

**Title**

Financial incentives may influence health behaviors, but do we end up with less than we paid for? A self-determination theory perspective

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We read with great interest a March 25th, 2019, *JAMA* Viewpoint article by Thirumurthy, Asch, and Volpp (1) on "*The Uncertain Effect of Financial Incentives to Improve Health Behaviors*," and appreciate the opportunity to offer the following response. As noted by Thirumurthy et al., the use of financial incentives in behavioral medicine has become widespread; more than 86% of U.S. employers offer financial incentives for health-related behaviors, yet evidence from well-designed trials have reported surprisingly mixed results.

We strongly agree with Thirumurthy et al.'s assertion that "*an important lesson is that seemingly small choices in how incentives are situated, framed, or deployed can have substantial effects on their success.*" This conclusion aligns with the recent findings of a range of relevant studies commissioned by the UK's National Institute of Health Research (<https://www.dc.nihr.ac.uk/highlights/patient-incentives.htm>). However, we propose that a clearer understanding of what intrinsic motivation is and how incentives affect it, may add to the explanations Thirumurthy et al. provide for incentives' uncertain effects. Below, we offer an alternative perspective based on self-determination theory (SDT; 2) and outline how resultant, empirically testable hypotheses based on SDT are either in agreement or disagreement with those proposed by behavioral economics.

The following overarching points will organize our discussion: 1) motivation is multifaceted; 2) rewards can be interpreted as informational and supportive or as controlling and undermining of intrinsic motivation; 3) rewards are not universally acceptable and often have unintended consequences, such as undermining intrinsic aspirations for safety, or compromising morals (e.g., cheating); and 4) we suggest that when incentives are used, they need to be employed alongside or contrasted with other forms of support to change health behaviors, and

their effects (good and bad) assessed more comprehensively, especially after the incentives are removed.

The first contribution we offer is that the term intrinsic motivation is seemingly misunderstood by Thirumurthy and colleagues. Intrinsic motivation is multifaceted and is about the things people do for pleasure, interest, curiosity, and personal challenge. The intrinsic reward is immediate and tied directly to the activity itself, never delayed as suggested by Thirumurthy and colleagues. We agree that many health behaviors are extrinsically motivated, including by concerns for delayed health outcomes. The examples offered by these authors, such as stopping smoking, wearing a seat belt, and taking a medication for hypertension, are not behaviors that are intrinsically interesting or enjoyable. Rather, SDT would classify these behaviors as extrinsically motivated, either because they are done for the purpose of avoiding injury or disease (an outcome extrinsic to the activity itself), or for the purpose of earning a financial incentive.

Nevertheless, in the SDT view, not all forms of extrinsic motivation are the same. Extrinsic motivation can still be adaptive if it reflects personal value for behavioral engagement, in other words, when extrinsic motivation is internalized to the point of becoming fully endorsed and autonomous. By contrast, extrinsic motivation is less adaptive when not internalized, for instance, if rewards or punishments are the primary or only reason for behavioral engagement. For example, in SDT studies of tobacco dependence treatments, SDT-based interventions enhanced extrinsic but internalized self-regulation, which accounted for the smokers' success in stopping smoking. This same pattern has been replicated with SDT-based interventions for physical activity, dental flossing and brushing, or taking a medication (see meta-analyses; 3, 4). Recent, complementary work by Verplanken and Sui (5) has also shown that linking new habits

to one's identity may contribute to the sustainability of those newly formed behaviors (see also Caldwell et al., 2018 on identity transformation; 6).

The second contribution we offer involves outlining how SDT might provide a deeper understanding of otherwise "uncertain effects" of rewards by explaining how rewards can be interpreted as informational and supportive, or as controlling and undermining intrinsic motivation. A meta-analysis of studies across many life domains found that tangible rewards tended to undermine intrinsic motivation after their removal (7). However, a number of factors moderated the strength of this overall effect. For instance, undermining effects were larger if only partial (i.e., less than promised) rewards were given, and for task-contingent relative to performance-contingent rewards (the former providing less information and being more controlling than the latter). Recent work has shown that focusing on financial incentives can also disrupt the ability to develop intrinsic motivation for incentivized health behaviors over time (8). Hence, considering the perceived functional significance of rewards (informational vs. controlling) is imperative in understanding how incentives can affect people's motivation, behavior, and health outcomes. We conclude that, until proven otherwise, all incentive programs should be closely studied to be sure that they are not undermining intrinsic motivation or autonomous extrinsic motivation for health behavior change, especially after incentives are no longer made available. If such undermining effects occur, incentives could be very harmful to health over time, and very expensive for the health care system.

A third contribution to the discussion that we offer is by highlighting the role of intrinsic aspirations (i.e., long-term goals). Humans in all cultures have been shown to have intrinsic aspirations for health and for safety (9). Patients may fail to initiate or maintain a recommended medication for many (often complicated) motives, but one primary motive is that providers too

infrequently involve patients in the decision making, or do not explain clearly and sufficiently potential long-term benefits and safety concerns. Incentive-focused interventions often emphasize changing the behavior for money awarded in the short-term, while typically ignoring patients' autonomous acceptance of the behavior's potential health benefits versus its potential harms. If patients perceive that they are being pressured to take a medication, do not understand the benefits, or are afraid of side effects, this can lead to long-term mistrust of the health care system, further undermining the effects of rewards on targeted (and untargeted; 8) health behaviors.

On the positive side, we believe that careful use of rewards that reduce costs or break barriers for engagement, and at the same time allow people to internalize a value for a health behavior in an autonomous manner, will be more likely to result in long-term change. For example, financial incentives might be especially useful for initiating behavior that is entirely unmotivated at baseline, or when linked to intrinsic aspirations (e.g., earned incentives for charities whose mission is personally meaningful, or shared amongst a group). Within SDT, it is crucial to determine whether the person feels their autonomy is being undermined by a financial incentive (i.e. the incentive feels coercive), or if their autonomy is being respected and their competence is being supported by the incentive. Much more research is needed at the motivational level to understand how incentives affect health-related behaviors in the short- and long-term, and how they can be optimally used alongside other supportive strategies (e.g., motivationally supportive communication style; 4) to improve patient outcomes.

In conclusion, we agree with Thirumurthy et al. that financial incentives may work under certain circumstances. However, to better understand the uncertainty with regard to their effects, we must also investigate how they influence health behaviors underlying intrinsic and

autonomous extrinsic motivation, and rigorously consider whether they produce undesired consequences on intrinsic aspirations, perceptions of fairness, and long-term behavior change.

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