

Combining gamification, cash incentive increases veterans' exercise

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We know that turning goals into a game can increase people's physical activity. We also know that financial incentives can be effective, especially when they're framed in a way where people lose money if they

don't reach their goals. But a new Perelman School of Medicine at the University of Pennsylvania study adds to evidence that combining the two can result in significant gains.

Researchers affiliated with Penn Medicine's Center for Health Care Innovation showed that a group of veterans who were overweight or obese and receiving care from a Philadelphia hospital were able to increase their daily step counts by more than 1,200, on average, when their personalized goals were paired with a game in which they received support from a buddy, all while they stood to potentially lose reward money if they didn't hit their targets.

The research, believed to be the first of its kind among veterans, was published in *JAMA Network Open*.

"What our study begins to show is that the combination of varying approaches can be effective, but we need to learn more about the duration and ability to sustain an effect over longer-periods of time," said the study's lead author, Anish Agarwal, MD, a clinical innovation manager in the Penn Medicine Center for Digital Health and an assistant professor of Emergency Medicine.

Often, companies create programs to encourage healthier behavior among employees. These programs typically involve step counts measured by some form of pedometer and daily or weekly goals, but leave it at that. Agarwal believes that it's important to study how different framings of goals and the accomplishment of them is important to improving them and actually helping people improve their behaviors.

"The world of mobile and digital health has created an environment where rolling these programs out is easier and more interactive," Agarwal said. "Time will certainly tell in how these incentives can be used to in equitable and sustainable ways."

For this study, Agarwal and his fellow researchers—including senior author Mitesh Patel, MD, an associate professor of Medicine—recruited 180 participants. They were randomly assigned to one of three different, equal groups. Everyone, including those in the control group, received an electronic, wearable device to track steps and selected a personalized [goal](#). But two of the groups utilized a behavioral science concept called "gamification," in which their goals were tied to a game in which they achieved points and levels for hitting their step goals. The progress of these participants was shared weekly via email with a buddy the participant had designated who could review them and encourage them.

One of those groups, though, had money riding on their goals. In total, they stood to make \$120 if they hit their goals each week for the study's 12-week intervention period. Every week that they didn't achieve their goals, the participants lost \$10 from the total they'd be issued at the end of the study.

It was this group, the researchers found, who made the largest strides during the intervention period. Compared to the control group, they significantly increased their steps by an average of 1,224. The other gamified group did increase their steps above the [control group](#), but it was only by 433, which was not significant.

"Loss aversion is a very powerful motivator," Patel said. "Most programs deliver rewards after the goal is achieved, but this clinical trial, similar to previous ones, shows that offering financial upfront and letting participants know they can be an [effective strategy](#)."

After the 12-week intervention period ended, the researchers continued to observe participants' step counts when the games were turned off. In the eight weeks following, neither group sustained their progress compared to those who were not part of the games. The group with [financial incentives](#) did still have an average 564 step increase in their

daily totals, but the non-incentive group actually decreased their daily steps by an average of 160.

Agarwal said that more research is needed to determine exactly why they got the results they did when research has supported gamification both with and without financial incentives. Their main focus is to increase the intervention time, and, ultimately, achieve longer term changes.

"Next steps for us are to begin to design and test approaches which help sustain the effect beyond the intervention period," Agarwal said. "One could imagine varying financial amounts at risk, duration of the intervention, and a strong social incentive. In this study the social incentive was passive, a weekly email to a social support person, but we could imagine more social connection or competition to test for individuals or groups."

More information: *JAMA Network Open* (2021). [DOI: 10.1001/jamanetworkopen.2021.16256](https://doi.org/10.1001/jamanetworkopen.2021.16256)

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