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Status incentive and peer spillover effects on physical activity habits

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ABSTRACT

We examine the impact of status-based threshold incentives on physical activity habits using a longitudinal data set from a private health and life insurance provider in the United Kingdom. We find that status-based incentives effectively foster sustained behavioral change, persisting even after the incentive is removed. We find variations in responses based on status goal levels and peer influence within member group sets. These findings suggest that status-driven incentives are particularly effective among individuals with weaker pre-existing habits, reinforcing the importance of social comparisons and goal gradient effects in shaping behavior. Our results contribute to the broader literature on threshold incentives, habit formation, and peer spillover effects in physical activity.

1. Introduction

Encouraging sustained physical activity is a key public health priority, given its significant benefits for long-term health outcomes and healthcare cost reductions (Haskell et al., 2009; Posadzki et al., 2020). While financial incentives have been shown to successfully promote increases in exercise during the intervention period (Volpp et al., 2008; Patel et al., 2016), the benefits of the intervention often taper off after the incentive is removed (West et al., 2022; Charness and Gneezy, 2009; Mitchell et al., 2013), which raises concern about the ability of these incentives to foster habitual behavior (Gneezy et al., 2011). Research suggests that while certain types of incentives can work to generate change, they are more effective at influencing discrete, infrequent health choices such as vaccine uptake, rather than changing behaviors (Marteau et al., 2009). In contrast, status-based incentives – where individuals earn social recognition or hierarchical distinctions based on their behavior – may provide a more lasting mechanism for behavioral change by leveraging intrinsic motivation in conjunction with social signaling.

Economic theory suggests that status operates as a powerful motivator distinct from financial rewards. Three features that contribute to the utility of status are its positionality – the ability to distinguish hierarchically from others in a group; its desirability as an indicator of entitlement to certain resources; and its nontradability (Heffetz and Frank, 2011, 3). Social signaling theory hypothesizes that individuals derive utility not only from the material gains from a reward, but also from their relative standing within a hierarchy (Frank, 1985). Ball and Eckel demonstrate this in their study on the economic value of status, and find that status-seeking behavior is rationally motivated by the fact that high-status individuals earn more, all else being equal, than their low-status counterparts (Ball and Eckel, 1998). Status awards have also been studied in corporate settings as an incentive device, as well as a signal of high performance (Besley and Ghatak, 2008).

Goal-gradient effects further suggest that individuals increase their effort as they approach a salient threshold or goal (Heath et al.,

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1999), and that these threshold-based goals encapsulate the properties of loss aversion and diminishing sensitivity (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). This makes status-based incentives particularly effective when structured around tiered achievement levels. Further, status can generate peer spillover effects, where individuals are influenced by the behaviors and achievements of those within their social network (Mas and Moretti, 2009). This social reinforcement may enhance the persistence of physical activity beyond the period of incentivized behavior.

We provide new evidence on status-based threshold incentives and peer spillover effects and their impact on physical activity. This analysis is conducted using data from a private insurer operating in the United Kingdom, offering both health and life insurance products. This insurer has embedded an array of behavioral interventions into their daily business practice, aimed at incentivizing healthier habits in their membership population. In addition to demographic and health data on their member population, the insurer also collects data on physical activity behaviors of their membership, including frequency and intensity of physical activity. As part of this insurer's behavioral program, members are assigned to a tiered status level (Bronze, Silver, Gold, Platinum), based on their health behaviors. This assignment is points-based and the primary mechanism for accruing points is through physical activity. This tiered status structure allows us to evaluate whether individuals adjust their behavior strategically near status thresholds, whether status-based incentives generate lasting habit formation, and the extent to which peer dynamics—particularly within spousal and family groups—amplify or moderate these effects.

We report several new results based on this analysis. First, we show that status attainment is a measurable, and significant motivator across the insurance member population. This is a key overall outcome supporting the salience and effect of threshold-based incentives in this population. Second, we show that even after a status goal has been attained, physical activity levels remain elevated above pre-status levels. This demonstrates that the use of tiered threshold incentive schemes may be effective in building and sustaining physical activity habits even after incentives are removed. Finally, we show a positive spillover effect from members with a comparatively high physical activity output to their lower-output peers, particularly after surpassing a status threshold. In this study, peers are defined within family units and most often comprise a spousal pair. These results in this study are consistent with earlier studies by Charness and Gneezy, which find that incentives that require people to continually exercise to earn a reward significantly improved uptake during the intervention period and, importantly, after the intervention period has concluded (Charness and Gneezy, 2009).

Our findings contribute to three key areas of economic research. First, this study contributes to the literature on non-monetary incentives by providing additional empirical evidence that status incentives can serve as a potent motivator for sustained health behavioral change. Consistent with Kosfeld and Neckermann, we show that status-based reward mechanisms promote increased participation in physical activity (Kosfeld and Neckermann, 2011). These findings highlight the utility of incorporating status considerations into the design of health behavioral interventions.

Second, we build on behavioral models of goal-setting and motivation, particularly with regards to the role of thresholds in shaping individual effort and persistence (Bénabou and Tirole, 2006; Grant and Green, 2009). We show that status thresholds generate discontinuities in health behaviors, and that these changes in physical activity behavior suggest both that status is a motivator and that motivation persists even after a status goal has been achieved.

Third, we provide new insights into peer effects in health behaviors, highlighting the role of social networks in developing and reinforcing status-driven exercise habits (Finkelstein et al., 2016). Individuals respond not only to absolute status cues but are influenced by their relevant standing within a group. In the case of this study, groups are defined by family members enrolled on the same insurance policy, and most often are spouses. These findings align with prior studies on concordance of physical activity behaviors within married couples (Cobb et al., 2016). The visibility of a peer or partner's health behaviors, particularly in the context of a status reward, sets a normative behavioral pattern and influences the health behaviors of others in the group. These findings together contribute to the empirical evidence on status-based threshold incentives and peer effects in the formation of health habits.

The remainder of this paper proceeds as follows. In Section 2 we provide a review of the literature on threshold incentives, gamification of behavioral incentives, and spillover effects. In Section 3, we describe our data and methods. Section 4 presents the results, and Section 5 concludes.

2. Related literature

Our study extends and combines multiple strands of literature. The first strand of literature examines the role of discontinuous threshold-based incentives, the second includes the use of gamification in behavioral interventions, and the third focuses on the spillover effects of health habits, particularly between married couples. Threshold incentives have been studied in the context of academic performance, long-distance racing, prosocial behavior, and healthcare reimbursement. Several recent studies have examined the effectiveness of gamification strategies in health behavioral interventions. Peer and spousal spillover effects have been studied in other healthy behavior promotion programs. The study of these incentives for health behavior change within partner sets provides a setting for studying the role of signaling and behavioral spillovers as they relate to threshold incentives. To the author's knowledge, status-based threshold incentives in conjunction with peer effects have not yet been studied in the context of health habit formation.

2.1. Threshold-based incentives

Threshold, or nonlinear incentives, are employed in a variety of settings, such as health care, pro-social behaviors and academic performance.

In health care reimbursement settings these non-linear incentives are often exploited by actors looking to maximize incentive

rewards. This phenomenon has been noted in Dutch rehabilitative care settings, and studies have found that profit-oriented independent treatment centers have a particularly strong response to discontinuous payment thresholds (Gaspar and Koolman, 2022). Likewise in the Medicare prospective payment system in the United States there is a substantial increase in Medicare payments when a patient's stay in a long-term care hospital exceeds a threshold number of days. Two separate studies note strategic provider behavior in this setting, with hospitals disproportionately discharging patients after they cross the threshold for the greater payment (Einav et al., 2018; Eliason et al., 2018). In each of these cases, private actors seek to maximize the marginal returns on effort by exploiting the threshold incentive structure that they are operating in.

Non-linear rewards schemes have also been studied with regards to individuals' prosocial behavior. In a longitudinal study of blood donors, donors significantly increase the frequency of their donations immediately before reaching reward thresholds, but only if the rewards are publicly acknowledged (Lacetera and Macis, 2010). Their findings contribute to the literature which suggests that providing monetary incentives may reduce pro-social behavior but non-monetary incentives which convey status, such as public recognition of good deeds, may increase these behaviors. This lends additional credence to the use of non-monetary, externally bestowed rewards as a motivator for positive health behaviors in a threshold incentive environment.

Perhaps the most closely related paper on non-linear rewards schemes focuses on the effect of academic grades and individuals' behavior. Grant and Green, in their study of the behavioral incentive properties of grades, posit several behavioral properties relevant to our study (Grant and Green, 2009). The first of these is the Peak Effort Property – the idea that individuals far below a threshold will put forth little effort, those near the threshold will put forth more, and those in between will put forth the most effort to surpass the threshold. The second of these is the Sawtooth property, which posits that effort follows a "sawtooth" shape and rises more quickly than it falls as an individual passes a goal threshold. This theory is demonstrated empirically in a later study of athlete behavior in long-distance races (Grant, 2016). The incentive scheme studied in this paper employs discrete thresholds like those used in academic grading scheme, and individual behaviors may mirror the non-continuous effort properties noted by Grant and Green in their studies.

Threshold incentives are also seen in loyalty schemes, for example airline loyalty programs. These loyalty schemes employ behavioral economics principles such as the endowment effect and loss aversion to keep users in a heightened awareness of their status (Bucher, 2017), often resulting in users expending disproportional effort to maintain their status (Sernovitz, 2016). The branding of these schemes with distinguished titles such as "Executive Club" also imply a degree of exclusivity and superiority designed to build brand loyalty. Similarly, the program studied in this paper, while reinforcing heath habits, may also contribute to building loyalty and consistent engagement with the incentive program within the insurance scheme.

We contribute to the existing literature on threshold incentives by examining how these incentive structures influence the development of health behaviors, specifically physical activity levels. Further, we examine how these health behaviors persist after a goal threshold has been achieved.

2.2. Gamification in behavioral interventions

As smartphones and wearable activity trackers have become more prevalent, empirical evidence to support gamification in health has begun to emerge (King et al., 2013). In a study of the top 50 ranked free health and fitness applications, 64% were found to use gamification tools, including goals, social influences, challenges, points, and badges (Cotton and Patel, 2019).

Gamification has been used in a number of health and wellbeing behavioural interventions, and has demonstrated some positive outcomes as compared to traditional, non-gamified incentives (Johnson et al., 2016; Nishi et al., 2024). A recent study combined gamification with peer effects and loss aversion to support sustained behavior changes, and found that participants randomized to the gamification with social support and loss-framed financial incentives trial arm sustained higher daily step counts than the control or gamification alone (Agarwal et al., 2021). Another study of the effects of gamification in combination with social support in rheumatoid arthritis patients found that patients increased physical activity and decreased health care utilization compared to control (Allam et al., 2015).

Further, the type and presentation of gamification appears to have a significant impact on behavior. A study of temporal discounting of rewards found that users selected applications more frequently when rewards were placed closer to the start of the interaction, and that effects were seen with both monetary and points-based rewards (Garaialde et al., 2021). Another study comparing different gamification norms (cooperation, competition, and hybrid) in promoting physical activity found that cooperation-based gamification significantly increased activity levels when compared to exercising alone, and outperformed the competition and hybrid gamification models (Chen and Pu, 2014).

The program studied in this paper employs several of these key features, namely gamification in the form of points and badges; cooperation towards goal achievement and peer effects of behavior; and loss aversion. This specific program design provides the opportunity to study these effects in a real-world setting. We contribute to the literature on gamification by studying the ways in which these gamification features influence health behaviors and contribute to the development of health habits.

2.3. Spillover effects in health behaviors

Spillover effects in peer groups, and particularly in spousal pairings, have been demonstrated across a range of health behaviors. Drinking behaviors before marriage have been shown to influence subsequent habits within the marriage (Leonard and Mudar, 2003). Evidence on spillover effects of smoking within marriage are mixed, with some studies finding that the decision of one partner to quit smoking does not have a substantial effect on their spouses decision to quit smoking (Palali and Van Ours, 2017), while others note large spillover effects in smoking behavior between spouses (Fletcher and Marksteiner, 2017).

Physical activity spillover effects have also been demonstrated among spouses. Individuals have higher odds of meeting physical activity recommendations if their spouse met recommendations (Cobb et al., 2016). This relationship is also impacted by partner concordance or disagreement within the relationship, with partner support positively associated with moderate physical activity and partner disagreement negatively associated with vigorous physical activity (Yuan et al., 2024).

Peer effects in physical activity have also been studied in non-spousal peer groups. Previous studies have demonstrated a causal link between peer effects among adolescents and increased physical activity (Zhou et al., 2023), and other studies find that there is behavioral spillover from children enrolled in childhood obesity prevention and health education interventions to their parents and families (Brown et al., 2024; Berniell et al., 2010).

We contribute to the literature on spillover effects in health behaviors by examining how physical activity levels adjust over time, particularly within partner pairs with discrepant pre-existing physical activity levels.

3. Data and methods

3.1. Data

Our analysis is based on a longitudinal dataset provided by a private insurance company operating in the United Kingdom. This insurance provider offers both health and life insurance coverage, and it employs multiple incentive programs to promote healthy behaviors in its members. For this study we evaluate health behaviors in a subset of the insurer membership during 2022 and 2023.

Insured individuals are encouraged to enroll in the so called “Active Rewards” program and link a fitness tracker to record their daily steps and physical activity. Participants earn points for physical activity, measured through wearable devices, gym check-ins, and self-reported activities. Earned points accumulate towards tiered status levels: Bronze, Silver, Gold, and Platinum. Status level is assigned based on the points accumulated at the policy level, and therefore is based on collective efforts for members on joint policies. Total points accumulation is updated daily, and any increases in status level are effective from the date that the requisite points were earned. Members are notified of status level changes via notifications in the insurer rewards app.

In addition to the annual status levels, members are also eligible for weekly physical activity rewards. These include discounted beverages from a national coffee chain or discounted cinema tickets. The points accrual level needed to earn these weekly rewards is the same across status level and plan type, and all members enrolled in the active rewards program are eligible for these rewards.

The dataset consists of 330,834 unique individuals with information on demographics, activity tracking history, and prior year’s earned status tiers. To ensure robust estimation we exclude records with gaps in status assignment information, members with multiple distinct policies, and members for which we did not have a complete policy year of data. We also exclude members in the Bronze status group from this analysis. Bronze is the default status level for all members enrolled on the rewards program, and as such there is no status maintenance goal and no risk of losing one’s status due to inactivity. This leaves an empirical sample of 120,873 individuals.

Under certain policy types, individuals at a higher status level are eligible for a discount on their premium adjustment in the following year. These policy types include life insurance policies and individually procured health insurance policies. Health insurance policies accessed through a workplace benefit do not have a direct financial incentive related to status.

Members may be enrolled on individual policies, providing coverage for just themselves, or on joint policies. Joint policies may include a spouse, adult dependent or child under 18. Policies with children under the age of 18 are excluded from this analysis as child physical activity does not contribute to overall status accrual. Status thresholds vary by status level and between individual and joint policies. For individual plans, point thresholds increase in increments of 800 from 0 points for Bronze status to 2400 points for Platinum status. For joint plans, the step between each status threshold increases to 1200, reflecting that multiple members’ activities contribute to the joint policy status. Status thresholds for joint policies range from 0 points for Bronze status to 3600 points for Platinum status. See Appendix Fig. A.1 for a full listing of status thresholds by policy class.

Members can earn points towards their status through several activities. The primary mechanism for points accrual is through physical activity, with members able to earn up to 40 points per week for gym workouts, daily step counts, or recording a workout via their wearable health tracker. Gym workouts are tracked based on entrances to a partner gym affiliated with the insurer, and are recorded by syncing the gym membership account with the insurance rewards app. Step counts and workouts are recorded via wearable activity trackers, and recorded activity is synced from these wearable devices to the insurance rewards app. Generally, a member can earn up to 8 points from physical activity in a single day, and if a member participates in multiple points-earning events per day, only the highest-value event will contribute to their status points accrual. Members may also earn points by completing an online health review, and for having health metrics such as BMI and blood pressure in a healthy range.

A summary of selected activities that members can complete to earn points towards rewards and statuses is provided in Appendix Fig. A.1 and Table A.1. A full list of point-eligible activities is included on the insurers website (Vitality UK, 2024). An individual’s status in a given year is the greater of a) their earned status from the prior year, or b) their earned status in the current year based on activities completed to date.

Our primary outcome variable is physical activity days per month, defined as days where at least one physical activity event is recorded. See Appendix Table A.1 for definitions of physical activity events. While the data includes other measures of physical activity, these were not used as the primary outcome variable because they do not have an easy interpretation (physical activity points per month) or are less representative of an individual’s physical activity habit (physical activity events per month). Physical activity points awarded for each qualifying activity are specific to this insurer’s rewards scheme, and so findings based on monthly physical activity points may not directly translate to other threshold incentive-based rewards schemes. Changes in annual physical activity points accumulations are used as a measure of overall engagement with the rewards program in Section 4.2 below. Physical activity

events differ from physical activity days in that a member may record multiple activities on the same day. While each of these activities may be points-eligible, only the highest-value activity on a given day will contribute towards annual points accumulation and status. Physical activity events are less representative of a physical activity habit in that they do not as clearly reflect a member's behaviour throughout the month and may misrepresent habits in period of high physical activity output. Physical activity events are used only as a robustness check to support the directionality of the primary regression discontinuity findings in Appendix B.4.

An individual's status within the active rewards program is based on points earned through both physical activity and other health-related activities such as health reviews and fitness assessments. Points are accrued at the policy level, and status level applies to all members on a given policy. As an illustrative example, if an individual accrued 900 points in the first year of their policy, they would begin the second policy year with Silver status (see Appendix Fig. A.1 for status point thresholds). Under this same example, the member would remain in the Silver status for the second year of their policy unless they accrued at least 1600 points over the policy year and progressed to the next status level (Gold status). If they did not accrue at least 800 points in the second year of their policy, their status would revert to Bronze in the third policy year. Point accruals reset to zero at the beginning of each policy year

3.2. Methods

In this section we present three econometric specifications considering different facets of the status-based incentive structure. We first establish status levels as a motivator within this insured member population. We do so using a regression discontinuity analysis of members close to a status threshold cutoff in the year preceding the study ($t = 0$). This approach identifies a cohort k_n who narrowly do not maintain their status level and thus are demoted a status level, and a cohort k_m, who narrowly retain their status level and carry it over to the next policy year ($t = 1$). We employ a regression discontinuity design using covariates as described by Calonico et al. to control for potential confounders that may affect a member's likelihood of treatment assignment (Calonico et al., 2019). The regression discontinuity is specified as follows:

$$PA_{i,\ t=1} = \alpha + \beta_0 D_{i,t=0} + \beta_1 \left(X_{i,t=0} - c\right) + \ \varepsilon_i \tag{1}$$

Where $PA_{i,\ t=1}$ is the monthly physical activity days for member i in the policy year following treatment assignment, $D_{i,\ t=0}$ indicates if the member retains their status level by the end of the assignment year, $D_{i,\ t=0} = 1\left(X_{i,\ t=0} \geq c\right)$. $X_{i,\ t=0}$ is the proportion of points accrued at year end in the assignment year, relative to the minimum number of points needed for the member to maintain their status. c is the cutoff value, in this setting equal to 1. β_i is a vector of covariates to control for confounding effects and ε_i is the error term. Standard errors in the covariates are clustered at the member level.

Our identification relies on the standard regression discontinuity assumption – that individuals have imprecise control over the attainment of a given status level. While status is defined by an individual's, or member-set's, physical activity output over a given policy year, in conjunction with other health-promoting activities such as preventative care screening, there is limited scope for how much effect an individual can have over their status assignment over a short period of time. There is a cap on the number of points that a member can accrue in a given week towards their status level based on physical activity, meaning that members only have limited capacity to manipulate their status assignment towards the end of the policy year. See Appendix A for maximum weekly physical activity point limits. Lee formally shows that localized random assignment can occur event if agents have some influence over the assignment variable, as long as they do not have the ability to sort precisely around the threshold (Lee, 2008). Similar assumptions have been applied in other regression discontinuity studies of threshold incentives, such as academic grades (Li and Xia, 2024).

Using the cohort of members identified in this optimal bandwidth, we assess the effect of cohort assignment $k \in [k_n, k_m]$, where k_n defines the cohort who do not maintain their status and k_m defines those who do, on monthly physical activity days and status maintenance impact in the next policy year ($t = 1$) using a panel regression approach.

The panel regression is specified as follows:

$$PA_{im} = \alpha + \ \beta x_{im} + \ \varepsilon_{im} \tag{2}$$

Where PA_{im} is the monthly physical activity, x_{im} is a vector of covariates including treatment cohort assignment, whether the member has reached their status maintenance threshold in month m, whether the member has reached the next status level threshold in month m, policy controls, demographic controls, and seasonal controls. Standard errors are clustered at the member level.

Finally, we inspect trends in physical activity behavior around the status maintenance threshold using an event study approach. This approach compares recorded physical activity levels on a monthly time horizon relative to when an individual crosses the status maintenance threshold. We estimate a window of six months before and after a member meets the requisite threshold to maintain their prior year's status, with pooled effects seven or more months before and after the event. We selected this window to provide a balanced view of behavioral trends before and after threshold attainment, as well as longer-term behavioral trends after the incentive was removed, while retaining adequate sample sizes in each period to estimate effects. We note that since individual, or member-set, behavior is the driver of physical activity levels and physical activity substantially contributes to subsequent status maintenance, this relationship is definitionally endogenous. We do not purport that the results of the event study estimation present causal effects, but instead present these as illustrative models of behavior around status thresholds.

We test how physical activity levels change as an individual builds towards, and meets, a given status threshold as well as how these behaviors change relative to the status level in question. Our event study analysis is specified as follows:

$$PA_{it} = \alpha_i + \gamma_t + q'_{it}\psi + \sum_{m=-G}^{M} \beta_m z_{i,t-m} + C_{it} + \varepsilon_{it} \quad (3)$$

where PA_{it} is the monthly physical activity days for individual i in month t. Offset from achieving the prior year's status is denoted by $z_{i,t-m}$ and the dynamic effects of the maintaining prior status are denoted by $\sum_{m=-G}^{M} \beta_m$. Unit and time fixed effects are denoted by α_i and γ_t, respectively. q_{it} is the vector of control variables, including age, gender, BMI range, smoking status, lagged physical activity days, calendar month, whether the policy for this individual has a financial incentive tied to status, whether the individual attends a health screening, and policy-level status from the prior year. C_{it} represents confounding that may be associated with the policy, and ε_{it} represents unobserved shock (Freyaldenhoven et al., 2025). Standard errors are clustered at the member level.

The event study graph for our primary model specification uses the following variation of Eq. (3):

$$PA_{it} = \sum_{k=-G-L_G}^{M+L_M-1} \delta_k \Delta z_{i,t-k} + \delta_{M+L_M} z_{i,t-M-L_M} + \delta_{-G-L_G-1}\left(1 - z_{i,t+G+L_G}\right) + \alpha_i + \gamma_t + q'_{it}\psi + +C_{it} + \varepsilon_{it} \quad (4)$$

where Δ denotes the first difference operator. Under this specification, $\sum_{k=-G-L_G}^{M+L_M-1} \delta_k$ measures the cumulative effect of maintaining one's prior-year status at different time horizons k after the fact (Schmidheiny and Siegloch, 2023). This specification further allows for the identification of pre-event trends L_G additional periods before an individual maintains their status and an additional L_M periods after. This specification is well-suited to the case of staggered adoption. In the case of this study, all individuals begin at a lower earned status than in the prior year since point accruals reset to zero at the beginning of each policy year, and once an individual regains their status level it is never reversed in that policy year (Freyaldenhoven et al., 2025, 2025).

We explore heterogenous effects by prior year status, by plan type, and, for joint policies only, by member performance relative to their peer on the same policy. Member performance is calculated at the point at which a member group crosses the status maintenance threshold. The calculation is based on the proportional contribution of effort from each individual in the member-set towards reaching the status maintenance threshold, as measured through points accumulation up until that point. Members are defined as having contribution at parity if their individual contribution proportion is within one standard deviation of the mean for the insurer's member population. High-contributors are those whose individual contribution is more than one standard deviation above the mean, while low-contributors are those whose individual contribution is more than one standard deviation below the mean. The definition of high- vs low-contributors reflects level of effort relative to one's partner within a joint policy.

Table 1
Descriptive Statistics by Prior-Year Status.

	All $N = 120,873$	**Silver** $N = 42,476$	**Gold** $N = 45,729$	**Platinum** $N = 32,668$
Maintained prior year's status level	96,822 (80.1%)	36,788 (86.6%)	35,699 (78.1%)	24,335 (74.5%)
Average time to maintain prior year's status level (months)	8.7	6.8	9.4	10.4
Age (years)	42.1	39.8	42.1	45.0
Male	52.9%	53.3%	53.3%	51.7%
Joint Policy	38.3%	25.8%	34.1%	60.6%
BMI range[1]				
Underweight	1.0%	1.0%	0.9%	1.0%
Healthy Weight Range	76.5%	73.1%	77.1%	79.6%
Overweight	10.5%	10.4%	10.3%	10.9%
Obese	9.4%	11.7%	9.2%	7.0%
Clinically Obese	2.1%	2.9%	1.9%	1.2%
Morbidly Obese	0.6%	0.9%	0.6%	0.3%
Smoking status[2]				
Never smoker	78.1%	76.3%	77.8%	80.6%
Former smoker	19.8%	20.5%	20.3%	18.4%
Current Smoker	2.1%	3.2%	1.9%	1.0%
Plan Type[3,4]				
Life	49.4%	45.6%	51.2%	51.9%
Health	55.6%	57.2%	53.3%	55.3%
Corporate	64.8%	74.8%	65.4%	50.5%
Individual	35.1%	25.2%	34.5%	49.5%

Notes: This table describes variations in descriptive statistics by prior-year's status level. All statistics besides status outcome and time to maintain prior year's status are at baseline. These statistics include information on status performance in the observation year, demographic characteristics, health risk factors, and policy type.

[1] BMI range percentages based on population with available BMI information at baseline (99,948 individuals).

[2] Smoking status percentages based on population with available smoking history information at baseline (97,813 individuals).

[3] A nominal percentage (<0.1% of policies) are an "unknown" plan type.

[4] Life and individually procured health insurance policies have a financial incentive associated with status level in the form of a premium discount. Corporate health insurance policies, that is, those that are provided through an employer, do not have a financial incentive directly attached to them. Members may be enrolled in both life and health insurance policies so percentages will not sum to 100%.

4. Results

4.1. Descriptive statistics

Table 1 presents descriptive statistics for our sample of individuals aged 18–89, by prior year's status. We report means for the full empirical sample in column 1, policies with a "Silver" status carried over from the prior year in column 2, policies with a "Gold" carry over status in column 3, and finally policies with a "Platinum" carry over status in column 4.

Regarding status threshold achievement, we note that most members retain their prior year's status in a given policy year. This proportion decreases for higher status levels, reflecting the comparatively greater effort needed to meet those thresholds. Members at a Platinum status level are also substantially more likely to be covered on a joint policy. This similarly suggests that attaining the status maintenance thresholds is more feasible when the workload is shared. Members on a health insurance plan are more likely to have individually procured the coverage at higher status levels, as opposed to receiving it as a benefit-in-kind through their workplace. This may be reflective of more active people selecting this insurer specifically because of the health rewards scheme that they offer.

Policy start dates are staggered throughout the calendar year, so we control for monthly fixed effects, as well as policy duration fixed effects in our analyses.

Compared to the UK population more broadly, the insured member population in this study is healthier at baseline and more affluent. Of our study population 22% are overweight or obese, excluding morbidly obese, as compared to 64% of the UK population (NHS England, 2024). Likewise, smoking is more common in the overall UK population as compared to the insured member population, with 12.9%% of adults in the UK reporting that they were current smokers, as compared to 2.1% of the insured member population (Office for National Statistics, 2024). The population with private health insurance in the UK is also more heavily skewed towards affluent populations, with 41.2% of the richest decile having private health insurance, as compared to 3.7% of the poorest decile (Emmerson et al., 2001).

4.2. Regression discontinuity: effect of status level assignment

Table 2 presents the results of the status assignment regression discontinuity with robust standard errors. In this model the treatment group is defined as those who narrowly maintain their status from one policy year to the next. Within the optimally-defined bandwidth, there were 4638 members who fell just below the status maintenance cutoff threshold, and 7915 who were just above the cutoff threshold.

The results in Table 2 indicate that status assignment discontinuity has a significant effect on subsequent physical activity levels. Those who narrowly maintain their status have lower physical activity levels in the subsequent year, as compared to those who narrowly miss maintaining their status. Rather than status maintenance as a disincentive for exercise, we propose that the loss of a previous status level, as in the control group, motivates an additional investment in physical activity days in the following year to re-earn the status level that was lost. Under this assumption, the model indicates that members who "lose" or who do not maintain their status level by a small margin each year are more highly engaged in physical activity in the following year, as compared to those who narrowly maintain their status.

Among members who narrowly maintain their status each year, we do not see a statistically significant change in activity level, although there is a slight, non-significant decrease in engagement with the rewards program as reflected in Table 3 below. Members who narrowly maintained their status in one year then, in the subsequent year, face a near-maximal gap between their current effort level and the effort level needed to progress to the next status level. This finding aligns with the Peak Effort Property, which posits that individuals far below a threshold put forth little effort (Grant and Green, 2009). In this case, members are far below the threshold to move to the next status level. However, they may also be motivated by loss aversion to avoid losing the status that they have earned thus far, which they narrowly maintained in the prior year. These two motivational properties working in conjunction may explain why we see a nominal change in year-over-year effort level changes in this particular membership subset.

We confirm this hypothesis using the mean difference in annual points accumulation between the control and treatment groups and find that the control group – those that narrowly miss maintaining their status – have a significantly greater points accumulation in the subsequent year, while there is no significant change in the treatment group's points accumulation. See Table 3 below.

Further, we find that among members who miss the status maintenance threshold, there is a trend towards increased engagement in the program as measured by change in points accumulation between the assignment and observation years. See Fig. 1 below.

Table 2
Effect of Status Treatment Assignment on Subsequent Physical Activity Days.

Monthly Physical Activity Days	Coefficient	$P > \|z\|$
Conventional St. Err.	−0.337**	0.001
Robust St. Err.	−0.286*	0.017

Controls used in the regression discontinuity include gender, age, BMI range (bins for underweight, healthy weight, overweight, obese, clinically obese, and morbidly obese), smoking status, policy length, calendar month and lagged physical activity days.

** $p < 0.01$.

* $p < 0.05$.

Table 3
Difference in Annual Mean Points Accumulation by Treatment Assignment.

Control				Treatment			
Members	Assignment Year Points Accrual	Observation Year Points Accrual	Mean Difference	Members	Assignment Year Points Accrual	Observation Year Points Accrual	Mean Difference
4638	2217.85	2252.77	34.92***	7915	2519.27	2512.09	−7.18

T-test for difference of the means. H_a: $Points_{(t=0)} < Points_{(t=1)}$.
*** $p < 0.001$.

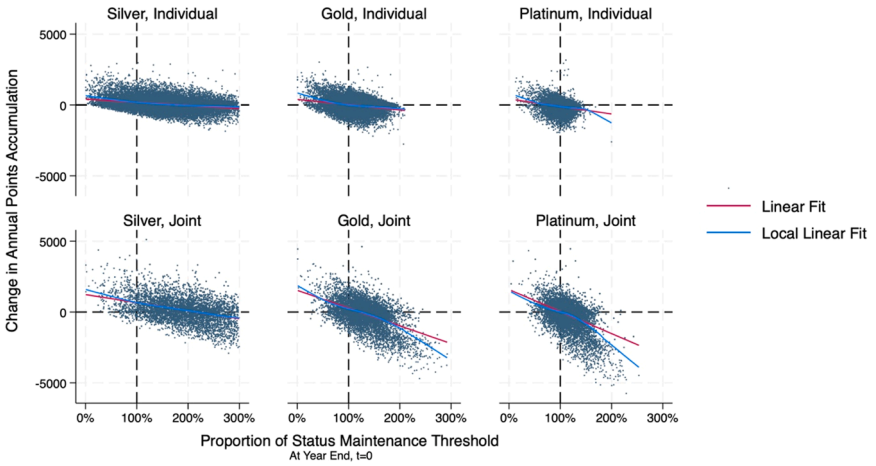

Fig. 1. Change in Annual Points Accumulation by Distance from Status Maintenance Threshold and Policy Type.

The y-axis presents the difference in year-end points accumulation between years $t = 0$ and $t = 1$. The x-axis represents proximity to status threshold at the end of year $t = 0$ as measured by proportion of points accrued that are needed to maintain each status level. Proportions below 100% indicate members who did not maintain their status from one year to the next ($t = 0$ to $t = 1$), while proportions greater than 100% indicate members who maintained their status levels year over year and, in certain cases, proceeded to increase their status level.

Fig. 1 above plots the relationship between proximity to the status maintenance threshold on the x-axis and change in points accumulation in the subsequent year on the y-axis. We note across all status levels and policy types, there is an inverse relationship between proximity to the status threshold at year end and change in points accumulation, with members further below the status maintenance threshold demonstrating greater increases in annual points accruals in the following year, while members who exceeded their status maintenance thresholds do not exhibit as great an increase in points accumulation year over year.

Table 4
Treatment Assignment and Status Maintenance Impact on Physical Activity.

Difference in Monthly Physical Activity Days	(1) All	(2) All, Interaction	(3) Individual	(4) Individual, Interaction	(5) Joint	(6) Joint, Interaction
Treatment Assignment	−0.588***	−0.523***	−0.707***	−0.633***	−0.444***	−0.395***
Maintain Current Year's Status	1.228***	1.402***	1.753***	1.934***	0.906***	1.064***
Reach Next Status Level	1.275***	1.207***	1.581***	1.559***	1.123***	0.996***
Treatment Assignment, Maintain Current Year's Status		−0.323***		−0.356**		−0.268*
Treatment Assignment, Reach Next Status Level		−0.023		−0.200		0.227
Groups	11,175	11,175	6342	6342	4833	4833
R^2	0.54	0.54	0.55	0.55	0.54	0.54
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Policy Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: 95% confidence intervals in brackets. Demographic controls include gender, age, BMI range (bins for underweight, healthy weight, overweight, obese, clinically obese, and morbidly obese), and smoking status. Other controls include month fixed effects, policy tenure, lagged physical activity days, and participation in health screening activities.
*** $p < 0.001$.
** $p < 0.01$.
* $p < 0.05$.

4.3. Panel regression: decomposition of physical activity and status

We next analyze member behavior across the year following treatment assignment. Table 4 presents the results of the panel regression analysis among members within the optimal bandwidth identified in the regression discontinuity in Section 4.2. We control for demographic, seasonal and policy controls. We present models estimating the effect of treatment assignment and status goal achievement separately, and as an interaction effect.

Consistent with the results presented in Section 4.2, assignment to the treatment group, that is, being just above the status assignment threshold in the prior year, is significantly associated with lower levels of physical activity as compared to those assigned to control. We posit that this relationship is reflective of status loss as a motivator for elevated physical activity levels in the subsequent year.

Retention of status and further status achievement are also highly correlated with higher physical activity levels. We note higher physical activities across plan types after members achieve enough points to maintain their prior year's status, and once they achieve a new, higher status level. This suggests that members are not economically optimal in their behaviors and may in fact be building an intrinsic habit for physical activity. If members were solely engaging in physical activity to earn a status label, we would expect to see a drop in output, measured in physical activity days, after that goal was achieved. The higher physical activity levels after maintaining one's status suggests that while status levels are a powerful motivational tool, their greatest benefit is in the development of sustained habits in the absence of the incentive.

This more economically optimal behavior is noted in the interaction model, with members in the treatment group displaying lower physical activity levels after crossing the status maintenance threshold, consistent with the results in Section 4.2. This suggests that members who just barely maintained their status in one year ($t = 0$), are more motivated by status level than they are by an intrinsic affinity for physical activity. We see this behavior exhibited in the year following treatment assignment ($t = 1$), with a significant decrease in physical activity output once the status goal has been met. Full model output results are included in Appendix C.

4.4. Event study results: physical activity around the status maintenance threshold

We expand the results discussed above by examining individual behavior around the status maintenance threshold using an event study approach. All analyses in this section are based on the full panel of members ($n = 120{,}873$) in year $t = 1$.

Table 5 examines the difference in mean monthly physical activity days before and after the status maintenance threshold is crossed. We provide two specifications, the first controlling for demographic, seasonal and policy controls, and the second omitting demographic controls.

The results in Table 5 indicate that while members maintain higher physical activity levels after reaching their respective status threshold, these effects are heterogeneous by the threshold goal. These post-threshold effects are heterogeneous by status level, with increases in mean monthly physical activity days for Silver and Gold statuses of 0.52 and 0.25 days, respectively. Conversely, a slight decrease in mean physical activity days is noted in the Platinum status group, which may be reflective of the higher levels of physical activity overall that are required to meet this status threshold.

These effects are broadly consistent when demographic controls are removed from the analysis, with the exception that post-status maintenance difference in physical activity levels for the Gold status group becomes non-significant, while difference in physical activity levels for the Platinum status group becomes significant.

Table 5
Difference in Mean Monthly Physical Activity Days.
After Reaching Incentive Threshold.

	(1) All	(2) Silver	(3) Gold	(4) Platinum
Difference in Monthly Physical Activity Days	0.35*** [0.27, 0.43]	0.52*** [0.37, 0.67]	0.25** [0.11, 0.40]	−0.21 [−0.43, 0.01]
Observations	111,388	37,651	42,187	31,535
R^2	0.71	0.64	0.66	0.65
Demographic Controls	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Policy Controls	Yes	Yes	Yes	Yes
Difference in Monthly Physical Activity Days	0.28*** [0.21, 0.36]	0.40*** [0.27, 0.53]	0.10 [−0.03, 0.24]	−0.24* [−0.46, −0.03]
Observations	120,625	42,370	45,617	32,624
R^2	0.70	0.64	0.66	0.65
Demographic Controls	No	No	No	No
Month Fixed Effects	Yes	Yes	Yes	Yes
Policy Controls	Yes	Yes	Yes	Yes

Notes: 95% confidence intervals in brackets. Demographic controls include gender, age, BMI range (bins for underweight, healthy weight, overweight, obese, clinically obese, and morbidly obese), and smoking status. Other controls include month fixed effects, policy tenure, lagged physical activity days, and participation in health screening activities.

*** $p < 0.001$.

** $p < 0.01$.

* $p < 0.05$.

Fig. 2 below presents the event study plot for the full sample analysis. Physical activity output follows a sawtooth shape, with effort levels rising more quickly than they fall around the incentive threshold, consistent with behavior noted in other studies of threshold incentives (Grant and Green, 2009). While physical activity levels are not sustained at the levels observed in the immediate leadup to status maintenance, they remain higher overall than in the period preceding status maintenance. As discussed in Section 3.2 above, we note that the null hypothesis of existing pre-trends in physical activity cannot be rejected under the current specification. Therefore, the graph below is intended to be illustrative of how physical activity in this member set changes around the status maintenance threshold.

We extend our analysis to assess heterogenous effects for member populations with and without financial incentive eligibility. Table 6 below examines the difference in mean monthly physical activity days before and after the status maintenance threshold is crossed, by financial incentive eligibility. As before, we control for demographic, seasonal and policy controls.

As in the overall sample, both members who are and who are not eligible for financial incentives display an increase in average physical activity levels after achieving the status threshold. We note variation in the pre-post difference in the means by financial incentive eligibility, although these differences are not significantly different from one another. This suggests that the observed difference between pre- and post-threshold physical activity levels is driven by status attainment, and this status motivation does not significantly vary based on whether the member is enrolled on a plan with a status-based financial incentive.

We next investigate variation in post-threshold behaviors by effort level within joint policies. We conduct this analysis on members that are comparatively low contributors within their member-set, defined as being more than one standard deviation below the mean contribution proportion. Table 7 examines the difference in mean monthly physical activity days before and after the status maintenance threshold is crossed, by status level and financial incentive eligibility. As before, we control for demographic, seasonal and policy controls. Fig. 3 presents the event study plot for all low contributors across status groups.

Across all status levels, low contributors demonstrate a significant increase in physical activity days in the post-threshold period. This may be driven by peer influence or a culture of exercise within a family unit spilling over to the low-contributor member. It may also be tied to unconscious self-signaling regarding the status label and perceived behaviors that should come along with that label. For example, if a low-contributor member learns that they have retained their Gold status primarily through the efforts of their partner, they may be influenced both by the status label and their partner's behavior to engage in more "Gold status-worthy" behavior. These findings are consistent with Freeman et al.'s experiments on team incentives, which finds that equal sharing of earnings induces greater effort from lower-ability team members (Freeman et al., 2025). Likewise, in our experimental setting where members on a joint policy are in lockstep with regards to their status gains (or losses), we see an increase in effort from lower-performing members.

These findings are consistent with the peer pressure (Mas and Moretti, 2009) and reference dependence (Abeler et al., 2011) models, which predicts that changes in behavior in small groups depends on interaction between the group members. The peer pressure model posits that peer pressure provides a mechanism to help mitigate the free-riding problem of low-contributors within groups. In the case of member-sets enrolled on a joint policy, the higher-contributing member may enact additional pressure on the lower-contributing member to incentivize increased physical activity and ensure goal achievement. The reference dependence model is based on the idea that expectations act as a reference point. In the case of group effort towards joint policy status accumulation, the behaviors of the higher-contributing member may act as the reference point around which the lower-contributing member bases their behaviors and physical activity preferences.

These findings are corroborated using a regression discontinuity approach to evaluate change in low-contributor's physical activity behaviors around a marginal increase in status. Consistent with the results in Table 7, we find that physical activity levels among low-contributors increase by 3.56 days per month, for members on policies that have maintained their status level as opposed to those who have not. See Appendix Table D.8 for full results of the regression discontinuity analysis.

We evaluate heterogeneous effects by enrollment in policies with status-based financial incentives. These results are consistent in members with no financial implication to their status level, and effect sizes are larger than seen in the low contributor group as a whole. For low contributor members of policies with a financial incentive tied to status maintenance, differences in mean physical activity are highly variable by status level. At the Silver status level, there is a significant increase in mean physical activity days in the post-threshold period. For Gold and Platinum statuses these differences in the mean are non-significant. As above, the differences

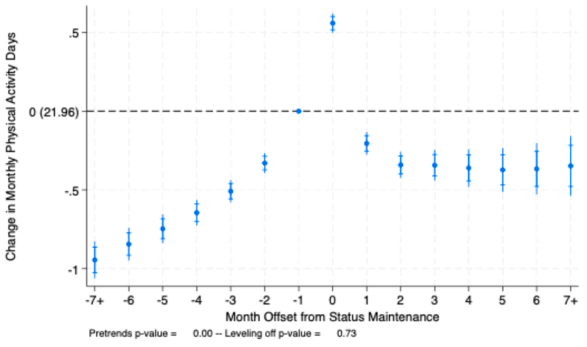

Fig. 2. Event Study Plot Around Status Maintenance Threshold, Full Study Sample.

Table 6
Difference in Mean Monthly Physical Activity Days.
After Reaching Incentive Threshold, by Financial Incentive Eligibility.

	(1) All	(2) No Financial Incentive	(3) Financial Incentive
Difference in Monthly Physical Activity Days	0.35*** [0.27, 0.43]	0.38*** [0.24, 0.52]	0.31*** [0.21, 0.41]
Observations	111,388	38,260	72,981
R^2	0.71	0.71	0.71
Demographic Controls	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Policy Controls	Yes	Yes	Yes

Notes: 95% confidence intervals in brackets. Demographic controls include gender, age, BMI range (bins for underweight, healthy weight, overweight, obese, clinically obese, and morbidly obese), and smoking status. Other controls include month fixed effects, policy tenure, lagged physical activity days, and participation in health screening activities.
*** $p < 0.001$
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Table 7
Difference in Mean Monthly Physical Activity Days of Under-Contributors.
After Reaching Incentive Threshold, By Status and Financial Incentive Group.

	(1) All	(2) Silver	(3) Gold	(4) Platinum
All Low-Contributors	3.15*** [2.16, 4.13]	3.81*** [2.65, 4.97]	2.81* [0.46, 5.16]	2.79* [0.20, 5.37]
Observations	4164	1469	1666	1029
R^2	0.62	0.64	0.51	0.61
Low-Contributors - No Financial Incentive	3.31*** [2.03, 4.59]	4.09*** [2.67, 5.51]	4.65* [0.42, 8.88]	5.15* [1.13, 9.17]
Observations	1498	566	579	353
R^2	0.64	0.67	0.54	0.64
Low-Contributors - Financial Incentive	2.90*** [1.46, 4.34]	3.80*** [1.81, 5.80]	2.01 [−0.85, 4.86]	1.16 [−2.07, 4.38]
Observations	2664	902	1086	676
R^2	0.60	0.62	0.49	0.59
Demographic Controls	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Policy Controls	Yes	Yes	Yes	Yes

Notes: 95% confidence intervals in brackets. Demographic controls include gender, age, BMI range (bins for underweight, healthy weight, overweight, obese, clinically obese, and morbidly obese), and smoking status. Other controls include month fixed effects, policy tenure, lagged physical activity days, and participation in health screening activities.
*** $p < 0.001$
.
* $p < 0.05$.

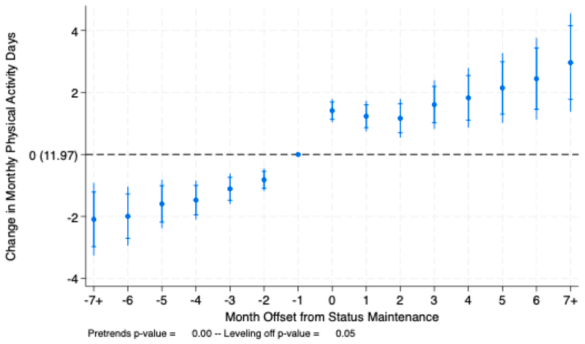

Fig. 3. Event Study Plot Around Status Maintenance Threshold, All Low-Contributors.

between pre-post threshold physical activity increases for members enrolled on policies with and without status-based financial incentives are non-significant, suggesting that status attainment has a similar motivational effect in each subgroup.

4.5. Robustness checks

We first present a series of robustness checks for the regression discontinuity analysis. We observe a greater number of observations to the right of the cutoff as compared to the left, suggesting potential manipulation of behavior around the cutoff. This follows logically, as members are *a priori* aware of the status level thresholds and the number of points that they need to accrue in each given year to maintain or exceed their status level. As discussed in the empirical specification in Section 3.2, Lee formally shows that localized random assignment can occur event if agents have some influence over the assignment variable, as long as they do not have the ability to sort precisely around the threshold (Lee, 2008). We use this assumption in our analysis based on the fact that members have only limited capacity to sort around the threshold within a short period before the end of the policy year.

We find that the regression discontinuity is robust to the placebo cutoff. We conduct robustness checks of the model with placebo cutoff adjusted higher and lower by 10%. Under these specifications we find no significant differences in physical activity levels in year $t = 1$, providing further support to the concept that status maintenance operates as an internal signal and motivator.

Likewise, we find that the results are robust to bandwidth choice. We conduct robustness checks with bandwidths at 50% and 200% of the optimal bandwidth identified. Differences in physical activity levels in year $t = 1$ under each of these alternate bandwidths are consistent with the primary analysis and statistically significant under both conventional and robust standard errors.

Finally, we repeat the regression discontinuity analysis with three additional outcome specifications: monthly physical activity events, whether the member reaches the maximum points accrual in each month, and the number points earned for attending a health screening. Physical activity events differ from physical activity days in that a member may record multiple activities, such as walking 10,000 steps and running a 5 km race, on the same day. In cases where there are multiple points-earning events recorded in a single day, only the highest-value event contributes to the member's cumulative points total. We find that results of the physical activity events analysis align with the main specification for physical activity days, although they are not significant under robust standard errors, and that there are no differences in monthly point maximization or screening points between our treatment and control groups. These results support our hypothesis that a near-miss of status maintenance may promote additional effort output in the future. Further, these results provide evidence that status loss does not necessarily lead to gamification of the points accrual system in subsequent years. See Appendix B for results of the regression discontinuity robustness checks.

As a robustness check for our panel regression, we run the main analysis with no controls for demographic or health variables to control for any potential endogeneity, for example with BMI. The results of this additional check are consistent with our primary models. See Appendix C for results of the panel regression robustness checks.

We conduct several robustness checks to further evaluate the changes in physical activity behavior noted in the event study analysis. We first conduct our analysis with Sun-Abraham interaction weighted estimator to estimate dynamic treatment effects (Sun and Abraham, 2021), and find that the results are consistent with the main event study analysis, with differences in the pre-post status threshold means driven primarily by members in the Silver status. The inclusion of the Sun-Abraham estimation allows for differentiation of effect sizes for member cohorts who achieve the status threshold at different points in the policy year. Members within the same status group who achieve the status threshold later in the policy year will generally have lower average physical activity levels, so we may expect variation in the post-threshold change in physical activity dependent on this.

Finally, we run our primary event study model with specification for the maximum event study window. Effect sizes are generally larger when using the maximum event study window, with overall difference in mean monthly physical activity days of 0.69, compared to 0.35 in the primary model. In the maximum-window model changes in physical activity days for the Platinum status group are positive and highly significant (increase of 0.84 physical activity days per month), which varies from the primary model where a negative change in physical activity is observed (−0.21 days). This suggests greater continual gains in physical activity over the policy year for members in the Platinum status group. Full results for the event study analyses and robustness checks are included in Appendix D.

5. Conclusion

This paper reports additional evidence supporting the effect of gamified, status-based threshold incentives and peer spillover effects on promoting physical activity level behaviors. Charness and Gneezy find in their study of incentives to exercise that requiring people to continually exercise to earn a reward significantly improved uptake during the intervention period (Charness and Gneezy, 2009). Crucially, this improvement in physical activity levels persisted after the intervention period had concluded. Likewise, Arad et al. find that intermittent, increasing incentive schemes induce higher rates of physical activity than the control, even after the incentives are removed (Arad et al., 2023). In this study we demonstrate a similar effect in a large-scale quasi-experimental setting, providing additional empirical support to the use of long-term incentive schemes as a tool to build habits.

Following the theoretical framework laid out by Gallus, Campbell, and Gneezy, we are able to evaluate the three sources of value that come with an award: the tangible component, social signal the award emits, and its self-signaling function (Gallus et al., 2023). We find consistent changes in behaviour between members enrolled on plans with and without financial incentives tied to status achievement. This suggests that status-related motivation persists across both groups and there is limited evidence of this financial incentive crowding out beneficial habit formation. We find that the self-signaling function that is attached to status-based rewards is an effective motivator for continued improvements in physical activity behaviour. While status is not immediately visible to members

outside of one's policy, i.e. there is no public forum of status levels, there is a social signaling component emitted within family groups by status-based rewards, particularly among members who had previously performed at levels below their peers.

Bénabou and Tirole propose a similar utility function for behavior based on extrinsic rewards, image vis-à-vis oneself and others, and enjoyment of an activity (Bénabou and Tirole, 2006). Regarding enjoyment of an activity as a behavioral utility, Chapman and Gneezy propose that changing peoples' behavior can in fact change their motivation through acquired tastes and habit formation (Chapman and Gneezy, 2024). Both acquired tastes and habit formation involve an initially forced behavior that becomes self-sustaining. Likewise in this setting we see sustained increases in physical activity behavior over time even after the status goal has been met, particularly among those who have been historically less engaged. This suggests the development of an acquired taste for exercise or an intrinsic exercise habit, and potentially both.

Self-determination theory, as outlined by Ryan and Deci, posits that competence, relatedness, and autonomy are essential features in promoting motivation (Ryan and Deci, 2017). The incentive scheme studied here uses gamification to address each of these basic psychological needs (Krath et al., 2021). Linking individual behaviors, and subsequent points earnings, to status achievement promotes autonomy; the use of hierarchically labelled status groups supports feelings of competence; and the team-based approach to status incentives in joint policies fosters feelings of relatedness within the insured member population.

Our results provide evidence on the interaction of status-based threshold incentives and peer spillover effects in promoting health habits. More specifically, our results provide evidence that threshold-based incentives are effective at promoting elevated, sustained physical activity levels, and that these incentive structures are particularly effective in fostering positive peer spillover effects. These results suggest that status-based incentives can have long-term effects, but that these effects are context dependent and will vary based on an individual's performance relative to their peers. These effects have generally been understudied in the literature due to limited follow-up periods in incentive evaluations and limited longitudinal data settings. This is important when considering the scalability and long-term feasibility of a behavioral incentive scheme to promote healthy habits in a larger population.

This research has several limitations. Firstly, since our data comes from a private supplemental health insurer operating in universal health care market, the population covered by the insurer is generally healthier, more active, and of a higher socioeconomic status than the population in the United Kingdom as a whole. Due to the differences in these populations, the behavioural incentive schemes employed in this population may not directly transfer to the UK population as a whole, and any implementations of a similar health behaviour incentive scheme should take into consideration the context and specific health needs of the target population.

Secondly, within the insurance scheme, individuals opt in to the active rewards program, so there is a risk of selection bias where only the most physically active insurance enrollees participate in the program. As our population is defined by members who are already enrolled in the active rewards program, we are unable to control for self-selection into the program in this study.

Finally, the status incentive scheme does not exist in a vacuum – at the same time individuals are working to maintain their prior year's status, they may also be receiving weekly micro rewards or other incentive nudges. These additional rewards take the form of discounted beverages at a national café chain or discounted cinema tickets, and members are equally eligible for them regardless of their current or previous status level, thus they are unlikely to confound the effects of a status-based threshold incentive scheme in this population.

Despite these limitations, the results of this study have promising policy implications. The results of this study have demonstrated that this tiered status structure is effective at incentivizing higher levels of physical activity within a population that is broadly healthy and motivated to track their physical activity at baseline. This in turn may promote better long-term health outcomes, as the maintenance of high levels of physical activity over the life course have been linked to reduced all-cause, cardiometabolic, and cancer mortality, as well as more favorable prognoses among people who have undergone cancer treatments (Banach et al., 2023; Lee et al., 2022; Wahid et al., 2016; Stamatakis et al., 2022; Courneya et al., 2025).

When employing status-based incentives in other populations, policymakers and researchers should adapt the incentives to each context, taking into account the target population's baseline health, physical activity levels, and technology aptitude. The use of status is a cost-effective and scalable incentive to ensure continued engagement in healthy behavior incentive programs.

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Pauline Pearcy reports financial support was provided by Vitality Corporate Services Limited. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jebo.2025.107270.

Data availability

The data used in this analysis is confidential and proprietary to Vitality Corporate Services Limited. Data may be made available for replication purposes only, subject to reasonable request and approval by Vitality Corporate Services Limited.

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