Dynamic Target Setting increases workplace physical activity: evidence from a randomised trial¹

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¹ We are grateful to the Movember Foundation for funding this research. We are also grateful to Olga Loseva from BUPA UK for making this research possible. We are grateful to seminar participants at the University of Pennsylvania, and participants at the Harvard Behavioural Insights and Public Health conference.

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Physical activity is an essential part of maintaining a healthy lifestyle. People who are more physically active have healthier weights, less incidence of heart disease and diabetes, and are concurrently less likely to miss work due to ill health¹.

Physical activity trackers have grown in use as a tool for helping people increase their activity levels. The evidence on the effectiveness of activity tracking devices by themselves is not encouraging, with some studies²⁻³ finding either no effects or inclusive results, while some find reductions in weight loss as a consequence⁴. Patel et al (2015), argue convincingly that there is a gulf between measurement and behaviour change that wearable devices are failing to bridge, and that these devices can at best act as facilitators for other interventions⁵.

Many devices provide a default target of 10,000 steps per day - an arbitrary target dating from the 1960s⁶. Research suggests that there is benefit to any incremental increase in step counts, and that trying to hit 10,000 steps every day can be demotivating⁷ and reduce the enjoyment derived from walking⁸. Goals tailored to the individual based on their past performance might more effectively motivate behaviour than a single 'one size fits all' target. We test this hypothesis.

The experiment was conducted with a large private firm based in the United Kingdom. Participants were employees of the company, who had signed up to the company's internal health and wellbeing app, and who had registered a wearable or phone-based activity tracker on the app, had recorded at least some steps in the week before the trial began, and consented to be part of the study. This gives a sample of 387 individuals, who were individually randomized to one of two conditions.

Participants received an introductory push notification from a 'Coach', and then one message each week for four weeks, with the content dictated by their treatment condition.

Standardised target condition: Participants received weekly push notifications from the Coach including a standard 10,000 step goal for the subsequent week.

Dynamic Personalised Target condition: Participants in the personalised target condition received weekly push notifications from the Coach, with targets based on their step count for the previous week. If they had met their step count for the previous week, their target increased by 10%; if they had not, it remained the same.

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Data on participants' steps were collected from the company's health and wellbeing app at the end of each week, and used to tailor the message in the personal target condition, as well as being collated for analysis.

The sample for the experiment consists of 387 individuals, of whom 199 are female, 178 are male, and 10 did not provide information on their gender.

Our data are analysed using panel regression with participant fixed effects to control for baseline activity (Table 1). We see a positive and statistically significant ($p < 0.001$) 1202 steps per day increase in the treatment group compared to the control group. This is driven in part by participants becoming more likely to use their wearable during the trial. Excluding those participants, we see a smaller increase, of 788 steps per participant per day, which remains statistically significant ($p < 0.05$).

We are also interested in the distribution of the effects. We conduct quantile regressions at the 25th, 75th percentiles and median. We find consistently positive and significant effects at each point, but that the size of treatment effects increases in line with the dynamic targets.

These findings suggest a role for dynamic target setting in increasing the effectiveness of wearable devices at increasing physical activity, with relevance for both employers and those wishing to increase their own activity.

Table 1 Main Results		
	(1)	(2)
	Full Sample	Active Sample
Sample, Level of Analysis	(Full sample, day level)	("Clean" sample, day level)
Treatment	1202.443*** (200.388)	788.580* (347.375)
Constant	3619.552*** (333.443)	4888.944*** (230.058)
<i>N</i>	13932	6230

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, fixed effects panel regression estimates with standard errors clustered at the level of the participant.

Table 2: Quantile Regressions of Treatment Effects

	(1)	(2)	(3)
	(25th Percentile)	(Median)	(75th Percentile)
Treatment	465.000*	827.000***	1201.000***
	(203.925)	(213.802)	(252.443)
Constant	4188.000***	7233.000***	10949.000***
	(293.087)	(307.283)	(362.818)
<i>N</i>	6094	6094	6094

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, quantile regressions presented at the 25th percentile, median and 75th percentile. Standard errors clustered at the level of the participant.

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