Step by Step: Sub-Goals as a Source of Motivation

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The present research explores the shifting impact of sub-goals on human motivation as individuals move closer to goal attainment, and attributes this shift to the changing source of motivation at different time points during the goal pursuit. In four lab and field experiments, we employed contexts such as exercising, business reviews, and work-for-pay jobs, and performed both within-subject and between-subject tests. We found that when individuals are initiating a goal and derive motivation primarily from the belief that the final goal state is attainable, the structure of sub-goals enhances the sense of attainability and therefore leads to greater motivation. Conversely, when people are completing a goal and the source of motivation centers primarily on the perception that their actions are of value, a focus on the overall goal (rather than sub-goals) heightens the perceived value of the goal-directed actions and leads to greater motivation.

Keywords: Sub-goal, goal structure, motivation, self-regulation, expectancy, value

An employee at a call center who aims to make 3,000 sales calls per month can frame his/her goal in two ways: as one integrated goal of 3,000 sales calls or as an accumulation of smaller, more manageable sub-goals, such as thirty sub-goals of 100 calls each. Setting sub-goals thus creates an elaborated goal structure, delineating a set of successive approximations and steps toward the achievement of the overall goal (Lewin, 1936; Murray, 1938; Kruglanski et al., 2002). While some business practices emphasize the leaders' role in identifying and formalizing one overall goal for their employees (e.g., executives at Aetna Inc. set and focus on a few annual companywide goals; Pratt, 2007), other industry guidelines promote the idea of setting smaller (e.g., quarterly) sub-goals (Financial Planning, 2016; Wilson, 2016).

Structuring the pursuit of an overall goal into a set of sub-goals has been shown to reduce the difficulty of the pursuit and to provide positive reinforcements that lead to greater motivation and persistence (Brunstein, 1993; Locke & Latham, 1990; Soman & Shi, 2003). For example, the aforementioned employee at the call center might be more motivated to work on the sales goal if it is divided into thirty sub-goals because the completion of 100 calls seems more easily achievable and motivating than that of 3,000 calls, which seems excessively difficult and, hence, discourages goal engagement (Locke & Latham, 1990; Pervin, 1989; Soman & Shi, 2003).

However, empirical evidence also suggests that focusing on sub-goals can conversely interfere with the pursuit of the ultimate goal (Amar et al., 2011; Amir & Ariely, 2008; Fishbach, Dhar, & Zhang, 2006; Newell & Simon, 1972). The achievement of sub-goals could breed a sense of self-congratulation and encourage relaxation (e.g., taking a long lunch break), thereby interfering with the progression toward and the attainment of the overall goal (Fishbach, Dhar, & Zhang, 2006). Similarly, Amir and Ariely (2008) found that providing

discrete progress markers such as sub-goals hindered people's performance in a spelling bee when the task was already rich in progress information.

The diverging evidence on the effectiveness of sub-goals, coupled with mixed business guidelines and principles, highlights the necessity of a closer examination of the variables that determine the motivational consequences of this elaborated goal structure, and this is precisely what we hope to achieve in the present research. In this research, we define motivation as individuals' tendencies to carry out goal-directed actions in order to reduce the discrepancy between the current state and the ideal state (Carver & Scheier, 1990). We adopt a longitudinal and dynamic view of the effects of sub-goals and aim to determine how, compared with an exclusive focus on the overall goal, such an elaborated intermediate goal structure influences motivation over the course of a pursuit. Drawing from the literature on the various sources of human motivation (Liberman & Förster, 2008; Locke & Latham, 1990) and the temporal variation of their impacts (Huang, Zhang, & Broniarczyk, 2012; Louro, Pieters, & Zeelenberg, 2007), we propose the following hypothesis: Because individuals derive motivation to persist on a goal from different sources as they progress toward the end point (Liberman & Förster, 2008; Louro, Pieters, & Zeelenberg, 2007), framing the goal as one integrated goal versus an accumulation of sub-goals may have a distinct influence on motivation at different times.

Specifically, we build on the influential value-expectancy models (Atkinson, 1957; Vroom, 1964) and propose that these two pillars of motivation have an interesting temporal aspect to them: When people have accumulated only a low level of progress on the goal and remain doubtful about the goal's attainability, the information that signals the goal's attainability should be the primary determinant of their motivation (Zhang & Huang, 2010). For example, researchers have recently found that having more variety within a set of means to goal attainment increases motivation in the initial stage of the pursuit by reducing the

uncertainty associated with goal attainment (Etkin & Ratner, 2012). Because a sub-goal structure fosters the sense of goal attainability (i.e., easier goal attainment) more than the structure that has only one overall goal, we thus argue that a focus on the sub-goal should elicit greater motivation when people first begin the pursuit, because in this early stage the source of motivation lies critically in the belief of a goal's attainability.

However, when people move into the advanced stages of the pursuit, the high level of progress they have accumulated should alleviate the concern on whether the goal is attainable (Liberman & Förster, 2008). At this stage, people instead focus on the reduction of the discrepancy between their current position and the goal (Koo & Fishbach, 2008). Their commitment to the goal and subsequent motivation therefore depend primarily on the extent to which they value the goal (Koo & Fishbach, 2012). Importantly, because a focus on the overall goal (instead of the next sub-goal) allows individuals to see their actions as directly linked to the valuable outcome, we propose that focusing on the overall goal would elicit greater motivation when people's concern centers on value. Overall, depending on whether people derive motivation from the perception of easy goal attainment or from the sense that their actions are associated with a valuable outcome, the motivational consequences of a sub-goal structure would change as people progress further in their pursuits.

This conceptualization reconciles conflicting findings in the sub-goal literature by identifying the conditions under which sub-goals' momentary impact on motivation shifts as individuals move from the beginning of the pursuit to goal completion. Our critical contribution lies in the finding that the motivational consequences of a sub-goal structure rely heavily on individuals' shifting concerns about the pursuit and in the delineation of how the structure of sub-goals (vs. having only the overall goal) addresses these concerns. Our findings suggest that a general statement on the effectiveness of sub-goals may be an oversimplification; organizations and employers who wish to implement a sub-goal structure

to motivate employees, sales teams, or consumers should hence be mindful of this shifting impact.

The Advantages and Disadvantages of Sub-Goals

The literature defines sub-goals as pre-established smaller steps toward the achievement of an overarching goal (Borrelli & Mermelstein, 1994; Heath, Larrick, & Wu, 1999; Lewin, 1936). Because sub-goals are successive approximations toward an overall goal (Murray, 1938), they are not ends in themselves. Instead, they exist only because of primary goals (Kruglanski et al., 2002).

The use of sub-goals is associated with many benefits. Because sub-goals are subordinate end points in the pursuit of an overall goal, they help to signify progress toward the ultimate end goal, especially when the overall progress is uncertain (Amir & Ariely, 2008). In addition, sub-goals are easier and quicker to accomplish than the overall goal, reducing the difficulty and complexity of the pursuit and providing a greater sense of progress (Brunstein, 1993; Locke & Latham, 1990; Newell & Simon, 1972; Pervin, 1989; Soman & Shi, 2003). As a result, the employment of sub-goals can help solve the "starting problem" that arises when one confronts a difficult goal (Heath, Larrick, & Wu, 1999). The achievement of sub-goals can enhance self-efficacy and competence, leading to greater persistence and motivation (Bandura & Schunk, 1981; Stock & Cervone, 1990). In the context of debt settlement, Gal and McShane (2012) found that as individuals paid off more debt accounts (i.e., the more financial sub-goals they accomplished), their subsequent effort in eliminating their overall debt increased. The actual dollar amount that was paid off did not have such a motivational effect.

On the other hand, there are also costs associated with setting and accomplishing sub-goals. Because sub-goals represent additional intermediate levels that individuals must work toward, they may lead to motivational distraction and interfere with the ultimate goal (Heath

et al., 1999; Kruglanski et al., 2002; Newell & Simon, 1972). Sub-goals often replace the

overarching goal as the center of reference (Heath et al., 1999), and the sense of

accomplishment from completing individual sub-goals can cause complacency, leading to

lower motivation to continue working on the overall goal. For instance, Fishbach, Dhar, and

Zhang (2006) showed that when people considered their success on a subgoal, they would

view additional actions toward achieving the superordinate goal as substitutes and thus were

less likely to pursue these actions.

These conflicting findings suggest that sub-goals may not have either a universally

positive or negative impact on motivation, and the effectiveness of sub-goals calls for closer

examination. While various factors could change the impact of sub-goals (e.g., trait

procrastination, sub-goal alignment, expertise in goal pursuit), we are particularly interested

in the level of progress on the goal as the focal point of investigation for the following three

reasons: First, goal pursuit is a dynamic process that spans from initiation to completion, and

situations change from moment to moment during this process. For this reason, a longitudinal

perspective reveals much more information than the usual snapshot-like approach, as it

accounts for the influence of time/stage. Second, prior research has documented that

individuals actively monitor their progress (Carver & Scheier, 1998) and adjust efforts

accordingly (Kivetz, Urminsky, & Zheng, 2006; Nunes & Drèze, 2006). However, what these

findings did not address is how individuals' relative position on a goal changes not only the

amount of effort they invest, but also the source of their effort and thus the way they interpret

goal-directed behaviors (Koo & Fishbach, 2012), both of which determine the impact of the

presence of a sub-goal structure. Third, in organizational settings, the goal structure often

remains static throughout the pursuit; for instance, once a sub-goal structure is employed in a

sales context, it would continue to be used throughout the fiscal year. It is thus especially

important to explore the dynamic impact of sub-goal structure across different stages of goal

pursuit to derive a goal structure and feedback system that maximizes individuals' effort and performance.

Sub-Goals as the Source of Motivation

On the conceptual level, goals function as reference points (Bonezzi, Brendl, & De Angelis, 2011; Heath et al., 1999) and motivate people by creating a negative discrepancy between a person's desired state and his or her current state. What distinguishes goals with an elaborated sub-goal structure from those without is that the latter focus people on a single reference point whereas the former present two (or more) distinct and simultaneous reference points. For example, an employee hoping to complete 3,000 sales calls might have only this number in mind as the reference point. However, if the employee divides the goal into consecutive 100-call sub-goals, he or she might simultaneously hold multiple numbers—100, 200, 300,…3,000—in mind, with both the most proximal sub-goal and the ultimate overall goal as relevant reference points (Heath et al., 1999).

One critical characteristic of pursuing goals with a sub-goal structure is that when both an overall goal and an immediate sub-goal are present, the immediate next sub-goal functions as the primary reference and, therefore, the basis for motivation. Bandura and Schunk (1981) found that a proximal reference point leads to greater motivation and performance because it provides an immediate and achievable benchmark, whereas a distal goal is ineffective in mobilizing or directing effort. Similarly, Hull's (1932) maze-learning experiments revealed that actions become progressively weaker as one moves further away from a goal point. Therefore, when both reference points are present, people are likely to focus on the proximal rather than the more distant reference point, anchoring on the immediate sub-goal when deriving motivation for the pursuit.[1]

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[1] A pilot study in our lab confirmed that people focused on the sub-goal when this proximal reference point was present. Participants (n = 201, 127 females) reviewed 10 restaurants for a $5 voucher, and

How, then, does an elaborated sub-goal structure function as the source of motivation? Classic theories on motivation have largely focused on two primary sources of motivation—goal expectancy and goal value—and have found that both variables contribute to people's commitment to a pursuit (Atkinson, 1957; Liberman & Förster, 2008; Locke & Latham, 1990; Mischel, Cantor, & Feldman, 1996; Tolman, 1955; Vroom, 1964). Recent findings suggest that these two sources may not play equal roles throughout the pursuit and that peoples' main concerns could change from one aspect to the other depending on the stage of the pursuit they are in (Huang, Zhang, & Broniarczyk, 2012; Koo & Fishbach, 2012; Louro, Pieters, & Zeelenberg, 2007). Specifically, when people first initiate the pursuit and have only accumulated a low level of progress, their commitment to the goal depends heavily on the belief that the goal is indeed attainable; people seek confirmation of the goal's attainability before investing further effort into the pursuit (Etkin & Ratner, 2012). Once the uncertainty about the goal's attainability abates, such as when people have made significant progress on the goal and are approaching the end of the pursuit (Louro, Pieters, & Zeelenberg, 2007), people shift their focus from the goal's attainability to the reduction of the remaining discrepancy between their current position and the final goal (Koo & Fishbach, 2008; 2012). Hence, in this advanced stage of goal pursuit, the source of motivation centers on whether this final goal is worth the continued effort, that is, the value of the goal (Zhang & Huang, 2010).

The potential impact of a sub-goal structure is particularly intriguing when viewed in this context because it holds answers to both concerns, helping to address the question of whether the goal is attainable, as well as whether it is worth pursuing. Consequently, whether

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they received feedback based on either five sub-goals of two reviews each or one overall goal of 10 reviews. Both participants' visual focus (captured by a heat-map measure) and self-reported focus (captured by a continuous seven-point scale) showed a significant main effect of goal structure, ($F(1,197) = 68.02$, $p < .001$, $\eta_p^2 = .26$ and $F(1,197) = 18.57$, $p < .001$, $\eta_p^2 = .09$, respectively) such that people focused more on the next sub-goal than on the overall goal when sub-goals were present.

individuals focus on an immediate sub-goal or the overall goal should have important implications for their answers to these questions and thus their subsequent motivation.

On the one hand, sub-goals represent smaller and more manageable steps forward than the overall goal; thus focusing on these incremental steps leads to the perception that the pursuit is easier and less complex than focusing on the overall goal (Brunstein, 1993; Soman & Shi, 2003). This perception can be particularly useful when individuals remain doubtful about the goal's attainability and derive motivation primarily from the sense that they can indeed attain the goal, at which time a focus on the next sub-goal (vs. the overall goal) should lead to enhanced motivation (Heath et al., 1999; Sutton, 2010; Weick, 1984). This situation is most likely to occur when people first initiate the pursuit and have made only a low level of progress, because the substantial distance until completion casts doubts on the belief that the goal is indeed achievable (Huang et al., 2012; Louro et al., 2007). For example, for a person who has recently begun to repay a $40,000 student loan, a focus on the ultimate goal may seem far and intimidating and may thus demotivate efforts. By contrast, a set of more budget-friendly sub-goals (e.g., setting aside $400 in the next month) may seem more manageable and make the overall target seem less out of reach, increasing people's likelihood of engaging in the goal-congruent behaviors.

On the other hand, although a focus on the more manageable sub-goals strengthens the sense of attainability and enhances motivation early on, this perception ceases to be instrumental when motivation is less dependent on the belief that the goal is attainable (Garland, 1983; Liberman & Förster, 2008), such as when people have accumulated sufficient progress and stop questioning whether the goal is a feasible target. For example, when the debt-paying student in our previous example has passed the $35,000 mark, the goal of $40,000 seems within reasonable reach and the concern about attainability dwindles. In these situations, individuals' tendencies to perform further goal-directed actions shift to the

second pillar of motivation, the perceived value of their actions. That is, people base their

tendency to act on the question of "Is this really worth doing?" (Bonezzi et al., 2011; Carver

& Scheier, 1998; Fishbach, Henderson, & Koo, 2011). Sub-goals, as the proximal and

primary point of reference, shape the answer to this question.

Goal-directed actions are valueless in themselves, and only become valuable by being

instrumental to the outcome that they help to achieve (Kruglanski et al., 2002). The value of

goal-directed actions should, in turn, be evaluated in the context of the outcome they serve

(Kruglanski, 1996; Kruglanski et al., 2002). When both reference points are present, any

goal-directed action may be represented in the context either of helping to achieve the next

sub-goal or of helping to attain the overall goal. By definition, sub-goals represent only small

steps toward the attainment of an overall goal and are associated with only a subset (if any at

all) of the benefits from the overall attainment. Therefore, whereas evaluating goal-directed

actions in both contexts would afford them value, doing so in the context of the overall

attainment would make the action seem more valuable than in the context of the sub-goal,

even though the actions and their effectiveness in helping to reach the end point remain

objectively identical.

For the student in our previous example, deciding whether to skip an expensive dinner

in order to save may be evaluated in the context of contributing to the monthly $400 target or

the context of helping to achieve the debt-free status. While the $400 is well aligned with the

overall goal of being debt free, representing the action as contributing to this sub-goal seems

less valuable and worthwhile than construing it as helping one achieve the debt-free status.

Therefore, when the motivation to act depends primarily on the perceived value of goal-

directed actions (Bonezzi et al., 2011; Levin, Schneider, & Gaeth, 1998), the focus on the

overall goal—rather than sub-goals—would yield a greater perceived value of these actions

and, thus, greater likelihood to act.

Based on the above reasoning, we propose the following formal hypotheses:

H1: The impact of a sub-goal structure on motivation depends on the stage of the pursuit. The sub-goal structure (vs. an overall-goal–only structure) would lead to greater motivation in the early stages of goal pursuit but lower motivation in the advanced stages of goal pursuit.

H2: The positive impact of a sub-goal structure (vs. an overall-goal–only structure) on motivation is mediated by perceived goal attainability; this pathway dominates in the early (vs. advanced) stage of goal pursuit, because the goal's attainability is the key determinant of motivation in this stage.

H3: The negative impact of a sub-goal structure (vs. an overall-goal–only structure) on motivation is mediated by the perceived value of goal-directed actions; this pathway dominates in the advanced (vs. early) stage of goal pursuit, because the value of goal-directed actions serves as the key determinant of motivation in this stage.

Three points merit further clarification. First, we focus on situations in which the effort–performance relationship is strong: individuals know that by increasing their effort, they will increase their chance of accomplishing the goal. This is important because when the effort–performance relationship is weak or uncertain, focusing on the sub-goal may not sufficiently enhance perceived goal attainability, which would inhibit the positive effect of a sub-goal structure on effort investment in the early stage of goal pursuit.

Second, it is important to note that our theory does not predict an overall positive or negative net effect of sub-goals on motivation. Instead, what we aim to explore is the relative impact that focusing on the sub-goal (vs. the overall goal) has on individuals' momentary motivation at different points during the course of goal pursuit. By documenting the shifting impact of sub-goals across different stages as well as the psychological mechanisms

underlying these effects, we can design better goal structures to help individuals stay

motivated.

Third, while previous literature emphasizes that individuals derive motivation from

the value of the ultimate goal (e.g., Liberman & Förster, 2008; Shah, Higgins, & Friedman,

1998), our theorizing fine-tunes existing theory by suggesting that what underlies the

motivation for goal-directed actions may be more than the value of the end goal itself; rather,

the perceived value of immediate actions may play an important role. The value of present

actions and the value of the ultimate goal are often highly correlated because the latter is the

key determinant of the former. However, at times when there is a separation between

individual actions and the ultimate outcome, such as when people focus on sub-goals and

associate actions with the sub-goals rather than with the overall goal, the distinction between

these two types of value is important. In these cases, the perceived value of the actions

relative to the salient reference point, rather than the value of the ultimate goal, determines

individuals' tendency to carry out these actions and to work toward the goal. This is a critical

distinction because it emphasizes action-based value evaluation as an important determinant

of motivation.

In the next section, we report our empirical tests of the hypotheses. Study 1

demonstrated the motivational impact of sub-goals by testing our first hypothesis at two

extreme points of the pursuit—the beginning and the end—through a physical exercise in the

lab. Study 2 replicated the motivational effects in Study 1, directly assessed the underlying

psychological mechanisms at these two time points (H2 and H3), and tested them through the

path model. Study 3 captured the impact of sub-goal structure on people's motivation and the

underlying psychological mechanisms (H1, H2, and H3) in a continuous manner using

repeated measures within-subject to document the natural change in the source of motivation.

Finally, based on our empirical findings in the first three studies, we tested a theory-driven

hybrid structure that set sub-goals in the initial stage and then removed them in the advanced

stage in an eight-day field experiment.

Study 1: Stepping Routine

In Study 1, we used an exercise task in which participants repeated a set of

"stepping routines" to burn calories. The exercise task was framed either as a holistic,

continuous task of burning 200 calories (overall goal condition) or as a task composed of four

sub-sessions that each required the participant to burn 50 calories (sub-goal condition). We

assessed the participants' motivation by measuring their exercise intensity after they

accumulated either a low level of progress or a high level of progress (H1).

Method

We aimed to recruit 150 participants. A total of 134 undergraduate students (78

females, 56 males; average age = 20.78) from a public university completed the study and

constituted our final sample. The experiment used a 2 (goal structure: overall goal vs. sub-

goal) × 2 (progress level: 1/4 vs. 3/4 of the task) between-subject design.

The participants completed the study in individual experiment rooms. Each room

included one large monitor with a 30" × 30" square stepping pad in front of it. A laptop was

placed in the far corner of each room, and the participants entered their personal information

and received feedback on the computer. We also set up a camera in the back of the room to

record the experiment session and maintained the room temperature at 75 degrees Fahrenheit.

The cover story informed the participants that we were examining how the human

body functions by testing the effectiveness of a set of "stepping routines" to help burn

calories. The participants were informed that their goal for the session would be to burn 200

calories, and we emphasized that it was important that they reach this number because only

complete data would allow us to fully test the effectiveness of the exercise routine. Before

commencing the task, the participants were asked to measure their pulse rate and record this

information on the laptop along with other basic information such as gender, weight, age, and exercise frequency.

In the overall goal condition, the participants were informed that there would be one exercise session in which they would need to burn 200 calories. By contrast, the participants in the sub-goal condition were informed that the exercise session consisted of four sub-sessions (Stages 1–4) and that each set of 50 calories burned would complete one sub-session, resulting in a total of 200 calories.

The participants then commenced the exercise session and followed the simple sequences shown in the instructive video on the screen to move their feet to different squares on the stepping pad. They were instructed to closely follow the rhythm of stepping in the video to ensure that they did not miss a step. We allowed the participants to exercise for either five minutes to accumulate a low (1/4) level of progress or 15 minutes to accumulate a high (3/4) level of progress; the difference in the amount of time they were allotted to exercise led to different levels of accumulated progress, mimicking real-life goal pursuit situations. In addition, by fixing the frequency (i.e., rhythm) and the duration of exercising within each progress level, we ensured that the participants invested roughly the same amount of effort in the sub-goal and overall goal conditions (thereby holding the progress level constant).

After the participants exercised for either 5 or 15 minutes, the video paused, and they were asked to measure their pulse rate and report it on the laptop. After entering this figure, the participants were told to wait while the computer processed the information. Following a "Calculating …" page, the laptop provided the participants with feedback. In the sub-goal condition, feedback was given on four horizontal progress bars that were arranged parallel to one another and labeled Stages 1 through 4. By contrast, in the overall goal condition, the feedback was given on a single long horizontal progress bar. The participants

in the 1/4 progress condition observed either that they had burned 50 calories and completed

Stage 1 (sub-goal condition) or that they had burned 50 calories toward the 200 calories

needed on the single progress bar (overall goal condition). In the 3/4 progress condition, the

feedback indicated that they had burned 50 calories for Stage 1, 50 calories for Stage 2, and

50 calories for Stage 3, thereby completing three sub-goals (sub-goal condition), or that they

had burned 150 of the 200 calories needed to complete the entire goal on the long progress

bar (overall goal condition).

      After receiving the feedback, all participants were informed that they should resume

exercising. The instructions informed them that they would need to perform a slightly

different stepping routine for the remainder of the session. The monitor demonstrated a set of

simple stepping patterns and asked the participants to learn these steps and repeat them.

There was no fixed rhythm to follow, and the participants were informed that they should

repeat the patterns as quickly as possible to burn more calories. The participants began

exercising and were stopped by an on-screen instruction after five minutes. We measured the

intensity of stepping (i.e., the total number of steps during the five-minute period) as the

proxy for their motivation to burn more calories after receiving progress feedback. After the

exercise session, the participants measured and recorded their pulse rate one more time before

exiting the room for a full debriefing at the checkout desk.

Results and Discussion

      Our main interest was participants' motivation to burn more calories after receiving

feedback. We captured this variable by measuring their total number of steps during the five-

minute period. An ANOVA of this measure yielded a main effect of progress level ($F(1, 130)$

$= 7.43, p < .01, \eta_p^2 = .05$) and, more importantly, a goal structure $\times$ progress level interaction

($F(1, 130) = 14.80, p < .01, \eta_p^2 = .10$). Further contrast analyses showed that when the

participants had completed 1/4 of the task, those who pursued sub-goals repeated the stepping

routine faster (M = 221.24 steps, SD = 28.34) than those who pursued the overall goal (M =

200.38 steps, SD = 31.08; t(66) = 2.89, *p* < .01). However, when the participants had

achieved 3/4 of the task, we observed the opposite pattern, i.e., those who pursued an overall

goal repeated the stepping routine faster (M = 233.03, SD = 28.17) than those who pursued

sub-goals (M = 215.67, SD = 27.20; t(64) = 2.55, *p* < .05; see Figure 1). Table 1 provides a

summary of the results of all of the studies.

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Insert figure 1 about here

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This study provided initial evidence for our first hypothesis, that while a sub-goal

structure leads to greater motivation in the early stages of goal pursuit, a focus on the overall

goal can be more motivating in the advanced stages. We hypothesize that this change in the

motivational impact of sub-goals occurs because of the shift of the source of motivation

during the course of goal pursuit—from the goal's attainability (H2) to the value of goal-

directed actions (H3). We directly measured these underlying psychological mechanisms and

submitted the key variables to moderated mediation analyses in the next study.

Study 2: The Psychological Mechanisms

Participants in this experiment accumulated reward points by sharing their dining

experiences and completed the task in the context of a scoring system that involved either a

sub-goal structure or an overall goal structure. We asked participants to report their perceived

goal attainability and the perceived value of the next goal-directed action when they

completed either 30% or 70% of the task and captured their motivation at that time by

recording the number of words they shared to earn more points in the program.

Method

We aimed to recruit 150 participants. A total of 158 undergraduate students (84

females, 74 males; average age = 20.20) completed the study and constituted our final sample

(the last group of participants showed up at the same time, so we allowed all of them to participate). The experiment used a 2 (goal structure: overall goal vs. sub-goal) × 2 (progress level: 30% vs. 70%) between-subject design.

The cover story informed participants that this study was conducted in collaboration with a social media website and that the researchers were interested in understanding how individuals share their dining experiences with others through online review services. All participants were informed that their task was to log in to a soon-to-be-launched website and share their dining experiences at different restaurants, as they would do on sites such as Yelp or Google. Similar to many real-world practices (e.g., earning reward points by writing product reviews), we offered participants rewards for sharing their opinions and incentivized them with a $10 restaurant voucher if they earned 100 points by the end of the task.

In the overall goal condition, the participants were informed that there would be one session in which they would need to earn 100 points. By contrast, the participants in the sub-goal condition were informed that the task consisted of five sections (1–5) and that they needed to earn 20 points in each section by sharing dining experiences, totaling 100 points.

Depending on the condition, the feedback page appeared after the participants earned either 30 points (30% progress) or 70 points (70% progress). In the 30% progress condition, the feedback was displayed as 30 of 100 points for the overall goal condition or as 20 points in Section 1 and 10 points in Section 2 for the sub-goal condition. In the 70% progress condition, the feedback was displayed as 70 of 100 for the overall goal condition or as 20 points in Sections 1, 2, and 3 and 10 points in Section 4 for the sub-goal condition.

After providing progress feedback, we informed the participants that we would like to ask about their experiences with the website before they continued the task. Among the filler questions—such as questions about food preferences—we asked participants to report their perceived goal attainability ("How likely do you think you are to complete the entire task for

the voucher?" [1 = Very unlikely, 9 = Very likely]) and their perceived value of the next

goal-directed action ("How much value do you see in sharing the next piece of dining

experience?" [1 = No value at all, 9 = Extremely high value]).

After the participants answered these questions, they resumed the main task. We

informed all participants that they could earn more points by sharing extensive information

regarding a dining experience; the more detailed the information they shared, the more points

they would earn. We measured how many words the participants typed to describe their

dining experience as the indicator of motivation. All participants were debriefed after they

completed the task and were entered into a lottery.

Results and Discussion

Motivation. We first performed an ANOVA on the number of words that participants

wrote to describe their dining experience after receiving the progress feedback. The analysis

yielded the hypothesized goal structure × progress level interaction ($F(1, 154) = 11.39$, $p <$

$.01$, $\eta_p^2 = .07$); there were no main effects. When the participants completed only 30% of the

task, those who pursued a series of sub-goals wrote more words ($M = 207.24$ words, SD =

101.65) than those who pursued an overall goal ($M = 156.73$ words, SD = 63.56; $t(77) = -$

2.61, $p = .01$). However, we observed the opposite pattern after the participants completed

70% of the task. Specifically, those who pursued an overall goal wrote more words ($M =$

225.38 words, SD = 125.38) than those who pursued sub-goals ($M = 175.88$ words, SD =

65.39; $t(77) = 2.19$, $p < .05$; see Figure 2).[2]

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[2] We also analyzed actual effort expenditure (i.e., the number of words participants typed) prior to
receiving progress feedback to ensure that there was no significant difference in their internal effort
perception. The analysis revealed only a main effect of progress level ($F(1,154) = 183.47$, $p < .001$,
$\eta_p^2 = .54$). Neither the main effect of goal structure ($F(1,154) = 0.36$, $p = .55$, $\eta_p^2 = .002$), nor goal
structure × progress level interaction was significant ($F(1,154) = 0.33$, $p = .57$, $\eta_p^2 = .002$).
Participants in the sub-goal condition did not invest greater effort than those in the overall goal
condition before receiving the 30% progress feedback ($M_{subgoal} = 328.17$, SD = 137.21 vs. $M_{overall\ goal} =$
329.43, SD = 119.23; $t(77) = 0.04$, ns), or before they received the 70% progress feedback ($M_{subgoal} =$
957.48, SD = 343.35 vs. $M_{overall\ goal} = 1014.77$, SD = 470.57; $t(77) = 0.62$, ns).

Insert figure 2 about here

Goal attainability and value of actions. We performed the same ANOVAs on the two proposed mechanisms. The ANOVA on the perceived goal attainability yielded a main effect of progress level (F(1,154) = 4.62, $p < .05$, $\eta_p^2 = .03$), a main effect of goal structure (F(1, 154) = 4.40, $p < .05$, $\eta_p^2 = .03$), and a goal structure × progress level interaction (F(1, 154) = 5.64, $p < .05$, $\eta_p^2 = .04$). Subsequent contrast analyses revealed that when the participants had only completed 30% of the task, those who pursued a series of sub-goals believed that they were more likely to attain the goal (M = 5.26, SD = 2.69) than those pursuing an overall goal (M = 3.54, SD = 2.22; t(77) = −3.08, $p < .01$). However, after the participants had completed 70% of the task, there was no significant difference in perceived goal attainability between those pursuing sub-goals (M = 5.18, SD = 2.53) and those pursuing an overall goal (M = 5.28, SD = 2.15; t(77) = .20, ns).

The ANOVA on the perceived value of goal-directed actions yielded a main effect of progress level (F(1,154) = 9.49, $p < .01$, $\eta_p^2 = .06$), a main effect of goal structure (F(1, 154) = 12.04, $p < .01$, $\eta_p^2 = .07$), and a goal structure × progress level interaction (F(1, 154) = 3.96, $p < .05$, $\eta_p^2 = .03$). Further contrast analyses revealed that there was no difference in the perceived value of actions between participants pursuing sub-goals and those pursuing an overall goal when the participants had only completed 30% of the task and the end point was still far ($M_{sub\text{-}goal} = 4.43$, SD = 1.67 vs. $M_{overall\ goal} = 4.86$, SD = 1.80; t(77) = 1.12, ns). However, after the participants had completed 70% of the task, those pursuing an overall goal perceived their actions to be more valuable (M = 6.36, SD = 1.98) than those pursuing a series of sub-goals (M = 4.75, SD = 1.95; t(77) = 3.64, $p < .01$).

From goal attainability and value of actions to motivation. To test the proposed underlying mechanisms of perceived goal attainablity and perceived value of goal-directed actions, we conducted a bias-corrected moderated mediation analysis with both variables

entered as simultaneous mediators (model 14, bootstrapping sample size = 5,000; Hayes,

2013; Preacher & Hayes, 2008). In this moderated mediation model, goal structure predicted

the perceived goal attainablity and the value of goal-directed action, and progress level

moderated the effects of these two proposed mechanisms on motivation.

The results supported our predictions (see Figure 3). A sub-goal structure enhanced

the perceived goal attainability ($\beta = 0.79$, $t(158) = 1.99$, $p < .05$); a sub-goal structure also

reduced the perceived value of the next goal-directed action ($\beta = -1.05$, $t(158) = -3.40$, $p <$

.001). However, which of these two mechanisms served as the dominant predictor of

participants' motivation depended on their progress level, as shown by two significant

mechanism × progress level interactions (perceived attainability × progress level interaction:

$\beta = -18.83$, $t(158) = -4.05$, $p < .001$; perceived value of the next action × progress level

interaction: $\beta = 25.20$, $t(158) = 4.20$, $p < .001$). The conditional indirect effects showed that

goal attainability was the dominant predictor of motivation in the early stage (early stage: $b =$

17.03, 95% CI [1.34 to 35.35]; advanced stage: $b = 2.24$, 95% CI [-0.90 to 10.73]), whereas

the perceived value of the next goal-directed action served as the dominant predictor of

motivation in the advanced stage of goal pursuit (advanced stage: $b = -35.82$, 95% CI [-62.74

to -14.37]; early stage: $b = -9.45$, 95% CI [-26.96 to -1.13]). As people accumulated greater

progress in their pursuits, the driving force of their motivation shifted from goal attainabiltiy

to the value of their actions, and this change in the source of motivation hence determined the

impact (positive or negative) of sub-goal structure on their subsequent effort.

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Insert figure 3 about here
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Study 2 replicated the findings in Study 1 that the impact of sub-goals on motivation

indeed depended on the stage of the pursuit. In addition, this study provided direct evidence

for the underlying mechanisms (H2 and H3). A focus on the next sub-goal (vs. the overall

goal) led to the perception of greater goal attainability, which led to greater motivation early in the pursuit when the goal's attainability served as the source of motivation. Conversely, a focus on the overall goal (vs. the next sub-goal) led to a higher perceived value of these goal-directed actions, resulting in greater motivation when people were approaching the end and were motivated by the sense that the next action that they performed toward the goal was valuable and meaningful.

In the first two studies, we examined the dynamic impact of goal structure on motivation at two time points of goal pursuit in a between-subject manner (1/4 vs. 3/4 or 30% vs. 70% of the task). This between-subject paradigm helped to ensure that within each progress level, the participants in the sub-goal and overall goal conditions experienced the same amount of progress as well as similar senses of accomplishment and depletion (participants in both the sub-goal and overall goal conditions were placed directly at 1/4, 3/4, 30%, or 70% of the task). Although this approach ensured the integrity of our experimental manipulations, we were curious whether the same pattern would emerge for a natural, continuous goal pursuit process. Therefore, we conducted the next study to test our three hypotheses in continuous goal pursuit and used repeated measures to capture the trend of individuals' motivation (H1) and the underlying psychological mechanisms (H2 and H3).

In addition, the next study extended previous studies in two important ways. First, we extended our test beyond physical goal pursuit and work for reward and moved to a more typical situation in organizations: work-for-pay. Second, we expanded the goal type under exploration from promotion-type goals (i.e., reaching the goal to earn the pay) to prevention-type goals (i.e., losing the pay if one fails to reach the goal; adopted from Brockner & Higgins, 2001; Higgins, 1997). This test further enhances the generalizability of our theory: Both types of goals are widely used in organizations to motivate employees, and,

theoretically, prevention and promotion goals constitute the two major self-regulatory

systems that shape human motivation (Brockner & Higgins, 2001; Higgins, 1997).

Study 3: Work-for-Pay

Participants in Study 3 completed a transcription job for cash payment. We either

presented the job as a holistic, continuous task totaling 100 points (overall goal condition) or

divided the job into five 20-point consecutive sub-tasks (sub-goal condition). We measured

participants' perceived goal attainability and perceived value of the next goal-directed action

at different time points in the pursuit and assessed their subsequent motivation.

Method

We aimed to recruit 150 participants. A total of 156 undergraduate students (87

females, 69 males; average age = 20.49) completed the study and all were included in the

final sample. The experiment used a 2 (goal structure: overall goal vs. sub-goal) × 2 (progress

level: 30% vs. 70%) mixed design; goal structure was manipulated between subjects, and

progress level was a within-subject variable.

The cover story told participants that they were hired to perform a transcription task in

which they needed to type, word for word, paragraphs of text in a foreign language from

JPEG files to a word processing program on a computer. The number of words for each piece

of transcription ranged from 50 to 100. Participants were told that 1) there was no time limit

for the task, 2) they would receive points based on the volume and precision of the

transcribed texts, and 3) the exact number of points awarded would be determined by a

computer program. To frame the job as a prevention goal, we prepaid all participants $5 prior

to the task and told them that they would need to meet the total number of points in the

transcription task in order to keep the payment (Brockner & Higgins, 2001; Higgins, 1997).

We structured the points in two different ways. In the overall goal condition,

participants were told that they needed to collect 100 points for the task, and we presented a

single progress bar at the top of the page. By contrast, participants in the sub-goal condition were informed that the job consisted of five consecutive sections (1–5) and that they needed to earn 20 points in each section (100 points in total). For this condition, five horizontal bars running parallel to each other were shown on the screen. All participants were told that they would not receive partial payment for an incomplete task.

Participants then began the transcription task. Importantly, there was no real-time feedback on the goal; rather, participants were prompted to submit their answers and check for progress twice during the task. The first prompt appeared approximately 10 minutes into the task, and the computer displayed a "checking and calculating" page. Feedback then appeared on the screen and informed participants that they had accumulated 31 points. Participants were also presented with an updated progress bar(s). For those in the overall goal condition, 31 points were shown on the single progress bar, and approximately 1/3 of the bar changed color to indicate the progress. For those in the sub-goal condition, the 31 points were represented by covering the entirety of the first small bar and approximately half of the second bar. The second prompt for participants' progress checking appeared another 20 minutes into the task. Following the same calculating page, participants learned that they had earned 73 points. Similar to the previous round, those in the overall goal condition saw approximately 3/4 of the single progress bar change in color to indicate their progress, whereas those in the sub-goal condition saw three bars and 3/4 of the fourth short progress bar change in color.

After participants viewed their progress via each of the two prompts, they were asked to answer a few questions about their experiences before they could continue. Among these questions, we assessed participants' perceived goal attainability and perceived value of their actions. Further expanding the measures in Study 2, we probed participants' perceived attainability through three questions: "How likely do you think you are to complete the entire

task to keep the pay? (1 = Very unlikely, 9 = Very likely)"; "How difficult do you think it is

for you to complete the entire task to keep the pay? (1 = Not difficult at all, 9 = Very

difficult)"; and "How attainable of a goal do you think it is for you to complete the entire task

to keep the pay? (1 = Not attainable at all, 9 = Very attainable)". Similarly, we measured their

perceived value of the next goal-directed action through three additional questions: "How

much value do you see in transcribing the next piece to earn more points? (1= No value at all,

9 = Extremely high value)"; "How important is it for you to transcribe the next piece to earn

more points? (1= Not important at all, 9 = Extremely important)"; and "How crucial is it for

you to transcribe the next piece to earn more points? (1= Not crucial at all, 9 = Extremely

crucial)". In each of the surveys, these six questions were embedded in 12 other filler

questions (e.g., "How often do you take part-time jobs?"; "What percentage of people around

you work part-time?"; and "What are the most enjoyable tasks that you worked on?"). And

other than these six core questions, all filler questions were different in the two instances in

order to minimize suspicion.

      In both instances, participants resumed the task after completing the survey and were

immediately presented with a bonus piece to earn more points for this job. We told

participants that this round was an extra opportunity for them to earn additional points toward

the same goal and that the points they would earn in this round would be based on the volume

of accurate transcription. They were also told that they could work on this piece to earn

points for as long as they wanted and could click "Continue" at any time to exit. This design

allowed us to obtain a clean measure of their motivation by calculating how many words

participants accurately transcribed before they decided to return to the main task.

Furthermore, by measuring motivation after providing participants feedback in both early and

advanced stages of the task, we were able to assess how the motivational impact of an overall

goal structure versus a sub-goal structure changed over time. All participants were debriefed

after they completed the job and kept their compensation.

Results and Discussion

Motivation. We performed a repeated-measures ANOVA on the number of words

that participants accurately transcribed after receiving the progress feedback. The analysis

yielded a main effect of progress level ($F(1, 154) = 4.97$, $p < .05$, $\eta_p^2 = .03$) and a goal

structure × progress level interaction ($F(1, 154) = 24.47$, $p < .001$, $\eta_p^2 = .14$). After

participants had completed 30% of the job, those who pursued a series of sub-goals

transcribed more words ($M = 558.53$ words, $SD = 413.45$) than those who pursued an overall

goal ($M = 375.12$ words, $SD = 434.28$; $t(154) = -2.70$, $p < .01$). However, we observed the

opposite pattern after the participants had completed approximately 70% of the job: those

who pursued an overall goal transcribed more words ($M = 645.20$ words, $SD = 480.51$) than

those who pursued sub-goals ($M = 456.23$ words, $SD = 327.23$; $t(154) = 2.88$, $p < .01$).

Separate repeated-measures ANOVAs within the overall goal and sub-goal conditions

replicated the findings of first two studies. When the participants focused on the overall goal,

their motivation was low early in the pursuit but increased significantly as they approached

the end of the task ($F(1, 75) = 23.65$, $p < .001$, $\eta_p^2 = .24$). By contrast, when participants

focused on the sub-goals, although they were highly motivated at the beginning of the task,

they showed lower motivation as they approached the end, even though they had exactly the

same amount of points as those in the overall goal condition ($F(1, 79) = 4.03$, $p < .05$, $\eta_p^2 =$

.05; see Figure 4).[34] This replicated the findings in the first two studies and provided

additional support for our first hypothesis in a work-for-pay, prevention-goal context using a

within-subject design.

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Insert figure 4 about here

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Goal attainability and value of actions. The three items used for each proposed

mechanism showed high reliability (Cronbach's α for perceived attainability = .81;

Cronbach's α for perceived value of action = .89); thus we averaged each set of three items to

form two composite indexes. A repeated-measures ANOVA on perceived goal attainability

yielded a main effect of progress level (F(1,154) = 31.85, $p < .01$, $\eta_p^2 = .17$), a main effect of

goal structure (F(1, 154) = 6.65, $p = .01$, $\eta_p^2 = .04$), and a goal structure × progress level

interaction (F(1, 154) = 9.88, $p < .01$, $\eta_p^2 = .06$). Similar to Study 2, when participants had

completed only 30% of the task, those in the sub-goal condition believed that they were more

likely to attain the goal (M = 5.32, SD = 2.48) than those in the overall goal condition (M =

3.88, SD = 2.58; t(154) = –3.54, $p = .01$). However, when participants had completed

approximately 70% of the job, there was no significant difference in perceived goal

attainability between those in the sub-goal condition (M = 5.91, SD = 1.89) and those in the

overall goal condition (M = 5.96, SD = 1.88; t(154) = .17, ns).

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[3] We also analyzed the number of words participants had transcribed in total (i.e., their total
effort/performance). We found that the total effort/performance did not differ between the sub-goal
(M = 955.71, SD = 1239.64) and overall goal conditions (M = 1216.91, SD = 1410.90; F(1,154) =
1.51, $p = .22$, $\eta_p^2 = .10$), indicating that although sub-goals (vs. overall goal) had momentary positive
or negative impact on motivation, they did not necessarily lead to a net positive or negative impact on
overall performance.

[4] We also analyzed the number of words participants had transcribed before receiving progress
feedback to ensure that there was no significant difference in their internal effort perception. We
found that the actual effort expenditure prior to receiving progress feedback did not differ between the
sub-goal (M = 188.10, SD = 21.51) and overall goal conditions (M = 188.68, SD = 14.90; F(1,154) =
0.04, $p = .85$, $\eta_p^2 = .00$). Participants in the sub-goal condition did not invest greater effort than those
in the overall goal condition prior to receiving progress feedback.

A repeated-measures ANOVA on the perceived value of action yielded a main effect of goal structure ($F(1, 154) = 6.12$, $p = .01$, $\eta_p^2 = .04$) and a goal structure × progress level interaction ($F(1, 154) = 4.39$, $p < .05$, $\eta_p^2 = .03$). Similar to Study 2, there was no difference in the perceived value of actions when participants had only completed 30% of the task and job completion was still far away ($M_{sub\text{-}goal} = 5.05$, $SD = 2.21$ vs. $M_{overall\ goal} = 5.32$, $SD = 2.47$; $t(154) = 0.71$, ns). However, after the participants had completed 70% of the job, those pursuing an overall goal perceived their actions to be more valuable ($M = 6.11$, $SD = 1.94$) than those pursuing a series of sub-goals ($M = 4.98$, $SD = 2.07$; $t(154) = 3.52$, $p = .001$).

From goal attainability and value of actions to motivation. To test the underlying mechanisms of perceived goal attainablity and perceived value of goal-directed actions, we conducted bias-corrected mediation analyses with both factors entered as simultaneous mediators (model 4, bootstrapping sample size = 5,000; Hayes, 2013; Preacher & Hayes, 2008). Unlike in Study 2, both the two mediators and the participants' motivation were measured twice (i.e., repeated measures). We thus conducted two separate mediation analyses within each progress level (instead of entering progress level as a between-subject moderator). We found that when the participants had completed only 30% of the job, the influence of the structure of the goal (overall goal vs. sub-goal) on motivation was fully mediated by perceived goal attainability (indirect effect: $\beta = 141.32$ [95% CI = 67.64 to 238.43]), whereas the indirect effect through the perceived value of actions was nonsignificant in this early stage (indirect effect: $\beta = -5.30$ [95% CI = −31.21 to 6.44]). When participants had reached 70% progress, the perceived value of actions became a significant mediator (indirect effect: $\beta = -127.64$ [95% CI = −218.73 to −55.86]), such that focusing on the sub-goal undermined the perceived value of the next goal-directed action, leading to lower motivation. The indirect effect through perceived goal attainability was nonsignificant in this late stage (indirect effect: $\beta = -2.23$ [95% CI = −35.37 to 22.44]).

The first three studies provided empirical evidence that supported our hypotheses in a variety of contexts (e.g., exercising, work-for-pay), with both promotion and prevention goals, and through between- and within-subject designs. Based on these findings and our theorizing, the most productive goal structure for companies and employers to adopt would be a hybrid one that sets sub-goals in the initial stage and then removes them in the advanced stage. We tested the effectiveness of this hybrid goal structure in our final study in order to gauge the external validity of our conceptual model as well as to provide a theory-driven solution for organizations and managers. We tested this idea in an eight-day work-for-pay field experiment.

In addition, an alternative explanation to our theory is that the participants provided with a sub-goal structure might be better calibrated because they can distribute their effort based on the milestones provided by sub-goals. Testing the hybrid goal structure would help to rule out this possibility because, based on our theorizing, the proposed hybrid structure should lead to the highest level of accumulated effort and performance by leveraging the shifting driving forces in early and advanced stages throughout the course of goal pursuit.

Study 4: Sub-Goal First and Overall Goal Later

In Study 4, we collaborated with a crowdsourcing company and launched an eight-day field experiment. Registered workers of the company completed a market intelligence collection job for pay via the company's mobile app. They were encouraged to either set a series of sub-goals (sub-goal condition) or focus on the overall goal (overall goal condition). We also included a "sub-goal first and overall goal later" hybrid condition, which presented the sub-goals during the first four days of the job but changed the goal structure to the overall goal for the latter four days. We provided progress feedback each day at approximately noon and recorded participants' performance at the end of each day.

Method

The study used a goal structure (overall goal vs. sub-goal vs. sub-goal first and overall goal later) × progress level mixed design. The goal structure was manipulated as a between-subject factor, and the progress level was a within-subject factor. We announced a job in collaboration with an online crowdsourcing company to hire workers to collect up-to-date information for books (e.g., shelf location, discounted price) at different bookstores. We aimed to recruit 200 to 250 workers. A total of 207 workers (139 males, 68 females; average age = 30.60) signed up. Prior to this experiment, these registered workers had completed, on average, 32.09 work-for-pay tasks for this online crowdsourcing company since their registration as part-time workers; the work history of the three groups did not differ ($F(2, 204) = 1.22$, ns).

The job required workers to collect up-to-date market information during an eight-day period. The workers needed to collect sales information on books at different bookstores across town by taking pictures and uploading them via the crowdsourcing company's mobile app. They would receive "work points" for each book they uploaded; the more books they uploaded, the more points they would earn. If the workers accumulated a total of 80 work points by the end of the eight-day period, they would be paid RMB 60 (approximately $10).

We sent daily reminders and feedback to workers through their smartphones at 12:00 p.m. each day during the course of the experiment. In the overall goal condition, the reminders emphasized that the workers needed to earn a total of 80 work points by the end of the task to receive the compensation. We illustrated the goal with a long progress bar anchored by 80 points on the right end. In the sub-goal condition, the reminders encouraged the workers to divide the 80 points into eight smaller sub-goals of earning 10 points each day. To strengthen this manipulation, we illustrated eight short progress bars, each anchored by 10 points on the right end. We also included a hybrid condition in which we presented sub-goals during the first four days but presented the overall goal during the latter four days. The

workers in this condition viewed their current number of points relative to their current sub-

goal ("4/10 points today") from days 1 to 4 but received feedback relative to their overall

goal ("44/80 points in total") from days 5 to 8. It is worth noting that while there was another

possible (reversed) hybrid condition that would present the overall goal during the first four

days and the sub-goals during the latter four days, we did not include this condition in the

field experiment because based on our theory, this reversed hybrid condition would only lead

to worse performance, and the director and managers at the collaborating company were

interested in maximizing the positive effect of goal structure rather than reducing it.

This company's regular practice was to award one work point for each book upload.

To control for progress across three conditions and to ensure the credibility of our feedback

to participants, we told them that for this job, the points would be allocated based on the

number of books uploaded as well as the the quality of the information (e.g., preciseness,

informativeness, and uniqueness). We intentionally kept the quality standard vague such that

we could credibly and directly manipulate progress feedback. We sent out a progress report at

12:00 p.m. each day, and reported to each worker that he or she had progressed as follows: 4

points on day 1 (mid-day), 16 points on day 2, 23 points on day 3, 37 points on day 4, 44

points on day 5, 56 points on day 6, 63 points on day 7, and 77 points on day 8. The variation

of the points ensured steady progress toward the end point and the credibility of the feedback.

While the point feedback was manipulated and controlled, the platform recorded the actual

number of books the participants uploaded each day; the more motivated they were to

achieve the goal, the more books they would upload. This number served as our measure of

workers' motivation and performance. All workers who uploaded 80 books were

compensated RMB 60 wage; those who uploaded fewer than 80 books were compensated in

proportion to their task completion level.

Results and Discussion

Total performance. We first analyzed total performance (total number of books uploaded) across the three conditions. At the end of the eight-day period, the workers in the overall goal condition (n = 68) uploaded 1,268 books in total, while those in the sub-goal condition (n = 69) uploaded 1,392 books. The workers in the hybrid condition (sub-goal early and overall goal later, n = 70) uploaded 1,906 books, generating the highest collective total performance among the three goal structures. A Poisson regression of the total number of books uploaded revealed a main effect of goal structure (Wald χ^2 (2) = 130.51, $p < .001$), indicating that the workers in the hybrid condition uploaded more books at the end of eight days (M = 27.27, SD = 32.03) than those in the overall goal condition (M = 18.65, SD = 18.41; $\beta = -0.38$, Wald χ^2 (1) = 109.13, $p < .001$) and those in the sub-goal condition (M = 20.19, SD = 19.67; $\beta = -.30$, Wald χ^2 (1) = 72.34, $p < .001$). The people in the sub-goal condition also performed slightly better than those in the overall goal condition ($\beta = -.079$, Wald χ^2 (1) = 4.11, $p = .043$), although we did not observe this net positive effect in our prior within-subject study (Study 3) or the goal achievement dependent measure below.

Another measure of total performance is whether the participants actually reached the goal based on the company's regular practice—that is, whether they uploaded at least 80 books by the end of the job. A total of 90 workers uploaded 80 books or more, yielding a goal achievement rate of 43.5%. There was a significant difference between the three groups (χ^2 (2, N = 207) = 8.43, $p < .05$). The goal achievement rate was higher for the hybrid condition (57.1%) compared to the sub-goal condition (39.1%; χ^2 (1, N = 139) = 4.52, $p < .05$) and the overall goal condition (33.8%; χ^2 (1, N = 138) = 7.56, $p < .01$). The latter two groups did not differ in their goal achievement rate (χ^2 (1, N = 137) = .42, ns).

Motivation across eight days. Similar to Study 3, we conducted a repeated-measures ANOVA on the number of books the workers uploaded each day, with goal structure as the between-subject predictor and progress level as the within-subject factor. The analysis

yielded a main effect of progress level ($F(7, 1428) = 9.29$, $p < .001$, $\eta_p^2 = .044$), qualified by

the predicted goal structure × progress level interaction ($F(14, 1428) = 2.96$, $p < .001$, $\eta_p^2 =$

.028). Follow-up separate repeated-measures ANOVAs for each condition revealed that when

the workers focused on the overall goal of earning 80 work points, their motivation fit a

significant quadratic function ($F(1, 67) = 20.54$, $p < .001$, $\eta_p^2 = .24$). Although they began the

task as motivated as the workers in the sub-goal condition, their motivation quickly decreased

after the first day, remained low during days 2 to 5, and increased on day 6. In comparison,

when the goal was structured as a set of sub-goals, the workers' motivation fit a significant

negative linear function ($F(1, 68) = 24.96$, $p < .001$, $\eta_p^2 = .27$). They began the work highly

motivated and then gradually reduced their effort as they inched forward in the task. The

motivation of workers in the hybrid condition also fit a quadratic function ($F(1, 69) = 10.73$,

$p < .01$, $\eta_p^2 = .14$). During days 1 to 4, these workers' motivation was higher than that of

those in the overall goal condition and was comparable to that of those in the sub-goal

condition. Importantly, these participants remained highly motivated during the latter half of

the task (days 5 to 8), which explained the higher total performance and goal achievement

rate in this condition (see Figure 5a). The pattern remained the same when we analyzed only

those who actually uploaded 80 books and completed the job according to the company's

regular practice (goal structure × progress level interaction, $F(14, 609) = 2.66$, $p = .001$, $\eta_p^2 =$

.058; see Figure 5b).

Insert Figures 5a and 5b about here

The results of Study 4 provide further evidence that although having sub-goals indeed

motivates greater effort at the beginning of the task, a focus on the overall goal elicits the

optimal amount of effort once people approach the end of the pursuit. Interestingly, the total

effort across the entire period differed slightly between the subgoal and overall goal

conditions, but not on participants' goal achievement rate nor the total effort/performance measure in Study 3 that also employed a within-subject design.

The most notable finding in this study was that while the total performance may not reliably differ between the sub-goal and overall goal conditions, the workers in these two conditions performed worse than those who had a hybrid structure of sub-goal first and overall goal later. This finding provides a valuable solution for organizations and companies that plan to use a sub-goal structure to motivate their employees.

General Discussion

Sub-goals, defined as the pre-established smaller steps toward an overarching goal (Borrelli & Mermelstein, 1994; Lewin, 1936), bring both benefits and costs to individuals' goal pursuit. Four studies that employed different contexts and different structures/completion ratios of sub-goals in the lab and in the field provided supportive evidence for our framework. In an exercise context, Study 1 showed that the impact of sub-goals on motivation shifted depending on which stage people were in during goal pursuit. Study 2 replicated this effect and directly tested the underlying mechanisms in a restaurant review task; we found that a sub-goal structure (vs. an overall-goal–only structure) increased motivation when progress was low because it enhanced perceived goal attainability, which was the source of motivation at this stage. By contrast, a focus on the overall goal led to a higher perceived value of goal-directed actions and thus greater motivation when people had accumulated a high level of progress and the value of actions became their source of motivation. Study 3 further tested the motivational impact of sub-goals and their underlying psychological mechanisms with a wider set of measures in a continuous work-for-pay task; in addition, it showed that the same motivational pattern could manifest for prevention-focused goals. Finally, through an eight-day field experiment in collaboration with a croudsourcing company, Study 4 showed that a hybrid structure of "sub-goal early and overall goal later"

elicited the greatest amount of total effort and sustained a high level of motivation throughout the job.

Theoretical Implications

The present findings provide important insight into our understanding of the variations in motivation as a person advances through a course of goal pursuit. The traditional goal gradient effect proposes a general upward trend in motivation (Anderson, 1933; Hull, 1932). The current findings add a new layer of understanding and suggest that this effect should be evident only when people view the entire goal pursuit as a holistic process, in which case accumulated progress breeds increased motivation by making the goal-directed actions appear more valuable. By contrast, the presence of sub-goals may alter this robust effect (e.g., Studies 3 and 4), especially when people near the end of the pursuit.

A second key theoretical contribution of our findings is that we fine-tuned existing theories that suggest that people are motivated by the value of and, thus, their commitment to the ultimate goal (e.g., Liberman & Förster, 2008; Shah et al., 1998). Our findings support the overall notion that greater goal value motivates more goal-directed actions. In addition, our results aid in a more precise understanding that individuals' perceived value of their present actions—rather than the value of the overall goal—may have a more direct influence on motivation. Therefore, it is possible that individuals experience different levels of motivation even when both the action and the end goal remain unchanged.

This separation between action value and the value of the overall goal echoes Higgins' (2006) work on value and engagement. This line of research suggests that value is not solely an experience of pleasure or pain. Value involves an experience of the intensity of a motivational force, which could come from sources that are independent of the value of the final goal, such as regulatory fit and the use of proper means in the pursuit (Higgins 2000; 2006). Our findings suggest that when sub-goals are the focus, people assess the value of

their goal-directed action based on the intermediate structure. Depending on how a sub-goal relates to the overall goal, the same action might be experienced differently, adding to the notion that there is value in *how* goals are pursued independent of the value of the ultimate outcome.

Finally, we obtained evidence for the shift of individuals' source of motivation, adding a temporal dimension to the classic expectancy-value models (Atkinson, 1957; Liberman & Förster, 2008; Locke & Latham, 1990; Mischel, Cantor, & Feldman, 1996; Tolman, 1955; Vroom, 1964). We found that when progress is low, people's source of motivation lies in the perceived attainability of the goal; when the progress level increases and the end point is within reasonable proximity, the source of motivation shifts to the value people attach to their actions (e.g., Studies 2 and 3). As a result, the impact of a sub-goal structure depends on the dominant source of motivation at a specific point of the pursuit. As shown in Study 4, a hybrid structure that highlighted sub-goals early on and then removed the sub-goal when employees reached the advanced stage of the task could help to leverage the driving forces in both stages and maximize their total effort and performance.

Implications for Organizations and Managers

Although it is not surprising that sub-goals could facilitate goal pursuit, and many organizations specifically set sub-goals for their employees (e.g., daily performance goals, weekly sales goals, monthly fund-raising goals), our key contribution lies in demonstrating how the motivational consequences of sub-goal structure may shift from stage to stage and alterting people to the potential downside of such a structure. Importanlty, we by no means suggest that sub-goals are not useful; they can be motivating indeed, as all of our studies have shown. Rather, we examine the dynamic sources of motivation and explore the conditions under which sub-goal structure may be the most beneficial.

For organizations that aim to motivate people (e.g., employees, sales teams, donors), the implication of the current study is that the use of sub-goals should depend on the specific situation. While sub-goal–based feedback could be very beneficial at the beginning of the pursuit (e.g., the beginning of the day, week, or month), as people make progress toward the end, providing feedback based on the overall goal (Study 4) can help ensure a high level of motivation and performance until the ultimate goal is achieved.

What if organizations are not able to change the goal structure for employees once they have embarked on the pursuits of their performance goals? One potential solution is shifting individuals' attention based on the most motivating component. We conducted another experiment (N = 224, 118 females, 106 males; average age = 20.72) to explore a potentially beneficial (yet less effective than the one tested in Study 4) hybrid structure, in which we set sub-goals but experimentally focused the participants' attention on the overall goal (see Appendix for visual stimuli).

Participants rated news articles for a soon-to-be-launched news website for seven days to gain 140 reviewer points; they were placed either in an overall-goal–only, sub-goals, or hybrid structure. We measured these raters' motivation on Day 2 (low progress) and Day 6 (high progress), and found the hypothesized goal structure × progress level interaction (F(2, 218) = 7.28, p < .01, η_p^2 =.06): When the progress level was low, those in the sub-goal condition were more motivated than those in the overall goal condition (t(81) = 3.63, p < .01), and moderately more motivated than those in the sub-goal present/overall goal highlighted condition (t(76) = 1.76, p = .08); there was no significant difference between the latter two groups (t(75) = 1.35, ns). However, after raters accumulated a high level of progress, those in the sub-goal condition were less motivated than those in the overall goal condition (t(71) = –2.13, p < .05) or those in the sub-goal present/overall goal highlighted condition (t(69) = –2.09, p < .05); the difference between the latter two groups was not

significant (t(64) = –.20, ns. It is interesting that visually highlighting the overall goal (while

keeping the structure of sub-goals) could help the raters elevate their focus to the final

destination when evaluating their actions, diminishing the negative impact of sub-goals in the

advanced stage of the task. While this attention-shifting solution was not as effective as the

hybrid goal structure tested in Study 4, it could serve as an executable alternative for

organizations and managers who are not able to change their goal structure and feedback

system/format halfway through the task. Future research is encouraged to explore different

hybrid goal structures that leverage the two dynamic driving forces across different stages of

goal pursuit.

Another inference that we can draw from our findings is that people who are new to a

pursuit (e.g., sales trainees, newly hired employees, first-time donors), as opposed to

experienced individuals, may need more help from organizations regarding the

design/structure of the goal because they tend to worry more about whether a goal is

attainable. Dividing an overall goal into manageable sub-units is thus crucial in sustaining

these individuals' motivation. Although sub-goals are useful in initiating efforts, their use

should be carefully managed when people are deep into a pursuit and no longer need sub-

goals to ensure the goal's attainability.

Limitations and Future Research

What happens when sub-goals do not dissect the overall goal in terms of quantity but,

rather, contribute to the overall goal in a qualitative manner? For instance, to achieve a sales

goal, an employee can divide this goal into weekly units of smaller quantities; he or she can

also set sub-goals such as taking shorter lunch breaks, reducing the use of social media at

work, and taking summary notes for the calls made at the end of each day. Although the latter

type of sub-goal does not quantitatively divide the overall goal, it specifies the steps one

could take to achieve this higher level goal (e.g., Fishbach et al., 2006; Kruglanski et al.,

2002). It is plausible that our theory could apply to this context as well, as an easier sub-goal (e.g., taking a shorter lunch break today) could help to make the overall sales goal seem more attainable, whereas a challenging sub-goal (e.g., acquiring a new skill or learning a new software to generate sales calls; Kanfer & Ackerman, 1989) could make goal achievement seem difficult and, therefore, affect effort when attainability is the source of motivation. Similarly, if this sub-goal is associated with lower or even negative value (e.g., reducing the use of social media enhances one's productivity at work but hurts social relationships), it could undermine the perceived value of actions and, thus, motivation. Explorations along this line could not only provide valuable extensions of our findings, but also uncover important insights for researchers and managers.

It is also important to note that we restricted our exploration to situations in which sub-goals carried no value in themselves. In daily life, sub-goals often have benefits. For example, reaching a weekly sales goal often comes with perks, albeit small, and the payment of a sub-set of one's student loan can help improve credit scores. We limited our explorations to sub-goals with no benefits of their own, not only to simplify the study, but also to provide a stronger test of how a sub-goal structure both increases perceived attainability and leads to low perceived value of actions. If we lifted the restriction and allowed sub-goals to carry benefits of their own, we may expect the present reversal to be even more pronounced. Specifically, people could be more likely to associate their efforts with the benefits of these sub-goals, further reducing their motivation toward the overall goal. Similarly, if accomplishing a sub-goal is endowed with a high level of intrinsic reward, the sub-goal could function in a manner that is similar to sub-goals carrying extrinsic benefits, and distract efforts away from the overall goal. Future research shedding light on these possibilities would be both interesting and instructive.

A careful examination of the manipulation in all of our studies reveals that the points at which we assessed individuals' motivation were uniformly set at the beginning, the middle, or the end of a sub-goal. We purposefully conducted these studies in this manner to ensure that we shed sufficient light on the process while keeping the scope of investigation manageable. From a micro-perspective, each sub-goal pursuit is a goal; thus individuals experience motivational variations within each of the sub-goals. To simplify the study, we chose a specific point of sub-goals as a progress level in each study to ensure that the motivational variation within a sub-goal would not complicate our investigation (Heath et al., 1999). Although this simplified route satisfied our purpose of illustrating the general trend of motivation when sub-goals are present versus absent, it left us with intriguing avenues for future investigation. For example, how does a sub-goal gradient effect interact with the gradient on the overall goal to influence motivation when a sub-goal structure is employed? Does the sense of accomplishing a sub-goal interact with the amount of progress people have accumulated on the overall goal to jointly determine motivation when people have just completed a small milestone?

Finally, a critical assumption in our model is that goal value and attainability carry different weights in shaping individuals' behavior at different time points of goal pursuit. It is worth noting that we are not making a case for the total separation of goal attainability from its value, nor suggesting that attainability and value are entirely orthogonal constructs. What we do believe in is that, while these constructs may not always be independent from each other, their relative impact on momentary motivation changes when people move from one stage to another, and the momentary motivation could be relatively more sensitive to either consideration (goal attainability or goal value) depending on the stage that one is currently in. The presence (and absence) of sub-goals, by addressing one or the other of these considerations, thus has a shifting impact on momentary motivation. It is important to note

that in some situations, people may think about whether a goal is valuable at the initiation stage and worry about attainability later on. For example, when people have multiple goals and need to decide whether to keep pursuing the focal goal or abandon it (Unsworth, Yeo, & Beck, 2014), it is possible that the value of the goal serves as the main driving force even in the early stages of the pursuit. These possibilities provide interesting avenues for the test of boundary conditions and are fruitful for future investigations.

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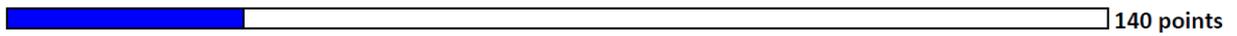
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Appendix

Visual Stimuli

Overall goal in the low-progress condition:

 140 points

Overall goal in the high-progress condition:

 140 points
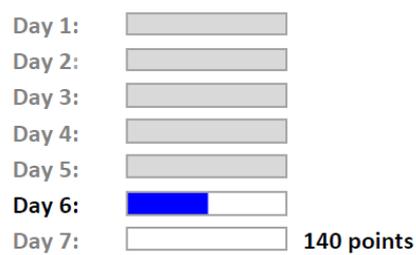
Sub-goal in the low-progress condition:

Day 1:		20 points
Day 2:		**20 points**
Day 3:		20 points
Day 4:		20 points
Day 5:		20 points
Day 6:		20 points
Day 7:		20 points

Sub-goal in the high-progress condition:

Day 1:		20 points
Day 2:		20 points
Day 3:		20 points
Day 4:		20 points
Day 5:		20 points
Day 6:		**20 points**
Day 7:		20 points
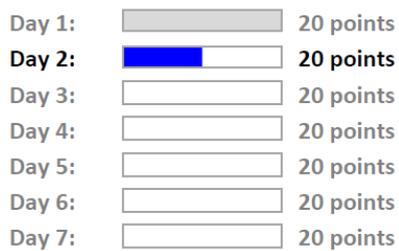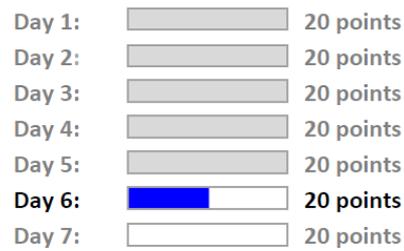
Hybrid in the low-progress condition:

Day 1:		
Day 2:		
Day 3:		
Day 4:		
Day 5:		
Day 6:		
Day 7:		140 points
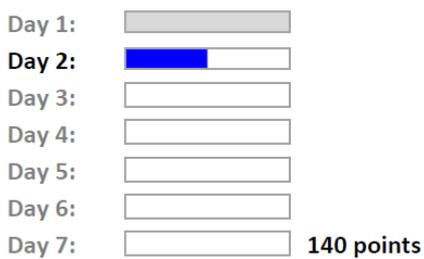
Hybrid in the high-progress condition:

Day 1:		
Day 2:		
Day 3:		
Day 4:		
Day 5:		
Day 6:		
Day 7:		140 points

Table 1. Summary of the results of all studies

	Sub-goal		Overall goal		Hybrid		Interaction statistics
	Low progress	**High progress**	**Low progress**	**High progress**	**Low progress**	**High progress**	
Study 1 *Motivation*							
	221.24(28.34)	215.67(27.20)	200.38(31.08)	233.03(28.17)			$F = 14.80, p < .01, \eta_p^2 = .10$
Motivation							
	207.24(101.65)	175.88(65.39)	156.73(63.56)	225.38(125.38)			$F = 11.39, p < .01, \eta_p^2 = .07$
Study 2 *Attainability*							
	5.26(2.69)	5.18(2.53)	3.54(2.22)	5.28(2.15)			$F = 5.64, p < .05, \eta_p^2 = .04$
Value of action							
	4.43(1.67)	4.75(1.95)	4.86(1.80)	6.36(1.98)			$F = 3.96, p < .05, \eta_p^2 = .03$
Motivation							
	558.53(413.45)	456.23(327.23)	375.12(434.28)	645.20(480.51)			$F = 24.47, p < .001, \eta_p^2 = .14$
Study 3 *Motivation trend*							
	$F = 4.03, p < .05, \eta_p^2 = .05$		$F = 23.65, p < .001, \eta_p^2 = .24$				$F = 24.47, p < .001, \eta_p^2 = .14$
Attainability							
	5.32(2.48)	5.91(1.89)	3.88(2.58)	5.96(1.88)			$F = 9.88, p < .01, \eta_p^2 = .06$
Value of action							
	5.05(2.21)	4.98(2.07)	5.32(2.47)	6.11(1.94)			$F = 4.39, p < .05, \eta_p^2 = .03$
Total performance							
	20.19(19.67)		18.65 (18.41)		27.27(32.03)		$\chi^2 (2, N = 207) = 130.51, p < .001$
Study 4 *Goal achievement rate*							
	39.1%		33.8%		57.1%		$\chi^2 (2, N = 207) = 8.43, p < .05$
Motivation trend							
	$F = 24.96, p < .001, \eta_p^2 = .27$		$F = 20.54, p < .001, \eta_p^2 = .24$		$F = 10.73, p < .01, \eta_p^2 = .14$		$F = 2.96, p < .001, \eta_p^2 = .028$

Notes: Means are presented in each cell. Standard deviations are presented in parentheses.

Figure 1. Total number of steps as a function of progress level and goal structure (Study 1).
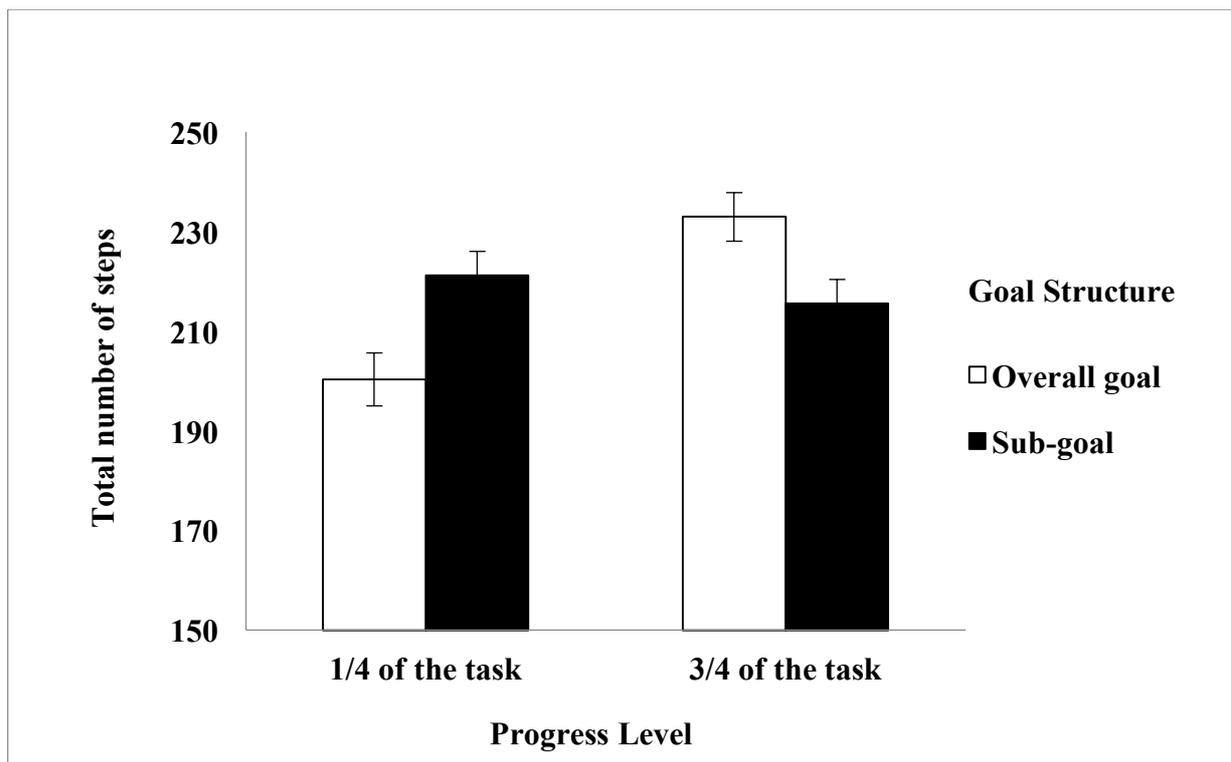
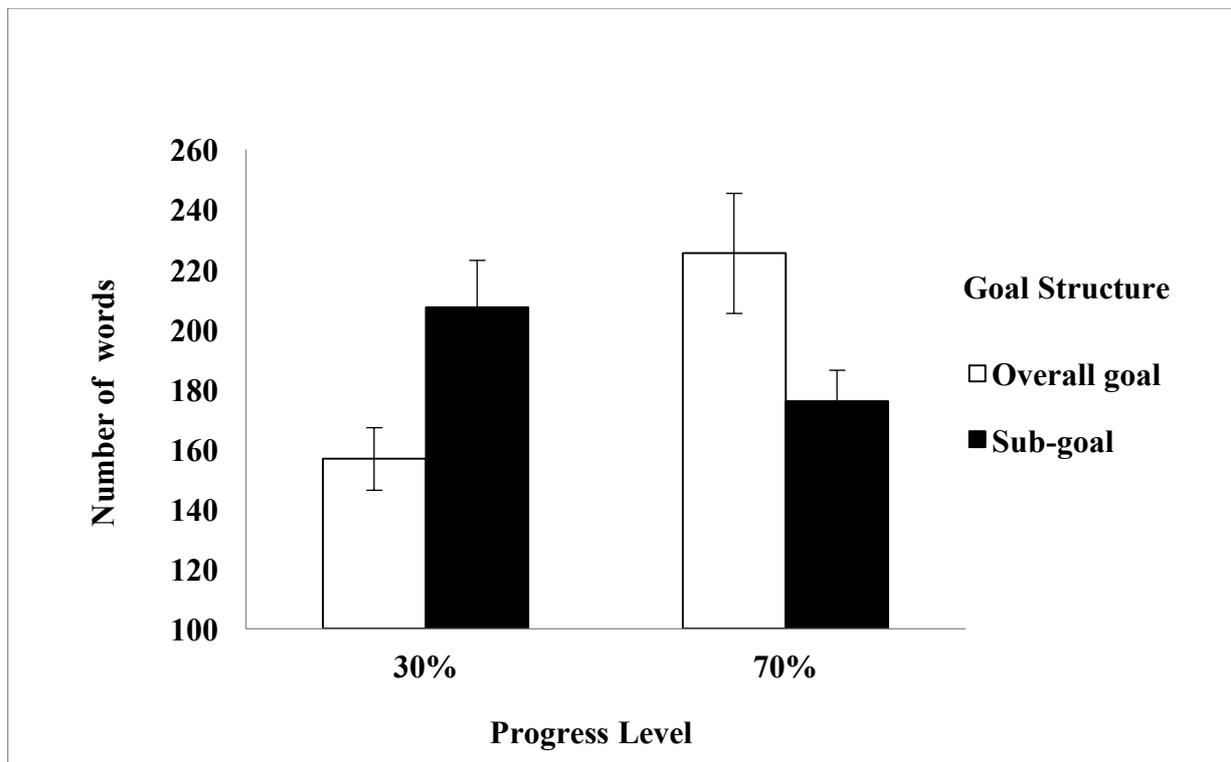*Figure 2.* Number of words as a function of progress level and goal structure (Study 2).

Figure 3. Moderated mediation model of the indirect effect of goal structure on motivation through perceived goal attainability and perceived value of actions, while the impact of the two mediators on motivation was moderated by progress level (Study 2).
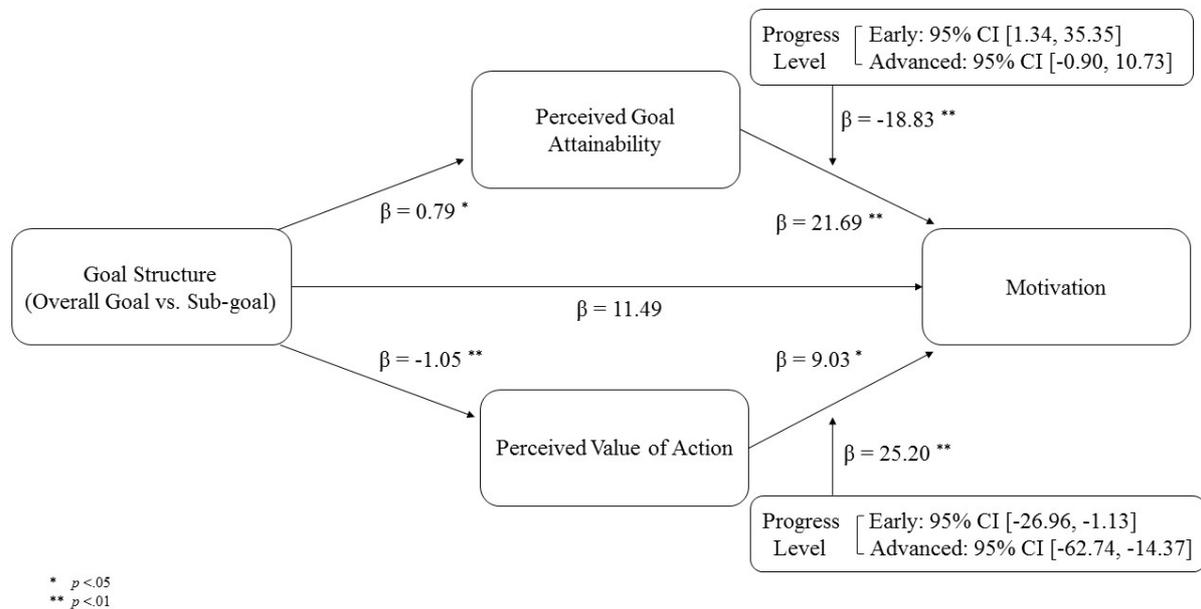
Figure 4. Number of words participants accurately transcribed as a function of progress level and goal structure (Study 3).
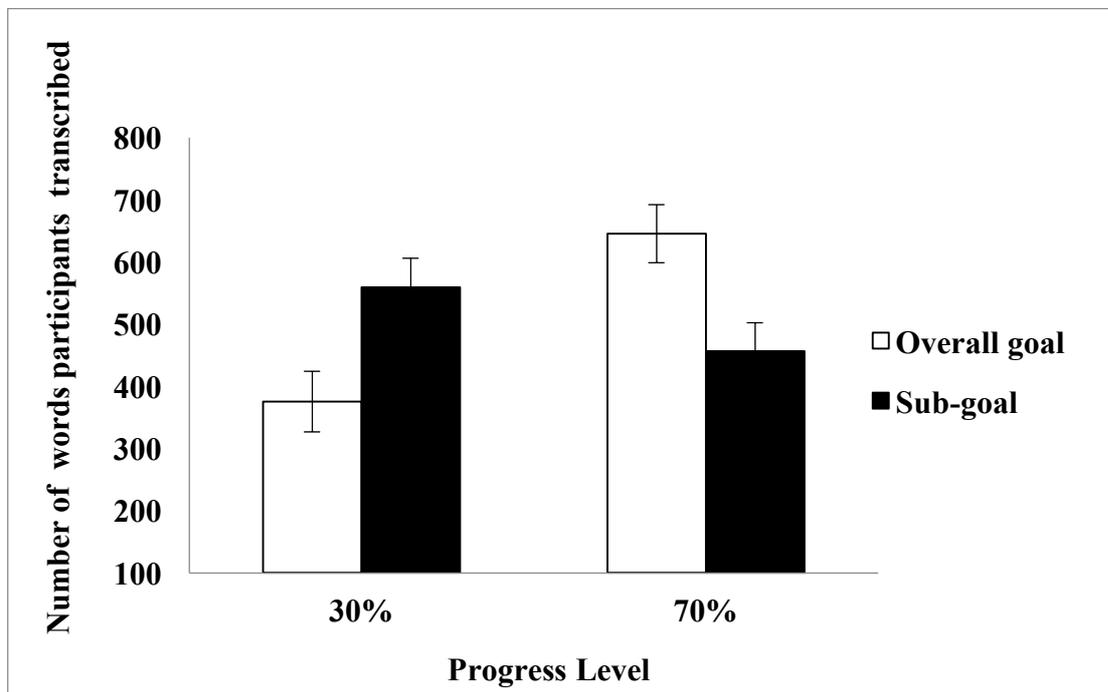
Figure 5a. Number of book pictures workers uploaded as a function of progress level and goal structure (Study 4).
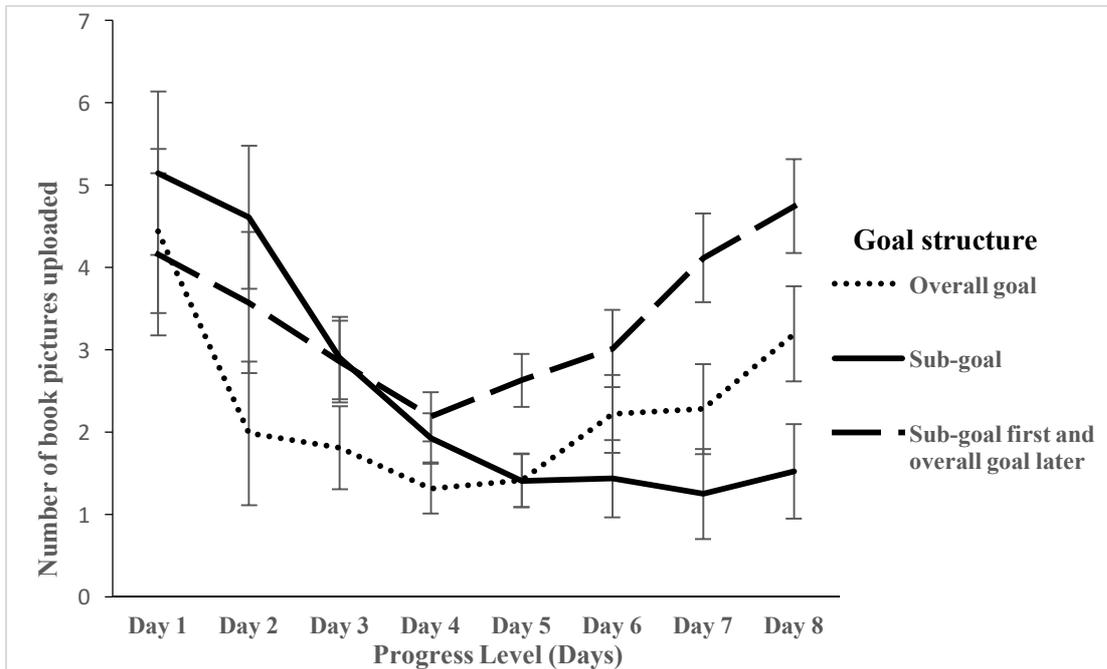

Figure 5b. Number of book pictures the workers who achieved the goal uploaded as a function of progress level and goal structure (Study 4).