promotion programs need to utilize strategies from the psychology literature that help individuals learn from failure instead of being discouraged. While the psychology concept of motivational interviewing has gained some traction in mainstream health care, other lesser-known advances like positive affect induction (random acts of kindness that boost patients' emotional resilience) or attribution retraining (cognitive reframing of failures as within patients' control) may be useful tools in promoting health behavior change.

Third, in the era of precision medicine, when molecular differences in tumors help to determine what targeted therapies are chosen, it seems outdated to apply one-size-fits-all approaches for the behavioral strategies that advance health. Precision medicine requires some form of behavioral phenotyping, such as helping clinicians distinguish patients more likely to be motivated by failure from those at risk of avoidance, and perhaps revealing other phenotypes yet unexplored.

In the future, organizations could target their employee incentive campaigns to the individuals with the greatest likelihood of benefit and also devise coaching or positive affect induction to help other individuals cope with the failures that are an inevitable part of health behavior change. Whether this approach will improve patient outcomes is unknown, but it would represent behavioral phenotyping in health promotion.

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Figure.**Response to Failure**

When faced with failure, individuals have cognitive and emotional reactions. Attribution retraining can encourage a sense of control over failures. Positive affect induction can buffer overwhelming negative emotions. These shifts may help individuals feel motivated, not discouraged, by failure.