

## ORIGINAL RESEARCH REPORT

# When Time on Task Is Seen as a Reward: Autonomous Motivation Increases Preference for Pursuing Goals More Often for Less Time

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When working towards goals, the length and frequency of goal pursuit sessions might play a role in individuals' goal pursuit motivation. We examined whether a more divided (frequent, shorter sessions) or a cumulated (less frequent, longer sessions) goal pursuit schedule increases people's motivation to work towards personal goals. Across two studies ( $N = 448$ ), the underlying reasons for pursuing the goal mattered. A divided schedule was more motivating than a cumulated schedule if participants reported highly autonomous reasons (pursuing a goal due to personal interest or values), but the difference was eliminated for those reporting low autonomous reasons. We discuss how perceiving time spent on goal activities as loss, reward, or investment may explain scheduling preferences and how these may map on to preferences for scheduling financial losses and rewards outlined by prospect theory.

**Keywords:** Self-determination Theory; Prospect Theory; Goals; Motivation; Time; Exercise Intervals

Pursuing personal goals (e.g., weight loss goal) typically requires engaging in specific activities (e.g., running) that help move us toward the goal. These activities might be completed in one long session or might be completed in shorter, but more frequent increments. For example, when pursuing the goal to exercise 150 minutes each week (Canadian Physical Activity Guidelines), some might exercise for 20 minutes each day and some might exercise for 70 minutes twice a week. One factor contributing to which schedule is more appealing might be the type of goal people are pursuing. Individuals who genuinely *want* to pursue their goal might prefer to schedule activities in more frequent, but shorter sessions because they perceive the time spent on such autonomous goals as rewarding in itself and want to experience this reward more often. In contrast, individuals might schedule the same activity done in pursuit of a goal they feel they *have to* pursue for fewer, but longer sessions because they perceive the time spent on the controlled goal as a loss and want to minimize the experience of loss. In the present studies we examine how goal pursuit activities are perceived (i.e., as a loss of time, as a reward, or as an investment) depending on the underlying reasons for the goal (autonomous and controlled), as well as examine whether autonomous and controlled reasons for goals affect scheduling preferences.

### Scheduling Goal Activity

Do individuals have preferences for how they schedule rewarding or aversive activities? Prospect theory suggests that individuals prefer to separate psychological gains (e.g., pleasant rewarding activities) into several experiences to maximize the pleasure derived from these gains, whereas they prefer to aggregate psychological losses (e.g., unpleasant activities) into fewer experiences, to minimize pain and irritation (prospect theory, Kahneman & Tversky, 1979; Thaler, 1985/2008; Tversky & Kahneman, 1991, 1992). This theory has been studied mostly in the financial domain but may also apply to other experiences outside the monetary domain: In a study examining event scheduling preferences, the majority of participants (78%) preferred to experience two hypothetical positive events on two separate weekdays rather than on the same weekday (Linville & Fischer, 1991). Breaking up a rewarding experience into more frequent, shorter sessions might maximize the pleasure experienced, compared to the same length of time spent in just one session. For example, a pleasant consumption experience (e.g., sitting in a massage chair) that was divided into several shorter sessions increased the enjoyment of the experience compared to fewer, longer sessions. In contrast, breaking up an unpleasant consumption experience (e.g., listening to a vacuum noise) into several sessions increased participants' irritation (Nelson & Meyvis, 2008).

Do goal activity schedules of varying frequency and duration matter to how motivated individuals are to

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pursue the goal? When time spent on goal activities is mentally reframed in smaller temporal units (e.g., minutes instead of hours), people report stronger goal pursuit intentions (Peetz, Buehler, & Britten, 2011; Ülkümen, & Thomas, 2013), and initiate goal pursuit for distant goals sooner (Lewis & Oyserman, 2015). For example, people with a health goal were more willing to try a walking and a meditation program if they considered the daily equivalent of the time required for these programs in minutes than the weekly or monthly equivalent in hours (Peetz et al., 2011). Similarly, people also tend to find shorter exercise schedules more appealing than longer exercise schedule (Astorino & Thum, 2018) and this extends even to regarding high intensity exercise intervals as more enjoyable than moderate intensity exercise as long as the high intensity exercise intervals are shorter (Jung, Bourne, & Little, 2014). The prevailing explanation of this preference of shorter over longer goal activity sessions seems to be that they appear more manageable and minimize the time and effort investment (e.g., Gourville, 1994; Peetz et al., 2011), addressing concerns of time constraints which are frequently cited as barriers to exercising (Allison, Dwyer, & Makin, 1999; Welch, McNaughton, Hunter, Hume, & Crawford, 2009).

### Goal Pursuit Motivation

Everyday goals can differ not only in the amount of motivation (i.e., how much a person wants to attain the goal; Wigfield & Eccles, 2000), but also in the underlying reasons, or *quality* of motivation for pursuing the goal (Deci & Ryan, 2008). According to self-determination theory, goals can be pursued for more autonomous or more controlled reasons (Deci & Ryan, 2008; Ryan & Connell, 1989). Some goals that people pursue stem from personal interest or values – these are autonomous goals that people genuinely *want to* pursue. Other goals are selected as a function of social pressure or other external demands – these are controlled goals that people feel they *have to* pursue.<sup>1</sup> Greater autonomous motivation has been associated with numerous positive outcomes, including greater goal progress (Koestner, Leves, Powers, & Chicoine, 2002), perceiving goal-disrupting temptations as less attractive (Milyavskaya, Inzlicht, Hope, & Koestner, 2015), increased sustained effort (Sheldon & Elliot, 1999), and increased perceived ease of goal pursuit (Werner, Milyavskaya, Foxen-Craft, & Koestner, 2016).

The present studies extend this body of research to examine whether these underlying reasons (i.e., the *type* of motivation) for the goal also affects *how* people prefer to pursue the goal, and in turn how much they actually want to pursue it (i.e., the *amount* of motivation). When working towards an autonomous goal, pursuing the goal more frequently might appear more motivating, since the activities done in pursuit of this goal might be experienced as pleasurable and a reward in and of themselves, and therefore people might want to experience the pleasure of goal pursuit more often. In contrast, when working towards a controlled goal, pursuing the goals less frequently (but for longer sessions each time) might appear more motivating, since the same goal pursuit

activities might be experienced as something that has to be endured to ‘get it over with’ and the time spent pursuing the goal may be seen as a ‘loss’ of time, which people might want to experience as few times as possible.

### Perception of Goal Pursuit Activities

Do the different types of reasons to pursue goals affect the way individuals perceive the actual goal pursuit activities? On the one hand, goal pursuit is effortful, and effort is often aversive (e.g., Brehm & Self, 1989; Gibson, 1900; Inzlicht, Legault, & Teper, 2014). Thus one might expect that goal pursuit is mostly perceived as unpleasant and goal pursuit is only rewarding in as far as progress is made towards the goal itself. On the other hand, there might be intrinsic enjoyment of some goal pursuit activities – for example, someone jogging in pursuit of their goal to stay fit might not only enjoy becoming or maintaining physical fitness but might also enjoy the act of jogging itself. Importantly, the attributes of goal activities (e.g., how pleasant or unpleasant the pursuit of the goal is) might be independent from the attributes of the goal itself (e.g., reasons for pursuing the goal, importance of the goal). To our knowledge there is little research examining the aversiveness or enjoyment of goal pursuit activities, but it stands to reason that some activities done in pursuit of goals are enjoyable, whereas others are less so. We expect that goal pursuit activities for autonomous goals may be particularly rewarding in themselves, whereas goal pursuit activities for controlled goals may be perceived as something that has to be endured to advance towards the controlled goal.

### Overview of Present Research

We examined how motivated participants were to pursue their goals in more frequent, shorter sessions (divided schedule) or in less frequent, longer sessions (cumulated schedule) as a function of whether they were pursuing an autonomous or controlled goal. We propose that divided goal pursuit schedules might be particularly motivating for individuals who enjoy the goal pursuit activities (i.e., those who pursue autonomous goals, because it maximizes rewarding experiences). We further expect that cumulated goal pursuit schedules might be motivating for individuals who feel that they need to endure the goal pursuit activities (i.e., those who pursue controlled goals, because it minimizes aversive experiences).

In the first study, individuals reported on a variety of self-nominated goals when considering a divided and a cumulated schedule (within-subject design). In the second study, we asked all individuals to think of the goal of being physically active when considering either a divided or cumulated schedule (between-subject design). In both studies, we assessed how motivated and how likely individuals were to pursue the goal in a divided or cumulated schedule. We compared whether motivation and likelihood of following each schedule differed between those with autonomous and controlled goals. All manipulations and exclusions in the study are disclosed. All data was collected prior to analysis and the studies were approved by the university ethics review

board prior to collecting data. Effect sizes are reported for all appropriate analyses. A  $\eta^2 \geq 0.01$  can be understood as a small effect,  $\eta^2 \geq 0.06$  as a medium effect. The full surveys, data, and additional analyses can be found in the supplemental online materials: <https://osf.io/zsvuc>.

### Study 1

In the first study we examined personal, self-nominated goals. We measured the degree to which participants pursued the goal for autonomous and controlled reasons. We assessed how motivated participants were and their predicted likelihood to pursue the goal in a more divided and more cumulated schedule than they currently were following, in a within-subjects design. We expected that participants would be more motivated and would be more likely to pursue a divided schedule for autonomous goals and a cumulated schedule for controlled goals.

### Method

#### Participants

We recruited MTurk participants from the U.S. or Canada who were compensated with \$0.50. We posted the number of participation spots determined by a power analysis on MTurk (i.e., a medium interaction effect ( $f = .25$ ) could be detected with 181 participants with 80% power). We overrecruited and posted 260 participation slots to account for exclusions. Data collection was stopped automatically once all slots were registered as full ( $N = 264$ ). Variations in posted versus filled spots are due to the recruitment tool. Participants were excluded if they did not list a goal ( $n = 30$ ). The final sample included 234 participants ( $M_{\text{age}} = 34.78$  years,  $SD = 11.48$ ; 46.6% female).

#### Procedure

After completing a consent form, participants were instructed to think of a current goal ("think about one of your personal goals. This should be a goal you are currently working towards"). Goals listed were, for example, "Saving for a car", "find another job", "losing 5 lbs", "Read 50 books this year". Participants then rated five items representing their reasons for pursuing the goal on a Likert scale (1 = *Not at all* to 7 = *Very*; Milyavskaya, Nadolny, & Koestner, 2014; Sheldon & Elliot, 1999). Three items were used to compute autonomous reasons (e.g., "Because it represents who you are and reflects what you value most in life.") and two items tapped into controlled reasons (e.g., "Because you would feel ashamed, guilty, or anxious if you didn't."). A growing body of research suggests that autonomous and controlled reasons may be best conceptualized as separate constructs (e.g., Koestner, Otis, Powers, Pelletier, & Gagnon, 2008), and these two scales did not correlate,  $r = .09$ ,  $p = .159$ .

Participants then described activities they were performing in pursuit of the goal (e.g., "exercise", "practice piano") and how often they currently did these activities (*several times a day*, *once a day*, *3–4 times a week*, *a couple of times a week*, and *once a week or less*). Participants rated the degree to which they perceived these activities

as a "loss of time", as a "reward", or as an "investment" (1 = *Not at all* to 7 = *Absolutely*).

In a within-subject design, participants were then asked to imagine pursuing these goals in a more divided schedule (i.e., more often than they currently do, but for less time each session) and in a more cumulated schedule (i.e., less often than they currently do, but for more time each session). To make this schedule specific while keeping it personally relevant, the instructions were adapted based on how often participants currently did these activities. For example, if a participant reported currently doing the activities "3–4 times a week", the instructions in the cumulated condition asked him or her to consider doing the same activities just "a couple of times a week" but for longer each time, and the instructions in the divided condition asked him or her to consider doing the same activity "once a day" but for shorter each time. The instructions emphasized that the total time spent on the activity per week in the divided or cumulated schedule would be equal to the current total time they spend on the goal activity per week. For each schedule, participants rated how motivated they were to pursue their goal following this schedule (1 = *Not at all motivated* to 7 = *Extremely motivated*) and the likelihood that they would follow this schedule (1 = *I'm certain I wouldn't do it (0%)* ... 11 = *I'm certain I would do it (100%)*). Participants were asked to imagine both the divided and the cumulated schedule, in counterbalanced order. Order did not affect any of the dependent variables and will not be considered further. All participants were debriefed about the purpose of the study.

### Results

When entering the self-rated autonomous and controlled reasons as simultaneous predictors in regression analyses, controlled reasons were linked to seeing goal activities more as a loss of time, whereas autonomous reasons were linked to seeing goal activities less as a loss of time, more as reward, and more as investment (see **Table 1** for coefficients and **Table 2** for correlations between outcome variables).

Overall, participants were more motivated to pursue their goals in a divided schedule ( $M = 4.97$ ,  $SD = 1.70$ ) than in a cumulated schedule ( $M = 4.67$ ,  $SD = 1.75$ ),  $F(1,229) = 4.48$ ,  $p = .035$ ,  $\eta^2 = .019$ . Participants also thought it more likely that they would pursue their goals in a divided schedule ( $M = 8.24$ ,  $SD = 2.36$ ) than in a cumulated schedule ( $M = 7.53$ ,  $SD = 2.83$ ),  $F(1,229) = 12.57$ ,  $p < .001$ ,  $\eta^2 = .052$ . These two measures were highly correlated (cumulated schedule ratings:  $r = .75$ ; aggregate schedule ratings:  $r = .78$ ) and thus we standardized and averaged these items for an overall measure of willingness to pursue goals. See online supplemental files for analyses separately by item.

Next we examined the underlying reasons for pursuing the goal as moderators. A repeated ANCOVA with rated autonomous and controlled reasons by 2 within-subject conditions (schedule: divided vs. cumulated) showed a significant autonomous  $\times$  schedule interaction term, (see **Table 3** for coefficients): For goals they rated as highly

**Table 1:** Perception of goal-directed activities as loss, reward and investment as a function of controlled and autonomous reasons to pursue the goal as simultaneous predictors in regression analyses.

	<i>M</i> ( <i>SD</i> )	Perceiving Goal Pursuit Time as Loss		Perceiving Goal Pursuit Time as Reward		Perceiving Goal Pursuit Time as Investment	
		$\beta$	<i>B</i> [95% <i>CI</i> ]	$\beta$	<i>B</i> [95% <i>CI</i> ]	$\beta$	<i>B</i> [95% <i>CI</i> ]
<i>Study 1</i>							
Autonomous reasons	5.35 (1.21)	-.13	-.19* [-.38, -.01]	.46	.71* [.53, .89]	.30	.30* [.18, .42]
Controlled reasons	3.35 (1.83)	.42	.42* [.30, .54]	.08	.08 [-.04, .20]	-.04	-.03 [-.11, .06]
<i>Study 2</i>							
Autonomous reasons	3.16 (1.00)	-.39	-.57* [-.74, -.37]	.74	1.45* [1.25, 1.65]	.45	.68* [.49, .87]
Controlled reasons	2.35 (0.77)	.24	.46* [.21, .71]	-.11	-.28* [-.54, -.02]	-.001	-.003 [-.25, .25]

Note: \*  $p < .05$ . Autonomous and controlled reasons were measured on a 7-point scale for Study 1, on a 5-point scale for Study 2. Study 2 aggregates across schedule conditions.

**Table 2:** Correlation of perceptions of goal-directed activities as loss, reward, and investment.

	Autonomous reasons	Controlled reasons	Perceive time as loss	Perceive time as reward	Perceive time as investment
Autonomous reasons	1	.34**	-.31**	.70**	.45**
Controlled reasons	.09	1	.11	.14*	.15*
Perceive time as loss	-.09	.41**	1	-.35**	-.22**
Perceive time as reward	.46**	.12	-.06	1	.34**
Perceive time as investment	.30**	-.01	-.22**	.19**	1

Note: Study 1 correlations are displayed below the diagonal and Study 2 correlations are displayed above the diagonal. \*  $p < .05$  (2-tailed). \*\*  $p < .01$  (2-tailed).

**Table 3:** ANOVA main effect and interaction effect coefficients.

	Study 1			Study 2		
	<i>F</i> (1, 229)	<i>p</i>	$\eta^2$	<i>F</i> (1, 208)	<i>p</i>	$\eta^2$
Autonomous reasons	27.29	<.001	.106	15.61	<.001	.070
Controlled reasons	8.69	.004	.037	8.26	.004	.038
Schedule condition	5.57	.019	.024	0.05	.790	<.001
Autonomous $\times$ Schedule	5.47	.020	.023	4.04	.046	.019
Controlled $\times$ Schedule	0.27	.605	.001	2.04	.155	.010

autonomous (+1SD), participants were marginally more willing to pursue a divided ( $M_{\text{estimated}} = 0.34$  [0.18; 0.51]) than a cumulated ( $M_{\text{estimated}} = 0.17$  [-0.01; 0.34]) schedule,  $F(1,229) = 2.98, p = .086, \eta^2 = .013$ . For goals rated low on autonomous motivation (-1SD), there was a non-significant trend in the opposite direction,  $F(1,229) = 2.73, p = .100, \eta^2 = .012$  (divided:  $M_{\text{estimated}} = -0.34$  [-0.50; .18]; cumulated:  $M_{\text{estimated}} = -0.17$  [-0.34; 0.002]). The controlled  $\times$  schedule interaction term was not significant.

**Discussion**

In sum, the reasons why participants pursued their goals influenced how people preferred to schedule their goal pursuit activities. The degree to which participants pursued their goals for autonomous reasons affected their willingness to engage in a more

divided or cumulated goal pursuit activity schedule than they currently do. Participants were more willing to pursue their highly autonomous goals in a more divided schedule than a more cumulated schedule. This preference was eliminated but not significantly reversed for low autonomous goals. Notably, this study examined self-nominated goals which may differ in the degree to which they can plausibly be pursued in different schedules. Goals such as reading a book, learning a new language, or exercising may be pursued at the individual's leisure, but goals such as saving money, team projects, or home renovation projects may have scheduling restraints that made the suggested change in schedule impractical. In the next study we therefore examined one type of common goal that can be pursued in different schedules.

## Study 2

In the next study, we again examined the role of reasons underlying a goal for how this goal is pursued. We examined a specific goal – being physically active – since this goal can conceivably be pursued in a variety of schedules. In a between-subjects design, we randomly assigned participants to read physically activity guidelines that recommended either a divided or a cumulated schedule, and we examined the impact of this schedule manipulation on how motivated they were to follow the schedule and their predicted likelihood to be active according to the schedule. We expected that individuals pursuing the goal of being physically active for autonomous reasons would be more motivated and more likely to exercise after reading the divided exercise schedule, whereas there would be no difference for individuals pursuing exercise for controlled reasons. This prediction was preregistered (<https://aspredicted.org/gf425.pdf>).

### Method

#### Participants

We recruited MTurk participants from the U.S. or Canada who were compensated with \$0.50. We posted the number of participation spots on MTurk as determined by the power analysis and other considerations (i.e.,  $N = 220$ , to detect a medium-sized interaction effect with 80% power). Data collection was stopped automatically once all slots were registered as full. Variations in posted versus filled spots are due to the recruitment tool. We excluded participants whose responses indicated they had misunderstood the instructions (i.e., they reported

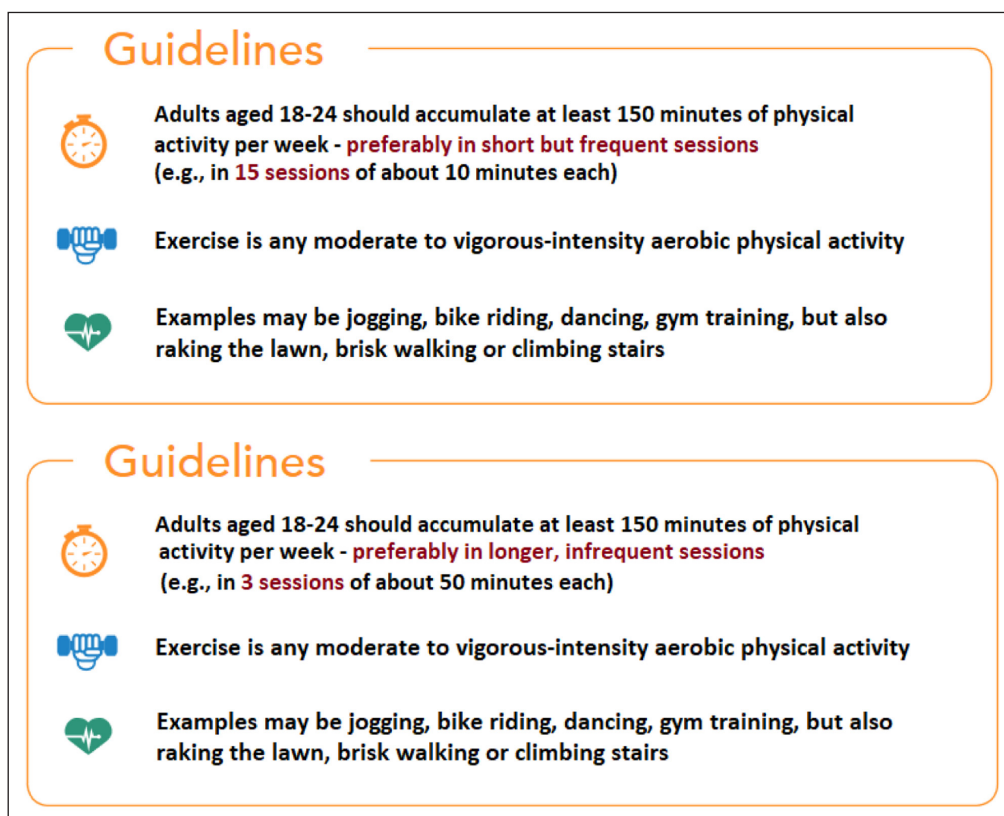
currently exercising for >12 hours a day,  $n = 3$ ). The final sample included 214 participants ( $M_{\text{age}} = 37.37$  years,  $SD = 10.68$ ; 45.8% female).

#### Procedure

After completing a consent form, participants first rated their reasons underlying their exercise goal on an established 24-item scale assessing autonomous and controlled reasons to exercise (1 = *Not true for me* to 5 = *Very true for me*; BREQ-3, Markland & Tobin, 2004; Wilson et al., 2006). The items were aggregated into an autonomous reasons index (12 items,  $\alpha = .95$ ) and a controlled reasons index (8 items,  $\alpha = .88$ ); we did not consider the amotivation subscale. The autonomous and controlled reasons subscales correlated positively,  $r = .33$ ,  $p = .001$ . The individual subscales of the BREQ are frequently (though not always) found to be positively correlated (e.g., Wilson et al., 2006), particularly the introjected items (classified as controlled motivation) with the integrated and identified items (classified as autonomous). That is, people may exercise for many reasons, including feeling like they have to (i.e., controlled motivation), and feeling like it is personally important (autonomous motivation).

Participants were then randomly assigned to read one of two versions of “Physical Activity Guidelines”. These guidelines specified that the preferred way to be active would be in “short, frequent sessions” (divided schedule) or in “longer, infrequent sessions” (cumulated schedule). The manipulations are depicted in **Figure 1**.

In each condition, participants then rated how motivated they were to pursue their goal following this schedule



**Figure 1:** Manipulation (Study 2). Wording adapted from Canadian Physical Activity Guidelines (<https://csepguidelines.ca>).

(1 = *Not at all motivated* to 7 = *Extremely motivated*) and rated the likelihood that they would try to be active in this way (1 = *I'm certain I won't try it (0%)* to 11 = *I am certain I will try it (100%)*). Finally, participants rated the degree to which they perceived time spent exercising as a “loss of time”, as a “reward”, and as an “investment” on 7-point scales as in Study 1. All participants were debriefed about the purpose of the study and there were given the unmodified guidelines (which do not specify the schedule in which one should exercise).

### Results

As in Study 1, reporting more controlled reasons for the exercise goal was linked to seeing exercising as loss of time, whereas reporting more autonomous reasons for the exercise goal was linked to seeing exercising less as a loss of time, more as a reward, and more as an investment (**Table 1**).

Overall, participants were not significantly more motivated in the divided frame condition ( $M = 4.51$ ,  $SD = 1.50$ ) than in the cumulated frame condition ( $M = 4.39$ ,  $SD = 1.60$ ),  $F(1,212) = 0.34$ ,  $p = .563$ ,  $\eta^2 = .002$ . They also did not judge it any more or less likely that they would act on the physical activity plan in the divided frame condition ( $M = 7.89$ ,  $SD = 1.92$ ) than in the cumulated frame condition ( $M = 7.50$ ,  $SD = 2.16$ ),  $F(1,212) = 1.94$ ,  $p = .165$ ,  $\eta^2 = .009$ . These two measures were highly correlated ( $r = .78$ ) and thus we standardized and averaged these items for an overall measure of willingness to pursue goals. See online supplemental files for analyses separately by item.

We next examined whether reasons to exercise moderated the effect of schedule. A repeated ANCOVA with rated autonomous and controlled reasons by 2 between-subject conditions (schedule: divided vs. cumulated) showed a significant autonomous  $\times$  schedule interaction term (**Table 3**): When exercise was rated as highly autonomous (+1SD), participants reported higher likelihood to exercise according to the divided ( $M_{\text{estimated}} = 0.45$  [0.20; 0.70]) than the cumulated ( $M_{\text{estimated}} = 0.07$  [-0.17; 0.30]) schedule,  $F(1,208) = 3.67$ ,  $p = .029$ ,  $\eta^2 = .023$ . When exercise was rated as less autonomous (-1SD), there was no significant difference between the divided ( $M_{\text{estimated}} = -0.31$  [-0.55; -0.07]) and the cumulated ( $M_{\text{estimated}} = -0.18$  [-0.43; 0.07]) schedule,  $F(1,208) = 0.53$ ,  $p = .466$ ,  $\eta^2 = .003$ .

In exploratory analyses, we also examined whether seeing time spent on exercising as a reward would moderate the effect of the schedule condition in the same way. An ANCOVA with rated perception of exercise time as reward by schedule condition (divided vs. cumulated) showed a significant interaction term,  $F(1, 209) = 5.09$ ,  $p = .025$ ,  $\eta^2 = .024$ : When exercise was seen as highly rewarding (+1SD), participants were more motivated in the divided than the cumulated schedule condition,  $F(1,209) = 6.49$ ,  $p = .012$ ,  $\eta^2 = .030$ . When exercise was rated as less of a reward (-1SD), there was no significant difference between divided schedule conditions,  $F(1,209) = 0.43$ ,  $p = .512$ ,  $\eta^2 = .002$ . This interaction term was robust and remained significant when controlling for autonomous and controlled reasons,  $F(1, 207) = 4.72$ ,  $p = .031$ ,  $\eta^2 = .022$ .

### Discussion

This study showed that when presenting individuals with general guidelines on exercising, the framing of how physical activity should be pursued mattered: those who reported autonomous reasons for their exercise goal were more willing to follow the exercise guidelines when the schedule emphasized frequent, short sessions than when the schedule emphasized infrequent longer sessions.

The exact timing of the divided and cumulated schedules might matter. In addition to the study presented here, we also conducted two replication studies with slightly different schedule manipulations (details and results are available in supplemental materials): In additional Study 2b we manipulated exercise schedule with self-referential times (i.e., as in Study 1, the divided and cumulated schedules were slightly more or less frequent relevant to their current exercise regime) and in additional Study 2c we manipulated exercise schedule with very specific recommendations (divided schedule: exercise 5 days a week for 30 minutes each time; cumulated schedule: exercise 2 days a week for 75 minutes each time). In both cases the results replicated the pattern in Study 2 (the simple effects of preferring a divided over a cumulated schedule were significant only for those who saw exercise as highly autonomous goal), however, the schedule  $\times$  autonomous motivation interaction terms did not reach significance. Taken together, these three manipulations suggest that more general language (“exercise more frequently”) with schedule examples may be more effective than specific schedules (“exercise  $\times$  times per week for  $\times$  minutes”).

### General Discussion

Participants were overall more motivated to pursue their goals in frequent, shorter sessions (divided schedules) than in less frequent, longer sessions (cumulated schedules), consistent with previous research showing a preference for shorter time frames (Jung et al., 2014; Peetz et al., 2011; Ülkümen, & Thomas, 2013). However, the present studies suggested that this preference was particularly pronounced for those participants who reported pursuing their goals for autonomous reasons. Indeed, an internal meta-analysis across all studies we conducted (see supplemental materials) showed that the scheduling effect was significant for those who pursue the goal for autonomous reasons, and even reversed for those who reported very low autonomous reasons. Thus, reframing goal pursuit in frequent bouts seemed to be attractive only for those goals people feel they *want to do*, those goals that are intrinsically enjoyable and personally important. In contrast, the scheduling effect did not interact with controlled goal reasons (i.e., pursuing a goal out of obligation or for external rewards). Thus, for those goals that people feel they *have to do*, goal pursuit activities do not seem to become more appealing when breaking them up into shorter increments. Our effect sizes for these key analyses were generally small (overall correlations in internal meta-analysis were  $-.10$  and  $.12$ , respectively); this small size is in line with most recent/preregistered findings in social psychology (see Schäfer & Schwarz, 2019),

but suggests that the benefits one might expect from reframing goal pursuit schedules are slight.

We also found that the more participants cited autonomous reasons for their goals, the more they regarded time spent on pursuing this goal as a reward and as an investment. This finding is perhaps unsurprising as autonomous goals are by definition more intrinsically rewarding (Deci & Ryan, 2008; Ryan & Connell, 1989), although these studies show that this also extends to the *behaviors* performed to reach this goal. Future research might examine whether these observed links are bidirectional. It may be that emphasizing how rewarding goal pursuit *activities* leads people to see the goal itself as more autonomous and as less controlled (also see Woolley & Fishbach, 2017).

### **Manipulating Type of Goals**

In both Study 1 and 2 we *measured* the degree to which participants reported autonomous reasons to pursue the goal or controlled reasons to pursue the goal. In an additional study, we also attempted to *manipulate* the type of goal (i.e., autonomous vs controlled) by explicitly instructing participants to think of a controlled goal they have to pursue or an autonomous goal they want to pursue. We did not succeed in inducing participants to report controlled goals, as goals in both conditions were rated as significantly more autonomous than controlled. Perhaps because of this weak manipulation, the manipulated type of goal by schedule interaction term was not significant – although simple effects showed that participants in the autonomous goal condition were significantly more motivated to pursue a more divided schedule than a cumulated schedule, while there was no difference in motivation to pursue the two schedules for participants in the controlled goal condition. Additionally, the measured types of reasons for pursuing the goal replicated the pattern of effects shown in Study 1 and 2 (see online supplements for details).

### **Boundaries and limitations**

Our studies suggest that when promoting goals, recommending shorter, more frequent intervals of goal pursuit appears to be most motivating. However, it is important to note that there likely is a sweet spot for temporal frames that is goal-specific; exercising for instance requires a minimum time per session to receive optimal benefits from the activity (Hansen, Stevens, & Coast, 2001). More research is needed to examine how to best reconcile the minimum required time necessary to produce results with people's preferences for shorter time frames when providing recommendations for practical goals such as doing chores, exercising, or even reading a novel. Future research might also examine whether divided versus cumulated schedules might affect motivation differently when it comes to more organized activities that require set-up time. For example, participants commented that getting ready (packing equipment, travel) for exercise would make the divided schedule more costly and thus less attractive than the cumulated schedule.

Another important limitation is the population this scheduling effect might be most relevant for (Simons, Shoda, & Lindsay, 2017). Our sample was drawn from a western, industrialized, and likely educated population who have the time and the means to regularly exercise (or pursue their other goals). Thus, our results do not extend to populations who do not tend to pursue their goals in such a structured way (e.g., Levine, 1997): individuals who tend to take their activities as they occur day by day (e.g., event-time focused) rather than by calendar weeks (i.e., clock-time focused) might be unaffected by reframing weekly schedules for goal pursuit. Similarly, subsets of the population whose leisure time is constrained by shift work, care responsibilities, or other factors might respond differently to the scheduling frame.

### **Different aspects of goal pursuit**

Previous work on preferences for the aggregation or segregation of experiences (Linville & Fisher, 1991; Nelson & Meyvis, 2008; Thaler, 1985) considered unique events or experiences. Our studies examined goal-directed activities that tend to recur until the goal has been achieved, over weeks or even over years. Future studies might compare scheduling preferences for one-time versus repeated events. Future research should also examine the different phases of goal pursuit: getting started on a goal activity, maintaining the goal activity, and (perhaps) disengaging from the goal activity. In the present studies, we have focused on goal activities that individuals were already pursuing (e.g., the vast majority of participants were already following an exercise regime), future studies might examine scheduling frame effects for *beginning* goal pursuit for new goals. It is possible that portraying goal directed activities in a way that is linked to perceiving this activity as more rewarding or minimizes the perceived time investment is particularly effective for motivating individuals to try something new.

### **Theoretical Contributions**

This research contributes to the emerging literature on the temporal context of goals (e.g., the effect of how and when the deadline is set, Munichor & LeBoeuf, 2018; Tu & Soman, 2014; the effect of including a minimum time requirement or not, Knox et al., 2015). Our studies suggest that individuals' motivation to work on their goals can depend on the way goal pursuit activities are scheduled. Future research is needed to examine the temporal aspects of goal pursuit, including optimizing length and spacing of goal pursuit intervals, and considering the influence temporal variables such as time of the day or days of the week may have in determining which goal activities might be most rewarding and most likely to be performed.

This research also contributes to prospect theory (Kahneman & Tversky, 1979; Thaler, 1985/2008; Tversky & Kahneman, 1991), since our studies test the principles of preferring aggregation of losses and separation of gains in the goals domain. Most notable, participants across studies showed a preference for segregating positive events, such as goal pursuit activities for autonomous goals, similar to the preference to segregate financial gains (Thaler, 1985).

Participants did not exhibit the reverse preference for aggregating goal pursuit activities for controlled goals, unlike the preference to aggregate financial losses. It may be that goal pursuit activities never feel completely like a loss of time in the same way paying a fine or a tax (Thaler 1985/2008) felt like a loss of money. Future studies might examine other experiences that are more clearly a loss of time, such as waiting in line, or examine more truly controlled goals that are primarily pursued because of duty and obligation.

### Data Accessibility Statement

The full surveys, data, and additional analyses can be found in the supplemental online materials: <https://osf.io/zsvuc>.

### Note

<sup>1</sup> This distinction is different from “ought” and “ideal” selves, as the ideal self can still be based on a representation from a significant other (rather than the self; Higgins, 1987); in contrast, want-to, or autonomous motivation is based on personal values, interests, and importance (Deci & Ryan, 2008).

### Additional File

The additional file for this article can be found as follows:

- **Text S1.** Supplemental materials. DOI: <https://doi.org/10.1525/collabra.285.s1>

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### Competing Interests

The authors have no competing interests to declare.

### Author Contributions

- Contributed to conception and design: JP, MM, MD
- Contributed to acquisition of data: JP, MD
- Contributed to analysis and interpretation of data: JP, MM
- Drafted and/or revised the article: JP, MM, MD
- Approved the submitted version for publication: JP, MM

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