Social influence on exercising: Its role in habit strength

Agata Leszkiewicz, University of Twente

Ana Minguez, University of Zaragoza

F. Javier Sese, University of Zaragoza

V. Kumar, Goodman School of Business, Brock University

Abstract:

Encouraging people to engage in regular physical exercise has become an important public policy issue. However, many individuals find it difficult to maintain regular physical activity over the long term. To address this challenge, in this study, we focus on the development of exercising habits. Specifically, this study derives a measure of habit strength that incorporates temporal stability together with frequency as relevant determinants of habit strength in the long-term and explores the role of a key dimension that can influence the development (or breakdown) of stronger habits: social influence (e.g., training with a personal trainer, training with a partner, going to group classes). Using longitudinal objective exercising behavioral data from five fitness studies in the US over a four-year period (2013-2016), the findings suggest that different sources of social influence such as personal trainers, other co-exercisers, and exercise groups can lead to different levels of habit strength over time.

Keywords: habit strength measure, temporal stability, temporal variation, frequency, and social influence

Track 1. Sectorial Marketing – Services

Track 2. Marketing and Sustainability

1. Introduction

The increasing use of technology, the sedentary nature of office jobs, and the changing patterns of transportation has led to a dramatic increase in the levels of inactivity, which in developed countries can be as high as 70% (World Health Organization 2018). Encouraging individuals to engage in regular physical activity has thus become a major public policy issue to ensure healthy lives and promote well-being (SDGs by United Nations). The benefits of engaging in regular physical exercise are undeniable. There are important immediate benefits, e.g., feeling of achievement, stress relief, or reduced mental fatigue. However, tangible health benefits only appear when physical activity is sustained over a long period of time. For example, an active lifestyle lowers the risk of cardiovascular diseases, strengthens the muscles and bones, prevents obesity, and leads to improved mental health and overall well-being. Yet, while individuals recognize the importance of doing exercise and often initiate physical activity, many of them have difficulties sustaining regular physical activity in the long term. Thus, identifying factors that contribute to the establishment of exercise routines has become an important area of research in multiple domains such as health (e.g., Orbell & Verplanken, 2010) behavioral economics (e.g., Condliffe et al., 2017), and marketing (e.g., Beshears et al., 2021). In this study, we focus on the development of exercising habits. Habits are a powerful mechanism for developing persistent exercise behaviors. Habits involve regular, cue-triggered routines (Beshears et al. 2021), and determine a person's psychological predisposition to repeat past behavior (Shah et al., 2014).

Within the domain of habit formation, this research focuses on habit strength, and investigates the way in which it can be captured reliably and its drivers. Specifically, using longitudinal objective exercising behavioral data from five fitness studies in the US, which includes 16,398 customers and 309,923 customer-week observations over a four-year period (2013-2016), this study derives a measure of habit strength that incorporates temporal stability together with frequency as relevant determinants of habit strength in the long-term. Using this measure of habit strength at the individual level, our work also investigates the role of social influence on the development of exercising habits, with a focus on diverse social influence factors (e.g. training with a personal trainer, training with a partner, going to group classes) that can lead to different types of social influence (i.e., social support, social pressure, social comparison, or social image) and, thus, to different levels of habit strength.

In doing so, our study provides an in-depth understanding of the habit formation process in the area of exercising and offers at least three important contributions to this domain. First, we propose new habit strength measures that are multidimensional and based on actual exercise behavior (rather than intentions or self-reported data), and that incorporate temporal stability together with frequency as relevant determinants of habit strength in the long-term. Second, we extend previous research on the drivers of habit strength formation by investigating a diverse set of social influence factors that capture different types of social influence (e.g., social support, social pressure, social comparison, or social image). Our findings suggest that major sources of social influence such as personal trainers, other co-exercisers, and exercise groups can lead to different levels of habit strength over time. Third, using observations about exercising activity over a 4-year timespan our research offers an approach to the study of habit formation that captures the variations in habit strength over time and thus better reflects the habit formation process, in contrast with most previous research that has been conducted using a single-wave survey or a short time frame of 6 months (see e.g., Carrera et al. 2018). This research can also have managerial and societal value, as it provides guidance to different stakeholders for the implementation of successful interventions that promote the development of strong exercising habits.

2. Literature review

2.1 The power of habits. The domain of physical activity

Habit has been defined as a behavior that has occurred repeatedly and frequently in the past, leading to a learned sequence of acts that have become automatic responses to specific cues and are functional in obtaining certain goals or end-states (Ouellette & Wood, 1998). Habit is thought to have a reciprocal relationship with behavior, where habit affects behavioral repetition, but that repetition also strengthens habit formation. In the domain of physical activity, habit has been shown to be predictive of future physical activity behavior, suggesting that, for many people, patterns of physical activity behavior may remain stable over long periods of time. Literature in this context also suggests that physical activity is less intentional for people with stronger habits, thus supporting that intended behavior can be facilitated by strong habit.

2.2 Antecedents of habit strength. Frequency, temporal stability and variation

An important aspect in the habit and exercise behavior literature is the understanding of the antecedents required for habit formation and how it becomes stronger over time. Habits are routinized behaviors that have been frequently paired with stable environmental contexts. As a result, habitual behaviors do not require deliberation, and are automatically cued by stable circumstances (Orbell & Verplanken, 2010). Individuals' recurring behavior is rationalized as stemming from underlying habit strength that increases in magnitude as customers consistently repeat the same behavior over time. Habits involve regular, cue-triggered routines. Routines can be seen as individual-level behaviors that are consistent in terms of when they occur (Dew et al., 2023). In line with this, behavior repetition is based on consistent situational cues or context, that is, exercise behavior can be habitual when it occurs automatically in response to unchanging environmental cues, such as the days of the week, or the number of days per week an individual exercises (Tappe et al., 2013).

A fundamental aspect of our study is that we incorporate the feature of temporal variation (irregularity) together with frequency and stability as determinants of habit strength. Behavioral frequency or repetition is a necessary component for habit formation (Ouellette & Wood, 1998), and therefore for habit strength. Also, as habits can be exhibited in varying contexts, a more efficient measure of habit strength can be obtained when the stability of the context (in which the repetitive behavior took place) is also considered.

2.3 The role of social influence in habit strength

In this study we argue that social influence plays a significant role in the formation of physical activity and, therefore, in habit strength. Social influence can be defined as a "either real or imagined pressure to change one's behavior, attitudes or beliefs" (Alcock et al., 1991, p. 195). Social influence helps us to explain physical activity participation in the general population (Kouvonen et al., 2012).

In the domain of physical activity, Carron et al (1996), suggest that among the major sources of social influence we can find exercise instructors, other co-exercisers, and exercise groups. They also note that, when others provide support without exerting control over behavior, the adherence to physical activity should be enhanced. Social influences such as social support, may positively influence exercising habit formation and strength by alleviating barriers. Thus, social contacts as well as social support, which allow connectedness with others, are important factors for facilitating participation (e.g., Deci & Ryan, 1985), and consequently, habit formation and strength. Research exploring the role of social influence and exercise habits

postulates that strategies offering information feedback to participants and team memberships can modify behavior with efficacy (Condliffe et al., 2017). Among other relevant results, these authors found that being in a team and receiving information on peers are effective in changing a non-user of the gym to a user. They also demonstrate that feedback about others' exercising has a longer-lasting impact on gym attendance.

Given all this, in this study we argue that social influence factors such as training with a personal trainer, or with a partner, or in group classes, instead of exercising alone, can lead to different levels of habit strength. We also suggest that these differences occur because each form of exercise is exerting different types of social influence (i.e., social support, social pressure, social comparison, or social image).

3. Data and method

3.1 Research context and sample

Our data comes from a firm operating several brands of fitness studios in the United States. It comprises customers acquired by five different studios in the period between June 2013 and June 2016. For all customers in our sample, we observe their complete transaction history until the end of the observation window, as well as usage of the fitness club. We begin with a weekly-level data set including 16,398 customers and 309,923 customer-week observations. From weekly observations of customer transactions and usage we create habit variables measured at the monthly level. Our final analyses are on the monthly level, with 82,768 customer-month observations.

3.2 Variable operationalization

We operationalize habit strength from gym goers' observed exercise behaviors in the following way. First, for each customer-week we calculate the frequency of exercise. Then we obtain the monthly habit strength calculated from all weeks in each month:

$habit_t = \frac{mean(frequency_{tl})}{1+sd(frequency_{tl})}$, where $l = \{1,2,..,n_t\}$.

We also consider how the amount of exercise and consumer exercise patterns impact the habit strength. To this end, we define frequency as the number of times a customer exercised in a month. Temporal stability captures a customer's habitual behavior with respect to exercising on particular days of the week (only Mondays, only Tuesdays, etc.):

$temporal\ stability_t = \sum_{i=1}^{7} \frac{mean(frequency_{itt})}{1+sd(frequency_{itl})}$, where i = {Mon, Tue,... Sun}.

The maximum value of temporal stability equal to 1 corresponds to a customer who is exercising every day of the week, each week in the month. If a customer exercises once per week, on the same day of the week, every week, temporal stability is equal to approx 1/7.

Social influence is a categorical variable taking the following values: 1 - individual exercise (baseline category); 2 - 1:1 exercise with a personal trainer; 3- 2:1 exercise with a personal trainer; 4 - group exercise. For the monthly level observation, we convert each category into a proportion. In table 1 we show the summary of the conceptualization of the main variables of the study.

Table 1 Variable conceptualization

Habit Strength (DV) Obtained from weekly observations and measured at the customer-month level.	Combines the frequency (mean) and stability (sd) of the behavior $\text{Habit Strength} = \frac{\text{mean (weekly frequency)}}{1 + \text{sd(weekly frequency)}}$
Exercise Irregularity (Temporal Variation) Capturing the clumpiness, (ir)regularity of visits based on the time elapsed between exercise visits	Coefficient of variation $\text{Temporal Variation} = \frac{\text{sd(time between visits)}}{\text{mean(time between visits)}}$.
Day of the Week Habit (Temporal Stability) Exercising on specific days of the week (only Mondays, only Tuesdays, etc.)	$\text{Monday habit} = \frac{\text{mean (Monday frequency)}}{1+\text{sd(Monday frequency)}}$ and summing Monday through Sunday.
Exercise Frequency	# sport classes attended in a month
Social influence	1 - individual exercise (baseline category); 2 - 1:1 exercise with a personal trainer; 3- 2:1 exercise with a personal trainer; 4 - group exercise.

Finally, we also define the scope of customer exercise behavior, capturing the variety of exercise intensity (number of different types of exercise intensity a customer did: light, moderate, or vigorous intensity; takes values between 0 and 3), the variety of exercise benefits (number of different exercise benefits a customer received: cardio, strength, skills, burn, relax/mind benefits; takes values between 0 and 5), and the variety of wellbeing dimensions (number of different wellness categories customer used: exercise, beauty, wellness, health; takes values between 0 and 4). Since our habit variable is left-censored at 0, the model is estimated with the random effects Tobit model.

3. Major results

As the findings of this study show (Table 2), low values of temporal stability (i.e., when there is a lot of variability in the time spent between visits going to the gym), cause a reduction in habit strength (β = -.007; $p < .001$), as opposed to a higher frequency of gym attendance, which promotes stronger habits (β = .025; $p < .001$). On the other hand, turning our attention to the main effects of social influence, the findings show that exercising with a personal trainer, both individually (β = .006; $p < .01$) and with a partner (β = .008; $p < .10$), as opposed to exercising alone promotes stronger habit levels. For the effects of exercising in group classes, we found no statistically significant differences.

Table 2 Estimation results

Dependent variable: Habit strength	**Model 1** ***Control effects***	**Model 2** ***Social influence main effects***
	b(SE)	b(SE)
Temporal Variation of Visits	-.006 (0.001)***	-.007 (0.001)***
Frequency of visits	.025 (0.000)***	.025 (0.000)***
Temporal Stability	-.053 (0.003)***	-.049(0.003)***
Temporal Variation of Visits (lag)	.002 (0.001)+	.001 (0.001)
Frequency of visits (lag)	.000 (0.000)	.000 (0.000)
Exercise intensity scope	-.005 (0.001)***	-.003 (0.001)**
Exercise benefit scope	.016 (0.000)***	.001 (0.001)*
Social influence		
Trainer_individual		.069 (0.002)***
Trainer_couple		.063 (0.006)***
Group		.052 (0.001)***
Female	.004 (0.001)***	-.002 (0.001)+
Studio FE	included	included
Year FE	included	included
Month FE	included	included
Individual RE	included	included
Intercept	-.019 (0.003)***	.028 (0.004)***

*Note. Significant parameters: ***p < .001; **p < .01; *p < .05; +p < .10*

4. Discussion

Through this study, we intend to contribute to research, as well as to the management of the individual-organization relationship and to the general welfare of society. First, we propose new habit strength measures that are multidimensional and capture a variety of behavioral patterns (e.g., strong-intensity infrequent exercise, low-intensity frequent exercise, etc.). As noted, an important aspect in the habit and exercise literature is the understanding of the antecedents required for habit formation and how it becomes stronger over time. In this study we incorporate temporal variation, together with frequency and temporal stability as relevant determinants of habit strength in the long-term. In addition, we also contribute to this literature by adding knowledge on the effect of social influence on habit formation and strength. Our findings suggest that major sources of social influence such personal trainers, other co-exercisers, and exercise groups (vs exercising alone) can lead to different levels of habit strength.

Second, given that habit is a dynamic construct, longitudinal studies provide stronger support for understanding habit formation. Using observations about exercising activity over a 4-year timespan our research can achieve higher reliability in measuring habit formation and strength. Finally, we aim to offer guidance to leverage social influence in the design of programs and interventions that help individuals develop strong and positive exercise habits. If the foundations of physical activity maintenance and reinforcement are well understood, then intervention initiatives targeting these foundations should meet with success. Change interventions are most likely to be successful when they are tailored to the habit strength of the target behavior. To our knowledge, this is a unique contribution. Our underlying aim is to

contribute to the societal progress towards healthy lifestyle habits and, as a result, the improvement of people's quality of life.

References.

Alcock, J. E., Carment, D. W., & Sadava, S. W. (1991). A textbook of social psychology (2nd ed.). Englewoods Cliffs, NJ: Prentice Hall

Beshears, J., Lee, H. N., Milkman, K. L., Mislavsky, R., & Wisdom, J. (2021). Creating exercise habits using incentives: The trade-off between flexibility and routinization. *Management science*, 67(7), 4139-4171.

Carrera, M., Royer, H., Stehr, M., & Sydnor, J. (2018). Can financial incentives help people trying to establish new habits? Experimental evidence with new gym members. *Journal of Health economic*s, 58, 202-214.

Carron, A. V., Hausenblas, H. A., & Mack, D. (1996). Social influence and exercise: A meta-analysis. Journal of Sport and Exercise Psychology, 18(1), 1-16.

Charness, G., & Gneezy, U. (2009). Incentives to exercise. *Econometrica*, 77(3), 909-931.

Condliffe, S., Işgın, E., & Fitzgerald, B. (2017). Get thee to the gym! A field experiment on improving exercise habits. Journal of behavioral and experimental economics, 70, 23-32.

Dew, R., Ascarza, E., Netzer, O., & Sicherman, N. (2023). Detecting Routines: Applications to Ridesharing CRM.

Orbell, S., & Verplanken, B. (2010). The automatic component of habit in health behavior: habit as cue-contingent automaticity. Health psychology, 29(4), 374.

Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. Psychological bulletin, 124(1), 54.

Tappe, K., Tarves, E., Oltarzewski, J., & Frum, D. (2013). Habit formation among regular exercisers at fitness centers: An exploratory study. *Journal of Physical Activity and Health*, 10(4), 607-613.

Shah, D., Kumar, V., & Kim, K. H. (2014). Managing customer profits: The power of habits. *Journal of Marketing Researc*h, 51(6), 726-741.

World Health Organization (2018). *Global action plan on physical activity 2018-2030. More active people for a healthier world.* Retrieved from https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2019/09/WHO_GAPPA_2018-2030.pdf (Last accessed: December 01, 2023).