American Psychological Association

Journal of Personality and Social Psychology

0022-3514/18/$12.00

2018, Vol. 114, No. 6, 877–890
http://dx.doi.org/10.1037/pspa0000116

It's About Time: Earlier Rewards Increase Intrinsic Motivation

Kaitlin Woolley
Cornell University

Ayelet Fishbach
University of Chicago

Can immediate (vs. delayed) rewards increase intrinsic motivation? Prior research compared the presence versus absence of rewards. By contrast, this research compared immediate versus delayed rewards, predicting that more immediate rewards increase intrinsic motivation by creating a perceptual fusion between the activity and its goal (i.e., the reward). In support of the hypothesis, framing a reward from watching a news program as more immediate (vs. delayed) increased intrinsic motivation to watch the program (Study 1), and receiving more immediate bonus (vs. delayed, Study 2; and vs. delayed and no bonus, Study 3) increased intrinsic motivation in an experimental task. The effect of reward timing was mediated by the strength of the association between an activity and a reward, and was specific to intrinsic (vs. extrinsic) motivation—immediacy influenced the positive experience of an activity, but not perceived outcome importance (Study 4). In addition, the effect of the timing of rewards was independent of the effect of the magnitude of the rewards (Study 5).

Keywords: intrinsic/extrinsic motivation, immediate/delayed rewards, motivation, self-control

Supplemental materials: http://dx.doi.org/10.1037/pspa0000116.supp

What motivates you to read this article? To what extent are you intrinsically motivated; that is, you enjoy the experience of learning about psychological research, feeling interested and engaged in reading? By definition, an activity is intrinsically motivated when it is experienced as an end in itself; when an individual is motivated to pursue the activity for its own sake because the benefits for pursuing the activity cannot be separated from it (Heath, 1999; Kruglanski et al., in press; Lepper, Greene, & Nisbett, 1973; Rheinberg, 2008; Sansone & Harackiewicz, 1996). Research often contrasts intrinsic motivation with extrinsic motivation, which is the motivation to complete an activity to achieve external benefits that are separate outcomes from pursuing the activity (Higgins & Trope, 1990; Kruglanski et al., 1975; Mischel, Shoda, & Rodriguez, 1989; Ryan & Deci, 2000; Wrzesniewski et al., 2014). Reading this article is extrinsically motivated if you do so to acquire some important knowledge you can apply later. Indeed, a combination of intrinsic motives (the positive feeling in the process) and extrinsic motives (the positive value of the outcome) underlie most activities people pursue, such as reading this article (Fishbach & Choi, 2012; Schwartz & Wrzesniewski, 2016).

Kaitlin Woolley, Department of Marketing, SC Johnson Cornell College of Business, Cornell University; Ayelet Fishbach, Department of Behavioral Science, Booth School of Business, University of Chicago.

This article is based on Kaitlin Woolley's dissertation. We thank Jane L. Risen, Ann L. McGill, and Oleg Urminsky for their helpful feedback. The raw data for all studies are available in an online data repository (osf.io/yhw85).

Correspondence concerning this article should be addressed to Kaitlin Woolley, Department of Marketing, SC Johnson Cornell College of Business, Cornell University, 403 Sage Hall, Ithaca, NY 14850. E-mail: krw67@cornell.edu

Our definition of intrinsic motivation—experiencing an activity as its own end—implies a perceptual fusion between the activity and its outcome; the activity and its end are strongly associated and are seen as inseparable (Fishbach, Shah, & Kruglanski, 2004; Kruglanski et al., in press). Thus, while an intrinsically motivated activity is goal directed, the attainment of the goal and the pursuit of the activity are no longer separable and the person experiences pursuing the activity as achieving the goal.

This analysis implies that intrinsicality varies on a continuum. Because the degree of fusion, that is, the strength of association between an activity and its outcome, varies, so too does intrinsic motivation. Activities that are strongly associated with their goal are more intrinsically motivated than activities that are weakly associated with their goal. For example, as much as reading this article (the activity) is hopefully associated with satisfying curiosity (the goal), it is possible that another activity (e.g., social media) is even more closely associated with satisfying curiosity and hence, more intrinsically motivated. Moreover, the positive properties of goal attainment transfer to the activity as a function of their association (Fishbach et al., 2004). The closer the association, the more the properties of goal attainment, be that satisfying curiosity, inducing relief, or evoking pride, come to characterize the activity as well.

The Number of Links Determines the Activity-Goal Association

What, then, determines the strength of the activity-goal association, and thus influences intrinsic motivation? Previous research identified that this association is a function of the number of goals an activity achieves. Classic research on the overjustification effect demonstrated that adding a goal to an activity undermines intrinsic motivation (Lepper, 1981; Lepper & Greene, 1978; Tang & Hall,

1995). Children were less intrinsically motivated to color after they learned they would get a prize for coloring (Lepper et al., 1973). Adding a new goal (i.e., the prize) diluted the association between coloring and other goals (e.g., self-expression), undermining intrinsic motivation to color. Similarly, children were less intrinsically motivated to eat certain foods (e.g., crackers) after learning the foods served other goals beyond good taste (e.g., that in addition to tasting good, these crackers would also make them healthier or smarter; Maimaran & Fishbach, 2014). Although adding rewards does not always decrease, and at times, increases intrinsic motivation (Eisenberger & Cameron, 1996; Goswami & Urminsky, 2017), it is likely that whenever the introduction of external rewards decreases intrinsic motivation, it occurs by diluting the association between the activity and the original goal.

Research on the dilution effect directly tested how increasing the number of goals an activity achieves decreases the association between the activity and any one of these goals, reducing the perceptual fusion between the activity and goal attainment (Orehek, Mauro, Kruglanski, & van der Bles, 2012; Zhang, Fishbach, & Kruglanski, 2007). In one study, the association between jogging and increasing the oxygen level in blood was weaker when participants learned about a second goal: that jogging is also a means for strengthening various muscles (Zhang et al., 2007). By weakening the association strength between the activity and its goal, a "multifinal" means (i.e., activity that serves multiple goals) appeared less associated and hence, motivated by any of these goals. In another study, a task that served two goals (e.g., learning and making money) was less intrinsically motivated than the same task that served only one goal (learning; Lafrenière, Bélanger, Kruglanski, & Vallerand, 2011).

Relatedly, research on activity engagement theory documented that the addition of any goal, be it typically intrinsic or extrinsic, undermines intrinsic motivation by diluting the association between the activity and the original goal (Higgins, Lee, Kwon, & Trope, 1995; Higgins & Trope, 1990; Higgins, Trope, & Kwon, 1999). For example, elementary schoolchildren felt less intrinsically motivated to read when reading was first associated with coloring via a coloring storybook, and then the coloring activity was removed from reading (Higgins et al., 1995). Adding and then removing an intrinsic goal (self-expression through coloring) had a similar effect as adding and then removing an external reward, such that both undermined intrinsic motivation.

Not only does adding a goal to an activity decrease intrinsic motivation for that activity, but adding an activity that serves the same goal similarly reduces intrinsic motivation for the original activity (i.e., "equifinal" means; Bélanger, Schori-Eyal, Pica, Kruglanski, & Lafrenière, 2015). In one study, people learned about either one or two activities that achieve the goal of connecting with others. When presented with two ways to connect with others, "hanging out with other people" and "helping others," people were less intrinsically motivated to engage in either activity than when presented with only one of the activities that served the connection goal (Bélanger et al., 2015).

Overall, existing research finds evidence that the number of links between an activity and a goal determines their association—the means–ends fusion—with additional links negatively affecting intrinsic motivation. But this literature is silent on other determinants of the strength of the activity-goal association. Might proximity between an activity and its goal also matter? We argue that this is indeed the case.

Temporal Activity-Goal Association

We hypothesize that delivering a goal more immediately increases intrinsic motivation. In this way, immediacy, similar to the number of links between activities and goals, affects the strength of the activity-goal association such that the activity is more strongly fused with its goal, and as a result, the activity is more intrinsically motivated.

This hypothesis is consistent with conditioning research, which finds that proximity between an activity and a goal strengthens their association (De Houwer, Thomas, & Baeyens, 2001; Razran, 1954). Immediately presenting a liked or disliked stimuli (unconditioned stimulus [US]), such as food or a shock, after a neutral stimuli (conditional stimulus [CS]), such as a sound, can lead to approach or avoidant behavior when the sound is presented alone (Dickinson, 1980). Importantly, for both animals and humans, a shorter delay between the conditioned and unconditioned stimulus is associated with a stronger conditioned response (Balsam, Drew, & Gallistel, 2010; Boakes & Costa, 2014; McAllister, 1953; Wolfle, 1932). If proximity is a driver of associative learning, it could increase intrinsic motivation.

We explore our hypothesis by manipulating the delivery time of rewards (i.e., the goal of pursuing the activity). We use rewards that are internal to an activity and are therefore typically considered intrinsic (e.g., becoming more informed from watching the news), as well as rewards that are external to the activity and are therefore typically considered extrinsic (e.g., receiving bonus payment for a task). We expect reward timing to influence intrinsic motivation when the reward is internal as well as external.

We compare immediate rewards with delayed rewards as well as with no rewards. The latter comparison with no rewards allows us to contrast our prediction with a prediction based on the overjustification effect. Whereas previous research found that rewards can crowd out intrinsic motivation for activities not typically associated with these rewards (Lepper et al., 1973), this effect is not universal (e.g., Eisenberger & Cameron, 1996). For example, whereas monetary payments for a game not associated with financial incentives (i.e., wooden block game) decreased intrinsic motivation, the same payments increased intrinsic motivation when money was a feature of the activity (i.e., coin-toss game; Kruglanski et al., 1975). In studying activities that are typically rewarded (e.g., participating in a paid experiment), we predict that an immediate reward will increase intrinsic motivation relative to both a delayed and no-reward.

We further predict the effect of reward timing is unique to intrinsic motivation—the pursuit of the activity as its own end. Extrinsic motivation—pursuing an activity to receive external outcomes—is unlikely affected by a strong activity–goal association. The activity continues to serve the goal and leads to the expected positive outcome regardless of the goal's temporal arrival, and as such, immediacy should have a weaker effect on the evaluation of the activity's outcome as important. Accordingly, we test for discriminant validity: whether immediate rewards increase intrinsic motivation (positive experience) more than extrinsic motivation (perceived outcome importance). For example, a reading task that provides an immediate bonus should feel more enjoyable and

fun (intrinsically motivated), but should not be evaluated as more important or useful for achieving the bonus (extrinsically motivated), than a task that provides the same bonus with a delay.

An alternative hypothesis is that an earlier reward actually increases extrinsic motivation because earlier rewards can be psychologically larger due to temporal discounting (Ainslie & Haslam, 1992; Frederick, Loewenstein, & O'Donoghue, 2002). For example, most people value $100 now more than $100 in 1 year and thus, the earlier reward could be larger and therefore, more extrinsically motivating, rendering the outcome of the activity as more important. However, we expect that the effect of timing on intrinsic motivation is larger than the effect of timing on extrinsic motivation; for example, immediate rewards will render an activity more pleasant to pursue but not necessarily more important for achieving the outcome.

A related alternative prediction, based on temporal discounting, is that earlier rewards only increase intrinsic motivation because earlier rewards are larger rewards, and not because they create an activity-goal fusion. Such an alternative requires that earlier rewards increase both intrinsic and extrinsic motivation (whereas we predict a stronger effect on intrinsic motivation). In addition, we test this alternative by independently varying the magnitude and timing of a reward. If proximity has a similar effect as an increase in magnitude, it is possible that proximal rewards are simply psychologically larger rewards. In contrast, if, as we predict, an earlier reward has a stronger effect on increasing intrinsic motivation than a larger reward, it is more likely that timing has an effect that is independent of the effect of magnitude.

Present Research

Across five studies, we tested our hypothesis that immediate (vs. delayed) rewards increase intrinsic motivation by strengthening the activity-goal association. We operationalized intrinsic motivation by drawing on past research, using self-report measures of interest and enjoyment, as well as a behavioral indicator—the likelihood of choosing to engage in the focal task during a free-choice period and absent additional rewards (Deci, 1971; Kruglanski et al., 1975; Lepper et al., 1973). We tested our hypothesis across a variety of tasks (e.g., watching the news, working, and reading).

Specifically, Study 1 tested whether framing rewards as arriving immediately versus with a delay increases intrinsic motivation. Study 2 manipulated reward timing, testing whether an actual immediate reward increases intrinsic motivation compared with a delayed reward. Next, Study 3 added a no-reward condition, testing whether immediate rewards increase intrinsic motivation compared with delayed and no rewards. The remaining studies examined the process underlying our hypothesis. Study 4 tested whether immediate rewards increase intrinsic but not extrinsic motivation (discriminant validity), by strengthening the activity-goal association (mediation). Specifically, Study 4 assessed intrinsic motivation as well as extrinsic motivation, operationalized as the importance of receiving external outcomes (Brehm & Self, 1989; Heath, 1999; Locke & Latham, 1990; Touré-Tillery & Fishbach, 2014; Woolley & Fishbach, 2015). Finally, Study 5 examined whether immediate rewards increase intrinsic motivation more than larger rewards do, which implies that the effect of immediacy does not result from temporal discounting and differences in magnitude of immediate versus delayed rewards.

We sought to maximize power across all studies by using a minimum sample of 50 participants per condition, and using previous effect sizes to estimate sample size where possible (i.e., Studies 1 and 4). Power analyses conducted in G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) for each study showed that based on the respective sample sizes and an alpha probability of .05, power was sufficient across all studies (i.e., $\geq$.80) to detect a small to medium effect (e.g., $d = .35$, $\eta_p^2 = .035$).[1] We further used measures adopted from previous research on intrinsic motivation (Deci, 1971; Kruglanski et al., 1975; Lepper et al., 1973). Overall, the studies in this article incorporate data from an online sample of American participants and university students. All studies reported received IRB review and approval.

Study 1: Framing Rewards as Immediate Versus Delayed Increases Intrinsic Motivation

Study 1 examined whether framing the rewards of an activity as immediate (vs. delayed) increases intrinsic motivation. Participants watched a clip from a satirical news program and elaborated on how two benefits from watching the show (i.e., becoming more informed and gaining conversation topics) arrive either immediately or with a delay before reporting their intrinsic motivation to watch the news program.

Method

Participants. A priori, we conducted a power analysis using G*Power software, with an estimated effect size of $d = .35$ based on Supplemental Study 1. Results revealed a total sample of 232 was needed to have power of .80 to detect an effect size (d) of .35, using an alpha of .05. We opened the study for 240 HITs on Amazon's Mechanical Turk (MTurk). A total of 242 workers participated for monetary compensation. A priori we planned to exclude participants who had previously seen this specific clip ($n = 22$), leaving a total sample of 220 ($M_{age} = 35.59$, $SD = 11.55$; 109 female; following Zhou & Fishbach, 2016, we tested for attrition: no participants dropped the survey after random assignment).

Procedure. This study employed a 2 (reward timing: immediate vs. delayed) between-participants design. Participants watched a 75-s clip from a satirical news program, *Last Week Tonight* with John Oliver, from an episode on Tibetan Buddhists and the Dalai Lama. To participate in the study, participants needed to complete a sound check that required them to listen to and type in a string of four numbers. Participants then spent 75 s watching and listening to the video clip. During this time, they were not able to advance the survey.

We next manipulated whether participants framed the rewards from watching the news program as immediate versus delayed. To hold the reward content constant, all participants read "Watching news clips like this can provide a number of benefits. For example, other participants told us that watching this clip helps them be-

[1] We report all data exclusions (if any), all manipulations, and all measures for all studies. The raw data for all studies are available in an online data repository (osf.io/yhw85).

come more informed about certain issues and gain conversation topics." We asked participants in the immediate-reward condition to "Think about and elaborate on how becoming more informed and gaining conversation topics is an immediate benefit you receive in the moment while watching this clip." We asked participants in the delayed-reward condition to "Think about and elaborate on how becoming more informed and gaining conversation topics is a delayed benefit you receive in the days or weeks after watching this clip." For example, participants in the immediate-reward condition wrote "It basically educates you on the spot" and "You are learning and forming opinions about this issue with the Dalai Lama and Tibet while you are watching the clip." Participants in the delayed-reward condition wrote "It may give you the insight you need in future situations, or might even give you something relatable to talk about in future situations" and "You can talk about it when the topic comes up."

To measure self-reported intrinsic motivation, we adapted measures from the interest-enjoyment dimension of the Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen, 1989; Ryan, 1982; Vallerand, 1997; see also Harackiewicz, 1979): (a) "How much did you enjoy watching this news clip?;" (b) "How interesting was it to watch this news clip?" (0 = *not at all*, 6 = *very much*); and (c) "To what extent did watching this news clip feel more like work or more like fun?" (0 = *more like work*, 6 = *more like fun*).

At the end of the survey, participants answered "How often do you watch *Last Week Tonight* with John Oliver?" (M = 2.15, SD = 1.48) and "Have you seen this clip or episode before?" Responses to these measures did not differ by condition (familiarity with this program: $t(218) = .21$, $p = .833$, 95% CI of the difference (95% CI_{diff}) [−.44, .35], $d = .03$; viewed this clip previously, $\chi^2(1, N = 242) = .106$, $p = .745$, $\varphi = .02$) and we did not analyze them further.

Results and Discussion

We collapsed the three items measuring intrinsic motivation ($\alpha = .90$). In support of our hypothesis, participants reported greater intrinsic motivation to watch the news program after framing the rewards from it as immediate (M = 4.72, SD = 1.16) versus delayed (M = 4.24, SD = 1.54), $t(218) = 2.61$, $p = .010$, 95% CI_{diff} [.12, .84], $d = .35$. For a conceptual replication of this study using a different task, see Study 1 in the supplemental materials.

This study provides initial evidence that immediate rewards increase intrinsic motivation compared with delayed rewards. When participants framed the same rewards from watching the same news program as arriving sooner, they were more intrinsically motivated to watch the program than when they framed these rewards as arriving with a delay.

Study 2: Receiving Immediate Versus Delayed Rewards Increases Intrinsic Motivation

In Study 2, we assessed participants' intrinsic motivation in a task that delivered either immediate (simultaneous, in this case) or delayed rewards. Participants completed an experimental task in exchange for chocolate rewards. In the immediate-reward condition, participants received the chocolate and the task simultaneously (but were not allowed to eat until after the task). In the delayed-reward condition, they saw the chocolate and learned they would receive it after completing the task. We predicted that receiving an immediate (vs. delayed) chocolate reward would increase intrinsic motivation for the experimental task.

Method

Participants. An experimenter approached 101 (M_{age} = 22.72, SD = 4.00; 31 female) undergraduate students seated in a common area on-campus to complete a paper survey.

Procedure. The study used a 2 (reward timing: immediate vs. delayed) between-participants design. An experimenter recruited participants by asking them to take a short research survey before assigning them to condition. In the immediate-reward condition, the experimenter said "For working on the survey, we're offering a piece of chocolate." Participants had a choice between a milk chocolate truffle and a chocolate hazelnut truffle. After making their selection, the experimenter handed participants a survey, asking them to complete it before eating. In the delayed-reward condition, the experimenter showed participants the chocolates and said "After you finish the survey, you'll receive a piece of chocolate." After participants completed the survey, they selected their chocolate. We required all participants to complete the survey before eating the chocolate.

At the end of the survey (which contained filler items irrelevant to our hypothesis, see Appendix A), we included three items measuring intrinsic motivation (similar to Study 1): (a) "How enjoyable was working on this survey?;" (b) "How interesting was this survey?" (0 = *not at all*, 6 = *very much*); and (c) "To what extent did filling out the survey feel more like work or more like fun?" (−3 = *more like work*, 3 = *more like fun*). We also measured participants' interest in the task absent a chocolate reward (i.e., during a free-choice period; modeled after Calder & Staw, 1975): (a) "If we had another similar survey for you to work on in the future, but that did not offer candy, would you be interested in working on it?" (0 = *not at all*, 6 = *very much*).

Results and Discussion

We coded the four items measuring intrinsic motivation on a scale from 0 to 6 and collapsed them ($\alpha = .78$). As predicted, intrinsic motivation was higher for a task offering an immediate reward (M = 3.52, SD = .94) compared with a delayed reward (M = 3.03, SD = .94), $t(99) = 2.57$, 95% CI_{diff} [.11, .85], p = .012, $d = .52$. Participants who received the chocolate with (vs. after) the experimental task, found the task more intrinsically motivating, even though none of them consumed the chocolate until after the task ended.

In this study, we were constrained to providing the chocolate compensation in close proximity to the task, both in the immediate and delayed conditions, which possibly manipulated not only temporal distance, but also spatial distance. Theoretically, temporal and spatial distance both operate by influencing the strength of the activity-goal association. However, our primary focus is to understand the effect of reward timing on intrinsic motivation. To more directly test this question, we moved to an online platform, which allowed us to compare an immediate bonus provided after completing a task (similar to the delayed condition from Study 2), with a more delayed reward—a bonus that arrives a month later.

Study 3: Immediate Rewards Increase Intrinsic Motivation Compared With Delayed and No Rewards

Participants in Study 3 received a bonus upon task completion or 1 month later. We also added a no-bonus control group. In addition to earning a fixed payment for completing their experimental task, some participants learned of a bonus payment for working on a spot-the-difference task (delivered immediately or with a delay), whereas the other participants did not expect to receive a bonus (no bonus reward control). With this third condition, we tested our prediction that an immediate bonus increases intrinsic motivation compared with either a delayed bonus or no bonus.

In this study, we also introduced a behavioral measure of intrinsic motivation by adjusting the free-choice paradigm to this context (Lepper, 1981; Lepper & Greene, 1978). We predicted participants who received an immediate bonus (vs. a delayed or no bonus) would want to continue the same spot-the-difference task even with no additional compensation.

Method

Participants. We opened the study for 225 (n = 75 per cell) HITs on MTurk. A total of 223 workers participated in the study for monetary compensation (M_{age} = 38.56, SD = 12.62; 127 female; two participants (one from each condition) dropped the survey after random assignment.

Procedure. This study employed a 3 (bonus-reward timing: immediate-bonus vs. delayed-bonus control vs. no-bonus control) between-participants design. All participants worked on the experiment for a fixed payment of $0.30. Some participants learned of a $0.60 bonus that was tied to completing a spot-the-difference task: A third of the participants learned this $0.60 bonus would automatically pay out immediately after they finished the spot-the-difference task (immediate-bonus), whereas another third learned the $0.60 bonus would be automatically paid to them 1 month after completing the spot-the-difference task (delayed-bonus control). A final third of participants did not expect to receive a bonus for completing the spot-the-difference task (no-bonus control).

Participants completed a study, presumably on visual perception, which involved completing a spot-the-difference task (see Appendix B). They viewed two similar images and had to locate four out of five preexisting differences between them, by clicking on the part of the image that was different, which left a red dot there. They received progress feedback for each difference they found (e.g., "You found 1/5 differences!"). After successfully locating four differences, participants answered questions assessing intrinsic motivation to work on the spot-the-different task. The first two were taken from Studies 1–2: (a) "How much did you enjoy working on this spot-the-difference task?" and (b) "How interesting was this spot-the-difference task?" We included a reverse-coded measure to reduce acquiescence bias: (c) "How dull or boring was this spot-the-difference task?" (0 = *not at all*, 6 = *very much*). As an additional measure, we asked: (d) "Completing tasks like this can be something you have to do or something you want to do. To what extent did working on this spot-the-difference task feel like something you had to do or feel like something you wanted to do?" (0 = *something I had to do*, 6 = *something I wanted to do*). Previous research used similar items to assess intrinsic motivation (e.g., have-to vs. want-to goals; Milyavskaya, Inzlicht, Hope, & Koestner, 2015). A response closer to "wanted to do" represented greater intrinsic motivation (e.g., Reeve, Jang, Hardre, & Omura, 2002; Reeve, Nix, & Hamm, 2003; Ryan, 1982).

As a behavioral measure of intrinsic motivation, we next assessed participants' task selection in a free-choice paradigm. That is, we measured whether participants chose to continue engaging in the focal task or end the survey, for no extra compensation (Lepper, 1981; Lepper & Greene, 1978). If participants chose to engage in the task for no additional compensation, we took this as evidence that they were intrinsically motivated to do so. Participants read "You now have a choice, you can continue working on the spot-the-difference task to find the 5th and final difference, or you can end the study." Depending on their choice, participants ended the study either after finding the last difference or right then.

Results and Discussion

We collapsed the four items measuring intrinsic motivation after reverse coding (α = .90). An ANOVA revealed a significant effect of reward timing, $F(2, 220) = 6.16$, $p = .002$, $\eta_p^2 = .05$ (see Figure 1). As predicted, an immediate bonus increased intrinsic motivation to pursue the spot-the-difference task compared with a delayed bonus ($M_{immediate}$ = 5.41, SD = 1.04; $M_{delayed}$ = 4.97, SD = 1.20), $t(220) = 2.26$, $p = .025$, $d = .39$. An immediate bonus further increased intrinsic motivation compared with a no-bonus control condition ($M_{no\ bonus}$ = 4.74, SD = 1.33), $t(220) = 3.45$, $p < .001$, $d = .56$, with no difference between delayed- and no-bonus conditions, $t(220) = 1.18$, $p = .238$, $d = .18$.

We next analyzed intrinsic motivation using the free-choice paradigm of continued engagement using a binary logistic regression on choice to continue the task (1 = yes, 0 = no) that included two dummy predictors for delayed- and no-bonus conditions. As predicted, participants in the immediate condition were more likely to continue the reading task (84.2%) compared with those in the delayed (70.3%), $B = -.81$, 95% CI [−1.63, −.04], $z = -2.01$, $p = .044$, odds ratio (OR) = .44, or no-bonus conditions (52.1%), $B = -1.59$, 95% CI [−2.39, −.85], $z = -4.06$, $p < .001$, OR = .20 (see Figure 2). There was also an unpredicted difference between the two control conditions (delayed vs. no bonus), $B = -.78$, 95% CI [−1.47, −.11], $z = -2.25$, $p = .024$, OR =

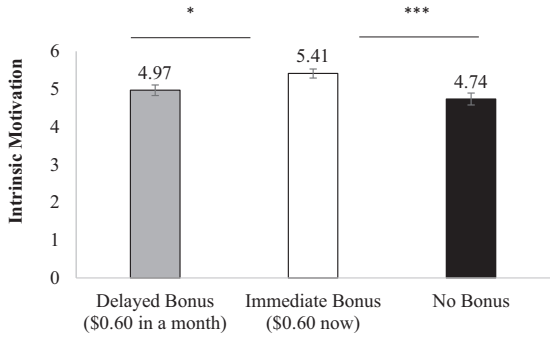


Figure 1. An immediate bonus increased self-reported intrinsic motivation to work on a spot-the-difference task compared with a delayed bonus or no bonus (Study 3. Error bars represent *SEM*; * $p < .05$, *** $p < .001$).

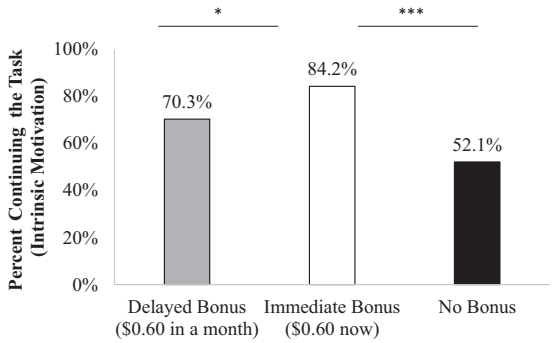


Figure 2. An immediate bonus increased the likelihood of choosing to continue a spot-the-difference task with no additional compensation compared with a delayed bonus or no bonus (Study 3; * $p < .05$, *** $p < .001$).

.46. For a conceptual replication of this study using a different paradigm, see Study 2 in the supplemental materials.

Overall, we found that adding an immediate bonus to a spot-the-difference task increases intrinsic motivation on self-report and behavioral (the free-choice paradigm) measures compared with delayed and no bonus conditions. We next tested for the process underlying the effect of immediate rewards, predicting that immediacy strengthens the activity-goal association, thereby increasing intrinsic motivation.

Study 4: Immediate Versus Delayed Rewards Strengthen the Activity-Goal Association, Thereby Increasing Intrinsic, but not Extrinsic Motivation

We predicted that an earlier reward would lead an activity to be more closely associated (i.e., fused) with its goal, which would in turn mediate the effect of immediacy on increased intrinsic motivation. In Study 4, we accordingly measured the activity–goal association with a modified version of the self-other overlap scale (Aron, Aron, & Smollan, 1992). Specifically, we created a set of Venn-like diagrams consisting of two circles—one representing the activity (reading) and one representing the goal (receiving rewards), with varying degrees of overlap. At a cognitive level, the activity and the goal become closely associated such that the boundary between them is blurred, resulting in the selection of more heavily overlapped circles. We predicted that a reading task offering an immediate bonus would lead to greater perceptual overlap between reading and receiving bonus rewards, which in turn would increase intrinsic motivation to read. In addition, we tested for discriminant validity: whether immediate rewards increase intrinsic motivation (e.g., positive experience), but not extrinsic motivation (e.g., perceived outcome importance).

Method

Participants. Basing our sample size on Supplemental Study 2 ($n = 60$ per cell), we opened the study for 120 HITs on MTurk. All participants first answered "Have you ever read part of the book *Big Magic?*" Twelve participants indicated yes to this question and were directed to a separate screen stating "You are not eligible for this study." A total of 119 workers indicated no and participated for monetary compensation ($M_{age} = 34.80$, $SD = 11.32$; 57 female; four participants dropped the survey after random assignment; immediate: $n = 2$, delayed: $n = 2$).

Procedure. This study employed a 2 (bonus-reward timing: immediate vs. delayed; between-participants) × 2 (motivation: intrinsic vs. extrinsic; within-participants) mixed-model design. All participants worked on the experiment for a fixed payment ($0.40) and learned of a $0.25 bonus that was tied to completing a reading task. Those in the immediate-reward condition learned this bonus would be automatically paid out immediately after they finished the reading task, whereas those in the delayed-reward condition learned the bonus would be automatically paid to them one month after completing the reading task.

Participants read the first five pages of a book, *Big Magic: Creative Living Beyond Fear* by Elizabeth Gilbert. Participants learned the researchers were pilot testing reading material and that they should "Read each page of the excerpt in its entirety as you will be answering questions about what you have read at the end of the task."

After reading the excerpt, participants answered questions assessing their intrinsic motivation to read the book (from Studies 1–3): "How much did you enjoy reading this book excerpt?" and "How interesting was this book excerpt to read?" Participants also answered questions assessing their extrinsic motivation to read the book: "How motivated were you to receive the outcome by finishing the reading task?" and "How important was it to you to receive the outcome in this task?" (0 = *not at all*, 6 = *very much*). These measures follow from our definition of extrinsic motivation as motivation to achieve outcomes that result from pursuing an activity, and assess outcome-focused motivation (i.e., finishing the task; Brehm & Self, 1989; Locke & Latham, 1990; Touré-Tillery & Fishbach, 2014; Woolley & Fishbach, 2015).

To capture the degree of overlap between the activity (reading) and the goal (receiving a bonus reward), we created seven pairs of circles that overlapped to different degrees, from completely separate (coded as 0) to largely overlapped (coded as 6). One set of circles represented the activity—reading—and the other set of circles represented the goal—receiving rewards (see Appendix C). Participants read: "Think about the reading task you just worked on. In your mind, to what extent does "receiving rewards" capture the experience of reading? Indicate whether the experience of receiving rewards does versus does not closely define the experience of reading this excerpt" (0 = *completely separate circles*, 6 = *very overlapped circles*). Finally, participants completed a manipulation-check item "When did you expect the bonus for this study to arrive?" (0 = *immediately*, 6 = *in a long time*).

Results and Discussion

Confirming our manipulation, participants in the immediate-reward condition expected the bonus to arrive earlier than those in the delayed-reward condition ($M_{immediate} = 2.38$, $SD = 1.58$; $M_{delayed} = 4.88$, $SD = 1.46$), $t(117) = 8.94$, $p < .001$, 95% CI_{diff} [1.95, 3.06], $d = 1.64$.

We collapsed the items measuring intrinsic motivation (enjoyable, good experience; $r = .90$) and extrinsic motivation (motivated by outcome, outcome importance; $r = .55$). A repeated-measures ANOVA of reward timing (immediate vs. delayed) on motivation (intrinsic vs. extrinsic) yielded the predicted interaction, $F(1, 117) = 7.70$, $p = .006$, $\eta_p^2 = .06$ (see Figure 3), with no

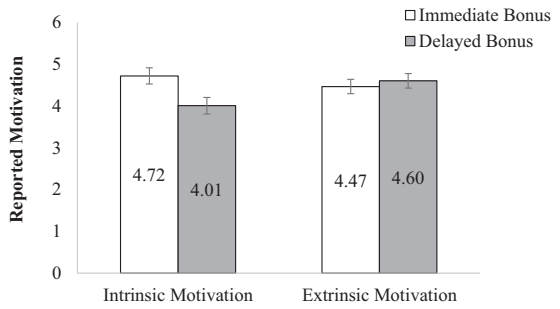


Figure 3. An immediate (vs. delayed) bonus increased intrinsic, but not extrinsic motivation to read (Study 4; Error bars represent *SEM*).

main effect of motivation, $F(1, 117) = 1.24$, $p = .268$, $\eta_p^2 = .01$, or timing $F(1, 117) = 1.84$, $p = .178$, $\eta_p^2 = .02$. Participants were more intrinsically motivated in the immediate-versus delayed-reward condition ($M_{immediate} = 4.72$, $SD = 1.19$; $M_{delayed} = 4.01$, $SD = 1.80$), $t(97.86) = 2.54$, $p = .013$, 95% CI_{diff} [.16, 1.27], $d = .47$. However, there was no effect of timing on extrinsic motivation ($M_{immediate} = 4.47$, $SD = 1.37$; $M_{delayed} = 4.60$, $SD = 1.29$), $t(117) = .56$, $p = .578$, 95% CI_{diff} [−.62, .35], $d = .10$.

Activity-Goal Association and Mediation Analysis

We next analyzed the activity-goal-association measure. As predicted, participants perceived reading and receiving rewards as more strongly associated in the immediate-versus delayed-reward condition ($M_{immediate} = 3.39$, $SD = 1.71$; $M_{delayed} = 2.57$, $SD = 1.92$), $t(117) = 2.48$, $p = .015$, 95% CI_{diff} [.17, 1.48], $d = .45$.

Moreover, we found that the activity-goal (reading-rewards) association mediated the effect of reward timing on intrinsic motivation ($\beta_{indirect} = .16$, $SE = .07$; 95% CI [.04, .32]; based on 10,000 bootstrap samples; Hayes, 2012). Reward timing (immediate vs. delayed) positively predicted intrinsic motivation ($B = .36$, 95% CI [.08, .63], $p = .012$) and the activity-goal association ($B = .41$, 95% CI [.08, .74], $p = .015$). Controlling for the activity-goal association reduced the effect of reward timing on intrinsic motivation ($B = .20$, 95% CI [−.05, .45], $p = .122$), whereas the activity-goal association remained a significant predictor of intrinsic motivation ($B = .38$, 95% CI [.25, .52], $p < .001$).

This study provided support for the prediction that the strength of the activity-goal association mediates the effect of reward timing on intrinsic motivation. The earlier delivery of a reward for reading led people to perceive greater overlap between reading (activity) and receiving rewards (goal), increasing intrinsic motivation. Moreover, immediate (vs. delayed) rewards increased intrinsic motivation, but not extrinsic motivation. When a reading task provided more immediate rewards, participants felt the task provided a greater positive experience, but did not perceive the task as providing a more valuable outcome.

Study 5: Immediate Rewards Increase Intrinsic Motivation More Than Larger Rewards

Does immediacy increase intrinsic motivation only because the magnitude of immediate rewards is psychologically larger (i.e., through temporal discounting; Ainslie & Haslam, 1992; Frederick et al., 2002)? To test our account against an explanation based on discounting of delayed rewards, Study 5 examined the alternative that immediate rewards are more motivating because they are psychologically larger than delayed rewards. Notably, the results of Study 4 are already inconsistent with such an alternative because larger rewards should increase both intrinsic and extrinsic motivation, which is opposite our findings. Yet, to better assess whether reward magnitude underlies the effect of timing, Study 5 independently varied reward timing (immediate vs. delayed bonus) and reward magnitude (large vs. small bonus) in order to test whether the effect of timing can be explained in terms of the effect of magnitude. We predicted that moving the rewards earlier in time would have an independent and stronger effect on intrinsic motivation than increasing the size of the rewards, which would suggest that the effect of timing cannot be explained in terms of higher subjective magnitude of immediate rewards. For discriminant validity, we again compared the effect on intrinsic motivation with the effect on extrinsic motivation.

Pilot Test

To compare the motivational impact of a sooner (vs. later) reward with that of a larger (vs. smaller) reward, we needed to choose differences in delivery times that were comparable to differences in dollar amounts. Specifically, we wanted participants to indicate that the difference in the dollar amount of our stimuli was at least as motivating as (or even more motivating than) the difference in the timing of our stimuli. With that purpose in mind, we used the time difference from Studies 3–4 (now vs. in 1 month) and an amount difference of $1.00 ($0.50 vs. $1.50). We tested whether people prefer to earn an additional $1.00 bonus at least as much as they prefer to receive a bonus one month earlier. Specifically, if most people prefer to wait a month to earn $1.00 more on an experiment, we can conclude the difference in amounts we used is no less (and actually more) motivating than the difference in delivery times.

For our pilot study, we recruited a total of 99 participants on MTurk ($M_{age} = 35.53$, $SD = 11.09$; 55 female; no participants dropped the survey). Participants imagined working on a 5-min book-reading task in exchange for a $0.25 base payment plus a bonus. We asked "Which bonus would you prefer? $0.50 bonus immediately after you complete the task or $1.50 bonus 1 month after you complete the task." We found that 67.7% ($n = 67$) of participants preferred the larger-later bonus, which is greater than chance ($z = 3.42$, $p < .001$). Given that the larger-later bonus was more attractive than the smaller-sooner bonus, we assume that an increase of $1.00 is no less motivating than delivering the bonus one month earlier. We therefore tested whether providing the bonus one month earlier increases intrinsic motivation more than adding $1.00 to the bonus does.

Method

Participants. We collected data from 206 workers on MTurk who participated for monetary compensation ($M_{age} = 37.90$, $SD = 13.26$; 115 female; 14 participants dropped the survey after random assignment; immediate-small: $n = 2$, immediate-large: $n = 3$, delayed-small: $n = 5$, delayed-large: $n = 4$).

Procedure. This study employed a 2 (reward timing: immediate vs. delayed; between-participants) × 2 (reward magnitude: smaller vs. larger; between-participants) × 2 (motivation: intrinsic vs. extrinsic; within-participants) mixed-model design. Participants received $0.25 for working on a book-reading task (adopted from Study 4). In the immediate-reward condition, participants expected a bonus within an hour of finishing the reading task. In the delayed-reward condition, they expected a bonus 1 month after finishing the task. We further manipulated the size of the bonus such that participants expected to receive either a smaller $0.50 bonus or a larger $1.50 bonus.

Participants read the five-page book excerpt from Study 4 and then answered questions assessing their intrinsic motivation to read the book: "How interesting was this book excerpt for you to read?" and "How much did you enjoy reading this book excerpt?" (1 = *not very interesting/did not enjoy*, 7 = *very interesting/enjoyed very much*). We also assessed their extrinsic motivation: "How motivated were you to finish the reading task?" and "How important was it to you to receive the outcome?" (1 = *not very motivated/important*, 7 = *very motivated/important*).

To measure intrinsic motivation with the free-choice paradigm, participants learned 2 min remained in the study, and in this time, they could continue reading the book excerpt or complete another task. All participants read that no additional bonuses were available for the remainder of the study. Participants chose to continue reading or to work on something else, and spent 2 min on the selected task (reading task or dot-counting task).

Results and Discussion

A repeated-measures ANOVA of intrinsic motivation (enjoy, interesting; $r = .91$) and extrinsic motivation (motivated by outcome, outcome importance; $r = .67$) on reward timing (immediate vs. delayed) and reward magnitude (small vs. large) resulted in a three-way interaction, $F(1, 202) = 5.08$, $p = .025$, $\eta_p^2 = .02$. To explore the three-way interaction, we examined the Timing × Magnitude interaction for intrinsic and extrinsic motivation measures separately. An ANOVA of intrinsic motivation revealed the predicted effect of reward timing, $F(1, 202) = 5.74$, $p = .017$, $\eta_p^2 = .03$, with no effect of reward magnitude, $F(1, 202) = 1.86$, $p = .175$, or interaction, $F(1, 202) = 1.22$, $p = .272$. Immediate (vs. delayed) rewards increased intrinsic motivation ($M_{\text{immediate}} = 6.01$, $SD = 1.15$; $M_{\text{delayed}} = 5.58$, $SD = 1.43$).

An ANOVA of extrinsic motivation on reward timing and magnitude revealed no significant effect of reward timing, $F(1, 202) = 1.21$, $p = .273$; reward magnitude, $F(1, 202) = 1.63$, $p = .204$; or interaction, $F(1, 202) = .80$, $p = .371$. Whereas more immediate rewards increased intrinsic motivation (positive experience), they once again had no similar effect on extrinsic motivation (outcome importance).

We next analyzed intrinsic motivation using our free-choice measure. We regressed choice (1 = continue reading; 0 = other task) on reward timing (1 = immediate; 0 = delayed), magnitude (1 = $0.50; 0 = $1.50) and their interaction, revealing no interaction, $B = -.31$, 95% CI [−1.51, .86], $z = -.52$, $p = .603$, $OR = .73$. Examining main effects of timing and magnitude, as predicted, participants in the immediate reward condition were more likely to continue the reading task (73.3%) compared with the delayed reward condition (54.5%), $B = .84$, 95% CI [.26, 1.44], $z = 2.80$, $p = .005$, $OR = 2.32$ (see Figure 4). There was a marginal effect of magnitude, $B = -.50$, 95% CI [−1.09, .09], $z = -1.66$, $p = .097$, $OR = .61$.

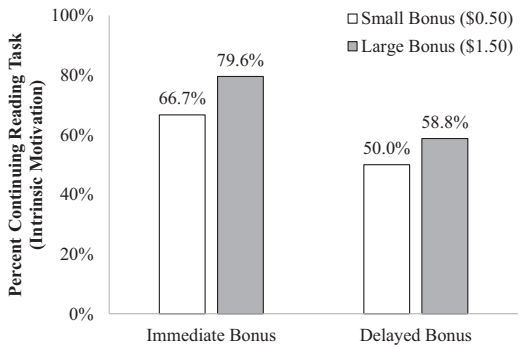


Figure 4. An immediate bonus reward increased the likelihood of choosing to continue to read compared with a delayed bonus reward, with no effect of the magnitude of the bonus on choice (Study 5).

Overall, results of Study 5 suggest it is unlikely that immediate rewards increase intrinsic motivation because they appear psychologically larger. Larger rewards did not significantly increase intrinsic motivation. In addition, we replicated the results of Study 4, where an earlier reward increased intrinsic, but not extrinsic motivation.

Notably, the magnitude of the reward could also potentially influence intrinsic motivation. On the one hand, consistent with the overjustification effect (Lepper et al., 1973), a larger payment may lead participants to infer that a task will be less pleasant and fun, decreasing intrinsic motivation. On the other hand, consistent with animal conditioning research, a larger reward could increase association strength between the activity and the outcome, leading to increased intrinsic motivation (Hull, 1943; Rescorla & Wagner, 1972). Possibly, these two effects cancelled each other out, such that the size of the reward did not influence intrinsic motivation in either direction. Alternatively, in Study 5, the size of the reward did not influence intrinsic motivation because participants were unaware their payment was large, a point discussed further in the General Discussion.

General Discussion

Across five studies and two supplemental studies, we provide evidence that immediate rewards increase intrinsic motivation by strengthening the activity-goal association. People were more intrinsically motivated to watch a news clip after framing the rewards for doing so as arriving immediately (vs. with a delay; Study 1), and they were more intrinsically motivated to complete an experimental task that provided an immediate (vs. delayed) chocolate reward (Study 2) or immediate monetary bonus (vs. delayed or no bonus; Study 3).

We further found immediate rewards increase intrinsic motivation by strengthening the activity-goal association (Study 4), and that temporal discounting is not part of the process. Whereas delayed rewards can be psychologically smaller, a larger reward did not increase intrinsic motivation as much as an earlier reward did (Study 5). Moreover, the effect of timing was unique to intrinsic (vs. extrinsic) motivation (discriminant validity, Studies

4–5). Indeed, immediate rewards rendered the experience of pursuing an activity more positive, but did not render the outcome of the activity as more important.

Theoretical Implications

Our findings support the means-ends fusion model of intrinsic motivation (Kruglanski et al., in press), though unlike previous research (e.g., Fishbach et al., 2004), the source of the association between an activity and a goal was the temporal proximity. Our model, and the structural perspective it offers, differs from yet complements research on self-determination theory (SDT), which identified certain contents that tend to be intrinsically motivating (Ryan & Deci, 2000). SDT proposes that intrinsic actions serve at least one of three end goals: autonomy, competence, and relatedness. We argue that SDT's three goal domains provide instances in which a strong association exists between an activity and its goal. For example, medical students who were given more autonomy when learning were more intrinsically motivated (Williams & Deci, 1996) because learning and becoming autonomous were strongly associated for them—they felt autonomous while learning as opposed to after some delay. Indeed, in our research, we adopted SDT measures of intrinsic motivation (Ryan, 1982) to test our predictions.

Where our work may appear to diverge from prior work (e.g., by Lepper, 1981; Lepper & Greene, 1978) is that we found extrinsic rewards, such as bonuses, increase rather than decrease intrinsic motivation. Whereas the previously documented overjustification effect surfaces when the association between an activity and its goal is weakened through the provision of an additional goal, our research compares intrinsic motivation in a rewarded activity where everyone expects a reward (e.g., a paid job), and we vary the reward timing. In such cases, the presence of a reward does not decrease the experience of an activity as intrinsically motivated, and we can test for the effect of reward timing. Only in Study 3 did we add a no-bonus condition, yet everyone received a reward for the activity (i.e., a paid experiment), and as such, the presence of a bonus did not crowd out intrinsic motivation.

Our findings are further relevant to research on conditioning, which has demonstrated how the association between an activity and a reward can facilitate liking of the rewarded task even after removing the reward (De Houwer et al., 2001; Razran, 1954). Specifically, evaluative conditioning is concerned with changes in the evaluation response to a conditioned stimulus (CS) in response to the CS being temporally and/or spatially paired with an unconditioned stimulus (US; Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010; Rozin & Zellner, 1985). Unlike Pavlovian conditioning, which addresses changes in any type of response (e.g., salivation, skin conductance), evaluative conditioning is specific to changes in liking (De Houwer, 2007; Walther, 2002). Our results are consistent with an explanation based on evaluative conditioning, except that we measured intrinsic motivation instead of general evaluation and we did not find effects on extrinsic motivation measures. This finding suggests the immediacy of rewards does not condition participants to evaluate a task as more positive in general (e.g., as providing more important outcomes), but rather, as more intrinsically motivating.

Finally, our results are relevant to research on the effect of immediate rewards on increased goal persistence (Acland & Levy, 2015; John et al., 2011; Volpp et al., 2008; Woolley & Fishbach, 2016). For example, associating immediate rewards, such as listening to a popular novel, with a workout increased exercise frequency (Milkman, Minson, & Volpp, 2014). Our research suggests immediate (vs. delayed) rewards boost persistence by increasing intrinsic motivation, such that the activity itself is more enjoyable. Indeed, research examining ways to counteract self-control depletion found that after engaging in a depleting task, associating the task with financial incentives (Boksem, Meijman, & Lorist, 2006) or with an immediately rewarding experience (Derrick, 2013; Friese, Messner, & Schaffner, 2012), bolstered subsequent self-control. Possibly immediate rewards improve performance by increasing intrinsic motivation.

Boundary Conditions, Limitations, and Open Questions

Possibly, immediate rewards increase intrinsic motivation by changing the meaning of the activity. For example, people pursuing exercise for an immediate reward may envision exercising as "running + watching TV" instead of just "running." Indeed, the meaning of activities is fluid, dynamic, and consists of associative networks for how people construe a given activity within a given context (Anderson & Pirolli, 1984; Collins & Loftus, 1975), and one consequence of having a close activity-goal association is that positive properties of goal attainment bleed into and come to color the experience of pursuing the rewarded activity (Fishbach et al., 2004). Although it is possible reflecting on immediate rewards could change the meaning of the activity, what is critical for our analysis is that in our studies, rewards did not change the behaviors people actually engaged in when pursuing the activity (e.g., those who received an immediate chocolate reward when completing a survey were not eating chocolate while completing the survey). Thus, whereas immediate rewards may sometimes change the meaning of the activity, they do not change what people do.

It is also worth distinguishing the effect of reward immediacy from that of misattribution. Misattribution occurs when task irrelevant stimuli (e.g., pleasant images, music, and room temperature while performing the task) color one's experience such that the task appears more intrinsically motivating (e.g., Leander, Kay, Chartrand, & Payne, 2017). Importantly, however, the reward for a task is not an irrelevant stimulus; rather, the reward is the goal of the task. Therefore, people correctly attribute (rather than incorrectly misattribute) the reward (i.e., the goal) to the task (i.e., the means). The variable that predicts intrinsic motivation is the strength of the means–ends (activity–goal) association and the psychological processes that explain the strength of this association are conditioning and emotional transfer, which lead the positive aspects of goal attainment to become associated with the activity (Fishbach et al., 2004). For example, the excitement associated with the bonus rewards, which is correctly attributed to completing the task, transfers to the experience of pursuing the activity as a function of the activity-goal association.

A potential alternative explanation for the effect of immediacy is that closer rewards can be psychologically larger, due to temporal discounting and, therefore, immediate rewards are motivating because they are larger. We note that in Study 5, we compared more immediate rewards with larger rewards and found only immediate rewards increased intrinsic motivation. Yet, this test requires that the differences in timing are similar to the differences

in magnitude of rewards. And whereas our pilot test identified people were more sensitive to differences in dollar amounts (i.e., $0.50 vs. $1.50) than differences in delivery time (i.e., today vs. a month), it is possible participants need a reference point for evaluating reward magnitude (but less so to evaluate reward timing). We further believe it is possible that larger rewards do indeed increase intrinsic motivation—it is only less likely that such an effect of reward magnitude accounted for the effect of reward timing we observed in our studies.

A boundary condition could refer to savoring behavior. There are situations where people prefer to delay consumption, such as savoring the anticipation of a future event like a vacation or drinking a bottle of nice wine (Loewenstein, 1987). It is possible in these situations that immediacy would not be desirable and would not serve to increase intrinsic motivation.

In addition to exploring alternative explanations and boundary conditions, open questions include what other variables affect the experience of fusion between an activity and its goal, and thus can foster intrinsic motivation. In particular, perceived similarity, or fit, between an activity and its goal can strengthen their association (Higgins, 2000; Higgins, Chen Idson, Freitas, Spiegel, & Molden, 2003). Indeed, anticipated and actual enjoyment of an activity increased as the fit between the activity and people's regulatory focus increased (Freitas & Higgins, 2002), potentially by increasing intrinsic motivation. One would predict that a more fitting goal (e.g., a free water bottle for those signing up for an exercise class) might increase intrinsic motivation compared with a less fitting goal (e.g., a free soda for an exercise class).

Although we provide initial insight into the role of immediacy in increasing intrinsic motivation, the present work is not without limitations. First, we relied on the modified IOS scale in providing evidence for the process underlying the effect of immediacy—that immediacy strengthens the activity–goal association, which in turn increases intrinsic motivation. Future research should examine other means of assessing this association (e.g., implicit measures). Second, we relied on online, MTurk paradigms. Although online paradigms are ideal for manipulating temporal distance separately from spatial distance, a limitation of using online paid workers is that results may differ for people that like their job more or who are not paid at all. Finally, delayed rewards may appear less reliable or certain than immediate rewards, although notably, we worked to mitigate this, for example, by explicitly stating that bonus rewards would be automatically delivered and by using online payments where there are not costs associated with needing to remember to cash the reward. This limitation is inherent to studies with temporal delays, and is not unique to our paradigms, yet to the extent that any discounting procedure evokes uncertainty about the availability of future rewards, the present research too could have unintentionally manipulated uncertainty in rewards.

In summary, we found immediacy increases intrinsic motivation by strengthening the activity-goal association. The temporal distance between an activity and its goal matters and so, to be intrinsically motivated to finish this article, it would be ideal to consider the benefits of reading as immediate, rather than delayed.

References

Acland, D., & Levy, M. R. (2015). Naiveté, projection bias, and habit formation in gym attendance. *Management Science, 61,* 146–160. http://dx.doi.org/10.1287/mnsc.2014.2091

Ainslie, G., & Haslam, N. (1992). Hyperbolic discounting. In G. Loewenstein & J. Elster (Eds.), *Choice over time* (pp. 57–92). New York, NY: Russell Sage Foundation.

Anderson, J. R., & Pirolli, P. L. (1984). Spread of activation. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 10,* 791–798. http://dx.doi.org/10.1037/0278-7393.10.4.791

Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of Other in the Self Scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology, 63,* 596–612. http://dx.doi.org/10.1037/0022-3514.63.4.596

Balsam, P. D., Drew, M. R., & Gallistel, C. R. (2010). Time and associative learning. *Comparative Cognition & Behavior Reviews, 5,* 1–22. http://dx.doi.org/10.3819/ccbr.2010.50001

Bélanger, J. J., Schori-Eyal, N., Pica, G., Kruglanski, A. W., & Lafrenière, M. A. (2015). The "more is less" effect in equifinal structures: Alternative means reduce the intensity and quality of motivation. *Journal of Experimental Social Psychology, 60,* 93–102. http://dx.doi.org/10.1016/j.jesp.2015.05.005

Boakes, R. A., & Costa, D. S. (2014). Temporal contiguity in associative learning: Interference and decay from an historical perspective. *Journal of Experimental Psychology: Animal Learning and Cognition, 40,* 381–400. http://dx.doi.org/10.1037/xan0000040

Boksem, M. A., Meijman, T. F., & Lorist, M. M. (2006). Mental fatigue, motivation and action monitoring. *Biological Psychology, 72,* 123–132. http://dx.doi.org/10.1016/j.biopsycho.2005.08.007

Brehm, J. W., & Self, E. A. (1989). The intensity of motivation. *Annual Review of Psychology, 40,* 109–131. http://dx.doi.org/10.1146/annurev.ps.40.020189.000545

Calder, B. J., & Staw, B. M. (1975). Self-perception of intrinsic and extrinsic motivation. *Journal of Personality and Social Psychology, 31,* 599–605. http://dx.doi.org/10.1037/h0077100

Collins, A. M., & Loftus, E. F. (1975). A spreading-activation theory of semantic processing. *Psychological Review, 82,* 407–428. http://dx.doi.org/10.1037/0033-295X.82.6.407

Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology, 18,* 105–115. http://dx.doi.org/10.1037/h0030644

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125,* 627–668. http://dx.doi.org/10.1037/0033-2909.125.6.627

De Houwer, J. (2007). A conceptual and theoretical analysis of evaluative conditioning. *The Spanish Journal of Psychology, 10,* 230–241. http://dx.doi.org/10.1017/S1138741600006491

De Houwer, J., Thomas, S., & Baeyens, F. (2001). Associative learning of likes and dislikes: A review of 25 years of research on human evaluative conditioning. *Psychological Bulletin, 127,* 853–869. http://dx.doi.org/10.1037/0033-2909.127.6.853

Derrick, J. L. (2013). Energized by television familiar fictional worlds restore self-control. *Social Psychological & Personality Science, 4,* 299–307. http://dx.doi.org/10.1177/1948550612454889

Dickinson, A. (1980). *Contemporary animal learning theory*. Cambridge, UK: Cambridge University Press.

Eisenberger, R., & Cameron, J. (1996). Detrimental effects of reward. Reality or myth? *American Psychologist, 51,* 1153–1166. http://dx.doi.org/10.1037/0003-066X.51.11.1153

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175–191. http://dx.doi.org/10.3758/BF03193146

Fishbach, A., & Choi, J. (2012). When thinking about goals undermines goal pursuit. *Organizational Behavior and Human Decision Processes, 118,* 99–107. http://dx.doi.org/10.1016/j.obhdp.2012.02.003

Fishbach, A., Shah, J. Y., & Kruglanski, A. W. (2004). Emotional transfer in goal systems. *Journal of Experimental Social Psychology, 40,* 723–738. http://dx.doi.org/10.1016/j.jesp.2004.04.001

Frederick, S., Loewenstein, G., & O'Donoghue, T. (2002). Time discounting and time preference: A critical review. *Journal of Economic Literature, 40,* 351–401. http://dx.doi.org/10.1257/jel.40.2.351

Freitas, A. L., & Higgins, E. T. (2002). Enjoying goal-directed action: The role of regulatory fit. *Psychological Science, 13,* 1–6. http://dx.doi.org/10.1111/1467-9280.00401

Friese, M., Messner, C., & Schaffner, Y. (2012). Mindfulness meditation counteracts self-control depletion. *Consciousness and Cognition, 21,* 1016–1022. http://dx.doi.org/10.1016/j.concog.2012.01.008

Goswami, I., & Urminsky, O. (2017). The dynamic effect of incentives on postreward task engagement. *Journal of Experimental Psychology: General, 146,* 1–19. http://dx.doi.org/10.1037/xge0000206

Harackiewicz, J. M. (1979). The effects of reward contingency and performance feedback on intrinsic motivation. *Journal of Personality and Social Psychology, 37,* 1352–1363. http://dx.doi.org/10.1037/0022-3514.37.8.1352

Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling*. Retrieved from www.afhayes.com/public/process2012.pdf

Heath, C. (1999). On the social psychology of agency relationships: Lay theories of motivation overemphasize extrinsic incentives. *Organizational Behavior and Human Decision Processes, 78,* 25–62. http://dx.doi.org/10.1006/obhd.1999.2826

Higgins, E. T. (2000). Making a good decision: Value from fit. *American Psychologist, 55,* 1217–1230. http://dx.doi.org/10.1037/0003-066X.55.11.1217

Higgins, E. T., Chen Idson, L., Freitas, A. L., Spiegel, S., & Molden, D. C. (2003). Transfer of value from fit. *Journal of Personality and Social Psychology, 84,* 1140–1153. http://dx.doi.org/10.1037/0022-3514.84.6.1140

Higgins, E. T., Lee, J., Kwon, J., & Trope, Y. (1995). When combining intrinsic motivations undermines interest: A test of activity engagement theory. *Journal of Personality and Social Psychology, 68,* 749–767. http://dx.doi.org/10.1037/0022-3514.68.5.749

Higgins, E. T., & Trope, Y. (1990). Activity engagement theory: Implications of multiply identifiable input for intrinsic motivation. In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (pp. 229–264). New York, NY: Guilford Press.

Higgins, E. T., Trope, Y., & Kwon, J. (1999). Augmentation and undermining from combining activities: The role of choice in activity engagement theory. *Journal of Experimental Social Psychology, 35,* 285–307. http://dx.doi.org/10.1006/jesp.1999.1384

Hofmann, W., De Houwer, J., Perugini, M., Baeyens, F., & Crombez, G. (2010). Evaluative conditioning in humans: A meta-analysis. *Psychological Bulletin, 136,* 390–421. http://dx.doi.org/10.1037/a0018916

Hull, C. L. (1943). *Principles of behavior: An introduction to behavior theory*. New York, NY: Appleton-Century-Crofts.

John, L. K., Loewenstein, G., Troxel, A. B., Norton, L., Fassbender, J. E., & Volpp, K. G. (2011). Financial incentives for extended weight loss: A randomized, controlled trial. *Journal of General Internal Medicine, 26,* 621–626. http://dx.doi.org/10.1007/s11606-010-1628-y

Kruglanski, A. W., Alon, S., & Lewis, T. (1972). Retrospective misattribution and task enjoyment. *Journal of Experimental Social Psychology, 8,* 493–501. http://dx.doi.org/10.1016/0022-1031(72)90075-3

Kruglanski, A. W., Fishbach, A., Woolley, K., Bélanger, J., Chernikova, M., Molinario, E., & Pierro, A. (in press). A structural model of intrinsic motivation: On the psychology of means-ends fusion. *Psychological Review*.

Kruglanski, A. W., Riter, A., Amitai, A., Margolin, B. S., Shabtai, L., & Zaksh, D. (1975). Can money enhance intrinsic motivation? A test of the content-consequence hypothesis. *Journal of Personality and Social Psychology, 31,* 744–750. http://dx.doi.org/10.1037/0022-3514.31.4.744

Lafrenière, M. A. K., Bélanger, J. J., Kruglanski, A. W., & Vallerand, R. J. (2011). *Goal-means associations and intrinsic motivation*. Manuscript in preparation.

Leander, N. P., Kay, A. C., Chartrand, T. L., & Payne, B. K. (2017). An affect misattribution pathway to perceptions of intrinsic reward. *Social Cognition, 35,* 163–180. http://dx.doi.org/10.1521/soco.2017.35.2.163

Lepper, M. R. (1981). Intrinsic and extrinsic motivation in children: Detrimental effects of superfluous social controls. In W. A. Collins (Ed.), *Aspects of the development of competence: Minnesota symposium on child psychology* (Vol. 14, pp. 155–213). Hillsdale, NJ: Erlbaum.

Lepper, M. R., & Greene, D. (1978). *The hidden costs of rewards: New perspectives on the psychology of human motivation*. Oxford, UK: Erlbaum.

Lepper, M. R., Greene, D., & Nisbett, R. E. (1973). Undermining children's intrinsic interest with extrinsic reward: A test of the "overjustification" hypothesis. *Journal of Personality and Social Psychology, 28,* 129–137. http://dx.doi.org/10.1037/h0035519

Locke, E. A., & Latham, G. P. (1990). Work motivation and satisfaction: Light at the end of the tunnel. *Psychological Science, 1,* 240–246. http://dx.doi.org/10.1111/j.1467-9280.1990.tb00207.x

Loewenstein, G. (1987). Anticipation and the valuation of delayed consumption. *Economic Journal, 97,* 666–684. http://dx.doi.org/10.2307/2232929

Maimaran, M., & Fishbach, A. (2014). If it's useful and you know it, do you eat? Preschoolers refrain from instrumental food. *The Journal of Consumer Research, 41,* 642–655. http://dx.doi.org/10.1086/677224

McAllister, W. R. (1953). Eyelid conditioning as a function of the CS-US interval. *Journal of Experimental Psychology, 45,* 417–422. http://dx.doi.org/10.1037/h0059534

McAuley, E., Duncan, T., & Tammen, V. V. (1989). Psychometric properties of the Intrinsic Motivation Inventory in a competitive sport setting: A confirmatory factor analysis. *Research Quarterly for Exercise and Sport, 60,* 48–58. http://dx.doi.org/10.1080/02701367.1989.10607413

Milkman, K. L., Minson, J. A., & Volpp, K. G. (2014). Holding the Hunger Games hostage at the gym: An evaluation of temptation bundling. *Management Science, 60,* 283–299. http://dx.doi.org/10.1287/mnsc.2013.1784

Milyavskaya, M., Inzlicht, M., Hope, N., & Koestner, R. (2015). Saying "no" to temptation: Want-to motivation improves self-regulation by reducing temptation rather than by increasing self-control. *Journal of Personality and Social Psychology, 109,* 677–693. http://dx.doi.org/10.1037/pspp0000045

Mischel, W., Shoda, Y., & Rodriguez, M. I. (1989). Delay of gratification in children. *Science, 244,* 933–938. http://dx.doi.org/10.1126/science.2658056

Orehek, E., Mauro, R., Kruglanski, A. W., & van der Bles, A. M. (2012). Prioritizing association strength versus value: The influence of self-regulatory modes on means evaluation in single goal and multigoal contexts. *Journal of Personality and Social Psychology, 102,* 22–31. http://dx.doi.org/10.1037/a0025881

Razran, G. (1954). The conditioned evocation of attitudes (cognitive conditioning?). *Journal of Experimental Psychology, 48,* 278–282. http://dx.doi.org/10.1037/h0058778

Reeve, J., Jang, H., Hardre, P., & Omura, M. (2002). Providing a rationale in an autonomy-supportive way as a strategy to motivate others during an uninteresting activity. *Motivation and Emotion, 26,* 183–207. http://dx.doi.org/10.1023/A:1021711629417

Reeve, J., Nix, G., & Hamm, D. (2003). Testing models of the experience of self-determination in intrinsic motivation and the conundrum of

choice. *Journal of Educational Psychology, 95,* 375–392. http://dx.doi.org/10.1037/0022-0663.95.2.375

Rescorla, R. A., & Wagner, A. R. (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. In A. H. Black & W. F. Prokasy (Eds.), *Classical conditioning II: Current research and theory* (pp. 64–99) New York, NY: Appleton-Century-Crofts.

Rheinberg, F. (2008). Intrinsic motivation and flow. In J. Heckhausen & H. Heckhausen (Eds.), *Motivation and Action* (pp. 323–348). Cambridge, UK: University Press. http://dx.doi.org/10.1017/CBO9780511499821.014

Rozin, P., & Zellner, D. (1985). The role of Pavlovian conditioning in the acquisition of food likes and dislikes. *Annals of the New York Academy of Sciences, 443,* 189–202. http://dx.doi.org/10.1111/j.1749-6632.1985.tb27073.x

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology, 43,* 450–461. http://dx.doi.org/10.1037/0022-3514.43.3.450

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55,* 68–78. http://dx.doi.org/10.1037/0003-066X.55.1.68

Sansone, C., & Harackiewicz, J. M. (1996). "I don't feel like it": The function of interest in self-regulation. In L. L. Martin & A. Tesser (Eds.), *Striving and feeling: Interactions among goals, affect, and self-regulation* (pp. 203–228). Hillsdale, NJ: Erlbaum.

Schwartz, B., & Wrzesniewski, A. (2016). Internal motivation, instrumental motivation, and eudaimonia. In J. Vitterso (Ed.), *Handbook of eudaimonic well-being* (pp. 123–134). New York, NY: Springer International Publishing. http://dx.doi.org/10.1007/978-3-319-42445-3_8

Tang, S. H., & Hall, V. C. (1995). The overjustification effect: A meta-analysis. *Applied Cognitive Psychology, 9,* 365–404. http://dx.doi.org/10.1002/acp.2350090502

Touré-Tillery, M., & Fishbach, A. (2014). How to measure motivation: A guide for the experimental social psychologist. *Social and Personality Psychology Compass, 8,* 328–341. http://dx.doi.org/10.1111/spc3.12110

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. *Advances in Experimental Social Psychology, 29,* 271–360. http://dx.doi.org/10.1016/S0065-2601(08)60019-2

Volpp, K. G., John, L. K., Troxel, A. B., Norton, L., Fassbender, J., & Loewenstein, G. (2008). Financial incentive-based approaches for weight loss: A randomized trial. *Journal of the American Medical Association, 300,* 2631–2637. http://dx.doi.org/10.1001/jama.2008.804

Walther, E. (2002). Guilty by mere association: Evaluative conditioning and the spreading attitude effect. *Journal of Personality and Social Psychology, 82,* 919–934. http://dx.doi.org/10.1037/0022-3514.82.6.919

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology, 70,* 767–779. http://dx.doi.org/10.1037/0022-3514.70.4.767

Wolfle, H. M. (1932). Conditioning as a function of the interval between the conditioned and the original stimulus. *The Journal of General Psychology, 7,* 80–103. http://dx.doi.org/10.1080/00221309.1932.9918448

Woolley, K., & Fishbach, A. (2015). The experience matters more than you think: People value intrinsic incentives more inside than outside an activity. *Journal of Personality and Social Psychology, 109,* 968–982. http://dx.doi.org/10.1037/pspa0000035

Woolley, K., & Fishbach, A. (2016). For the fun of it: Harnessing immediate rewards to increase persistence in long-term goals. *The Journal of Consumer Research, 42,* 952–966. http://dx.doi.org/10.1093/jcr/ucv098

Wrzesniewski, A., Schwartz, B., Cong, X., Kane, M., Omar, A., & Kolditz, T. (2014). Multiple types of motives don't multiply the motivation of West Point cadets. *Proceedings of the National Academy of Sciences of the United States of America, 111,* 10990–10995. http://dx.doi.org/10.1073/pnas.1405298111

Zhang, Y., Fishbach, A., & Kruglanski, A. W. (2007). The dilution model: How additional goals undermine the perceived instrumentality of a shared path. *Journal of Personality and Social Psychology, 92,* 389–401. http://dx.doi.org/10.1037/0022-3514.92.3.389

Zhou, H., & Fishbach, A. (2016). The pitfall of experimenting on the web: How unattended selective attrition leads to surprising (yet false) research conclusions. *Journal of Personality and Social Psychology, 111,* 493–504. http://dx.doi.org/10.1037/pspa0000056

Appendix A

Filler Survey From Study 2

Participants completed a 5-min survey during which they imagined meeting and getting acquainted with a new friend. They read "This person can tell you things about themselves in order for you to get to know them better. Please read the statements below that your new friend could tell you and think about how you will view your friend based on these statements:" (a) "Imagine your new friend tells you they are taking an elective class on computer programming to gain useful professional connections," (b) "Imagine your new friend tells you they read news articles to get conversation topics to discuss with others," and (c) "Imagine your new friend tells you they own a nice cookbook to impress people with their meals." For each statement, participants answered two questions: "How well will you know your new friend after learning they engaged in this activity?" (0 = *know less*, 6 = *know more*) and "How much will you like your new friend after learning they engaged in this activity?" (0 = *like less*, 6 = *like more*).

(*Appendices continue*)

Appendix B

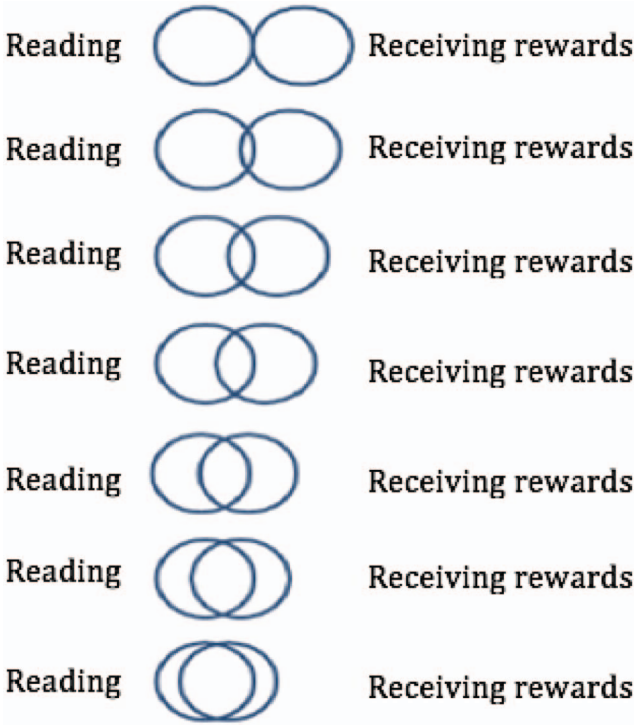
Spot-the-Difference Task From Study 3

See the online article for the color version of this figure.

(*Appendices continue*)

Appendix C

Measure of Activity-Goal Association Used in Study 4



See the online article for the color version of this figure.

Received May 15, 2017
Revision received December 11, 2017
Accepted December 18, 2017 ■