

Hot streak! Inferences and predictions about goal adherence

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ABSTRACT

When do people make optimistic forecasts about goal adherence? Nine preregistered studies find that a recent streak of goal-consistent behavior increases the predicted likelihood that the individual will persist, compared to various other patterns holding the rate of goal adherence constant. This effect is due to perceiving a higher level of commitment following a streak. Accordingly, the effect is larger when the behavior requires commitment to stick with it, compared to when the same behavior is enjoyable in its own right. Furthermore, the effect is weaker in the presence of another diagnostic cue of commitment: when the individual has a high historic rate of goal adherence. People also behave strategically in ways consistent with these inferences (e.g., are less likely to adopt costly goal support tools following a streak, choose partners with recent streaks for joint goal pursuit). Together, these results demonstrate the significance of streaky behavior for forecasting goal adherence.

Individuals and organizations are increasingly using behavioral tracking technologies that display data about past behavior, particularly when it comes to goal pursuit. For example, individuals can track and improve progress towards their health goals through wearable devices (e.g., Fitbit, Apple Watch) and calorie-logging apps (e.g., MyFitnessPal, FatSecret). Similarly, organizations can track employees' behaviors that align with organization-wide goals, like when hospitals require medical professionals to wear hand-washing sensors to improve their hygiene compliance and retailers monitor workers' sales to boost performance. These technologies highlight *patterns* of behavior over time. Observing these patterns might affect individuals' inferences regarding their pursuit of relevant goals.

In this paper, we examine how one specific pattern of past behavior – a recent streak – influences inferences and forecasts of future goal adherence. Previous research defines a streak as three or more events or behaviors in a row (Carlson and Shu, 2007)¹. In line with this definition, we define a *recent streak* as having engaged in three or more consecutive behaviors inclusive of the most recent opportunity. The growing prevalence of tracking technologies makes people more aware of such streaks.

To illustrate, consider two individuals who have a goal of becoming healthier through regular exercise. Imagine that each of them exercised four days in the past week: Person A exercised on Days 1, 2, 5, and 7,

whereas Person B exercised on Days 1, 5, 6, and 7. Despite both exercising the same amount, only Person B exhibits a recent streak: they exercised on the three most recent opportunities. We suggest that such a pattern is particularly meaningful. Our key prediction is that a recent streak is seen as a signal of increased commitment to the goal, which leads to more optimistic predictions about sticking to that goal in the future. We expect this to be the case whenever goal pursuit 1) involves repeated, trackable behavior, and 2) is thought to require commitment for achieving the goal at hand.

Predictions about goal adherence are important because they can affect the strategic actions individuals take in the pursuit of a goal. This applies both to what people choose in support of their own goals as well as how people support others' goals, such as organizations helping employees or consumers and parents/teachers helping children. If a person is optimistic about their own (or another person's) future goal success, they will be less likely to seek or recommend outside help, such as commitment devices, to aid in future goal-congruent actions. However, if they are pessimistic, they may view investing in costly goal support tools as necessary to be successful. Inferences about others' potential for goal success could also impact interpersonal decisions about who to work with toward a shared goal. Thus, beyond forecasts of future goal-consistent behavior, we also investigate how patterns of goal adherence influence behavioral consequences, such as the adoption of

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¹ For deeper consideration of this definition, see Weathers and Poehlman, 2023.

costly goal support tools and the choice of partner for joint goal pursuit.

1. Theoretical background

The research herein builds on two previously disconnected areas of research: 1) inferences following sequences of outcomes (e.g., streaks) and 2) inferences regarding goal pursuit. We discuss each of these areas in turn below.

1.1. Inferences following streaks

Prior work has explored the influence of past streaks in forecasting future outcomes of independent events. For example, seminal research on the “gambler’s fallacy” and the “hot hand belief” investigate the predictions people make following streaks of coin flips or basketball free throws, respectively (Gilovich, Vallone, and Tversky, 1985; Tversky and Kahneman, 1971). Interestingly, the gambler’s fallacy describes the intuition that streaks must come to an end, while the hot hand belief is the prediction that streaks will continue.

At their core, both of these effects are driven by people’s conceptions of the outcome-generating process. With regards to the gambler’s fallacy, people anticipate that a small set of outcomes is representative of the expected probability (e.g., a fair coin flipped four times should result in two heads and two tails; Tversky and Kahneman, 1971, 1974). Consequently, people expect a streak of independent, random outcomes to end (e.g., a coin should land on tails after multiple heads in a row), thus bringing the sequence’s outcomes closer to the overall expected probability. With regards to the hot hand belief, people believe randomly generated sequences have a higher frequency of alternating outcomes and a lower frequency of streaks than is truly the case (Gilovich et al., 1985; Wagenaar, 1972). Because a streak is seen as a deviation from the expected random pattern, it is interpreted as an indicator that something has changed about that individual’s performance (i.e., that the individual has a “hot hand”), leading people to expect the streak to continue.²

We too focus on predictions following streaks. However, rather than examining predictions of event outcomes over which an actor does not have control (e.g., observed coin flips and free throws), we instead examine predictions about fully autonomous behaviors (assuming free will). More specifically, we study streaks in the context of goal pursuit, which involve repeated, purposeful decisions to adhere to one’s goal. Here, individuals are in control of their decisions, yet must repeatedly put in effort and avoid temptation to reach their long-term goal (e.g., exercising, choosing fruit for dessert). In these contexts, commitment to the goal is paramount. We propose that a streak of goal-consistent behavior signals an increase in commitment to the goal, and that this greater perceived commitment leads people to forecast a greater likelihood of continued goal adherence. Thus, while the hot hand belief is about perceiving “signal” in noise, we show how the signal (i.e., a streak) has unique meaning in the context of goal pursuit. In other words, by examining forecasts following streaks in this new context, we reveal a distinct inference that people make from streaks (commitment), with several important consequences.

1.2. Inferences about goal pursuit

A largely separate area of research has investigated the relationship between past goal activities and subsequent goal pursuit. When it comes to perceptions of goal progress, past actions serve as especially strong motivators, often boosting subsequent goal adherence (Huang, Jin and Zhang, 2017; Kivetz, Urminsky, and Zheng, 2006). Interestingly, not all

goal-related activities are given the same weight when inferring goal progress. For instance, goal-consistent behaviors (e.g., putting \$45 in a saving account) are seen as more impactful towards reaching a saving goal than goal-inconsistent behaviors of the same size (e.g., spending \$45 on something frivolous; Campbell and Warren, 2015). Even the same goal activities can vary in the extent to which they convey goal progress, depending on whether they complete a sub-category (e.g., making a 20-minute run count as completing the “cardio part” of a longer workout; Sharif and Woolley, 2020).

Past work has also examined how people use evidence of past goal progress to infer one’s commitment to the goal (Fishbach and Dhar, 2005). For example, past goal-consistent behavior signals greater commitment when it was particularly hard to accomplish (Rafieian and Sharif, 2023) and when progress is seen as earned (vs. endowed; Zhang and Huang, 2010). Moreover, goal failure, or even a single lapse, can be interpreted as a lack of commitment (Fishbach, Dhar and Zhang, 2006; Touré-Tillery and Fishbach, 2015).

Building on this literature, we investigate a new potential signal of goal commitment: the recent *pattern* of goal adherence. That is, we examine how the presence of a recent streak influences perceived goal commitment and forecasts of future goal adherence, controlling for the amount and recency of past goal progress. This research is especially timely given the growing prevalence of behavioral tracking tools in goal pursuit, which make patterns salient by design (e.g., wearable devices, calorie-logging apps). Notably, while recent research has demonstrated the benefits and drawbacks of monitoring goal progress more broadly (e.g., Dai, 2018; Silverman et al., 2022; Stiglbauer, Weber and Batinic, 2019), little has examined how the specific patterns inherent within such monitoring can affect inferences and predictions about subsequent success.

2. The present research

Our key prediction is that people will forecast a higher likelihood of goal adherence following a recent streak of goal-consistent behavior, compared to other patterns of past behavior. Why might recent streaks in particular affect such forecasts? People often try to make sense of deviations from what they expected to happen, seeking explanations for outcomes they view as outside the bounds of anticipated noise (Moldoveanu and Langer, 2002; Snowden, 2011; Tanner and Swets, 1954). A streak is a pattern that people are particularly keen to notice and perceive as a deviation (Alter and Oppenheimer, 2006; Gilovich et al., 1985).

A recent streak of goal-consistent behavior seems especially relevant for predictions regarding goal adherence because it combines two noteworthy features that are critical whenever goal pursuit involves repeated behavior over time: 1) consistency and 2) recency. First, the more consistently a person behaves, the more likely they are to succeed (Locke, 1996). Not only does behaving consistently with one’s goal promote goal progress, but it also boosts one’s confidence in their ability to attain that goal (Bandura, 1977). Second, the more recently an individual has adhered to their goal, the more likely they are to do so in the near future (Bagozzi and Warshaw, 1990). Moreover, when evaluating goal progress, people often view more recent actions as more diagnostic of their abilities than less recent actions (Touré-Tillery and Fishbach, 2011).

We suggest that, together, the consistency and recency of a recent streak of goal adherence reveal a window into a person’s current mindset, which can influence perceptions of that person’s *commitment* to the higher-level goal they are pursuing. In particular, a person with a recent streak will be seen as having higher commitment relative to people with other behavioral patterns (e.g., ones that include just recency or just consistency). Given that commitment is an integral aspect of goal pursuit and attainment (Fishbach and Dhar, 2005; Hollenbeck and Klein, 1987; Locke, 1968; Zhang, Fishbach and Dhar, 2007), this will in turn increase expectations of that person’s future goal

² Of note, there is also an interesting debate as to whether the hot hand belief is accurate or not (e.g., Bar-Eli, Avugos, and Raab 2006; Miller and Sanjurjo 2018).

adherence. Thus, a recent streak will be seen as a signal that an individual is more likely to stick to their goal, compared to forecasts following other patterns (even when controlling for the frequency of goal adherence). Put formally:

H1a: People will forecast greater goal adherence following a recent streak of goal adherence, relative to other patterns.

H1b: This will be driven by an increase in perceived goal commitment.

Building from the hypothesized role of perceived commitment in individuals' forecasts of goal adherence, we make two key predictions regarding moderators of this effect. First, we predict that the effect will depend on the extent to which commitment is believed to be necessary for the behavior. To illustrate, consider an individual who wants to cook dinner for themselves more often to save money. The more committed this individual is to saving money, presumably the more often they will cook dinner. In this situation, a recent streak will signal greater commitment, leading to a higher predicted likelihood of the individual cooking dinner in the near future. However, consider an individual who cooks dinner for themselves simply because they find it enjoyable. In this case, a recent streak of cooking dinner is less likely to imply something about that individual's commitment to a particular goal, and as a result, less likely to lead to a higher predicted likelihood of cooking dinner in the near future. Put formally:

H2: The effect of a recent streak on forecasted behavior will be larger for behaviors that require commitment, versus behaviors that are primarily enjoyable in their own right.

Second, we predict that the effect of a recent streak on predictions of future behavior will be moderated by another diagnostic cue of commitment: the historic rate of goal adherence, i.e., how regularly the individual has worked towards their goal in the past. When this rate is low, a recent streak is particularly informative that there has been a shift in mindset. For example, if a person has rarely eaten healthy foods, but displays a recent streak of doing so, it implies that they are now more committed to a healthy eating goal; in this case, the recent streak is a substantial departure from their past behavior, and thus a clear signal of increased commitment to the goal. However, when the rate of goal adherence is high, an observer gains little additional insight about a person and their commitment from a recent streak. Building on the example above, a recent streak of eating healthy food should be seen as less diagnostic of an individual's current mindset when the individual has eaten healthy food nearly every day for the last six months; the high rate of healthy eating already signals a high level of commitment to the goal. Put formally:

H3: The effect of a recent streak on forecasted behavior will be stronger when the historic rate of goal adherence is low, compared to when the rate is high.

Finally, we propose two notable ways in which patterns of past behavior will guide people's strategic behavior regarding goal pursuit. First, recent streaks of goal adherence may affect the adoption and recommendation of tools that support goal success. When people are concerned with the ability to stick to the goal at hand, they often turn to goal support tools, like commitment devices or professional assistants (Brocas, Carrillo, and Dewatripont, 2004; Bryan, Karlan, and Nelson, 2010; Milkman, Minson, and Volpp, 2013). Although such tools are often costly in terms of money, time, and effort (as well as personal autonomy), these costs may be worth it if they ultimately help individuals achieve their goals (Ariely and Wertenbroch, 2002; Wertenbroch, 1998). Therefore, to the extent that a recent streak is seen as a signal of commitment and future goal adherence, we expect that people will view expending resources to employ goal support tools as *less* essential following a recent streak. In other words, if an individual seems likely to reach their goal without costly outside help (i.e., because they seem more committed), then support tools will seem less necessary. Put

formally:

H4: People will be less likely to adopt or recommend costly goal pursuit tools following a recent streak of goal adherence.

Second, when it comes to joint goal pursuit, inferences about goal commitment may affect strategic social behavior. Recent research shows that when people need to cooperate to achieve a common goal (as is common in the workplace), they strategically select group members based on inferences about potential members' traits (and thus inferences about their future behavior; Levine et al., 2018; Srna, Barasch and Small, 2022). More generally, people often rely on (or avoid) others as a function of their beliefs about others' commitment to team performance (e.g., Martin et al., 2022; Scott and Boyd, 2023). Building on this, we posit that perceived commitment may also play a role in interpersonal decisions within shared goal contexts. If, as we suggest, recent streaks of goal adherence signal greater goal commitment, it follows that people may be more willing to collaborate with an individual with a recent streak. Put formally:

H5: In joint goal pursuit, people will be more likely to choose a partner who has a recent streak of goal adherence.

3. Overview of Studies

Across nine studies, we contrast judgments following a recent streak to several alternate patterns of past behavior. Importantly, in each study, we hold constant the individual's historic rate of goal adherence and number of recent goal-consistent behaviors to isolate the effects of recent patterns of behavior on inferences and forecasts.

Studies 1a and 1b find consistent support for the key predictions (H1a and H1b): people perceive that an individual with a recent streak of goal-consistent behavior, compared to other patterns of past behavior, is more committed to their goal and more likely to stick to their goal in the future. Study 2 finds these effects are robust to a realistic interface mimicking a behavioral tracking app.

Studies 3a, 3b, and 4 explore two theoretically relevant moderators of the effect of a recent streak on forecasts of future behavior. Studies 3a and 3b test if such forecasts depend on whether commitment to a goal is seen as necessary for continuation (H2). Study 4 examines whether the effect on forecasts depends on the presence of another diagnostic cue of commitment (a lower versus higher historic rate of goal adherence; H3).

The final three studies examine ways in which patterns of past behavior can guide people's strategic behavior regarding goal pursuit. Studies 5a and 5b test the effect of a recent streak on individuals' willingness to adopt costly goal support tools for themselves and to recommend such tools to others, respectively (H4). Finally, Study 6 investigates if people are more likely to select a partner with a recent streak when working towards a shared goal (H5).

We examine the generalizability of our predictions across many contexts. We test the effects of patterns of behavior on inferences about the self (Studies 1a, 4, and 5a) as well as inferences about others (Studies 1b, 2, 3a, 3b, 5b, and 6), and both for shorter (i.e., six or seven; Studies 1a, 1b, 4, 5a, and 6) and longer (i.e., 14; Studies 2, 3a, 3b, and 5b) sequences. Additionally, we examine many different types of goal pursuit, from self-control dilemmas (Studies 1a, 1b, 4, and 5b) to those without explicit tempting alternatives (Studies 2, 3a, 3b, 5a, and 6), and from goals with concrete end-states (e.g., read ten books; Studies 2 and 5a) to those with less defined ends (e.g., maintenance goals; Studies 1a, 1b, 3, 4a, 4b, 5b, and 6). These contexts covered a range of oft-tracked goals, such as healthy eating (Studies 1b, 3a, and 4), fitness (Studies 3b and 5a), and productivity (Studies 1a and 5b).

In all studies, no participants or conditions were excluded (except where noted, as part of our preregistered plan). Sample sizes in all lab studies (Studies 1a, 3a, 5a, and 6) were determined by the number of people recruited to the lab session. Sample sizes in all online platform studies (i.e., those recruited from Amazon Mechanical Turk and Prolific

Academic) were determined to provide at least 80% power to detect the anticipated effect sizes, with a minimum of 100 participants per condition. All participants were U.S. adult residents and were screened so that they had not completed a similar study in at least the past two months.

All studies were preregistered. Additional exploratory items and analyses can be found in the Online Supplemental Materials. The data, preregistrations, and materials from all studies, as well as the Online Supplemental Materials, are available here: <https://researchbox.org/312>.

4. Studies 1a and 1b: forecasting goal adherence

In Studies 1a and 1b, we examine how patterns of goal-consistent behavior affect inferences and predictions regarding subsequent goal adherence. We test this across two important and prevalent goals: waking up on time to be more productive (Study 1a) and eating healthy foods to aid weight loss (Study 1b). We predict that people will perceive someone with a recent streak of goal adherence as more committed to their goal and more likely to stick to their goal in the near future. Study 1a tests in a scenario about the self and Study 1b tests this in a scenario about another person.

4.1. Study 1a

4.1.1. Methods

We recruited 376 participants from a behavioral lab at a university in the northeastern United States (M age = 20.09, 59.20% female, 1.07% other/did not say).

All participants were told to imagine that they had the goal of being more productive in the morning, and that they had been working towards this goal for several weeks. Adherence to this goal required them to wake up and get out of bed when their alarm goes off, which they did about 50% of the time over the past several weeks, and avoid sleeping in past their alarm, which they did the other 50% of the time. All participants were also told that they had done the goal-consistent behavior (woken up on time) on three of the last six days and had done the goal-inconsistent behavior (slept in) on the other three days. Thus, the rate of goal adherence over both the past six days and the past several weeks was held constant across conditions.

Participants were randomized into one of three conditions (*recent streak*, *old streak*, or *scattered*) that varied the pattern of behavior over the previous six days (see Fig. 1). In the *recent streak* condition, the participant had woken up on time on the three most recent days. In the

old streak condition, the participant had woken up on time on the third, fourth, and fifth days. In the *scattered* condition, the participant had woken up on time on the first, fourth, and sixth days. These two “comparison” conditions enable us to test whether any effects of a recent streak are driven solely by consistency, as conveyed by the presence of a streak (which is true for both the *recent streak* and *old streak* conditions), or solely by recency, as conveyed by choosing fruit on Day 6 (which is true for both the *recent streak* and *scattered* conditions).

After seeing their pattern of behavior, participants answered several questions about the scenario. First, they forecasted their future behavior with two items: “How likely is it that you will wake up on time today (on Day 7)?” and “How likely is it that you will sleep in today (on Day 7)?” (1 = Extremely unlikely to 7 = Extremely likely). We reverse-coded the question that asked about the likelihood of the non-target behavior (sleeping in) and averaged these two items to represent the *forecast* measure ($r = 0.82$). Participants also answered four items about their commitment to their goal, based on prior research (e.g., Fishbach, Dhar and Zhang, 2006; Koo and Fishbach, 2008): “How committed are you to your goal of being productive in the morning?”; “How much do you care about waking up on time to be productive?”; “How important do you think waking up on time to be productive is to you?”; and “How motivated are you to wake up on time to be productive?” (1 = Not at all/Very little to 7 = Extremely/A great deal). We averaged these four items as the measure of *perceived commitment* ($\alpha = 0.92$).³

Finally, participants answered a manipulation check question regarding the pattern of behavior they saw in the scenario (80.85% answered correctly), and two questions intended to ensure that participants viewed the goal and behaviors they imagined for themselves as realistic (86.17% responded that the scenario was either very similar to their own lives or that they could easily imagine it). In this and all other studies, we report results for our full sample (as preregistered). Basic demographic information was collected at the end of the lab session.

4.1.2. Results

Our key prediction is that the individual with the recent streak, compared to other patterns, will be perceived as more likely to subsequently adhere to their goal. Therefore, as preregistered, our primary analyses compare the *recent streak* condition to the two “comparison” conditions combined (i.e., collapsing across the *old streak* and *scattered* conditions). For completeness, we also report additional analyses comparing the *recent streak* condition to each comparison condition and show the means for each comparison condition separately in our figures. We follow a similar procedure in Studies 1b and 5b, which also include more than one comparison condition. We do not find consistent differences between the comparison conditions used in our studies. To keep our results focused on the effects of interest, we report the statistical tests contrasting the two comparison conditions in the Online Supplemental Materials.

Forecasts. First, as expected, an independent t -test found that participants predicted they would be more likely to wake up on time following a recent streak ($M = 4.58$, $SD = 1.28$) than following the other patterns ($M = 3.35$, $SD = 1.40$; $t(374) = 8.29$, $p < .001$; $d = 0.92$; see Fig. 2, top panel). Considering each comparison group separately, a one-way ANOVA revealed a main effect of condition ($F(2, 373) = 34.73$, $p < .001$); participants forecasted that they were more likely to wake up on time when they had a recent streak than when they had an old streak ($M = 3.27$, $SD = 1.45$; $t(250) = 7.60$, $p < .001$; $d = 0.96$) and when they had a scattered pattern ($M = 3.43$, $SD = 1.36$; $t(249) = 6.93$, $p < .001$; $d = 0.87$).

Perceived commitment. Similar to their forecasts, participants

Recent Streak Condition:
(Conveys consistency and recency)

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Slept in	Slept in	Slept in	Woke up on time	Woke up on time	Woke up on time

Old Streak “Comparison” Condition:
(Conveys consistency)

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Slept in	Slept in	Woke up on time	Woke up on time	Woke up on time	Slept in

Scattered “Comparison” Condition:
(Conveys recency)

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Woke up on time	Slept in	Slept in	Woke up on time	Slept in	Woke up on time

Fig. 1. The images shown to participants to illustrate patterns of behavior in each condition in Study 1a.

³ The *forecast* and *perceived commitment* measures loaded on separate factors in an exploratory factor analysis with varimax rotation for this and all subsequent studies where there were more than one item representing each construct (see Online Supplemental Materials).

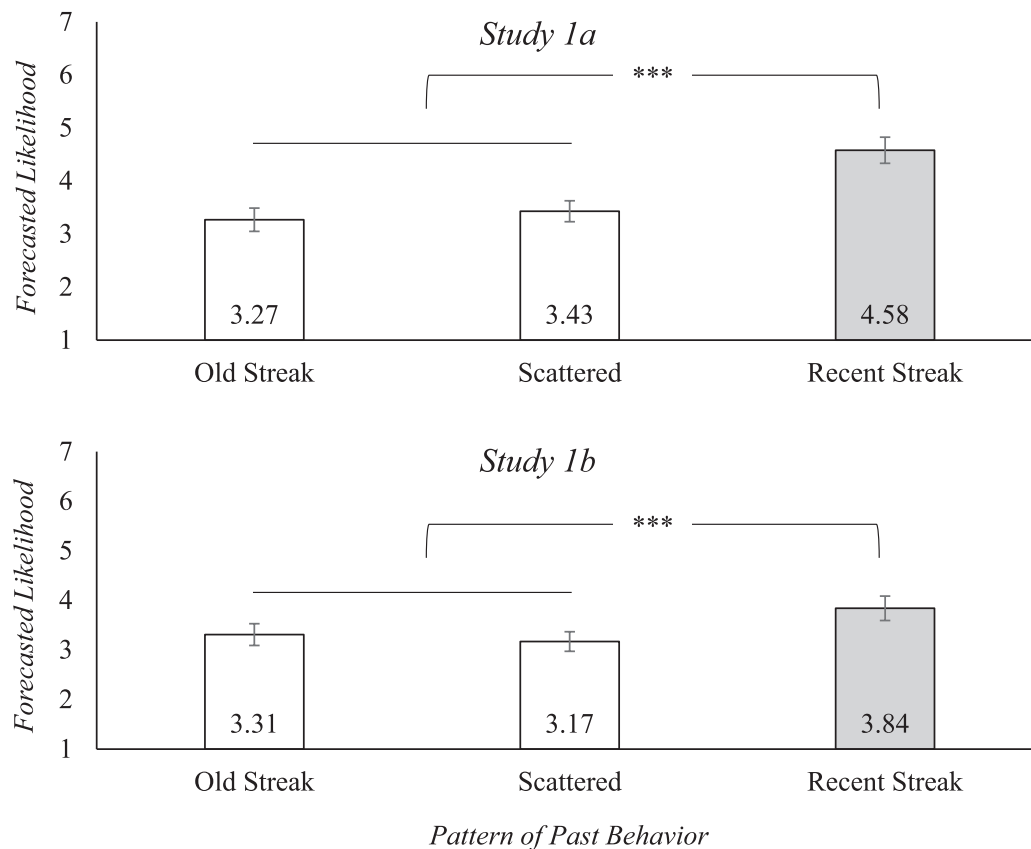


Fig. 2. Participants' forecasted likelihood that they would adhere to their goal of waking up on time (Study 1a; top panel) or that another individual would adhere to their healthy eating goal (Study 1b; bottom panel) as a function of their pattern of behavior. Error bars represent 95% confidence intervals. (* $p < .05$, ** $p < .01$, *** $p < .001$).

perceived themselves to be more committed to their goal when they had a recent streak ($M = 5.03$, $SD = 1.24$) than when they did not ($M = 4.59$, $SD = 1.21$; $t(374) = 3.33$, $p = .001$; $d = 0.36$).⁴ Considering each comparison group separately, a one-way ANOVA revealed a main effect of *pattern* condition ($F(2, 373) = 5.87$, $p = .003$). More specifically, participants perceived that they were more committed to waking up on time when they had a recent streak versus when they had an old streak ($M = 4.65$, $SD = 1.17$; $t(250) = 2.50$, $p = .013$; $d = 0.32$) or a scattered pattern ($M = 4.52$, $SD = 1.26$; $t(249) = 3.22$, $p = .002$; $d = 0.41$).

Mediation analysis. We conducted a mediation analysis using a bootstrap procedure with 10,000 samples to test the process by which an individual's pattern of behavior affected forecasts of future goal adherence (Hayes, 2017). We expected that a participant with a recent streak would see themselves as more committed to their goal, which would increase the predicted likelihood of future goal adherence. Our mediation model (SAS PROCESS Macro v. 3, Model 4) included pattern of behavior as the independent variable (comparing the *recent streak* condition, coded as 1, to the comparison conditions, both coded as 0), perceived commitment as the mediator variable, and predicted likelihood of waking up on time as the dependent variable. As predicted, perceived commitment mediated the effect of a recent streak on forecasted goal adherence (Indirect effect = 0.12, $SE = 0.05$, 95% $CI = [0.04, 0.23]$). The effect persisted when we tested each comparison condition separately (vs. *old streak*: Indirect effect = 0.11, $SE = 0.05$, 95% $CI = [0.02, 0.23]$; vs. *scattered*: Indirect effect = 0.15, $SE = 0.06$, 95% $CI = [0.05, 0.28]$).

⁴ See Online Supplemental Materials for robustness checks involving the *perceived commitment* measures.

4.2. Study 1b

4.2.1. Methods

We recruited 461 participants from Amazon Mechanical Turk (M age = 42.14, 46.42% female, 1.08% other/did not say).

All participants read about an individual who had been trying to eat healthy in order to lose weight for several weeks. Each day, this individual chose whether to eat a healthy dessert, like fruit, or an unhealthy dessert, like ice cream. To control for the historic rate of goal adherence, all participants read that the individual had eaten fruit 50% of the time over the past several weeks. All participants were also told that the individual had done the goal-consistent behavior (eaten fruit) on three of the last six days and had done the goal-inconsistent behavior (eaten ice cream) on the other three days. Like in Study 1a, participants were randomized into one of three conditions (*recent streak*, *old streak*, or *scattered*) that varied the pattern of behavior over the previous six days.

After viewing the individual's pattern of behavior, participants answered similar questions as those in Study 1a. That is, participants forecasted how likely the individual was to eat fruit today, as well as how likely they were to eat ice cream. Again, we reverse-coded the question that asked about the likelihood of the non-target behavior (eating ice cream) and averaged these two items to represent the *forecast* measure ($r = 0.75$). They also answered the same four *perceived commitment* items adapted for this scenario ($\alpha = 0.94$). Participants answered these two sets of questions in randomized order (see Online Supplemental Materials for exploratory analyses controlling for order, which found similar results).

Participants then answered a manipulation check question in which they had to identify the pattern of behavior for the individual about whom they read (94.58% of participants answered correctly). Lastly, participants answered demographic questions.

4.2.2. Results

Forecasts. Participants predicted that the individual would be more likely to eat fruit following a recent streak ($M = 3.84$, $SD = 1.58$) than following the other patterns ($M = 3.24$, $SD = 1.31$; $t(459) = 4.31$, $p < .001$; $d = 0.41$; see Fig. 2, bottom panel). Considering each comparison group separately, a one-way ANOVA revealed a main effect of *pattern* condition ($F(2, 459) = 9.69$, $p < .001$); participants forecasted an individual with a recent streak was more likely to eat fruit than an individual with an old streak ($M = 3.31$, $SD = 1.39$; $t(310) = 3.11$, $p = .002$; $d = 0.36$) or an individual with a scattered pattern ($M = 3.17$, $SD = 1.23$; $t(305) = 4.13$, $p < .001$; $d = 0.47$).

Perceived commitment. Similar to their forecasts, participants perceived an individual with a recent streak to be more committed to eating healthy ($M = 3.86$, $SD = 1.25$) than an individual without a recent streak ($M = 3.41$, $SD = 1.14$; $t(459) = 3.94$, $p < .001$; $d = 0.38$). Considering each comparison group separately, a one-way ANOVA revealed a main effect of *pattern* condition ($F(2, 458) = 8.22$, $p < .001$); an individual with a recent streak was perceived as more committed to eating healthy than an individual with an old streak ($M = 3.47$, $SD = 1.15$; $t(310) = 2.86$, $p = .005$; $d = 0.33$) or a scattered pattern ($M = 3.34$, $SD = 1.12$; $t(305) = 3.84$, $p < .001$; $d = 0.44$).

Mediation analysis. We conducted a mediation analysis which included pattern of behavior as the independent variable (comparing the *recent streak* condition, coded as 1, to the comparison conditions, both coded as 0), perceived commitment as the mediator variable, and predicted likelihood of eating healthy as the dependent variable. Consistent with our hypothesis, perceived commitment mediated the effect of a recent streak on forecasted goal adherence (Indirect effect = 0.11, $SE = 0.04$, 95% CI = [0.04, 0.20]). The effect held when we tested each comparison condition separately (vs. *old streak*: Indirect effect = 0.11, $SE = 0.05$, 95% CI = [0.03, 0.22]; vs. *scattered*: Indirect effect = 0.17, $SE = 0.06$, 95% CI = [0.07, 0.29]).

4.3. Discussion

Studies 1a and 1b serve as basic tests of our hypotheses: participants believed a recent streak of goal-consistent behavior signals greater commitment and therefore is diagnostic of subsequent goal adherence, both regarding their own behavior (Study 1a) and others' (Study 1b).

Importantly, the comparison conditions used in these studies give insight into why recent streaks may affect inferences of future goal success. By contrasting a recent streak to an old streak, we demonstrate that the recency of streak, not merely its existence, is important to this effect. By contrasting a recent streak to a scattered pattern that included goal-consistent behavior at the most recent opportunity, we demonstrate that the effect is not simply about the individual's most recent single behavior; rather, it necessitates more than one recent instance. That is, recent streaks positively influence inferences of goal commitment and forecasts of subsequent behavior because they feature *both* recency and consistency in working towards a goal.

5. Study 2: the behavioral tracking setting

Study 2 builds on our first two studies by investigating the robustness and generalizability of the effect. In particular, we designed the stimuli in a way that more closely mimics the look and feel of behavioral tracking technology. The stimuli also contained various other goal-relevant information, much like individuals often see in practice. To make it particularly relatable, we recruited parents of school-aged children to participate in this study, which asked them to make inferences about their child's educational pursuits (as tracked by a school program).

We also sought to generalize the effects from Studies 1a and 1b by changing the goal and the presentation of tracked behavior in a few key ways. First, this study described an attainment goal (i.e., to read ten books), which is different from the previous studies where participants

imagined working towards an unspecified goal (e.g., "eating healthy regularly in order to lose weight"). Second, unlike Studies 1a and 1b, in this study there was no explicit trade-off between a goal-consistent and a tempting, goal-inconsistent option. Third, relative to the previous studies, participants observed a longer time period of past behavior, and the manipulation contained a longer streak.

5.1. Methods

We recruited 1478 total participants in two consecutive waves on separate platforms (749 from Amazon Mechanical Turk and 729 from Prolific) by soliciting parents to participate (see Online Supplemental Materials for exploratory analyses controlling for platform, which found similar results). In line with our preregistration, we only included responses from participants who were qualified for the study based on several initial screener questions asked before condition assignment. Specifically, participants had to be parents of at least one child between the ages of 8–14 who was in grades 1–11, was not home schooled, and read chapter books on their own at least a few times per month.⁵ The final sample was comprised of 580 participants (M age = 39.35, 56.90% female, 1.03% other/did not say).

All participants were told to imagine that the school their child attends started a reading program two weeks ago, and that their child had a goal of reading ten chapter books. As part of this program, they were given access to a website where they could see their child's progress in reading. Then, participants saw an image of a website displaying various information about their child's progress since the program started, such as how many chapters and total books their child had read so far (see Fig. 3). This image also included a two-week calendar (i.e., since the program had started) where each day that their child read was marked with a "digital sticker" of a book, as well as the number of chapters read. All participants saw that their child had read on eight of the last 14 days, and that they had read two books in total so far (thus holding goal progress constant across conditions). However, the exact pattern varied by condition (*streak* or *non-streak*, manipulated between subjects). In the *streak* condition, their child had a recent streak of reading on the five most recent days, while in the *non-streak* condition, their child had read on the two most recent days (thus controlling for recency).

After reading the scenario, participants answered one *forecast* item: "What do you think [your child] will do next? That is, on the next day after what is shown in the calendar above, how likely are they to read at least one chapter?" (1 = Extremely unlikely to 7 = Extremely likely). Participants also answered the same four *perceived commitment* items as in the previous studies, adapted for this scenario ($\alpha = 0.91$). Finally, participants answered a question about how realistic the scenario was to them (97.59% said that it was realistic) and basic demographic information.

5.2. Results

Forecasts. Participants predicted their child was more likely to read when they had a recent streak ($M = 5.97$, $SD = 1.24$) than when they did not ($M = 5.07$, $SD = 1.81$; $t(578) = 6.96$, $p < .001$; $d = 0.58$).

Perceived commitment. Participants perceived their child as

⁵ If parents had more than one child in the required age range, they imagined that the scenario was about their oldest child within this range.

Chapter Book Reading Program

Progress Summary:

Chapters Read: 21

Books Read: 2

Streak Condition:

Week 1						
M	Tu	W	Th	F	Sa	Su
 3 Chapters				 4 Chapters		 3 Chapters
Week 2						
M	Tu	W	Th	F	Sa	Su
		 2 Chapters	 1 Chapter	 4 Chapters	 2 Chapters	 2 Chapters
You're on a five day reading streak right now!						

Non-streak Condition:

Week 1						
M	Tu	W	Th	F	Sa	Su
 3 Chapters		 4 Chapters		 3 Chapters		
Week 2						
M	Tu	W	Th	F	Sa	Su
 2 Chapters		 1 Chapter	 4 Chapters		 2 Chapters	 2 Chapters

Fig. 3. “Webpage” shown to participants in each condition in Study 2.

directionally more committed to their reading goal when they had a recent streak ($M = 5.83$, $SD = 0.79$) versus not ($M = 5.72$, $SD = 0.90$; $t(578) = 1.56$, $p = .12$; $d = 0.13$).⁶

Mediation analysis. We conducted a mediation analysis which included *pattern* condition as the independent variable ($streak = 1$, $non-streak = 0$), perceived commitment as the mediator variable, and predicted likelihood of reading as the dependent variable. Perceived commitment mediated the effect of a recent streak on forecasted goal adherence at the 85% confidence level (Indirect effect = 0.08, $SE = 0.05$,

95% CI = [-0.02, 0.18]; 85% CI = [0.01, 0.15]).

5.3. Discussion

Study 2 replicated the effect in a new setting that was particularly relevant for participants: parents thought their child was more likely to stick to their reading goal if they had a recent streak of goal-consistent behavior. Notably, participants made these judgments based on information portrayed on a reading program website that also featured other relevant information besides the recent pattern of behavior, thus demonstrating the robustness of the effect in a noisier, more realistic setting. This study also found this effect in the context of an attainment goal with a specific end-state in mind, as well as with a new operationalization of recent patterns of goal adherence. In the next two studies, we further examine how perceived goal commitment might drive this effect.

⁶ Post hoc, we believe that the effect of a recent streak on perceived commitment may be weaker in this study compared to other studies due to a ceiling effect, perhaps because parents tend to be optimistic about their children. Supporting this possibility, the means in this study are higher and the standard deviations are lower, compared to other studies ($M_s < 4.80$, $SD_s > 1.00$). Also, for each item, over 20% of participants responded with the maximum value (above a common threshold of 15%: McHorney and Tarlov 1995; Singh et al. 1988).

6. Studies 3a and 3b: examining moderation by whether commitment is necessary for the behavior

Studies 3a and 3b seek to establish support for our proposed mechanism via moderation. Specifically, we test how the effect of a recent streak on forecasts of future behavior is influenced by whether that behavior requires commitment. We do so by examining predictions following *the exact same set of behaviors* – an individual cooking dinner for themselves (Study 3a) or going to a swimming pool (Study 3b) – described as either a means toward some end (i.e., requiring commitment), or as providing immediate utility (i.e., enjoyment). We argue that above and beyond any more general perceptions about streaky patterns (e.g., the hot hand belief; Gilovich et al., 1985), a recent streak will be especially diagnostic of future behavior whenever commitment is seen as particularly important for continuation. In other words, we predict that expectations of continuing a behavior will be higher for a streak when the behavior necessitates commitment relative to when the same behavior is done for enjoyment in its own right.

To further support these predictions, we also measure perceived commitment in Study 3b. Finally, these studies examine two new, distinct contexts where patterns of behavior are often salient.

6.1. Study 3a

6.1.1. Methods

We recruited 255 participants from a behavioral lab at a university in the northeastern United States (M age = 20.28, 39.22% female, 0.78% other/did not say).

Participants were randomly assigned to condition in a 2(*pattern: streak or non-streak*) by 2(*commitment necessary: yes or no*) mixed design. Before reading the scenarios, participants first imagined either an individual who “has a goal of cooking dinner at home more often” (*commitment necessary* condition) or an individual who “enjoys cooking dinner” (*commitment not necessary* condition). Then, participants wrote down two reasons why “cooking dinner more often is a good goal” or why “cooking dinner is an enjoyable activity,” depending on condition.

Next, participants read a scenario about the individual described on the previous page. To control for historic rate of behavior, all participants read that over the past several weeks, this individual had cooked dinner for themselves on about half of the days (and therefore ordered dinner in on the other half of the days). Participants were randomly assigned to see one of two *pattern* conditions (see Fig. 4). Like in Study 2, in the *streak* condition, the individual had a recent streak of cooking dinner for themselves on the five most recent days, while in the *non-streak* condition, the individual had cooked dinner for themselves on the two most recent days (thus controlling for recency). These conditions again controlled for the frequency of having engaged in the target behavior (i.e., the individual had cooked dinner for eight of the last 14 days).

After reading the scenario, participants answered one *forecast* question: “What do you think this individual will do next? That is, on the next day after what is shown in the calendar above, how likely are they to cook dinner?” (1 = Extremely unlikely to 7 = Extremely likely). Participants forecasted an individual’s behavior in two scenarios: one which showed the *streak pattern* condition and one that showed the *non-streak pattern* condition (i.e., a within-subjects manipulation, presented in random order). In both scenarios, each participant imagined either that the individual had a goal of cooking dinner or enjoyed cooking dinner (a between-subjects manipulation). Finally, participants answered one attention check question regarding the scenarios (97.65% of participants answered correctly) and reported demographic information.

6.1.2. Results

Forecasts. We ran a two-way mixed ANOVA with *pattern* condition, *commitment necessary* condition, and their interaction as factors. There was a significant effect of pattern, such that participants predicted a

greater likelihood of choosing the target behavior (cooking dinner) when the individual had a recent streak ($M = 3.74$, $SD = 1.61$) than when they did not ($M = 3.08$, $SD = 1.64$; $F(1, 253) = 23.96$, $p < .001$; $d_{rm} = 0.55$). There was no main effect of whether commitment was necessary for the behavior ($F(1, 253) = 1.32$, $p = .252$).

Importantly, the main effect of a recent streak was qualified by a significant interaction ($F(1, 253) = 4.12$, $p = .044$; see Fig. 5, top panel). When cooking dinner was described as necessitating commitment, participants thought the individual with a recent streak was significantly more likely to cook dinner ($M = 3.98$, $SD = 1.55$) than the individual who did not have a streak ($M = 3.03$, $SD = 1.61$; $t(125) = 4.54$, $p < .001$; $d_{rm} = 0.78$). When cooking dinner was described as an enjoyable activity, the effect persisted, but to a lesser degree ($M_{streak} = 3.52$, $SD = 1.62$ vs. $M_{non-streak} = 3.13$, $SD = 1.68$; $t(128) = 2.20$, $p = .029$; $d_{rm} = 0.36$).

6.2. Study 3b

6.2.1. Methods

We recruited 800 participants from Amazon Mechanical Turk (M age = 42.74, 54.50% female, 0.08% other/did not say).

Participants were randomly assigned to condition in a 2(*pattern: streak or non-streak*) by 2(*commitment necessary: yes or no*) between-subjects design. As in Study 3a, before reading the scenario, participants imagined either an individual who “has a goal of going to the swimming pool more often” (*commitment necessary* condition) or an individual who “enjoys going to the swimming pool” (*commitment not necessary* condition) and wrote down two reasons someone might go to the pool for the purpose described.

Next, participants read a scenario about the individual described on the previous page. Participants were randomly assigned to see one of two *pattern* conditions like those used in Study 3a: a *streak* condition, where the individual had a recent streak of going to the pool on the five most recent days, or a *non-streak* condition, where the individual had gone to the pool on the two most recent days (thus controlling for recency; see Fig. 4). Again, both conditions showed the individual had gone to the pool for eight of the last 14 days (thus controlling for the historic rate of behavior).

After reading the scenario, participants answered one *forecast* question like that in Study 3a about how likely the individual was to go to the pool on the next calendar day. Then, participants answered four items adapted directly from prior research that developed scales to assess goal commitment (Klein et al., 2014; Lount, Pettit and Doyle, 2017): “How committed is this person to going to the pool?”; “How much has this person chosen to be committed to going to the pool?”; “How much does this person care about going to the pool?”; and “How dedicated is this person to going to the pool?” (1 = Not at all to 7 = Extremely). We averaged these four items as the measure of *perceived commitment* in this study ($\alpha = 0.91$).

Participants also answered two manipulation check questions regarding the *commitment necessary* manipulation: “How much does this individual need commitment in order to go to the pool?” and “To what extent is commitment relevant to their decision to go to the pool?” ($r = 0.79$). As expected, commitment was seen as more relevant for the individual described in the *commitment necessary* condition ($M = 5.67$, $SD = 1.00$) than in the *commitment not necessary* condition ($M = 3.88$, $SD = 1.58$, $t(798) = 19.12$, $p < .001$; $d = 1.35$). Finally, participants reported demographic information.

6.2.2. Results

Forecasts. We ran a two-way ANOVA with *pattern* condition, *commitment necessary* condition, and their interaction as factors. There was a significant effect of pattern, such that predicted likelihood of going to the pool was greater when the individual had a recent streak ($M = 4.14$, $SD = 1.75$) than when they did not ($M = 3.09$, $SD = 1.87$; $F(1, 798) = 67.70$, $p < .001$; $d = 0.58$). There was also a significant effect of

Streak Condition:

Week 1							Week 2						
M	Tu	W	Th	F	Sa	Su	M	Tu	W	Th	F	Sa	Su
Cooked	Ordered in	Ordered in	Ordered in	Cooked	Ordered in	Cooked	Ordered in	Ordered in	Cooked	Cooked	Cooked	Cooked	Cooked

This individual currently has a streak of cooking dinner for the past five days.

Non-streak Condition:

Week 1							Week 2						
M	Tu	W	Th	F	Sa	Su	M	Tu	W	Th	F	Sa	Su
Cooked	Ordered in	Cooked	Ordered in	Cooked	Ordered in	Ordered in	Cooked	Ordered in	Cooked	Cooked	Ordered in	Cooked	Cooked

Fig. 4. The pattern of behavior shown to participants in each condition in Study 3a.

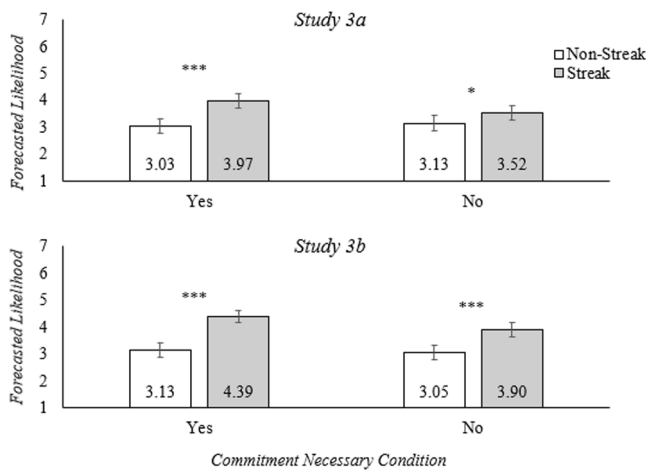


Fig. 5. Participants' forecasted likelihood that the individual would engage in the target behavior in Study 3a (cooking dinner; top panel) and Study 3b (going to the pool; bottom panel), as a function of their recent pattern of behavior and whether or not that behavior necessitated commitment. Error bars represent 95% confidence intervals. (* $p < .05$, ** $p < .01$, *** $p < .001$).

whether the behavior necessitated commitment, such that the individual who had a goal of going to the pool more was seen as more likely to go to the pool ($M = 3.76$, $SD = 1.89$) than the individual who simply enjoyed going to the pool ($M = 3.48$, $SD = 1.88$; $F(1, 796) = 4.83$, $p = .028$; $d = 0.15$).

The interaction was not significant ($F(1, 798) = 2.55$, $p = .111$). Still, the relative effects of a recent streak within each *commitment necessary* condition were as expected, and consistent with Study 3a (see Fig. 5, bottom panel). When going to the pool was described as necessitating commitment, participants thought the individual with a recent streak was significantly more likely to go to the pool ($M = 4.39$, $SD = 1.68$) than the individual who did not have a streak ($M = 3.13$, $SD = 1.88$; $t(393) = 7.00$, $p < .001$; $d = 0.71$). When going to the pool was described as an enjoyable activity, the effect persisted, but to a lesser degree ($M_{streak} = 3.90$, $SD = 1.79$ vs. $M_{non-streak} = 3.05$, $SD = 1.87$; $t(403) = 4.66$, $p < .001$; $d = 0.46$).

Perceived commitment. A two-way ANOVA revealed a significant effect of *pattern* condition, such that participants perceived the individual with a recent streak as more committed ($M = 5.27$, $SD = 0.92$) than the individual with the non-streak pattern ($M = 5.03$, $SD = 1.04$; $F(1, 798) = 11.63$, $p < .001$; $d = 0.24$). There was also a significant effect of the *commitment necessary* condition, such that participants perceived the individual as more committed to going to the pool when doing so was framed as an enjoyable activity ($M = 5.23$, $SD = 0.98$) versus when it necessitated commitment ($M = 5.08$, $SD = 1.00$; $F(1, 798) = 4.87$, $p = .028$; $d = 0.15$).

Notably, these main effects were qualified by a significant interaction ($F(1, 798) = 4.52$, $p = .034$). Replicating previous studies, when going to the pool was described as necessitating commitment, the individual with a recent streak was seen as more committed ($M = 5.27$, $SD = 0.92$) than the individual with the non-streak pattern ($M = 4.89$, $SD = 1.05$; $t(393) = 3.88$, $p = .001$; $d = 0.39$). However, as anticipated, the effect of pattern on perceived commitment was not significant when the behavior was described as enjoyable ($M_{streak} = 5.27$, $SD = 0.93$ vs. $M_{non-streak} = 5.19$, $SD = 1.02$; $t(403) = 0.92$, $p = .36$; $d = 0.08$).

Mediation analysis. We conducted a moderated mediation analysis (PROCESS Model 7) which included *pattern* condition as the independent variable ($streak = 1$, $non-streak = 0$), perceived commitment as the mediator variable, *commitment necessary* condition as the moderator ($yes = 1$, $no = 0$) and predicted likelihood of going to the pool as the dependent variable. As predicted, perceived commitment mediated the effect of a recent streak on forecasted behavior when the behavior was framed as necessitating commitment (Indirect effect = 0.12, $SE = 0.04$, 95% $CI = [0.05, 0.20]$). Moreover, perceived commitment did not mediate the effect when the behavior was described as simply enjoyable (Indirect effect = 0.03, $SE = 0.04$, 95% $CI = [-0.03, 0.09]$; Index of moderated mediation = 0.09, $SE = 0.05$, 95% $CI = [0.01, 0.19]$).

6.3. Discussion

In these studies, people again forecasted that an individual was more likely to continue a behavior if they had a recent streak of engaging in that behavior versus if they had a different pattern of recent behavior. Importantly, we found that this effect was stronger when the exact same behavior necessitated commitment, compared to when it was enjoyable in its own right. That is, above and beyond any other inferences that can be derived from streaky patterns of behaviors (e.g., a "hot hand"; Gilovich et al., 1985), we show that a recent streak is especially diagnostic of future behavior in the context of goal pursuit, which is consistent with our theory that streaks are a signal of commitment.

These moderation results also cast doubt on certain alternative explanations. If the effect of recent streaks on forecasts was driven by other factors besides perceived goal commitment – such as greater perceived ability (e.g., Anderson and Butzin, 1974) or preference strength (e.g., Rifkin and Etkin, 2019) – then we would not only expect a similarly-sized effect regardless of whether the same behavior required commitment or not, but also would not find differences in perceived commitment. Instead, in line with our theory, the effect was somewhat larger when an identical recent streak of behavior necessitated commitment, and perceived commitment only mediated the effect for behaviors described as a means to an end (versus those simply done for enjoyment).

7. Study 4: examining moderation by the historic rate of goal adherence

Thus far, we have demonstrated that a recent streak leads to judgments of greater likelihood of subsequent goal adherence and have provided evidence that this effect is driven by an increase in perceived commitment to the goal. Study 4 further examines this mechanism by investigating whether the presence of another diagnostic cue about goal commitment moderates the effect. Specifically, we test the effect when varying the historic rate, or how regularly the individual has worked towards their goal for the past several weeks or months. Our theory predicts that this historic rate will be inversely related to the effect of a recent streak on forecasts. That is, for an individual with a low rate of goal adherence, a recent streak will be seen as a stronger signal of commitment to the goal, thus amplifying the effect. However, when the individual has a high rate, the recent streak will be less diagnostic, diminishing the effect.

7.1. Methods

We recruited 597 Amazon Mechanical Turk participants (M age = 40.98, 41.88% female, 1.34% other/did not say).

Participants imagined a scenario where they were trying to lose weight by eating healthy, and learned that they had eaten either fruit or ice cream for dessert for the past six days (similar to Study 1b). Participants were randomly assigned to one of six conditions in a 2(*pattern: streak or non-streak*) by 3(*rate: low, moderate, or high*) between-subjects design. In both *pattern* conditions, participants read that they had eaten fruit for dessert on three of the last six days and had eaten ice cream on the other three days. In the *streak* condition, participants saw the same graphic as the *streak* condition in Study 1b (i.e., they had eaten fruit on Days 4, 5, and 6), while in the *non-streak* condition, participants saw the same graphic as the *scattered* condition in Study 1b (i.e., they had eaten fruit on Days 1, 4, and 6; see the first and third visuals in Fig. 1). Participants also read that they had chosen fruit for dessert either 20% (*low rate* condition), 50% (*moderate rate* condition), or 80% (*high rate* condition) of the time over the past several weeks.

After reading this information, participants forecasted how likely they would be to eat fruit on the next day with a similar item as in Studies 2, 3a, and 3b. Participants then answered three new items intended to capture a change in perceived commitment to the goal: “To what extent do you feel that your commitment to your goal has been renewed?”; “Given your recent pattern of behavior, how committed do you currently feel to your goal?”; and “How do you think your commitment to your goal has changed since six days ago (Day 1)?” (1 = Not at all/Extremely unlikely to 7 = A great deal/Extremely likely). We averaged these items together to create one measure of *perceived commitment* ($\alpha = 0.71$).

Finally, participants answered two manipulation check questions – one regarding their pattern of behavior (97.32% answered correctly) and one regarding their historic rate of eating fruit (83.58% answered correctly) – as well as demographic questions.

7.2. Results

Forecasts. A two-way ANOVA revealed a main effect of pattern ($F(1, 591) = 6.91, p = .009$), such that participants predicted that they would be more likely to eat fruit when they had a recent streak ($M = 4.86, SD = 2.76$) compared to when they did not ($M = 4.39, SD = 1.98; d = 0.20$). There was also a significant effect of rate ($F(2, 591) = 26.86, p < .001$), such that people predicted they would be more likely to eat fruit when they had a higher rate of eating fruit.

Most importantly, we found the expected significant interaction between the two factors ($F(2, 591) = 3.31, p = .037$; see Fig. 6). As predicted, the effect of a recent streak on the predicted likelihood of eating fruit was strongest when the historic rate of goal adherence was

lowest ($M_{streak} = 4.51, SD = 1.79$ vs. $M_{non-streak} = 3.66, SD = 1.98; t(200) = 3.19, p = .002; d = 0.45$). This effect decreased in size, and was no longer significant, as the rate increased (*moderate rate* condition: $M_{streak} = 4.66, SD = 1.80$ vs. $M_{non-streak} = 4.27, SD = 1.86; t(196) = 1.49, p = .137, d = 0.21$ ⁷; *high rate* condition: $M_{streak} = 5.34, SD = 1.59$ vs. $M_{non-streak} = 5.41, SD = 1.71; t(195) = 0.33, p = .74; d = -0.04$).

Perceived commitment. A two-way ANOVA revealed a main effect of pattern ($F(1, 591) = 130.09, p < .001$), such that participants felt they had greater commitment to their goal of eating healthy when they had a recent streak ($M = 4.96, SD = 1.24$) than when they did not ($M = 3.84, SD = 1.14; d = 0.94$). There was no effect of the rate of goal adherence ($F(2, 591) = 1.58, p = .208$).

We found a significant interaction on this measure as well ($F(2, 591) = 7.36, p < .001$). As predicted, the effect of a recent streak on perceived goal commitment was strongest for the *low rate* condition ($M_{streak} = 5.13, SD = 1.20$ vs. $M_{non-streak} = 3.54, SD = 1.25; t(200) = 9.15, p < .001; d = 1.30$). This effect decreased in size, but remained significant, as the rate increased (*moderate rate* condition: $M_{streak} = 4.88, SD = 1.23$ vs. $M_{non-streak} = 3.84, SD = 0.97; t(196) = 6.65, p < .001, d = 0.94$; *high rate* condition: $M_{streak} = 4.87, SD = 1.27$ vs. $M_{non-streak} = 4.19, SD = 1.11; t(195) = 3.98, p < .001; d = 0.58$).

Mediation analysis. We conducted a moderated mediation analysis (PROCESS Model 7), which included *pattern* condition as the independent variable (*streak* = 1, *non-streak* = 0), perceived commitment as the mediator variable, *rate* condition as the moderator variable (*low rate* = 0.5, *moderate rate* = 0, *high rate* = -0.5), and forecasted goal adherence as the dependent variable. Consistent with our hypothesis, we found that perceived commitment mediated the interaction in the expected direction (index of moderated mediation = 0.53, SE = 0.16, 95% CI = [0.24, 0.85]). While the 95% confidence intervals for all three *rate* conditions excluded zero, the effect was largest in the *low rate* condition (Indirect effect = 0.93, SE = 0.13, 95% CI = [0.68, 1.20]), then followed by the *moderate rate* condition (Indirect effect = 0.66, SE = 0.09, 95% CI = [0.50, 0.84]), and was smallest in the *high rate* condition (Indirect effect = 0.40, SE = 0.10, 95% CI = [0.21, 0.60]).

7.3. Discussion

Replicating previous studies, Study 4 found that people inferred they were more likely to adhere to their goal following a recent streak of goal-consistent behavior. Again, we also found that perceived commitment mediated the relationship between a recent streak and forecasts of behavior.

In addition, we uncovered another important moderator of this effect: the individual’s historic rate of goal adherence. Specifically, the effect was strongest when the individual had a low rate of goal adherence and became weaker as the rate increased. This moderation supports our proposed theory; a recent streak is seen as a less diagnostic cue of goal adherence in the presence of another signal of goal commitment (a high rate of goal adherence).

Next, we investigate several ways in which patterns of goal adherence may guide people’s strategic choices in goal pursuit.

8. Studies 5a and 5b: adopting and recommending goal support tools

Studies 5a and 5b examine an important potential downstream consequence of the inferences people make from recent streaks: the use of goal support tools. Because a recent streak of goal-consistent behavior signals greater commitment to the goal, we expect that people will be more likely to think an individual with a recent streak is sufficiently

⁷ Note that the *moderate* condition had the same historic rate as previous studies (50%). This contrast was significant in previous studies, but although in the predicted direction, was not significant in this study.



Fig. 6. Participants' forecasted likelihood that an individual would engage in the goal-consistent behavior (eating fruit) based on their recent pattern and historic rate of behavior in Study 4. Error bars represent 95% confidence intervals. (* $p < .05$, ** $p < .01$, *** $p < .001$).

motivated to reach their goal without external assistance. Therefore, people will prefer forgoing the costs of such tools when they have a recent streak (versus not), as they will believe the individual is more capable of attaining their goal without additional help. In other words, to the extent that people have more optimistic forecasts of an individual's future goal adherence, we anticipate that people will find goal support tools to be less critical for future success. We investigate this hypothesis both in terms of whether people are willing to adopt a tool themselves (Study 5a) or recommend a tool to others (Study 5b). Moreover, we examine the robustness of the effect across two new, distinct goal contexts.

8.1. Study 5a

8.1.1. Methods

We recruited 291 participants from a behavioral lab at a university in the northeastern United States (M age = 20.13, 48.45% female, 0.69% other/did not say).

All participants imagined that they had a goal of going on 25 runs by the end of April (which was approximately 6 weeks from when they completed the study). Participants read that they were using a running app to keep track of their progress. In particular, this app tracked their running history by marking a calendar with stars on each day they had gone on a run (similar to fitness apps like Peloton and Strava). All participants also read that they had the same amount of goal progress: they had gone on eight runs so far, meaning they had "made 32% progress towards their goal." Participants then saw images from the app depicting their running behavior over the past two weeks which served as our *pattern* manipulation. The two *pattern* conditions (*streak* and *non-streak*) were similar to those in Studies 3a and 3b, again controlling for the number of times they had adhered to their goal (i.e., eight of the last 14 days; see Fig. 4). Participants saw both of these *pattern* conditions in random order in a within-subjects design (i.e., they read two scenarios).

After viewing their pattern of behavior for each scenario, participants reported how likely they would be to pay for a coach through the app to ensure that they did not fail their goal (1 = Extremely unlikely to 7 = Extremely likely). Participants also answered a *forecast* item similar to the one used in Studies 2–4, as well as three *perceived commitment* items similar to those used in Study 4 ($\alpha > 0.75$) and two exploratory items (see Online Supplemental Materials). Finally, participants answered an attention check about the scenarios (95.88% answered correctly), a question asking how realistic the scenarios were to them (72.51% answered that they were realistic), and basic demographic information.

8.1.2. Results

Likelihood of hiring a coach. A paired t -test revealed that participants were less likely to hire a coach when they had a recent streak ($M = 2.54$, $SD = 1.65$) versus when they did not ($M = 2.71$, $SD = 1.68$; $t(290) =$

2.66 , $p = .008$; $d_m = 0.24$; see Fig. 7, top panel).

Forecasts. Participants predicted they would be more likely to go for a run the next day when they had a recent streak ($M = 4.83$, $SD = 1.89$) versus when they did not ($M = 3.92$, $SD = 1.81$; $t(290) = 6.35$, $p < .001$; $d_m = 0.72$).

Perceived commitment. Participants felt that they had greater commitment to their goal when they had a recent streak ($M = 5.81$, $SD = 1.13$) versus when they did not ($M = 4.85$, $SD = 0.98$; $t(290) = 14.08$, $p < .001$; $d_m = 1.22$).

Mediation analysis. We conducted a repeated measures mediation analysis using a bootstrap procedure with 10,000 samples to test the process by which an individual's pattern of behavior affected forecasted goal adherence and willingness to adopt a goal support tool (SAS MEMORE Macro; Montoya and Hayes, 2017). The perceived commitment measure mediated the relationship between a recent streak and likelihood of hiring a coach at the 90% confidence level (Indirect effect = -0.10 , $SE = 0.06$, 95% CI = $[-0.23, 0.01]$; 90% CI = $[-0.20, -0.01]$). In this study, predicted likelihood of future goal adherence did not mediate this relationship (Indirect effect = -0.02 , $SE = 0.03$, 95% CI = $[-0.09, 0.04]$), nor did perceived commitment mediate the relationship between a recent streak and the predicted likelihood of future goal adherence (Indirect effect = 0.17 , $SE = 0.12$, 95% CI = $[-0.07, 0.38]$).

8.2. Study 5b

8.2.1. Methods

We recruited 226 Amazon Mechanical Turk participants (M age = 34.75, 44.69% female, 0.44% other/did not say).

All participants read about an individual who had a goal of trying to cut back on how much time they spent online. Every evening, the individual could either adhere to their goal by staying offline or succumb to temptation by going online. Across conditions, participants read that the individual was able to stay offline 50% of their evenings for the past several weeks, and that they had stayed offline on three of the last six days. Participants saw the same *pattern* conditions as in Studies 1a and 1b (*recent streak*, *old streak*, and *scattered*; see Fig. 1). However, in this study, participants saw all three conditions in random order in a within-subjects design (i.e., they saw three scenarios).

After viewing the individual's pattern of behavior, participants read a brief description of commitment devices, which illustrated how they are both helpful while also costly to individual freedom: "The upside to commitment devices is that they increase the chances that the person will stay on track with their goal (i.e., avoid using the internet in the evening). The downside to commitment devices is that they infringe on a person's freedom to choose what they want to do; in other words, commitment devices limit a person's ability to make their own decisions." Then, participants were asked how likely they would be to recommend that the individual use a website blocker as a commitment device to help them reach their goal (1 = Extremely unlikely to 7 =

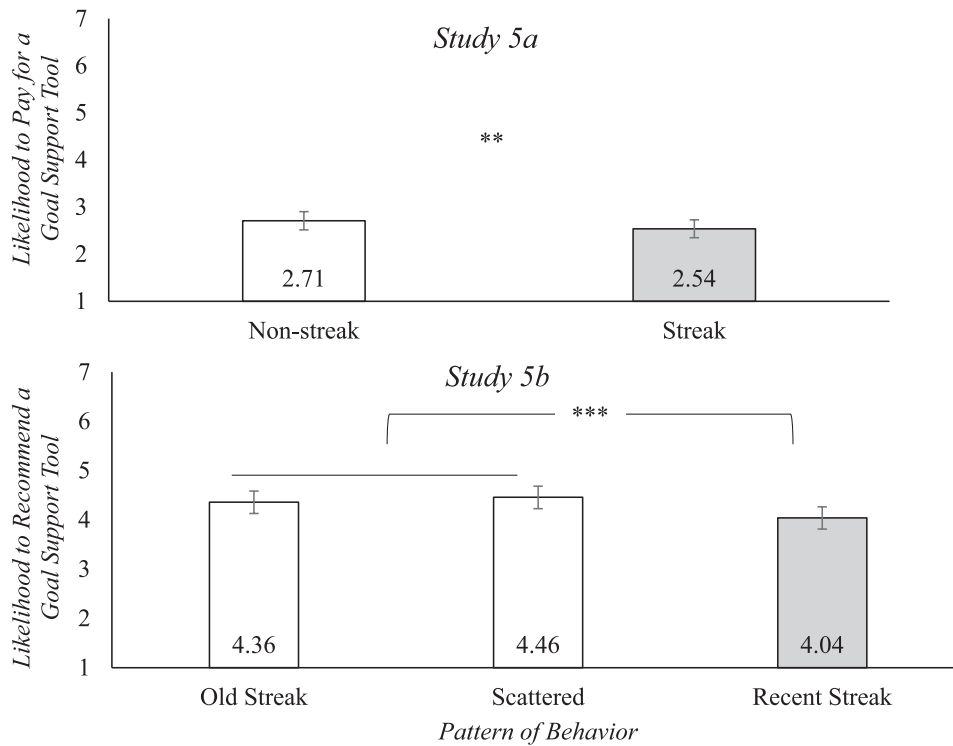


Fig. 7. Participants' likelihood of adopting a goal support tool (Study 5a, top panel) and recommending a goal support tool to others (Study 5b, bottom panel) as a function of the individual's pattern of behavior. Error bars represent 95% confidence intervals. (* $p < .05$, ** $p < .01$, *** $p < .001$).

Extremely likely). They also reported how likely it was that the individual would stay offline and go online the next evening. Again, the latter item was reverse-coded and they were averaged together to create our *forecast* measure ($r = -0.62$). Participants also answered the same four *perceived commitment* items as in Studies 1a, 1b, and 2 ($\alpha = 0.92$). Lastly, participants reported basic demographic information.

8.2.2. Results

Recommendation of a commitment device. First, as preregistered, we compared the effect of a recent streak to both comparison conditions combined. As this study used a within-subjects design, we used a random-intercept generalized linear model to examine the effect of *pattern* condition. This model revealed that participants were less likely to recommend a commitment device to an individual with a recent streak than an individual without a recent streak ($b = -0.37$, $SE = 0.07$, $t(451) = 5.31$, $p < .001$; see Fig. 7, bottom panel). A repeated measures ANOVA that considered each comparison group separately also found a significant main effect of *pattern* condition ($F(2, 450) = 14.83$, $p < .001$); participants were less likely to recommend a commitment device to an individual with a recent streak ($M = 4.04$, $SD = 1.73$) compared to an individual with an old streak ($M = 4.36$, $SD = 1.76$; $t(225) = 3.78$, $p < .001$; $d_m = 0.47$) or a scattered pattern ($M = 4.46$, $SD = 1.78$; $t(225) = 5.10$, $p < .001$; $d_m = 0.63$).

Forecasts. A similar random-intercept generalized linear model revealed that participants predicted the individual would be more likely to adhere to their goal following a recent streak compared to other patterns of behavior ($b = 0.73$, $SE = 0.10$, $t(451) = 7.40$, $p < .001$). A repeated measures ANOVA that considered each comparison group separately also found a significant main effect of *pattern* ($F(2, 450) = 25.55$, $p < .001$); participants predicted an individual with a recent streak would be more likely to stick to their goal ($M = 4.35$, $SD = 1.37$) than an individual with an old streak ($M = 3.68$, $SD = 1.17$; $t(225) = 5.71$, $p < .001$; $d_m = 0.61$) or a scattered pattern ($M = 3.58$, $SD = 1.22$; $t(225) = 6.56$, $p < .001$; $d_m = 0.59$).

Perceived commitment. A similar random-intercept generalized linear

model revealed that participants perceived an individual with a recent streak to be more committed to their goal compared to the other two conditions ($b = 0.57$, $SE = 0.06$, $t(451) = 9.27$, $p < .001$). A repeated measures ANOVA considering each comparison condition separately also found a significant main effect of *pattern* ($F(2, 450) = 23.34$, $p < .001$). Participants perceived an individual with a recent streak to be more committed ($M = 4.79$, $SD = 1.05$) than an individual with an old streak ($M = 4.30$, $SD = 1.03$; $t(225) = 6.94$, $p < .001$; $d_m = 0.66$) or a scattered pattern ($M = 4.14$, $SD = 1.08$; $t(225) = 8.28$, $p < .001$; $d_m = 0.81$).

Mediation analysis. We again conducted repeated measures mediation analyses to test the process by which an individual's pattern of behavior affected forecasted goal adherence and recommendations for a commitment device. As expected, perceived commitment mediated the relationship between a recent streak and recommendations for a commitment device, relative to an old streak (Indirect effect = -0.23 , $SE = 0.06$, 95% CI = $[-0.36, -0.12]$) and a scattered pattern (Indirect effect = -0.19 , $SE = 0.06$, 95% CI = $[-0.31, -0.10]$). Predicted likelihood of staying offline in the near future also mediated this relationship (vs. *old streak*: Indirect effect = -0.21 , $SE = 0.06$, 95% CI = $[-0.34, -0.11]$; vs. *scattered*: Indirect effect = -0.18 , $SE = 0.04$, 95% CI = $[-0.27, -0.10]$). Replicating the results from previous studies, perceived commitment mediated the relationship between a recent streak and the predicted likelihood of staying offline relative to an old streak (Indirect effect = 0.52 , $SE = 0.08$, 95% CI = $[0.36, 0.69]$) and a scattered pattern (Indirect effect = 0.55 , $SE = 0.10$, 95% CI $[0.36, 0.74]$).

8.3. Discussion

Studies 5a and 5b replicated the effect of a recent streak on forecasts of goal adherence for different types of goals. Most importantly, these studies revealed an important consequence of recent streaks of goal adherence: they reduce people's inclination to adopt goal support tools for themselves (Study 5a) and to recommend them to others (Study 5b). That is, an individual with a recent streak is perceived as more

committed to their goal, which makes it seem less necessary to incur the costs associated with common goal support tools.

9. Study 6: pursuing a shared goal

Our final study tests whether inferences from past patterns of goal adherence matter in a collaborative context, where people must cooperate to achieve a shared goal. In addition to further testing generalizability, this new context allows us to examine whether people make consequential decisions as a function of their beliefs about another individual's commitment.

In particular, we investigate whether people's decision of who to cooperate with on an incentive-compatible task is influenced by the potential partner's recent pattern of goal adherence. Building on a paradigm used in previous research (Levine et al., 2018; Srna et al., 2022), participants were given the opportunity to earn bonus money by collaborating with a partner of their choice. They viewed each potential partner's recent history in a similar study: one had a recent streak of choosing work tasks, while the other chose the same number of work tasks but did not have a recent streak. If a recent streak of goal-consistent behavior signals greater commitment, as we suggest, then people should be more interested in working with a partner with a recent streak.

9.1. Methods

We recruited 118 participants from a behavioral lab at a university in the northeastern United States (M age = 20.63, 39.83% female, 1.69% other/did not say).

All participants were informed that in this study, they would choose between completing a fun activity (watching a funny 30-second video) and a work task (coding a set of six CAPTCHAs) three times. Additionally, they would be paired with an anonymous partner for the study. The incentive scheme created a shared goal of earning raffle tickets that entered them into a drawing to win a \$10 Amazon gift card; participants who earned more tickets were more likely to win the gift card. The incentive scheme applied to each task choice: a) the participant earned two tickets if they and their partner both chose the work task; b) the participant earned one ticket if they chose the work task but their partner chose the fun activity; c) the participant did not earn any tickets if they chose the fun activity, regardless of their partner's choice. Participants were not informed of their partner's choices (or their ticket earnings) while completing the tasks; participants' total ticket earnings were revealed only at the end of the study.⁸

Before making any choices between fun activities and work tasks, participants first selected their partner for the study from two options: Person A or Person B. Participants were told that both people had recently done a similar survey with seven tasks and were shown each person's pattern of choices in that survey (see Fig. 8). Both Person A and Person B had selected the work task four out of seven times, thus holding the rate of goal adherence constant. However, one of the potential partners had a recent streak of choosing the incentivized work task and the other did not (order was counterbalanced).

Next, participants answered the same four *perceived commitment* items ($\alpha = 0.91$) as in Study 3b, but adapted for the scenario: "Who is more committed to completing CAPTCHA sets?"; "Who has chosen to be committed to completing CAPTCHA sets to a greater extent?"; "Who cares more about completing CAPTCHA sets?"; and "Who is more dedicated to completing CAPTCHA sets?" (1 = Definitely Person A to 7 = Definitely Person B, with 4 = They are equal). We coded the items to account for counterbalancing, such that higher values indicated greater

⁸ In reality, the partner was fictitious. All participants were given tickets into the raffle as if their partner had chosen to complete the work task every time (i. e., a participant received two tickets each time they chose the work task and zero tickets each time they chose the fun activity).

Person A's recent pattern:

Choice:	1	2	3	4	5	6	7
	V	V	V	\$	\$	\$	\$

Person B's recent pattern:

Choice:	1	2	3	4	5	6	7
	\$	\$	V	\$	V	V	\$

Fig. 8. The images shown to participants depicting each potential partner's recent pattern in Study 6. A "\$" indicated that the person chose the incentivized work task and a "V" indicated that they chose the fun activity (watching a video).

perceived commitment for the individual with a recent streak.

Finally, participants completed three activities, choosing each time whether to watch a video clip or complete a set of CAPTCHAs, and then answered demographic questions.

9.2. Results

Partner choice. Our key prediction was that participants would favor the partner with a recent streak. As predicted, the majority of participants chose to work with the person with a recent streak of goal adherence (68.64%; $Z = 4.05, p < .001, Cohen's g = 0.186$).

Perceived commitment. A one-sample t -test revealed that perceived commitment ($M = 4.52, SD = 1.19$) was significantly above the midpoint of the scale (i.e., 4; $t(117) = 4.74, p < .001; d = 0.44$), indicating that participants viewed the individual with the recent streak as more committed to the shared goal.

Moreover, we found a significant positive relationship between perceived commitment and choosing the partner with the recent streak. Perceived commitment predicted partner choice (coded as 1 = recent streak, 0 = non-streak) in a logistic regression model ($b = 0.85, SE = 0.24, Wald \chi^2 = 12.89, p < .001$), and the two variables were significantly correlated ($r = 0.37, p < .001$).

9.3. Discussion

Study 6 replicated the key effect in a new context with an incentive-compatible design and real behavior. When working toward a common goal, participants preferred partnering with someone who had a recent streak of goal adherence. Moreover, this effect was driven by the inferences participants drew from their potential partners' recent patterns: the person with a recent streak was seen as more committed to the goal, which led to them being chosen more for joint goal pursuit.

10. General discussion

Streaks convey meaning; a recent streak is an especially conspicuous pattern, and as such, triggers sense-making. We suggest that, in the context of goal pursuit, the particular meaning signaled by a streak is that the individual has greater commitment to the goal at hand. Consequently, we find that an individual with a recent streak of goal-consistent behavior is seen as more likely to adhere to their goal in the near future. This effect holds for people's predictions about their own behavior (Studies 1a, 4, and 5a) as well as others' behavior (Studies 1b, 2, 3a, 3b, 5b, and 6).

We demonstrate this effect in nine controlled experiments by comparing judgments following recent streaks to those following

patterns matched on recency and rate of goal adherence. This effect generalizes across various goal domains for which progress is often tracked, including productivity (Studies 1a and 5b), healthy eating (Studies 1b, 3a, and 4), education (Study 2), and exercise (Studies 3b and 5a). Additionally, the effect is robust to different types and descriptions of behaviors and goals, including self-control dilemmas (i.e., choosing to pursue a goal in the face of a tempting alternative: Studies 1a, 1b, 4, and 5b) and attainment goals (i.e., working towards a specific end-state: Studies 2 and 5a). In all of these cases, goal pursuit involves repeated, trackable behavior over time, where commitment is a critical psychological variable for achieving the goal.

In accordance with the proposed mechanism, we demonstrate two notable moderators of the effect of recent streaks on forecasts of future behavior. Specifically, the effect 1) is amplified when the *same* behavior necessitates commitment, versus when it is simply done for enjoyment (Studies 3a and 3b), and 2) is attenuated in the presence of another diagnostic cue of high commitment (a high historic rate of goal adherence; Study 4). Moreover, as a result of these forecasts of likelier goal adherence, people are less likely to adopt and recommend goal support tools following streaks (Studies 5a and 5b). Finally, in the context of joint goal pursuit, people are more likely to select a partner with a recent streak of goal adherence, as that partner appears to be more committed (Study 6).

10.1. Theoretical contributions

This research bridges two previously disconnected areas of study – inferences following sequences of outcomes (e.g., streaks) and goal pursuit – and as such, makes notable contributions to each.

First, we add to research on predictions following sequences of outcomes (in particular, streaks). Past work in this area has examined the influence of streaks on people's forecasts of outcomes of statistically independent events, like basketball free throws and coin flips (Ayton and Fischer, 2004; Gilovich et al., 1985; Parker, Paul, and Reinholtz, 2020; Tversky and Kahneman, 1971). In this literature, the dominant explanation for why streaks influence forecasts has been people's (mis) conceptions of the outcome generating process (that is, seeing "signal" even within fully random patterns). We extend this sphere of study to understanding how streaks influence predictions of goal adherence, a domain of behavior where the psychological forces at play are distinct from prior work. Specifically, we examine the meaning inferred from the repeated, purposeful decision to adhere to one's goal. In doing so, we identify a distinct inference – perceived commitment to the goal – that explains how streaks inform forecasts in this context.

Second, this work contributes to literature on beliefs regarding goal pursuit. Understanding how people make inferences about goal commitment is especially valuable given that commitment is a crucial determinant of successful goal achievement (Hollenbeck and Klein, 1987; Locke, 1968). Prior research has shown that past goal adherence (or a lack thereof) can be a diagnostic signal of commitment (Fishbach and Dhar, 2005; Fishbach, Dhar and Zhang, 2006; Touré-Tillery and Fishbach, 2015). Yet beyond examining the influence of a singular goal-consistent or inconsistent choice, no research (that we know of) has considered how a *series* of consecutive past choices can impact future predictions. Our findings add to this literature by showing how lay beliefs of goal pursuit and commitment are influenced by a particularly common, oft-highlighted pattern of behavior: a recent streak.

10.2. Practical implications

Technological advancements have made behavioral tracking more prevalent than ever before. This begs the question: what is the utility of tracking behaviors when it comes to goal pursuit? Prior work suggests that, broadly speaking, there can be both negative and positive effects from such information collection, from decreased enjoyment of the behavior to increased engagement in the behavior itself (e.g., Bravata

et al., 2007; Etkin, 2016). One consequence of tracking is that it makes patterns of behavior more apparent. Our findings suggest that doing so should not only influence people's beliefs about commitment to goals, but also their strategic actions taken when pursuing goals (e.g., the adoption of goal support tools, partner choice in collaborative tasks).

Understanding this effect is useful for organizations and individuals looking to improve outlooks towards goal pursuit. For example, a manager who wants to boost morale might highlight employees' streaks in meeting sales targets, while a school facing truancy issues might call attention to students' streaks in attendance. Similarly, an individual feeling somewhat defeated in their weight-loss journey might be encouraged if they see that they have a recent streak of healthy eating. Emphasizing streaks of desirable behaviors should improve those individuals' beliefs in themselves.

Additionally, our work has important behavioral implications for the adoption of goal support tools and for joint goal pursuit. Individuals and organizations alike face the question of whether the expected benefits of goal support tools are worth their costs (in dollars, time, and/or restricted freedom of choice). We find that people are less likely to adopt or recommend such tools following a recent streak of goal adherence. Accordingly, organizations may want to selectively disclose such patterns to encourage adoption of these tools. In a similar vein, companies may want to carefully choose when to highlight patterns of employee performance, as this could impact interpersonal beliefs and social dynamics between coworkers.

10.3. Limitations and future directions

To examine how recent streaks affect inferences and forecasts, our studies used simplified representations of patterns and goals. For one, participants saw streaks of three to five behaviors in a row. As such, it is unclear how the effects might change as the length of an individual's recent streak increases. On the one hand, a longer streak may serve as an even stronger signal of commitment; sticking to one's goal dozens of times in a row requires much more effort than doing so five times. If that is the case, our studies represent a conservative test of how streaks affect inferences and predictions of goal pursuit. On the other hand, an especially long streak could lead to predictions about licensing, whereby people believe an individual is due for a reward or reprieve, resulting in an attenuation of the effect.

Second, many of our studies presented stylized, hypothetical representations of goal progress, wherein participants judged a sequence of decisions over time without much other information about the individual. This approach provided a high level of internal validity, allowing us to manipulate patterns of past behavior while holding constant all other information. In doing so, we were able to cleanly test our predictions, avoiding issues that arise from self-selection and other confounding inferences that might occur from allowing participants to choose their own patterns of behavior. Still, an open question remains as to how additional factors present in the noisy real world might influence this effect. To get closer to a natural environment, Study 2 was designed to mimic the look and feel of behavioral tracking in practice by using a "website" that included other goal-relevant (but controlled) information. Yet given its practical importance, future work should examine judgments and adoption of goal support tools when individuals elect to track patterns of goal adherence in the field, despite the aforementioned potential confounds.

Third, our studies find that streaks influence inferences and predictions when the display of past behavior is a sequence of binary choices (e.g., reading vs. not reading; waking up on time vs. sleeping in). Future research should broaden the investigation to include other realistic behavioral tracking displays containing more than two behaviors, or even different patterns (e.g., alternating sequences). Although any decision may be reduced to whether it is consistent or inconsistent with some long-term goal, specifying additional options could alter what appears to be a streak, thus moderating our effects. Along those lines,

open questions remain regarding how tracking technology can best portray patterns of behavior. We expect that any display that highlights recent streakiness (e.g., through color or labeling) should amplify their effects on subsequent behavior.

More broadly, given great interest in the accuracy of predictions regarding future events and behaviors alike (e.g., Miller and Sanjurjo, 2018; Silverman et al., 2022), it is important to learn more about whether the optimism we document about goal adherence following streaks is indeed warranted. Recent research finds that in certain cases, people actively choose to continue their intact streaks, and are especially discouraged to continue after broken streaks, because they value these streaks in and of themselves (Silverman and Barasch, 2023). Alternatively, if sufficient goal progress is signaled via a streak, individuals might feel free to take a break, especially if they feel they should spend time pursuing other salient, important goals (Dhar and Simonson, 1999; Fishbach and Dhar, 2005). Thus, it seems that the lay theories we have uncovered about streaks in goal adherence may be justified or not, depending on the particular situation or other objectives at hand.

Finally, future research could explore streaks of “bad” behaviors, or when a person has failed to adhere to their goal multiple times in a row. Since tracking technologies capture and convey patterns of many behaviors – both goal consistent and inconsistent – studying this question seems quite practically important. Based on our findings, we would expect that a similar inferential process might be triggered in these cases. That is, recent streaks of goal-inconsistent behaviors may also signal a mindset shift, leading to the inference that people are currently even less committed to their goals, relative to other patterns. This would imply that a person is especially unlikely to stick to their goal in the near future, resulting in an increased likelihood of recommending or adopting commitment devices.

11. Conclusion

Tracking technologies allow individuals and organizations alike to easily see a bird’s eye view of people’s past behaviors, making any pattern over time, including recent streaks, particularly salient. We demonstrate that people make inferences about goal commitment and forecasts of future behavior based on these patterns. These judgments, in turn, affect people’s willingness to adopt and recommend tools which aid in long-term goal success (at a cost), and inform their choices of who to collaborate with when working toward a shared goal. This sheds light on the specific meaning, and consequences, associated with streaks in the context of goal pursuit.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

All data are available in a ResearchBox repository (see manuscript for link).

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References

- Alter, A. L., & Oppenheimer, D. M. (2006). From a fixation on sports to an exploration of mechanism: The past, present, and future of hot hand research. *Thinking & Reasoning*, 12(4), 431–444.
- Anderson, N. H., & Butzin, C. A. (1974). Performance = motivation × ability: An integration-theoretical analysis. *Journal of Personality and Social Psychology*, 30(5), 598.
- Ariely, D., & Wertenbroch, K. (2002). Procrastination, deadlines, and performance: Self-control by precommitment. *Psychological Science*, 13(3), 219–224.
- Ayton, P., & Fischer, I. (2004). The hot hand fallacy and the gambler’s fallacy: Two faces of subjective randomness? *Memory & Cognition*, 32(8), 1369–1378.
- Bagozzi, R. P., & Warshaw, P. R. (1990). Trying to consume. *Journal of Consumer Research*, 17(2), 127–140.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215.
- Bar-Eli, M., Avugos, S., & Raab, M. (2006). Twenty years of “hot hand” research: Review and critique. *Psychology of Sport and Exercise*, 7(6), 525–553.
- Bravata, D. M., Smith-Spangler, C., & Sirard, J. R. (2007). Using pedometers to increase physical activity and improve health: A systematic review. *Journal of the American Medical Association*, 298(19), 2296–2304.
- Brocas, I., Carrillo, J. D., & Dewatripont, M. (2004). Commitment devices under self-control problems: An overview. *The Psychology of Economic Decisions*, 2, 49–67.
- Bryan, G., Karlan, D., & Nelson, S. (2010). Commitment devices. *Annu. Revista de Economia*, 2(1), 671–698.
- Campbell, M. C., & Warren, C. (2015). The progress bias in goal pursuit: When one step forward seems larger than one step back. *Journal of Consumer Research*, 41(5), 1316–1331.
- Carlson, K. A., & Shu, S. B. (2007). The rule of three: How the third event signals the emergence of a streak. *Organizational Behavior and Human Decision Processes*, 104(1), 113–121.
- Dai, H. (2018). A double-edged sword: How and why resetting performance metrics affects motivation and performance. *Organizational Behavior and Human Decision Processes*, 148, 12–29.
- Dhar, R., & Simonson, I. (1999). Making complementary choices in consumption episodes: Highlighting versus balancing. *Journal of Marketing Research*, 36(1), 29–44.
- Etkin, J. (2016). The hidden cost of personal quantification. *Journal of Consumer Research*, 42(6), 967–984.
- Fishbach, A., & Dhar, R. (2005). Goals as excuses or guides: The liberating effect of perceived goal progress on choice. *Journal of Consumer Research*, 32(3), 370–377.
- Fishbach, A., Dhar, R., & Zhang, Y. (2006). Subgoals as substitutes or complements: The role of goal accessibility. *Journal of Personality and Social Psychology*, 91(2), 232.
- Gilovich, T., Vallone, R., & Tversky, A. (1985). The hot hand in basketball: On the misperception of random sequences. *Cognitive Psychology*, 17(3), 295–314.
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: a regression-based approach*. Guilford Publications.
- Hollenbeck, J. R., & Klein, H. J. (1987). Goal commitment and the goal-setting process: Problems, prospects, and proposals for future research. *Journal of Applied Psychology*, 72(2), 212–220.
- Huang, S. C., Jin, L., & Zhang, Y. (2017). Step by step: Sub-goals as a source of motivation. *Organizational Behavior and Human Decision Processes*, 141, 1–15.
- Kivetz, R., Urminsky, O., & Zheng, Y. (2006). The goal-gradient hypothesis resurrected: Purchase acceleration, illusionary goal progress, and customer retention. *Journal of Marketing Research*, 43(1), 39–58.
- Klein, H. J., Cooper, J. T., Molloy, J. C., & Swanson, J. A. (2014). The assessment of commitment: Advantages of a unidimensional, target-free approach. *Journal of Applied Psychology*, 99(2), 222.
- Koo, M., & Fishbach, A. (2008). Dynamics of self-regulation: How (un)accomplished goal actions affect motivation. *Journal of Personality and Social Psychology*, 94(2), 183–195.
- Levine, E. E., Barasch, A., Rand, D., Berman, J. Z., & Small, D. A. (2018). Signaling emotion and reason in cooperation. *Journal of Experimental Psychology: General*, 147(5), 702.
- Locke, E. A. (1968). Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance*, 3(2), 157–189.
- Locke, E. A. (1996). Motivation through conscious goal setting. *Applied and Preventive Psychology*, 5(2), 117–124.
- Lount, R. B., Jr, Pettit, N. C., & Doyle, S. P. (2017). Motivating underdogs and favorites. *Organizational Behavior and Human Decision Processes*, 141, 82–93.
- Martin, S. R., Emich, K. J., McClean, E. J., & Woodruff, C. T. (2022). Keeping teams together: How ethical leadership moderates the effects of performance on team efficacy and social integration. *Journal of Business Ethics*, 1–13.
- McHorney, C. A., & Tarlov, A. R. (1995). Individual-patient monitoring in clinical practice: Are available health status surveys adequate? *Quality of Life Research*, 4(4), 293–307.
- Milkman, K. L., Minson, J. A., & Volpp, K. G. M. (2013). Holding the Hunger Games hostage at the gym: An evaluation of temptation bundling. *Management Science*, 60(2), 283–299.
- Miller, J. B., & Sanjurjo, A. (2018). Surprised by the hot hand fallacy? A truth in the law of small numbers. *Econometrica*, 86(6), 2019–2047.
- Moldoveanu, M., & Langer, E. (2002). False memories of the future: A critique of the applications of probabilistic reasoning to the study of cognitive processes. *Psychological Review*, 109(2), 358–375.
- Montoya, A. K., & Hayes, A. F. (2017). Two condition within-participant statistical mediation analysis: A path-analytic framework. *Psychological Methods*, 22, 6–27.

- Parker, J. R., Paul, I., & Reinholdt, N. (2020). Perceived momentum influences responsibility judgments. *Journal of Experimental Psychology: General*, 149(3), 482.
- Rafieian, H., & Sharif, M. A. (2023). It's the effort that counts: The effect of self-control on goal progress perceptions. *Journal of Marketing Research*, 60(3), 527–542.
- Rifkin, J. R., & Etkin, J. (2019). Variety in self-expression undermines self-continuity. *Journal of Consumer Research*, 46(4), 725–749.
- Scott, R. J., & Boyd, R. (2023). Determined to succeed: Can goal commitment sustain interagency collaboration? *Public Policy and Administration*, 38(1), 3–33.
- Sharif, M. A., & Woolley, K. (2020). The effect of categorization on goal progress perceptions and motivation. *Journal of Consumer Research*, 47(4), 608–630.
- Silverman, J., & Barasch, A. (2023). On or off track: how (broken) streaks affect consumer decisions. *Journal of Consumer Research*, 49(6), 1095–1117.
- Silverman, J., Barasch, A., Diehl, K., & Zauberan, G. (2022). Harder than you think: Misconceptions about logging food with photos versus text. *Journal of the Association for Consumer Research*, 7(4), 419–428.
- Singh, S. N., Rothschild, M. L., & Churchill, G. A., Jr (1988). Recognition versus recall as measures of television commercial forgetting. *Journal of Marketing Research*, 25(1), 72–80.
- Snowden, D. (2011). Naturalizing sensemaking. In *Informed by knowledge* (pp. 237–248). Psychology Press.
- Srna, S., Barasch, A., & Small, D. A. (2022). On the value of modesty: How signals of status undermine cooperation. *Journal of Personality and Social Psychology*.
- Stiglbauer, B., Weber, S., & Batinic, B. (2019). Does your health really benefit from using a self-tracking device? Evidence from a longitudinal randomized control trial. *Computers in Human Behavior*, 94, 131–139.
- Tanner, W. P., Jr., & Swets, J. A. (1954). A decision-making theory of visual detection. *Psychological Review*, 61(6), 401–409.
- Touré-Tillery, M., & Fishbach, A. (2011). The course of motivation. *Journal of Consumer Psychology*, 21(4), 414–423.
- Touré-Tillery, M., & Fishbach, A. (2015). It was (n't) me: Exercising restraint when choices appear self-diagnostic. *Journal of Personality and Social Psychology*, 109(6), 1117.
- Tversky, A., & Kahneman, D. (1971). Belief in the law of small numbers. *Psychological Bulletin*, 76(2), 105–110.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases: Biases in judgments reveal some heuristics of thinking under uncertainty. *Science*, 185(4157), 1124–1131.
- Wagenaar, W. A. (1972). Generation of random sequences by human subjects: A critical survey of the literature. *Psychological Bulletin*, 77(1), 65–72.
- Weathers, D., & Poehlman, T. A. (2023). Defining, and understanding commitment to, activity streaks. *Journal of the Academy of Marketing Science*, 1–23.
- Werthenbroch, K. (1998). Consumption self-control by rationing purchase quantities of virtue and vice. *Marketing Science*, 17(4), 317–337.
- Zhang, Y., & Huang, S. C. (2010). How endowed versus earned progress affects consumer goal commitment and motivation. *Journal of Consumer Research*, 37(4), 641–654.
- Zhang, Y., Fishbach, A., & Dhar, R. (2007). When thinking beats doing: The role of optimistic expectations in goal-based choice. *Journal of Consumer Research*, 34(4), 567–578.