



“Numbers and Units Affect Goal Pursuit Organization and Motivation.”

CHRISTOPHE LEMBREGTS*

Erasmus University, Rotterdam School of Management

P.O. Box 1738, 3000 DR Rotterdam, The Netherlands

Email: lembregts@rsm.nl

JORGE PENA-MARIN*

IESE Business School

Camino Cerro del Águila, 3, 28023 Madrid, Spain

Email: jpena@iese.edu

* Christophe Lembregts is an associate professor of marketing at Rotterdam School of Management, Erasmus University and Jorge Pena-Marin is an assistant professor of marketing at IESE Business School.

Both authors contributed equally.

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DR. CHRISTOPHE LEMBREGTS (Orcid ID : 0000-0002-5415-9063)

DR. JORGE PENA MARIN (Orcid ID : 0000-0002-0434-9774)

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Abstract

Goals are one of the most ubiquitous drivers of behavior. Despite the wealth of research on goal pursuit, less is known about how individuals organize their goal pursuit in the first place. This manuscript represents one of the first studies to provide insight into quantitative goal organization, proposing that the unit/numerical value in which a goal is described influences goal pursuit organization. Specifying a superordinate goal in units with larger numbers (e.g., studying for an exam for 120 minutes per week), rather than with smaller numbers (2 hours per week), leads to a goal pursuit structure that consists of more, but smaller subgoals. We also find that units with larger compared to smaller numbers tend to have a positive effect on goal motivation (i.e. more likely to start the goal earlier and to finish it). Finally, this positive effect on goal motivation is attenuated when consumers focus is on the number of subgoals left (rather than completed) while pursuing the overarching goal. We believe that changing units may be an easy-to-implement nudge for anyone (e.g., marketers, managers, public policymakers, behavioral therapists, etc.) who wants to increase the likelihood that individuals use a particular goal pursuit structure.

Keywords: goals, subgoals, goal motivation, goal organization, framing effects, nudges, unit effects, unit type, numerosity, numerical cognition.

Goals are one of the most ubiquitous drivers of behavior: a consumer decides to save \$150 per month, a runner pursues a goal of running 5 km per week, and an employee may work on a project for 12 hours per month. Because goals have such a central place in people's lives, it is not surprising that much research has been dedicated to understanding the mechanics of goal pursuit (e.g., Fishbach & Dhar, 2005; Heath, Larrick, & Wu, 1999; Kopetz, Kruglanski, Arens, Etkin, & Johnson, 2012; Kruglanski et al., 2002; Locke, 1982). While there is a wealth of such research, less is known about how individuals organize their goal pursuit in the first place. For example, to pursue a goal of studying 5 hours a week, a student can decide to complete this goal in one stretch or restructure it into smaller subgoals (e.g., one 2-hour block and one 3-hour block; one 3-hour block and three 1-hour blocks).

The present work seeks to better understand the determinants of goal organization by focusing on quantitative goals, which are goals that are specified with a number symbol expressed in a measurement unit. Drawing from prior work in numerical cognition (e.g., Bonato, Fabbri, Umiltà, & Zorzi, 2007; Ni & Zhou, 2005; Siegler et al., 2013) and unit effects (e.g., Bagchi & Davis, 2016), we propose that the unit in which a goal is framed (e.g., hours vs. minutes) impacts the number of subgoals consumers set (e.g., one goal vs. a few subgoals vs. many subgoals). For example, normatively speaking, specifying a studying goal as 5 hours or 300 minutes should not affect how this goal is pursued. Nevertheless, we find that specifying a goal in units with larger (vs. smaller) numbers increases the number of subgoals with which people pursue the overall goal. That is, people will plan to study more times per week when the goal is framed as 300 minutes rather than 5 hours per week. We also predict that the effect of unit larger versus smaller numbers on the organization of quantitative goals may have positive implications in consumers' goal pursuit motivation. For example, we anticipate that consumers start goal pursuit earlier or they are more likely to complete a goal. In addition, we suggest that these positive effects on goal motivation are attenuated when consumers focus on the number of subgoals left (rather than completed) to finish the overarching goal. Finally, we suggest that the effect of unit type on goal organization may be driven by how smaller numbers (e.g., 5) appear to provide less opportunity to be divided in many parts than larger numbers (e.g., 300). As a result, people are less likely to consider many subgoals when a goal happens to be presented in units with smaller numbers than when it is specified with larger numbers.

This work offers three important contributions. First, while previous research on goals has primarily examined how goal pursuit structure (e.g., number of subgoals) influences various goal dimensions, such as commitment, pursuit, and motivation, we instead focus on how people organize goals before initiating their pursuit (*preaction phase*; Heckhausen & Gollwitzer, 1987). We demonstrate that a seemingly irrelevant numerical feature affects the frequency with which people engage in goal-related activities, which in turn influences goal pursuit outcomes. Second, this research is one of the first to connect the rich literature on goal pursuit (e.g., Kopetz et al., 2012), numerical cognition (e.g., Siegler, Fazio, Bailey, & Zhou, 2013) and unit effects (e.g., Bagchi & Davis, 2016) by demonstrating how numerical cognition may drive goal pursuit organization. This investigation is particularly pertinent because although many goals are specified numerically, little research has investigated the impact of numerical features (but see Pope & Simonsohn, 2011). Finally, we provide a novel, easy-to-implement nudge (Thaler & Sunstein, 2008) for managers or public policymakers who want to subtly encourage individuals to use a particular goal pursuit structure.

Theoretical Background

Understanding the factors that determine the choice of a particular goal pursuit structure is crucial for several reasons. First, because completing a goal might not be feasible all at once, in many situations people autonomously organize their goal pursuit. For instance, decisions about losing weight, reducing time on social media or studying for an exam involve tasks for which consumers will need to organize their superordinate goal in smaller and more manageable subgoals (Borrelli & Mermelstein, 1994; Heath, Larrick, & Wu, 1999). Secondly, whether goals are pursued through no, few or many subgoals has diverse implications for motivation, persistence and goal completion (Amir & Ariely, 2008; Fishbach, Dhar, & Zhang, 2006; Huang, Jin, & Zhang, 2017; Soman & Shi, 2003; Van Den Bergh, Heuvinck, Schellekens, & Vermeir, 2016). For example, breaking up a superordinate goal into subgoals may signify progression and lead to greater commitment to complete the goal. In other situations, however, subgoals may interfere with goal completion because they may breed a sense of self-congratulation (Amir & Ariely, 2008; Fishbach et al., 2006).

Many goals are represented in a symbolic quantitative format (i.e., expressed using Arabic numerals). Quantitative information consists of two components: a number symbol (e.g., 5) and a unit (e.g., hours). Prior work suggests that specifying quantitative information in alternative units influences individuals' decisions in various ways (for a summary: Adaval, 2013; Bagchi & Davis, 2016). Particularly relevant is prior research suggesting that people usually focus more on the numerical symbol and less on the units (i.e., more on 300 vs. 5 rather than minutes vs. hours). For instance, Pandelaere, Briers and Lembregts (2011) found that attribute differences appeared larger when the same information was presented in units with larger numbers (i.e. the difference between two products' warranties of 72-months versus 84-months was perceived to be bigger than the difference between a 6-years versus 7-years warranty). Wertebroch, Soman and Chattopadhyay (2007) suggested that, in the context of financial transactions, consumers assess their purchasing power by focusing more on the nominal difference between the price of a product and their budget. Thus, they found that a high numerosity currency yields to a higher perceived purchasing power than a low numerosity currency (i.e., higher perceived purchasing power in dollars versus euros because 1 dollar = 0.89 euros).

The decision to organize a superordinate goal in several subgoals involves *dividing* a *number*, namely, the quantitative goal (e.g., 5-hour vs. 300 minutes task), into a *number* of smaller parts or subgoals. We expect that in this context people will adopt a similar focus on the number component, leading consumers to organize goals described in units with larger (vs. smaller) numbers into more (less) subgoals. This prediction is based on prior work suggesting that people tend to think more in terms of natural numbers compared to decimal numbers. For instance, people execute numerical calculations using natural number rules: they are faster to give the correct response to the statement "1/3 is smaller than 2/3" than "1/5 is larger than 1/9" because the former is consistent with a natural number rule (i.e., "larger number = larger magnitude"; Bonato, Fabbri, Umiltà, & Zorzi, 2007; Obersteiner, Van Dooren, Van Hoof, & Verschaffel, 2013). In more recent work, Roell and her colleagues (2019) found that people overgeneralize the natural number rule of "more number symbols = larger magnitude" such that it interferes with the comparison of the magnitude of the two decimal numbers (e.g., 0.8 vs.

0.543), that is, when the smaller one had the greatest number of digits after the decimal point (also see DeWolf & Vosniadou, 2015; Ni & Zhou, 2005; Vamvakoussi, Van Dooren, & Verschaffel, 2012; Vamvakoussi & Vosniadou, 2010).

If people have a natural tendency to think more in terms of natural (versus decimal) numbers, then a goal associated with a smaller number (e.g., 2) might naturally be perceived to offer less opportunity to be divided into many smaller subgoals than a goal associated with a larger number (e.g., 120): the number 2 may be more likely to be thought of as a combination of two parts or subgoals (e.g., 1 + 1) but less likely as a combination of five (e.g., 0.25 + 0.25 + 1 + 0.25 + 0.25), since the second combination involves decimals. In contrast, even if one considers only natural numbers, a higher number such as 120 can still be quite easily thought as a combination of two parts or subgoals (e.g., 60 + 60) as well as five (e.g., 5 + 5 + 100 + 5 + 5 or 25 + 25 + 25 + 25 + 20).

In sum, we predict that the likelihood that one divides a goal specified in units with larger numbers (e.g., 120-minute task) in many smaller parts is higher compared to units with smaller numbers (e.g., 2-hour task). This effect might occur because the perceived opportunity to divide a superordinate goal including numbers of lower (versus higher) magnitudes into smaller parts or subgoals is lower (versus higher). Next, we elaborate on how the choice of a goal structure with more versus less subgoals due to a unit with higher versus lower numbers may impact goal motivation.

Consequence of using units with smaller versus larger numbers in goal motivation

The choice of a particular goal structure usually occurs *before* initiating goal pursuit (preaction phase; Heckhausen & Gollwitzer, 1987). In this context, we suggest that organizing a goal with more versus less subgoals due to its specification using units with large versus small numbers will tend to have a positive effect on goal motivation. Evidence for this claim comes from work suggesting the advantages of subgoals in completing a superordinate goal (e.g., Gal & McShane, 2012; Huang, Jin, & Zhang, 2017; Soman & Shi, 2003). For instance, when initiating a goal, research suggests that individuals perceive goal structures containing more rather than less subgoals as more manageable, promoting goal initiation and perseverance (Heath, Larrick & Wu, 1999). Huang, Jin and Zhang (2017) also found that goal structures containing more

subgoals enhance goal attainability and motivation when goal attainability is individuals' main concern (usually at the beginning of goal pursuit, for similar findings: Huang and Zhang, 2011). In a different line of work, Zhang and Gao (2016) studied two reward acquisition programs: piecemeal and lump-sum. Their findings suggest that piecemeal procedures, which contain more subtasks or smaller rewards rather than an overarching larger reward, are more motivating because they foster a sense of achievement. Similarly, goal structures containing more rather than fewer subgoals are likely to increase participants' perceptions of goal advancement because the number of subgoals completed and the speed with which they are completed are higher and therefore increase their motivation (Huang and Zhang, 2011). Aligned with this argument, Gal and McShane (2012) showed that closing smaller debt accounts predicted debt elimination, or in other words, completing subgoals fostered goal success.

Although prior work suggests a positive effect of specifying a goal in units with larger versus smaller numbers on goal motivation due to the usage of goal structures containing more subgoals in the context of goal initiation, there might be instances in which this positive outcome might not emerge. We predict one instance where the effect might be attenuated: if individuals' attention *during* goal pursuit is directed to the number of remaining subgoals to be completed. This might occur because, according to the small-area hypothesis (Koo and Fishbach, 2012), individuals' motivation to pursue a goal is higher when their attention is directed to the smaller size of their remaining progress. In other words, more remaining subgoals may signal that more work or tasks are left, such as 10 remaining subgoals might be seen as more work left than 2 remaining subgoals, and thus, it may attenuate motivation.

In summary, we propose that the choice for a specific goal structure is influenced by the unit in which the goal is described. Specifying a goal with a unit including larger (smaller) numbers will increase (decrease) the number of subgoals with which people pursue the overall goal. We suggest that this effect might occur because people perceive numbers of low (versus high) magnitude to offer a lower (versus higher) opportunity to be divided in smaller parts (i.e., subgoals). Finally, we propose that this effect has a positive consequence on goal motivation, and we suggest that this positive effect might be attenuated if consumers focus on the number of remaining subgoals while pursuing the overarching goal.

Study Overview

We report four studies in the current manuscript (and two additional studies in the Methodological Detail Appendix – MDA) to test our hypotheses (see Figure 1 for an overview). Study 1 is a preregistered study providing support for the contention that goals specified in units with larger versus smaller numbers lead to goal pursuit structures with more versus fewer subgoals across a wide array of domains. Study 2 replicates the unit effect in an actual goal pursuit context. This study also finds preliminary evidence of a positive effect of units with larger (versus smaller) numbers on goal motivation. Study 3 further documents how changing units may have positive downstream effects on motivation. The study also tests participants' focus during their goal pursuit as a boundary condition. In addition, it shows the mediating role of the perceived opportunity to divide a number (quantitative goal) on the effect of unit type on the number of subgoals with which people pursue the overall goal. Finally, the main goal of Study 4 is to show the effect of type of unit on goal organization and motivation in a field experiment. Specifically, it shows that when participants (students) planned their study time for an exam, they were more likely to spread their study over more days and they were more eager to start studying when the study time was described using a unit with larger (120 minutes) compared to lower (2 hours) numbers.

Study 1

The goal of Study 1 is twofold. First, to find support for the contention that equivalent goals specified in units with smaller versus larger numbers lead to goal pursuit structures with fewer versus more subgoals across a wide array of domains and types of numbers (e.g., more vs less round, even vs. odd) in a preregistered study. For this study, we preregistered all measures, predictions, exclusion criteria and analyses (<https://aspredicted.org/zs6zy.pdf>). In addition, we controlled for attainability perceptions of the overarching subgoals since a goal expressed in a unit with larger numbers (e.g., 120 minutes) could lead people to infer that it is more difficult to attain than when it is specified in a unit with smaller numbers (e.g., 2 hours).

Method

We recruited participants from Amazon's Mechanical Turk (MTurk). As indicated in our preregistration form, we aimed for 200 participants. After all preregistered exclusions, our final sample comprised 199 participants (mean age = 34 years old, 85 females). The study had a mixed experimental design, with unit type (numbers: small vs. large) as the between-subjects factor and scenario (7) as the within-subjects factor. The scenarios involved teaching (3 hours vs. 180 minutes a week), limiting television watching (2 hours vs. 120 minutes), volunteering for a charity (6 hours vs. 360 minutes), running (10 km vs. 10,000 meters), carrying items to the cellar (12 kilograms vs. 12,000 grams), working on an assignment (8 hours vs. 480 minutes), and burning calories (2 kilocalories vs. 2000 calories). Please see the Methodological Detail Appendix for full details. For each scenario, the participants imagined having a particular goal (e.g., working on an assignment for 8 hours vs. 480 minutes), and they were asked to decide how they would like to complete it (1 - all at once, 7 = split into seven subgoals). Order of stimuli presentation was determined randomly.

At the end of the survey, the participants were asked to rate the perceived goal attainability of each scenario separately on the following three items on a 9-point scale (adapted from Huang, Jin and Zhang, 2017): 1) To what extent do you think that you would be able to complete the entire task; 2) Would it be difficult for you to complete the entire task (reverse scored); and 3) Would it be attainable for you to complete the entire task (1-not at all; 9-very much)? For the analyses, these items were averaged into one composite score of attainability (average $\alpha = .61$).

Results and discussion

Number of subgoals. Because our dependent variable can be considered count data, we conducted Poisson regressions (also in the following studies; Cameron & Trivedi, 1998). Although Poisson regressions are the standard analysis for count data, we also replicated the effect of unit type on number of subgoals using t-tests and negative binomial regressions as recently suggested by Ryan, Evers and Moore (2018; see MDA). A multilevel model accounted for the repeated-measures nature of the data. We regressed number of subgoals on unit type (dummy variable; 0 = small numbers; 1 = large numbers). A (preregistered) multilevel Poisson

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regression with unit type as the between-subjects factor and scenario as the within-subjects factor shows that across all scenarios, specifying quantitative goals in units with larger numbers leads to choosing goal structures with more subgoals than when using units with smaller numbers ($\beta = -.19$, Wald $\chi^2(N = 199) = 19.15$, $p < .001$, see Figure 2; non-preregistered analyses per scenario, see Table 1). These results replicate when controlling for goal attainability perceptions ($\beta = -.18$, Wald $\chi^2(N = 199) = 18.82$, $p < .001$).

Discussion. This preregistered study provides the first evidence that specifying a quantitative goal in units with larger numbers, relative to units with smaller numbers, leads to choosing goal structures with more subgoals. Notably, the effect seems robust while controlling for goal attainability perceptions.

Study 2

Study 2 has four main objectives. First, we aim to replicate the unit effect on goal organization in an actual goal pursuit context. Second, to provide initial evidence for the claim that expressing a goal in units with larger rather than smaller numbers has a positive effect on participants' goal motivation. Third, it is possible that the results of Study 1 could be influenced by whether a unit is considered to be the default (Lembregts & Pandelaere, 2013). To reduce this possibility, we keep (un)familiarity with the unit constant across conditions. Finally, we again wanted to show that the proposed effect is robust while controlling for perceived goal attainability. To do so, in this study we explicitly manipulate goal attainability (instead of measuring it). We expected the effect of unit type on number subgoals holds independently of goal attainability perceptions.

Method

We recruited 301 MTurk participants (Mage = 35 years, 168 women). The experiment had a 2 (unit numbers: smaller vs. larger) x 2 (goal attainability: control vs. higher) between-subjects design. The participants were presented with a goal to burn energy by mouse clicking,

and their goal was specified in novel and artificial units: RD in the large numbers condition [goal: 2,000 RD (1 click = 10 – 30 RD)] and kiloRD in the small numbers condition [goal: 2 kiloRD (1 click = .01 – .03 kiloRD)]. Thus, to achieve their goal participants should, on average, click 200 times. All participants had the same time (28 seconds) to complete their goal.

Next, in the high goal attainability condition, participants were told: “*Please be aware that the required number of [kilo]RD may seem very large, but it is not! This is the reaction that we often got from earlier participants. They confirmed that it is not much work*”. In the control condition this information was omitted. We ran a posttest to verify the success of the goal attainability manipulation. The participants (N = 201) were presented with the same scenario as in the main study with the only difference that instead of being asked their preferred goal structure (and to actually complete their goal), they responded to the same 3-item scale ($\alpha = .81$) as in Study 1 aimed to measure goal attainability. As expected, the participants perceived the task as more attainable when they were told that the task was not too much work (M = 7.31, SD = 1.79) versus when this information was omitted (M = 6.45, SD = 1.77; $F(1,197) = 11.56, p = .001$). There was no significant difference between unit types (M_{small numbers} = 6.80, SD_{small numbers} = 1.98; M_{large numbers} = 6.95, SD_{large numbers} = 1.65; $F(1,197) = .30, p = .58$). The interaction between unit type and the goal attainability manipulation was also not significant ($F(1,197) = 2.84, p > .09$). These results suggest that the goal attainability manipulation was successful.

After participants knew their burn energy goal and were presented (vs. omitted) with the goal attainability information, they decided how to complete it: they could do it all at once or in as many parts as desired. They were also informed that in between parts, they would rate some pictures (see MDA for full details). Since the overall task time was kept constant across conditions, if a participant chose to complete the goal in more (versus less) parts, each part lasted less (more) time. Participants organized their goal pursuit by indicating their preferred goal organization in open-ended boxes (maximum of division was 14 parts), and they corroborated their choices with a multiple-choice question. As the goal motivation measure, we recorded the number of times that each participant clicked the mouse. We reasoned that higher motivation to complete the goal would lead to a higher number of clicks. To not influence the effect that unit type and number of subgoals might have on participants motivation to complete the task, they weren't informed of their performance while pursuing their goal (i.e. how many times they

clicked the mouse or percentage of goal completion). Finally, they responded to some demographic questions.

Results and discussion

Number of (sub)goals. Some participants ($N = 36$) failed to correctly complete the open-ended form and thus were excluded from the analysis (the results with the full sample and the close-ended dependent variable fully replicate, see MDA). As expected, a Poisson regression with only unit type (numbers: small vs. large) and the number of (sub)goals as the dependent variable yielded a main effect of unit type (Wald $\chi^2(N = 265) = 87.40, p < .001$). Participants chose to complete their energy goal in more parts when the goal was specified in units with higher numbers (2,000RD: $M = 4.43; SD = 4.79$) compared to units with smaller numbers (2KiloRD: $M = 2.28; SD = 2.81$). Adding perceived goal attainability and the interaction with unit type as predictors replicated the significant effect of unit type (Wald $\chi^2(N = 265) = 87.28, p < .001$, see Figure 3). Less relevant for the theorizing, this analysis yielded a main effect of goal attainability information (Wald $\chi^2(N = 265) = 15.37, p < .001$) meaning that higher goal attainability led to goal structures of less subgoals, and a marginally significant interaction term (Wald $\chi^2(N = 265) = 3.15, p = .08$).

Goal motivation. The proposed theorizing also predicts a positive effect of units with higher numbers on participants' motivation derived from a goal organization including more subgoals. For this analysis, we dropped all participants who did not click at all ($N = 4$) because they did not follow the task instructions. As expected, merely specifying a goal in larger numbers led to a higher number of clicks ($M = 155.30; SD = 66.03$) than a goal in smaller numbers ($M = 140.47; SD = 58.17; \beta = -.10$, Wald $\chi^2(N = 261) = 96.79, p < .001$), which suggests that participants became more motivated by using a goal system containing more subgoals. In addition, the attainability manipulation did not influence participant's goal motivation ($M_{\text{absent}} = 149.18; SD_{\text{absent}} = 63.75; M_{\text{present}} = 147.03; SD_{\text{present}} = 61.79; \beta = -.01$, Wald $\chi^2(N = 261) = 1.18, p > .27$). Overall, 16.8% of participants (44 out of 261) reached the average clicking goal (200 clicks), which suggests that the goal was somewhat challenging. Consistent with the theorizing, 13.4% of participants (17 out of 127) reached their clicking goal in the units with low numbers

condition, whereas this percentage was higher (20.1% of participants; 27 out of 134) in the unit with higher numbers condition (z score = 1.45, $p = .14$), although this difference did not reach significance.

Mediation of goal motivation. Finally, we tested whether the positive effect of units with larger compared to smaller numbers on goal motivation was, as predicted, a consequence of a goal structure containing more subgoals. To test this prediction, we conducted a mediation analysis using a PROCESS macro (Hayes 2013, model 4) that utilized bootstrapping with repeated extraction of 5,000 samples, including type of unit as independent variable, number of subgoals as mediator (log transformed), and clicking behavior as dependent variable. We log-transformed the number of subgoals variable for the mediation analysis (in this and the next studies) due to its count data nature and high skewness = 1.86 (threshold to be considered highly skewed > 1), therefore not adhering to normality assumptions (i.e., Cohen & Cohen, 1983; Huang et al., 2016). After transformation skewness = 1.01. As theorized, the mediation analysis yielded a positive indirect effect of the number of subgoals as a mediator ($\beta = 14.48$, $SE = 3.82$) that was significantly different from zero (95% CI: 8.09 to 23.29).

Discussion. This study replicates that people's preferred goal pursuit structure is affected by a mere change in the unit on which a goal is specified. In addition, this effect emerges in a context where familiarity was the unit held constant by using an artificial unit. Moreover, the results held at different levels of perceived goal attainability. Finally, this study provides evidence that specifying a goal in units with smaller numbers results in less motivation to complete the goal than a unit with larger numbers and that this effect is mediated by the usage of a goal structure containing fewer rather than more subgoals.

Study 3

The goal of study 3 is threefold. First, we want to replicate the unit effect on goal organization in a different context. Second, we want to further investigate the positive effect of units with larger (versus smaller) numbers on goal motivation. In addition, to test a boundary condition, we have argued that one instance in which this positive effect on goal motivation might be attenuated is if individuals' attention *during* goal pursuit is directed towards the number of remaining (rather than completed) subgoals. This might occur because, according to the small-

area hypothesis (Koo and Fishbach, 2012), individuals' motivation to pursue a goal is higher when their attention is directed to the smaller size of their remaining progress. In other words, people might consider that an area of larger size is left if there are more rather than fewer remaining subgoals to be completed, and thus, their motivation might decrease. To test this boundary condition on goal motivation, this study will interrupt participants' goal pursuit, and it will ask them if they want to restart it after focusing on the number of completed versus remaining subgoals. We anticipate a positive effect on goal restoration when participants focus on the number of subgoals completed but an attenuation when they focus on the number of remaining subgoals.

Second, as suggested by the proposed theorizing, we aim to show process evidence for the unit effect based on the perceived divisibility of the numerical goal using a statistical mediation approach.

Method

Two hundred and fifty-nine students (127 women; mean age = 20.94) recruited from a large university participated in this study in exchange for partial course credit. This study had a 2 (unit numbers: small vs. large) x 2 (number of subgoals: completed vs. remaining) between-subjects design.

Procedure. Adapted from Koo and Fishbach (2012), the participants were initially told that the study was about how people write scientific communications. With this pretext, they were informed that their task would be to accurately count how many times a particular word appeared in a text (the word was "estimate"). The length of the text included the unit manipulation: 4 pages in the small number unit condition and 2,000 words in the high number unit condition. The participants were informed that one page is approximately 500 single-spaced words (which is a correct assessment). Similar to previous studies, the participants were given the opportunity to choose how to complete the task, either by completing it all at once or by dividing it into smaller parts. In between in each part, embedded in the text, the participants would see a picture. Then, the participants indicated their preferred goal structure ("How would you like to complete the 4 (vs. 4000) pages (words) task? Remember, you can choose to complete it in any way") in an open-ended question (maximum number was 10 parts).

Next, they were presented with the actual text and started to work in the task based on their selected goal organization. For instance, if they decided to pursue the task in three parts, the text included two embedded pictures that allowed the participants to rest for a few seconds if desired. Following Koo and Fishbach (2012), the task stopped after 1 minute. Then, the participants were asked to think about how many parts they had already completed (versus how many parts of the task they still needed to complete), and they indicated how eager they were to come back to the task and finish it (1-not eager; 7-very eager), which acted as the goal motivation measure. They also indicated how much they were enjoying the task (1-nothing; 7-very much). We included this covariate since watching the embedded pictures during the task could influence their enjoyment, which in turn might influence their decision to comeback the task. Finally, to measure the perceived divisibility of the number representing the quantitative goal, the participants indicated to what extent the number included in the goal (4 pages vs. 2,000 words) offered them many ways in which they could divide the task in smaller parts (1-not much, 7-a lot).

Results

Number of (sub)goals. Two participants did not follow the instructions and were excluded from the analysis. Since participants indicated their preferred goal structure before they were asked to focus on the number of completed versus remaining subgoals, to analyze their preferred goal structure we only included in the Poisson regression unit type (numbers: small vs. large) as predictor and number of subgoals as the dependent variable. This analysis yielded a main effect of unit type (Wald $\chi^2(N = 257) = 12.97, p < .001$, see Figure 4), indicating that participants decided to pursue the task with a goal structure containing more subgoals (in more parts) when the goal was described using a unit with higher (2,000 words) numbers ($M = 2.78, SD = 2.75$) compared to smaller (4 pages) numbers ($M = 2.08, SD = 2.02$).

Perceived number divisibility. Our theorizing predicts that the unit effect occurs because larger numbers are perceived to offer more opportunity to be divided in smaller parts than smaller numbers. As predicted, an ANOVA with unit type (numbers: small vs. large) and work focus (completed vs. remaining) as independent variables, and perceived opportunity to divide the quantitative goal as dependent variable yielded a main effect of unit type ($F(1, 253) = 13.33$,

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 $p < .001$). Participants thought that when the goal was expressed with larger numbers it offered more opportunities to be divided in smaller parts ($M = 4.46$, $SD = 1.88$) than when it was expressed with smaller numbers ($M = 3.60$, $SD = 1.94$). In addition, we found an unexpected main effect of work focus ($M_{\text{Completed}} = 4.25$, $SD_{\text{Completed}} = 1.93$; $M_{\text{Remaining}} = 3.80$, $SD_{\text{Remaining}} = 1.96$; $F(1, 253) = 3.90$, $p < .05$) and a non-significant interaction ($F(1, 253) = .178$, $p > .67$).

Mediation of unit effect on goal organization. We tested if, as theorized, the perceived divisibility of the numbers used to describe the goal mediated the effect between unit type and number of subgoals. A mediation analysis using a PROCESS macro (Hayes 2013, model 4, 5,000 samples) including type of unit as independent variable, quantitative goal perceived divisibility as mediator, and number of subgoals as dependent variable yielded a positive indirect effect. Goal perceived divisibility acted as a mediator between type of unit and number of subgoals ($\beta = .13$, $SE = .08$), and it was statistically different from zero (95% CI: .014 to .352).

Goal motivation. As previously explained, we expected that participants would be more eager to come back to the task when they were focused on the number of subgoals completed, but this effect would be attenuated when their focal point was on the number of remaining subgoals. To test it, we conducted an ANOVA with unit type (numbers: small vs. large) and work focus (completed vs. remaining) as independent variables, eagerness to restore the task as dependent variable, and task enjoyment as covariate ($p < .001$). This analysis yielded a main effect unit type ($M_{\text{Large numbers}} = 3.40$, $SD_{\text{Large numbers}} = 2.44$; $M_{\text{Small numbers}} = 2.62$, $SD_{\text{Small numbers}} = 1.94$; $F(1, 252) = 3.90$, $p < .05$), a non-significant effect of work focus ($M_{\text{Completed}} = 3.12$, $SD_{\text{Completed}} = 2.25$; $M_{\text{Remaining}} = 2.89$, $SD_{\text{Remaining}} = 2.22$; $F(1, 252) = .678$, $p > .41$), and crucially, the expected interaction effect ($F(1, 252) = 3.99$, $p < .05$ [without task enjoyment as covariate; $p < .05$]). Planned contrasts revealed that when participants focused on the numbers of completed subgoals, they were more eager to reinitiate the task in the large numbers (words) condition ($M = 3.82$, $SD = 2.50$) compared to small numbers (pages) condition ($M = 2.46$, $SD = 1.77$; $t(253) = 3.484$, $p = .001$). However, when participants focused on the number of remaining subgoals, this effect was attenuated ($M_{\text{Large numbers}} = 3.01$, $SD_{\text{Large numbers}} = 2.33$; $M_{\text{Small numbers}} = 2.77$, $SD_{\text{Small numbers}} = 2.12$; $t(253) = -.61$, $p > .54$, see Figure 5).

Moderated mediation on goal motivation. Finally, the proposed framework predicts that a goal structure of more versus less subgoals lead to a higher goal motivation (eagerness to come back to the task) due to a goal structure containing more subgoals, and that the mediating effect of number of subgoals on goal restoration is contingent on participants' focus. To test this final prediction, we conducted a PROCESS macro 15, with unit type as independent variable, number of subgoals as mediator (log transformed; skewness before transformation = 1.87, after = 0.98), participants' focus (subgoals: completed vs. remaining) as moderator, task enjoyment as covariate, and eagerness to come back to the task as dependent variable. As theorized, when participants focused on the number of completed subgoals, these mediated the effect between unit type and eagerness to reinitiate the task ($\beta = -.10$, $SE = .07$, 95% CI: $-.29$ to $-.008$). However, when participants focused on the numbers of remaining subgoals, the mediation effect disappeared ($\beta = .009$, $SE = .04$, 95% CI: $-.05$ to $.12$). Without task enjoyment as covariate; when participants focused on the number of completed subgoals ($\beta = -.07$, $SE = .06$, 95% CI: $-.28$ to $.00$), and when participants focused on the numbers of remaining subgoals ($\beta = .01$, $SE = .05$, 95% CI: $-.07$ to $.15$).

Discussion. The results of Study 3 supported the proposed theorizing. First, it replicated that people's preferred goal pursuit structure is affected by a mere change in the unit on which a goal is specified. It also showed that goal perceived divisibility acted as a mediator between unit type and number of subgoals. Finally, it further supported the claim that units with larger compared to smaller numbers have a positive effect on goal motivation, and it suggests consumers' focus during goal pursuit (completed versus remaining subgoals) as a boundary condition to this claim.

Study 4

The main goal of this study is to test whether the proposed effect of unit type on goal organization may hold in an important field setting: students' planning of their study time for a voluntary mock exam. We hypothesized that when the proposed study time was framed in larger numbers (120 minutes) rather than in smaller numbers (2 hours), students would be more likely to split their study time in more, but smaller subgoals. In addition, this study further tested the

downstream consequence on students' goal motivation (motivation to start studying earlier for the mock exam). We reasoned that if students were more motivated, they would prepare for the exam earlier rather than to procrastinate. This expectation aligns with prior work suggesting that people perceive goal structures containing more subgoals are as more manageable, promoting goal initiation (e.g., Gal & McShane, 2012; Huang, Jin, & Zhang, 2017; Soman & Shi, 2003).

Method

This study had a two-cell (unit numbers: small vs. large) between-subjects design. Three hundred twenty-eight students from a large public university (143 women; mean age = 18 years old) voluntarily participated in a study in which they could plan their study time (September 14 – 21; see Figure 6 for an overview) for a mock test (2 hours vs. 120 minutes) during week three of a seven-week course.

On September 9 (only 2 lectures were completed at that time), students were told that after week three there would be a mock test on lectures 1, 2 and 3 (test available on Sept 23). After learning about the mock test, students indicated their study planning (2 hours vs. 120 minutes) for week three (Sept 14 - 21) in a calendar. The number of days that they planned to study was our main dependent variable of number of (sub)goals (see MDA for full details). We expected that participants would study more days (albeit less time each day) when the study time was framed as 120 minutes compared to 2 hours.

Our main goal motivation dependent variable was students' eagerness to study for the exam. To measure it, we looked at how early students planned to study for the exam (1 - Sept 14th; 8 – Sept 21st). That is, we coded as "1" if students' first day of study was planned for Sept 14th, coded as "2" if students' first day of study was planned for Sept 15th, etc. As a secondary goal motivation variable, we also measured if students planned to study the first available day, Sept 14th (coded yes = 0, no = 1).

As control variables, students were asked (1 - not at all; 7 – very much): to what extent they were motivated to obtain a good grade for the course (interested in marketing management, they were someone who typically plans their study, they planned to study more hours, they were planning to stick to the planning). Finally, in which part of the course they were (1- beginning, 2 – middle, 3 – end). Controlling for these variables did not significantly influence the effect of

type of unit on the main dependent variables (number for subgoals and goal motivation), and thus, they are not discussed further. Finally, students responded to some demographic questions.

Results and discussion

Number of (sub)goals. Two participants who did not follow the instructions and one participant who filled out the initial survey after week three were excluded from the analysis. As expected, a Poisson regression with unit type (numbers: small vs. large) as the predictor and the number of subgoals as the dependent variable revealed that specifying the study time as 120 minutes led to choosing goal structures with more subgoals (planning to study more days: $M = 3.57$, $SD = 1.62$) than when the same study time was specified as 2 hours ($M = 2.64$, $SD = 1.50$; $\beta = .30$, Wald $\chi^2 (N = 325) = 22.33$, $p < .001$, see Figure 7).

Goal motivation. We expected that if students' motivation towards the exam was higher, they would be more eager to start to study for the exam rather than to procrastinate. In line with these expectations, it took students less time to start studying when the overall goal was specified as 120 minutes ($M_{\text{days}} = 2.35$, $SD_{\text{days}} = 1.51$) rather than 2 hours ($M_{\text{days}} = 2.81$, $SD_{\text{days}} = 1.70$; $F(1, 324) = 6.335$, $p = .01$). In addition, 34.6% of students (54 out of 156) planned to study the first available day in the 120 minutes condition, whereas this percentage dropped to 20.7% of students (35 out of 169) in the 2 hours condition (Pearson $\chi^2 (N = 325) = 7.888$, $p < .01$).

Mediation of goal motivation. Finally, we tested whether the positive effect of conveying the study time in units with larger rather than smaller numbers on students' eagerness to start to study was, as predicted, a consequence of their decision to organize their study in more days (goal structure with more subgoals). We run a mediation analysis using a PROCESS macro (Hayes 2013, model 4) that utilized bootstrapping with repeated extraction of 5,000 samples, including type of unit as independent variable, number of subgoals as mediator (log transformed; skewness before transformation = 1.22, after = .01), and how early students planned studying as dependent variable. This analysis yielded a positive indirect effect of the number of subgoals as a mediator ($\beta = .45$, $SE = .13$) that was significantly different from zero (95% CI: .23 to .75). We replicated these results when using as dependent variable if students planned to study the first available day of the study week ($\beta = .36$, $SE = .08$; 95% CI: .22 to .53).

Discussion. The results of study 4 show that even in a field experiment, the effect of the type of unit on goal organization and goal motivation is replicated. That is, students were more likely to plan to start studying early for an exam when they thought about studying 120 minutes compared to 2 hours. We believe that these results may have important implications because they suggest that people will be less likely to procrastinate doing a task when the goal is conveyed in units with larger numbers instead of smaller numbers. As a follow up, we also recorded if students' participation in the mock test differed based on the type of unit conditions. The results showed that even though the exam was available 14 days after the manipulation, students' likelihood of taking the mock test seemed higher in the 120-minute (50.6%) condition than in the 2-hour (40.8%) condition (Pearson χ^2 (N = 325) = 3.15, p = .07). Although there might be many reasons that may have driven students' participation in the exam, these results suggest that the effects of type of unit on goal organization may have consequences in other relevant outcomes.

General Discussion

The present work aimed to advance the understanding of quantitative goal pursuit organization. In four studies, we tested the hypothesis that for quantitative goals, the choice of a particular goal structure is determined by the measurement unit in which a goal happens to be specified: a superordinate goal that is specified in a unit with larger numbers is more likely to be organized with more subgoals than when the goal is specified in a unit with smaller numbers. We replicated the effect across a wide set of contexts, including a preregistered study, real behavior studies and a field experiment. Furthermore, we found evidence for the proposed positive effect of goals specified in units with larger compared to smaller numbers on goal motivation and a boundary condition for this positive effect. We believe that the findings of this manuscript are counternormative in two respects. On the one hand, specifying equivalent information in alternative units should not affect decisions in any way: a quantitative goal specified in smaller numbers (e.g., 2-hour task) can be pursued with as many subgoals as one specified in larger numbers (e.g., 120-minute task). On the other hand, with regard to the proposed process of perceived divisibility, all numbers are infinitely divisible mathematically speaking, so there should be no difference in a number's perceived divisibility into smaller parts. However, our findings demonstrate how people routinely violate these assumptions.

Contributions and Implications

This work offers several important contributions. First, while previous research on goals has primarily examined the *consequences* of goal pursuit structure (e.g., number of subgoals), we instead focus on its *antecedents*. We show that a seemingly irrelevant feature of a quantitative goal—the unit—affects how people organize their goal pursuit. In addition, we complement prior work by showing the positive effect of using quantitative goals with larger versus smaller numbers on goal motivation. The second contribution of this research is that it connects for the first time the rich literatures on goal pursuit, numerical cognition and unit effects by demonstrating how numerical cognition affects goal pursuit structure and provides first evidence of its downstream consequences in terms of motivation and consumer welfare. Third, we present an easy-to-implement nudge (Thaler & Sunstein, 2008) for managers or public policymakers who want to encourage individuals to use a particular goal pursuit structure.

We believe that a wide array of consumers may benefit from considering how numerical features may affect quantitative information's perceived opportunity to be divided and how this may affect people's subsequent decisions. For example, the link between the type of unit used to set a goal and its impact on pursuit frequency may have other implications for loyalty programs. The presented framework predicts that consumers will use a service more frequently if its loyalty program is defined using units with larger numbers (e.g., goal of 10,000 points) versus smaller ones (e.g., goal of using the service 10 times). Another application could be financial for decision making. For instance, employees might decide to receive their salary weekly if it is expressed using units with larger numbers (\$) but monthly if it is expressed using units with smaller numbers (\$K). Similarly, consumers may contribute to their 401K more frequently if the goal is to assign \$10,000 per year instead of \$10K, which may also increase the commitment to this goal. An extension worth investigating is how consumers might differ in their loan payment schedules based on the unit used to set up the loan (\$ vs. \$K). In this case, the type of unit might influence the payment timeframe (years to pay off the loan). We can speculate that a loan set in \$, compared to \$K, might lead consumers to pay it over more years.

We believe that the present work may also have important implications in regard to problematic consumption. For example, from a consumer welfare perspective, it is better to

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spread out alcohol consumption over more days rather than binge drink for only a few days (Liu, Redmond, Morrow, & Cullen, 2011; O'Neill et al., 2018; Piano, Mazzuco, Kang, & Phillips, 2017; Roerecke & Rehm, 2014). Another relevant instance is the growing worry with the negative effects of digital distractions that may inhibit people's ability to concentrate (Herrera, 2019; Ophir, Nass, & Wagner, 2009). To limit the negative effects of multitasking, it is generally better to limit distracting stimuli such as social media in as few sessions as possible per day (Junco & Cotten, 2012; Parry & le Roux, 2019). In fact, in two studies reported in the Methodological Detail Appendix (studies 5 and 6), we found that a goal to limit social media (Study 5) or to limit alcohol consumption (Study 6) was organized in fewer sessions when presented in units with smaller compared to larger numbers, which, according to the previously mentioned research, might be beneficial in the former case but detrimental in the latter. Study 5 also showed the replicability of the unit effect in a case where participants were asked to organize the reduction of a task that they presumably liked, as it is social media consumption. In addition, Study 6 suggested that participants' motivation to make the goal easier to pursue independently influenced its organization from the type of unit in which it was specified.

Our findings may also be relevant for goal-setting behavior in clinical settings (Bovend'Eerdt, Botell, & Wade, 2009; Wade, 2009). In cognitive behavioral therapy (CBT), it is common to have an organization module in which a client is asked to set up a calendar and break down a problem into manageable steps (Sprich, Knouse, Cooper-Vince, Burbridge, & Safren, 2010). For example, in the case of treating ADHD, participants may be more likely to break down a concentration task in more manageable "chunks" when it is specified as 60 minutes rather than 1 hour, thereby potentially increasing the likelihood of success. In the treatment of patients with traumatic brain injuries, goal setting and partitioning in subgoals are frequently used in goal management theory (Levine et al., 2002; van Hooren et al., 2006). Likewise, the behavioral activation treatment of depression involves identifying behavioral goals involving important life areas such as relationships, education and recreational activities (Dimidjian, Barrera, Martell, Muñoz, & Lewinsohn, 2011; Hopko et al., 2011; Hopko, Lejuez, Ruggiero, & Eifert, 2003). For each activity, it is determined what the goals will be in terms of the frequency of activity per week. Specifying the duration of desirable activities in units with larger numbers may lead to more desirable goal organizations involving more but smaller steps.

The finding that units with smaller numbers may lead to negative effects on goal motivation might be particularly relevant considering that most widely used units – so-called default units – are specified with relatively small numbers (Lembregts & Pandelaere, 2013). For example, it is probably more common to have a short duration to be specified as 5 minutes rather than 300 seconds. As such, the use of these default units may have unintended side effects in terms of goal motivation and other relevant downstream consequences.

Limitations and future research

As this work is one of the first to investigate the antecedents of goal organization, it may have important limitations that provide opportunities for future work. For instance, the current studies are primarily focused on situations in which people schedule how they will organize their goal and then actually follow through with that schedule. Future research may investigate the impact of unit type if consumers are not prompted to organize their goal ahead of time. Additionally, it would be interesting to assess whether quantitative goals prompt people more to plan beforehand compared to nonquantitative goals. This hypothesis would be based on prior work suggesting that precise numerical information may provide a higher sense of predictability (Lembregts & Pandelaere, 2019) or may appear more implementable (Gollwitzer & Sheeran, 2006) compared to more ambiguous information. Another interesting venue for future research would be to study factors that may lead consumers to maintain their predetermined goal structure, particularly for quantitative goals. In this case, units with higher (versus lower) numbers may lead people to switch faster to a different task because of a sense of accomplishment after completing a certain number of subgoals. At the same time, since prior work suggests that the perceived goal progress velocity is higher when it contains more (versus less) subgoals (Huang & Zhang 2011), people might be more willing to wait to complete the entire goal before moving to a different task or leaving the goal altogether. Finally, other boundary conditions for the positive effect of units with higher (versus lower) numbers on goals motivation might be worth studying. For instance, there might be instances where consumers rest more on their laurels (Amir & Ariely, 2008) if they realize that they have completed more (versus less) subgoals, and this effect might be enhanced if goal completion perceived velocity is higher (Huang et al 2017).

Although we found evidence of the proposed effect irrespective of goal attainability, future research might provide a deeper understanding of its role. Additionally, are consumers aware of the several factors that might influence their goal organization decisions (Williams & Poehlman, 2017), in particular, the unit in which a goal is specified? As with most numerical cognition effects (i.e., Monga & Bagchi, 2012; Pandelaere et al., 2011; Yan & Pena-Marín, 2017), consumers may be unaware that the unit/number would influence goal-related decisions. As a result, when asked to explain their goal organization decisions, other considerations such as goal attainability or the motivation to make the goal easier to achieve might be more prevalent. This might be relevant in situations where consumers are prompted to justify their decision (Simonson, 1989). Future work may examine how manipulating the need to justify a goal organization decision may alter the unit effect. Relatedly, since the proposed theorizing is based on the notion that larger (versus smaller) numbers are perceived to be easier to divide into smaller parts, future work could investigate when consumers may override this tendency or when it could be magnified. One situation might be if they are explicitly given reasons about the benefits of subgoals (e.g., if they are told that more subgoals are better). This being the case, even for goals using units with smaller numbers, consumers might be willing to spend more time and effort, eventually coming up with goal structures containing more subgoals. Another situation might be if consumers are encouraged to take as much time as needed to organize their goal. On the other hand, we believe that in situations where consumers do not have much time to make their decision, if they are multitasking (Zane, Smith and Reczek, 2019) or under cognitive load, the proposed unit effect might be amplified.

Other limitations relate to the influence of the proposed unit effect on goal motivation. For instance, although we mainly focused on situations where consumers choose their goal structure before starting their pursuit, there might be instances where this decision is made (or revised) towards the *end* of goal pursuit. We believe that in these cases, the positive effect of units with larger numbers might be attenuated. The reason is that in this phase, consumers' focus tends to be when goal completion may occur (Huang and Zhang, 2011) or to what extent the remaining tasks add value to goal completion (Huang, Jin & Zhang 2017). Thus, choosing goal structures with more subgoals at final stages may signal that a) it may take more time to achieve the goal because there is a higher number of remaining subgoals or b) the remaining subgoals are of lesser value because they are smaller, therefore reducing in both cases individuals' motivation.

Other areas for future research might be those related to other goal-related consequences. For instance, does goal pursuit start earlier if the goal is specified in units with larger compared to smaller numbers? We anticipate that this might be the case since units with larger numbers could lead to first subgoals that are perceived as easier to complete. Another relevant question is whether unit type might influence the time needed to complete an overall goal. For instance, would students finish their studying earlier (i.e., less likely to procrastinate) if their study goal was specified in minutes rather than hours? We hope that future research provides answers to these and other intriguing questions.

References

- Adaval, R. (2013). Numerosity and Consumer Behavior. *Journal of Consumer Research*, 39(5), xi–xiv.
- Amir, O., & Ariely, D. (2008). Resting on laurels: The effects of discrete progress markers as subgoals on task performance and preferences. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 34(5), 1158–1171.
- Bagchi, R., & Davis, D. F. (2011). 29for70itemsor70itemsfor 29? How presentation order affects package perceptions, *Journal of Consumer Research*, 39(1), 62-73.
- Bagchi, R., & Davis, D. F. (2016). The Role of Numerosity in Judgments and Decision-Making. *Current Opinion in Psychology*, 10(August), 89–93.
- Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation, *Journal of personality and social psychology*, 41(3), 586.
- Bonato, M., Fabbri, S., Umiltà, C., & Zorzi, M. (2007). The mental representation of numerical fractions: Real or integer? *Journal of Experimental Psychology: Human Perception and Performance*, 33(6), 1410–1419.
- Borrelli, B., & Mermelstein, R. (1994). Goal setting and behavior change in a smoking cessation program. *Cognitive Therapy and Research*, 18(1), 69-83.
- Bovend'Eerd, T., Botell, R. E., & Wade, D. T. (2009). Writing SMART rehabilitation goals and achieving goal attainment scaling : a practical guide. *Clinical Rehabilitation*, 23(4), 352–361.
- Burson, K. A., Larrick, R. P., & Lynch, J. G. (2009). Six of One, Half Dozen of the Other: Expanding and Contracting Numerical Dimensions produces Preference Reversals. *Psychological Science*, 20(9), 1074–8.
- Cameron, A. C., & Trivedi, P. K. (1998). *Regression Analysis of Count Data*. New York: Cambridge University Press.
- DeWolf, M., & Vosniadou, S. (2015). The Representation of Fraction Magnitudes and the Whole Number Bias Reconsidered. *Learning and Instruction*, 37, 39–49.

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- Dimidjian, S., Barrera, M., Martell, C., Muñoz, R. F., & Lewinsohn, P. M. (2011). The Origins and Current Status of Behavioral Activation Treatments for Depression. *Annual Review of Clinical Psychology*, 7, 1–38.
- Fishbach, A., & Dhar, R. (2005). Goals as Excuses or Guides: The Liberating Effect of Perceived Goal Progress on Choice. *Journal of Consumer Research*, 32(3), 370–377.
- Fishbach, A., Dhar, R., & Zhang, Y. (2006). Subgoals as substitutes or complements: The role of goal accessibility. *Journal of Personality and Social Psychology*, 91(2), 232–242.
- Gal, D., & McShane, B. B. (2012). Can Small Victories Help Win the War? Evidence from Consumer Debt Management. *Journal of Marketing Research*, 49(4), 487–501.
- Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in experimental social psychology*, 38, 69-119.
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Publications.
- Heath, C., Larrick, R. P., & Wu, G. (1999). Goals as Reference Points. *Cognitive Psychology*, 38(1), 79–109.
- Heckhausen, H., & Gollwitzer, P. M. (1987). Thought Contents and Cognitive Functioning in Motivational versus Volitional States of Mind. *Motivation and Emotion*, 11(2), 101–120.
- Herrera, T. (2019). How to Actually, Truly Focus on What You’re Doing: Tired: Shallow work. Wired: Deep work. *The New York Times*, pp. 1–5. Retrieved from <https://www.nytimes.com/2019/01/13/smarter-living/how-to-actually-truly-focus-on-what-youre-doing>
- Hopko, D. R., Armento, M. E. A., Robertson, S. M. C., Ryba, M. M., Carvalho, J. P., Colman, L. K., ... Lejuez, C. W. (2011). Brief behavioral activation and problem-solving therapy for depressed breast cancer patients: Randomized trial. *Journal of Consulting and Clinical Psychology*, 79(6), 834–849.
- Hopko, D. R., Lejuez, C. W., Ruggiero, K. J., & Eifert, G. H. (2003). Contemporary behavioral activation treatments for depression: Procedures, principles, and progress. *Clinical Psychology Review*, 23(5), 699–717.
- Huang, S. C., Jin, L., & Zhang, Y. (2017). Step by step: Subgoals as a source of motivation. *Organizational Behavior and Human Decision Processes*, 141, 1–15.

- Huang, S. C., & Zhang, Y. (2011). Motivational consequences of perceived velocity in consumer goal pursuit. *Journal of Marketing Research*, 48(6), 1045-1056.
- Junco, R., & Cotten, S. R. (2012). No A 4 U: The relationship between multitasking and academic performance. *Computers and Education*, 59(2), 505–514.
- Koo, M., & Fishbach, A. (2012). The small-area hypothesis: Effects of progress monitoring on goal adherence. *Journal of Consumer Research*, 39(3), 493-509.
- Kopetz, C. E., Kruglanski, A. W., Arens, Z. G., Etkin, J., & Johnson, H. M. (2012). The dynamics of consumer behavior: A goal systemic perspective. *Journal of Consumer Psychology*, 22(2), 208–223.
- Kruglanski, A., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A Theory of Goal Systems. *Advances in Experimental Social Psychology*, 34, 331–378.
- Lembregts, C., & Pandelaere, M. (2013). Are All Units Created Equal? The Effect of Default Units on Product Evaluations. *Journal of Consumer Research*, 39(6), 1275–1289.
- Lembregts, C., & Pandelaere, M. (2019). Falling Back on Numbers: When Preference for Numerical Product Information Increases after a Personal Control Threat. *Journal of Marketing Research*, 56(1), 104-122.
- Levine, B., Robertson, I. H., Duncan, J., Hong, J., Wilson, B. A., Clare, L., ... Carter, G. (2002). Rehabilitation of executive functioning: An experimental–clinical validation of Goal Management Training. *Journal of the International Neuropsychological Society*, 6(3), 299–312.
- Liu, W., Redmond, E. M., Morrow, D., & Cullen, J. P. (2011). Differential effects of daily-moderate versus weekend-binge alcohol consumption on atherosclerotic plaque development in mice. *Atherosclerosis*, 219(2), 448–454.
- Locke, E. A. (1982). Relation of goal level to performance with a short work period and multiple goal levels. *Journal of Applied Psychology*, 67(4), 512–514.
- Monga, A., & Bagchi, R. (2012). Years, Months, and Days versus 1, 12, and 365: The Influence of Units versus Numbers. *Journal of Consumer Research*, 39(1), 185–198.
- Ni, Y., & Zhou, Y.-D. (2005). Teaching and Learning Fraction and Rational Numbers: The Origins and Implications of Whole Number Bias. *Educational Psychologist*, 40(1), 27–52.

- O'Neill, D., Britton, A., Khaw, K. T., Bell, S., Kuh, D., Hannah, M. K., & Goldberg, M. (2018). Association of longitudinal alcohol consumption trajectories with coronary heart disease: a meta-analysis of six cohort studies using individual participant data. *BMC Medicine*, *16*(1), 1–13.
- Obersteiner, A., Van Dooren, W., Van Hoof, J., & Verschaffel, L. (2013). The natural number bias and magnitude representation in fraction comparison by expert mathematicians. *Learning and Instruction*, *28*, 64–72.
- Ophir, E., Nass, C., & Wagner, A. D. (2009). Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences*, *106*(37), 15583–15587.
- Pandelaere, M., Briers, B., & Lembregts, C. (2011). How to Make a 29% Increase Look Bigger: Unit Effect in Option Comparisons. *Journal of Consumer Research*, *38*(2), 308–322.
- Parry, D. A., & le Roux, D. B. (2019). Media multitasking and cognitive control: A systematic review of interventions. *Computers in Human Behavior*, *92*(November 2018), 316–327.
- Pena-Marin, J., & Bhargave, R. (2016). Lasting performance: Round numbers activate associations of stability and increase perceived length of product benefits. *Journal of Consumer Psychology*, *26*(3), 410–416.
- Piano, M. R., Mazzuco, A., Kang, M., & Phillips, S. A. (2017). Cardiovascular Consequences of Binge Drinking: An Integrative Review with Implications for Advocacy, Policy, and Research. *Alcoholism: Clinical and Experimental Research*, *41*(3), 487–496.
- Pope, D., & Simonsohn, U. (2011). Round numbers as goals: evidence from baseball, SAT takers, and the lab. *Psychological Science*, *22*(1), 71–79.
- Roell, M., Viarouge, A., Houdé, O., & Borst, G. (2019). Inhibition of the whole number bias in decimal number comparison: A developmental negative priming study. *Journal of Experimental Child Psychology*, *177*, 240–247.
- Roerecke, M., & Rehm, J. (2014). Alcohol consumption, drinking patterns, and ischemic heart disease: A narrative review of meta-analyses and a systematic review and meta-analysis of the impact of heavy drinking occasions on risk for moderate drinkers. *BMC Medicine*, *12*(1), 1–11.
- Ryan, W., Evers, E., & Moore, D. A. (2018). False Positive Poisson. Available at SSRN 3270063.

- Siegler, R. S., Fazio, L. K., Bailey, D. H., & Zhou, X. (2013). Fractions: The new frontier for theories of numerical development. *Trends in Cognitive Sciences*, *17*(1), 13–19.
- Simonson, I. (1989). Choice based on reasons: The case of attraction and compromise effects. *Journal of consumer research*, *16*(2), 158-174.
- Soman, D., & Shi, M. (2003). Virtual Progress: The Effect of Path Characteristics on Perceptions of Progress and Choice. *Management Science*, *49*(9), 1229–1250.
- Sprich, S. E., Knouse, L. E., Cooper-Vince, C., Burbridge, J., & Safren, S. A. (2010). Description and Demonstration of CBT for ADHD in Adults. *Cognitive and Behavioral Practice*, *17*(1), 9–15.
- Stock, J., & Cervone, D. (1990). Proximal goal-setting and self-regulatory processes, *Cognitive therapy and research*, *14*(5), 483-498.
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge*. New Haven: Yale University Press.
- Vamvakoussi, X., Van Dooren, W., & Verschaffel, L. (2012). Naturally biased? In search for reaction time evidence for a natural number bias in adults. *Journal of Mathematical Behavior*, *31*(3), 344–355.
- Vamvakoussi, X., & Vosniadou, S. (2010). How many decimals are there between two fractions? aspects of secondary school students' understanding of rational numbers and their notation. *Cognition and Instruction*, *28*(2), 181–209.
- Van Den Bergh, B., Heuvinck, N., Schellekens, G. A. C., & Vermeir, I. (2016). Altering speed of locomotion. *Journal of Consumer Research*, *43*(3), 407–428.
- van Hooren, S. A. H., Valentijn, S. A. M., Bosma, H., Ponds, R. W. H. M., van Boxtel, M. P. J., Robertson, I., ... Jolles, J. (2006). Effect of a structured course involving goal management training in older adults: A randomised controlled trial. *Patient Education and Counseling*, *65*(2), 205–213.
- Wade, D. T. (2009). Goal setting in rehabilitation: an overview of what, why and how. *Clinical Rehabilitation*, *23*(4), 291–295.
- Williams, L. E., & Poehlman, T. A. (2016). Conceptualizing consciousness in consumer research. *Journal of Consumer Research*, *44*(2), 231-251.
- Yan, D., & Pena-Marin, J. (2017). Round off the bargaining: The effects of offer roundness on willingness to accept. *Journal of Consumer Research*, *44*(2), 381-395.

Zane, D. M., Smith, R., & Reczek, R. (2019). The meaning of distraction: How metacognitive inferences from distraction affect brand attitudes. *Journal of Consumer Research*.

Zhang, Y., & Gao, L. (2016). Wanting ever more: Acquisition procedure motivates continued reward acquisition. *Journal of Consumer Research*, 43(2), 230-245.

Methodological Detail Appendix

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1. Additional analyses of the focal unit effect on subgoals.

(as recommended by Ryan, Evers and Moore, 2018)

	Poisson regression	T-test (S1, S3, S4)/ Multilevel linear regression (S1)	Negative binomial regression
Study 1	$\beta = .19, SE = .04$ $\chi^2(N = 199) = 19.15, p < .001$	$\beta = .67, SE = .15$ $\chi^2(N = 199) = 19.76, p < .001$	$\beta = .19, SE = .04$ $\chi^2(N = 199) = 19.15, p < .001$
Study 2 (only unit effect)	$\beta = .67, SE = .07$ $\chi^2(N = 265) = 87.40, p < .001$	Smaller Numbers.: $M = 2.28, SD = 2.82$ Larger Numbers: $M = 4.43, SD = 4.75$ $t(263) = 4.45, p < .001$	$\beta = .67, SE = .14$ $\chi^2(N = 265) = 22.02, p < .001$
Study 3	$\beta = .29, SE = .08$ $\chi^2(N = 257) = 12.97, p < .001$	Smaller Numbers: $M = 2.08, SD = 2.02$ Larger Numbers: $M = 2.78, SD = 2.75$ $t(255) = 2.33, p = .020$	$\beta = .29, SE = .14$ $\chi^2(N = 257) = 3.83, p = .050$
Study 4	$\beta = .30, SE = .06$ $\chi^2(N = 325) = 22.33, p < .001$	Smaller Numbers: $M = 2.65, SD = 1.51$ Larger Numbers: $M = 3.57, SD = 1.62$ $t(323) = 5.33, p < .001$	$\beta = .30, SE = .13$ $\chi^2(N = 325) = 5.50, p = .019$
Suppl. study 5	$\beta = .79, SE = .05$ $\chi^2(N = 200) = 225.81, p < .001$	Smaller Numbers: $M = 5.33, SD = 4.44$ Larger Numbers: $M = 11.69, SD = 17.78$ $t(198) = 3.47, p = .001$	$\beta = .79, SE = .15$ $\chi^2(N = 200) = 27.14, p < .001$
Suppl. study 6	$\beta = .36, SE = .04$ $\chi^2(N = 187) = 94.46, p < .001$	Smaller Numbers: $M = 13.54, SD = 9.02$ Larger Numbers: $M = 19.33, SD = 9.87$ $t(185) = 4.19, p < .001$	$\beta = .36, SE = .15$ $\chi^2(N = 187) = 5.58, p = .018$

2. Study 1: Procedure and Materials.

Scenarios and measures of number of sub-goals

- “Imagine that you want to lose weight, and you plan to run 10 kilometers [10 000 meters] a week. How would you complete this goal of running 10 km [10 000 meters]?”

- 1) all in 1 stretch
- 2) spread it out over 2 days
- 3) spread it out over 3 days
- 4) spread it out over 4 days
- 5) spread it out over 5 days
- 6) spread it out over 6 days
- 7) spread it out over 7 days”

- “Imagine that your boss asks you to work on an assignment (deadline = within 1 week), and you need to work for 8 hours [480 minutes] on it. How would you complete this goal of working for 8 hours [480 minutes]?”

- 1) all in 1 stretch
- 2) spread it out over 2 days
- 3) spread it out over 3 days
- 4) spread it out over 4 days
- 5) spread it out over 5 days
- 6) spread it out over 6 days
- 7) spread it out over 7 days”

- “Imagine that you want to limit your television watching by 2 hours [120 minutes] a week. How would you complete this goal of limiting your television watching by 2 hours [120 minutes]?”

- 1) all in 1 stretch
- 2) spread it out over 2 days
- 3) spread it out over 3 days
- 4) spread it out over 4 days

- 5) spread it out over 5 days
6) spread it out over 6 days
7) spread it out over 7 days”

- “Imagine that you need to teach for 3 hours [180 minutes] a week. How would you complete this goal of teaching for 3 hours [180 minutes]?”

- 1) all in 1 stretch
- 2) spread it out over 2 days
- 3) spread it out over 3 days
- 4) spread it out over 4 days
- 5) spread it out over 5 days
- 6) spread it out over 6 days
- 7) spread it out over 7 days”

- “Imagine that you plan to burn 2 kilocalories [2000 calories] per week by doing exercise. How would you complete this goal of burning 2 kilocalories [2000 calories]?”

- 1) all in 1 stretch
- 2) spread it out over 2 days
- 3) spread it out over 3 days
- 4) spread it out over 4 days
- 5) spread it out over 5 days
- 6) spread it out over 6 days
- 7) spread it out over 7 days”

- “Imagine that you are at home and you need to carry a pile of stuff weighing 12 kilograms [12000 grams] to your cellar. If you want you can split up the weight so you can carry it multiple times. How would you complete this goal of carrying 12 kilograms [12000 grams]?”

- 1) all in 1 stretch
- 2) do it in 2 turns
- 3) do it in 3 turns
- 4) do it in 4 turns

- 5) do it in 5 turns
6) do it in 6 turns
7) do it in 7 turns”

- “Imagine that you want to work for a charity for 6 hours [360 minutes] a week. How would you complete this goal of working for 6 hours [360 minutes]?”

- 1) all in 1 stretch (all in 1 session)
- 2) spread it out over 2 sessions
- 3) spread it out over 3 sessions
- 4) spread it out over 4 sessions
- 5) spread it out over 5 sessions
- 6) spread it out over 6 sessions
- 7) spread it out over 7 sessions”

Next page

Attainability Questions for each scenario:

- To what extent do you think that you would be able to complete the entire task? (1-not at all; 9-very much)
- To what extent do you think it would be difficult for you to complete the entire task? (1-not at all; 9-very much)
- To what extent do you think it would be attainable for you to complete the entire task? (1-not at all; 9-very much)

Next page

Please, indicate your age: _____

Gender: _Male; _Female

3. Study 2: Procedure and materials.

“In this study, we ask you to complete two tasks (for real):

- rate pictures on their attractiveness
- complete a goal of burning a number of kiloRD by clicking your mouse (a new unit for measuring how much energy you consume - something like kilocalories or joule).

If you want to know how much kiloRD we ask you to burn, please click next”

Next page

“You would be asked to burn: 2 kiloRD. 1 mouse-click burns somewhere between 0,01-0,03 kiloRD.”

[*In the conditions with an alternative cue:* “Please be aware that the required number of kiloRD may seem very large, but it is not! This is the reaction that we often got from earlier participants. They confirmed that it is not much work”.]

Next page

“So we ask you to rate pictures AND to burn 2 kiloRD by clicking with your mouse. Interestingly, YOU can choose how to complete the goal of 2 kiloRD . You can choose to burn the 2 kiloRD all at once before or after you rated all the pictures, but you can also choose to split up this goal.”

Before you make any decision, we want to make sure that you understand that anyway you choose to do it, everything is the same in duration/amount of work, it is just to give you as much freedom as possible in your goal pursuit!

Next page

Accepted Article

So you can choose to complete the picture rating task and burning 2 kiloRD. To do so, we ask you to complete the following form below. Please type the number of KiloRD you want to do in each part. An open box will mean that you will do the picture rating task. Again note that regardless of how you choose to organize this, all tasks are the same in duration/amount of work.

For example:

if you would like to burn the goal of 2 kiloRD all at once, and then the photos. you can fill type "2 kiloRD" in the first part. If you want to split the task of 2 kiloRD up in multiple pieces (e.g., to have some variation or to battle fatigue from clicking), you split the number of 2 kiloRD up and type it in the box. Any sequence will be arranged automatically so you don't have to worry how it will be organized practically."

Measure of number of (sub-)goals: We then presented them with the following open-ended format boxes:

Part 1 ___

Part 2 ___

Part 3 ___

Part 4 ___

Part 5 ___

...

Part 14 ___

Next page

“As our processing module sometimes has difficulties processing information, please indicate below what option is the closest to what you have chosen on the previous page.

Example two parts (Option 3):

A) rate pictures (part 1)

- B) burn kiloRD's (part 1)
C) rate pictures (part 2)
D) burn kiloRD's (part 2)

Next page

Next, they were presented with their preferred option. To save space, we present only one of the eight possibilities: the no-breaks condition with the clicking first, photo-rating second.

“You have chosen to first complete the clicking task first, next the photo rating task. On the next page, we will calibrate how much RD's your mouse-click burns.”

“If you are ready to start clicking, start clicking, the page will proceed automatically”

Next page

“Please click NOW as much as possible, the page will advance automatically if you have reached the required number of clicks.”

*At this stage, we automatically recorded the number of clicks within the fixed time interval. The total number of clicks within this timeframe constituted our **measure of motivation to complete the goal.***

“Next we will proceed to the photo rating-task.

- How attractive is this picture? (1 = not attractive at all; 7 = very attractive)”



297

Participants rated 9 of those (very similar) pictures.

Next page

Please, indicate your age: _____

Gender: _Male; _Female

4. Study 2: Results with full sample (close-ended data).

Number of sub-goals. As theorized, a Poisson regression with unit type and goal level cue as predictors and number of sub-goals as dependent variable yielded a main effect of unit type (Wald $\chi^2(N = 301) = 13.78$, $p < .001$), a main effect of goal cue (Wald $\chi^2(N = 301) = 11.68$, $p = .001$), and no significant interaction term (Wald $\chi^2(N = 301) = .04$, $p = .85$). Whether or not an explicit goal cue was present, a goal specified as 2 kiloRD was pursued with less sub-goals than 2000 RD in both situations ($\beta_{\text{cue absent}} = -.26$, Wald $\chi^2(N = 301) = 5.46$, $p = .019$; $\beta_{\text{cue present}} = -.28$, Wald $\chi^2(N = 301) = 8.82$, $p = .003$). Finally, we found a main effect of goal cue. Not surprisingly, a lower goal level leads to less sub-goals than a higher one ($\beta_{\text{small numbers}} = .24$, Wald $\chi^2(N = 301) = 4.59$, $p = .03$; $\beta_{\text{large numbers}} = -.16$, Wald $\chi^2(N = 301) = 7.52$, $p = .006$). Overall, these results replicate the ones obtained with the open-ended dependent variable.

5. Study 3: Procedure and materials.

We are conducting research on how people write in scientific communications. In this task, you will be asked to accurately count how many times a particular word appears in a text of 4 pages (vs. 2,000 words). On average, a page tends to have around 500 words.

However, you don't need to complete the 4 pages (vs. 2,000 words) task at once, you can split it in as many times as you want. During each break, you will see a picture. You can advance to the next part as soon as you want.

Next page

To summarize, we ask you to accurately count how many times a particular word appears in a text of 4 pages (vs. 2,000 words), and you are allowed to decide how do you want to complete the task. You can do it all at once or split it in as many times as you want. During each break, you will see pictures.

On the next page, you will be allowed to indicate how you would like to complete the goal.

Next page

How would you like to complete the 4 pages (vs. 2,000 words) counting task? Remember, you can choose to complete it in any way.

Open ended answer _____

Next page

You have decided to complete the 4 pages task in ____(*own open-ended answer*)____.

Please confirm your choice: _____

Next page

How many times does the **word "estimate(s)"** appears in the following text? (the text will appear according to your previous selection).

Short example of the text: “Estimations that include numerical information are ubiquitous in our daily lives and in numerous marketing contexts—whether to estimate stock market prices, housing prices, the battery life of a new phone, tablet or computer, the range of an electric vehicle, the calories of a dish—or simply when we answer questions about the temperature or the time. Because of its relevance, much work has investigated how the numerical information included in an estimation might be interpreted by its recipients, influence source judgments, or be persuasive in driving behavior.”

[Example after one part completed]

Break 1. Keep completing the task as soon as you want



Text would resume after the picture.

Next page

(After one minute) We are sorry, the task has been stopped.

Think about how many parts of the task you've already completed [vs. you still need to complete].

- Accepted Article
- How eager are you to come back to the task and finish it? (1-not eager; 7-very eager).

Next page

- How much were you enjoying the task? (1-nothing; 7-very much)

Next page

- Regarding the 4 pages (vs. 2,000 words) that you needed to review, to what extent did the number 4 (vs. 2,000) gave you the impression that it offered you many ways in which it could be divided into smaller parts? (1-not much; 7-a lot).

Next page

Please, indicate your age: _____

Gender: _Male; _Female

6. Study 4: Procedure and materials.

Two important notes:

- *The original survey was done in DUTCH – this is a translated version.*
- *We mentioned the survey and the follow-up mock test already in class 1 and 2, so students are already familiar with the 2-stage structure before they participated.*

Intro survey (launched on September 9)

Dear student, thank you for your participation in this short survey in which we hope can help you with making a plan for week 4 (from 14 to 21 September 2019). First, we will show you a consent form. If you do not agree with the consent form, or if you want to quit the survey, you are of course allowed to do it at any moment.

Next page [consent form]

Next page

Gender: Male; Female

Please indicate your age: _____

Please indicate your student number: _____

Next page

Dear student, it is of great importance that you keep track of the learning materials during the course. Both the lectures and the articles are a crucial part of the course. On the next page, we want to help you to plan the week from 14/9 until 21/9 and keep track of the materials of the past 2 lectures, and the upcoming lecture 3. After that week, a short quiz will become available with questions that are representative of the exam.

Next page

We would advise you to spend at least 2 hours [120 minutes] on the materials that week. You can, of course, decide on how to plan these 2 hours [120 minutes]. You can do it all at once, but you can also spread it over multiple days.

We only want to know how you would plan to distribute 2 hours [120 minutes] in the week between 14 and 21 September.

You can indicate this on the calendar on the next page.

Next page

How would you plan 2 hours [120 minutes] of study time in the week between 14 and 21 September? (Total has to be 2 hours [120 minutes])

Measure of number of (sub-)goals: *We then presented them with the following open-ended format boxes:*

Saturday 14 September ____

Sunday 15 September ____

Monday 16 September ____

Tuesday 17 September ____

Wednesday 18 September ____

Thursday 19 September ____

Friday 20 September ____

Saturday 21 September ____

If you want to study more, that's really OK.

Next page

Below you can find some general questions. Of course, they will be processed anonymously.

To what extent are you motivated to get a good grade for the course (1 = not at all; 7 = very motivated)

To what extent are you interested in marketing management (1 = not at all; 7 = very much interested)

To what extent are you somebody who typically plans his/her studying (1 = not at all; 7 = very much)

To what extent are you planning to study more than those 2 hours (1 = not at all; 7 = very much)

To what extent are you going to try to stick to the planning on the next page (1 = very much; 7 = not at all)

In which part of the course are we now, according to you?

1 = beginning of the course

2 = middle of the course

3 = end of the course

7. Supplementary Study 5.

In this study, participants were asked for advice about how to complete a goal of reducing daily social media use. From a consumer welfare position, it is generally better to limit social media use to as few sessions as possible (per day), to limit the negative effects of multi-tasking (Junco & Cotten, 2012; Ophir et al., 2009; Parry & le Roux, 2019). In line with the proposed theorizing, we expected that participants would be less likely to split up the goal in many parts when it happened to be specified in a unit with smaller numbers, which may be interpreted as a better decision as it may lead to less distractions and less switching costs than when a goal happened to be specified in a unit with larger numbers.

Method. We recruited 203 participants (Mage = 40 years, 106 women) on Prolific Academic, an online labor market designed for academic research. Participants were randomly assigned to one of the two unit between-subjects conditions (“wasting 1 hour [60 minutes] per day on social media such as Facebook or Instagram”). To encourage participants involvement, they were told that the experimenters would randomly test a couple of the advices given, and the most-liked ones by the experimenters would get a bonus payment. In reality, we awarded a bonus payment to randomly selected participants who suggested a consumption pattern that was best in terms of consumer welfare (i.e. less than 3 social media sessions). Next, participants were asked whether they understood the instructions (YES/NO). Finally, participants indicated the number of sub-goals in an open-ended question (“I would like to advise you to organize this 1 hour [60 minutes] of Facebook/Instagram in ... session(s); just type the number of session(s) below”). Three participants were excluded: one participant indicated that he/she did not understand the instructions, two additional participants did not give a valid answer to the dependent variable.

Results. A Poisson regression with unit type as predictor and number of sub-goals dependent variable revealed that specifying a goal to limit social media in units with smaller numbers was more likely to lead to goal structures consisting of less sessions compared to when it was specified in a unit with larger numbers ($\beta = -.79$, Wald $\chi^2(N = 200) = 226.81$, $p < .001$). These results replicate the proposed unit effect in a context where participants were asked to organize the reduction of a task that they presumably liked, as it is social media consumption.

8. Supplementary Study 6.

In Study 6, participants were asked for advice about how to organize a goal of limiting monthly beer consumption. In this case, it is better to spread out consumption over more days rather than binge drinking on only a few days (Liu et al., 2011; O’Neill et al., 2018; Piano et al., 2017; Roerecke & Rehm, 2014). We predicted that specifying that goal in a unit with larger numbers, rather than a unit with smaller numbers, would be more likely to lead to spread-out drinking pattern, which can be considered to be healthier. This study also tested if the motivation to make goal pursuit easier accounted for the effect of unit type on goal pursuit organization or if, as the theorizing suggests, may have an independent effect. That is, we predicted that having a stronger motivation to make a goal easier to pursue would lead to more sub-goals, and that this effect would be independent from the proposed unit effect.

Method. We recruited 200 Mturk participants (Mage = 35 years, 82 women). The procedure of this study was identical to Study 5. Participants were randomly assigned to one of the two unit between-subjects conditions (4a: “drinking 11 liters [372 fluid ounces] of beer in the month of March”). Next, participants indicated the number of sub-goals in an open-ended question: “On how many days (of the 31 days in that month) do you advise me to drink beer?; just type the number of day(s) below”. Finally, participants responded to a 5-items scale ($\alpha = .80$) aimed to measure the extent to which they tried to make the goal pursuit easier (1-not at all; 7-very much): To what extent did you think about making it easier for me (easier to complete; easier to manage; making it less likely that I drink more than I should; making it less likely that I would suffer)?. Including this measure at the end of the study allowed us to test whether the motivation to make goal easier to pursue would act as a mediator, moderator or, as the theorizing suggests, as an independent factor that might influence goal organization. Thirteen participants were excluded from the following analysis: five participants indicated that he/she did not understand the instructions, eight additional participants did not give a valid answer to the dependent variable.

Results. The results showed that specifying the goal as “372 fluid ounces of beer per month”, rather than “11 liters” lead to more spread-out drinking patterns ($\beta = .36$, Wald $\chi^2(N = 187) = 94.46$, $p < .001$). Crucially, specifying a goal in liters ($M = 5.44$, $SD = 1.17$) or fluid

ounces ($M = 5.55$, $SD = .99$) did not affect the motivation to make a goal easier ($t(185) = -.65$, $p = .51$), which is consistent with the proposed theorizing. Further, when adding this variable (mean-centered) to the Poisson regression with unit type as predictor and number of (sub-)goals as dependent variable, the proposed effect of unit type remained significant ($\beta = .34$, Wald $\chi^2(N = 187) = 85.30$, $p < .001$), and that motivation to make the goal easier to pursue had an independent effect on goal pursuit organization ($\beta_{\text{small numbers}} = .13$, Wald $\chi^2(N = 187) = 24.75$, $p < .001$; $\beta_{\text{largenumbers}} = .13$, Wald $\chi^2(N = 187) = 28.77$, $p < .001$). Also, the interaction between unit type and the motivation to make the goal easier to pursue was not significant (Wald $\chi^2(N = 187) = .05$, $p = .82$).

Discussion. These results shed light into the separate effects of unit type and participants' motivation to make the goal easier to pursue on goal organization. A stronger motivation to make a goal easier to pursue did lead to a goal structure with more sub-goals, but this motivation was independent from the proposed effect of unit type on goal pursuit organization.

Table 1

Mean number of (sub)goals per scenario as a function of (number) unit type (not preregistered):
Study 1

<u>Scenarios (N = 199)</u>	<u>Mean number of (sub)goals (SD)</u>	<u>Test statistic</u>
3 hours teaching 180 minutes	2.19 (1.28) 3.22 (1.58)	$\beta = -.39$, Wald = 19.18, p < .001
2 hours less tv-watching 120 minutes	3.35 (2.10) 3.94 (1.93)	$\beta = -.16$, Wald = 4.68, p = .03
6 hours charity work 360 minutes	2.88 (1.64) 3.72 (1.88)	$\beta = -.26$, Wald = 10.61, p = .001
10 kilometers running 10 000 meters	4.44 (1.78) 4.65 (1.59)	$\beta = -.05$, Wald = .46, p = .50
12 kilograms carrying 12 000 grams	2.94 (1.82) 3.44 (1.93)	$\beta = -.16$, Wald = 3.90, p = .05
8 hours work assignment 480 minutes	3.60 (1.71) 4.00 (1.60)	$\beta = -.11$, Wald = 2.14, p = .14
2 kilocalories reduction 2000 calories	3.43 (2.00) 4.53 (1.71)	$\beta = -.28$, Wald = 14.89, p < .001

Note. Results controlling for attainability perceptions (per scenario) are similar.

Figure 1

Conceptual Model

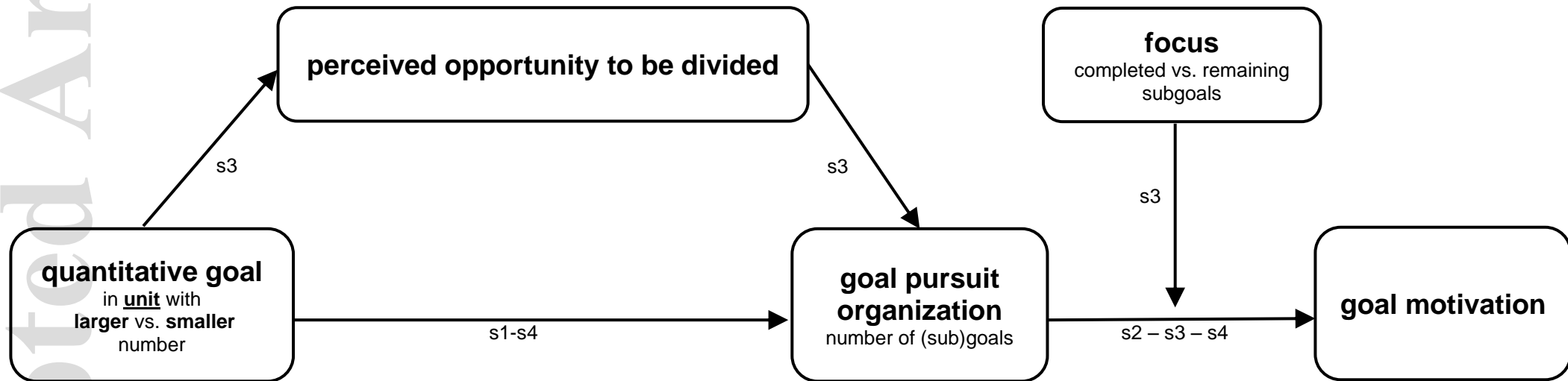
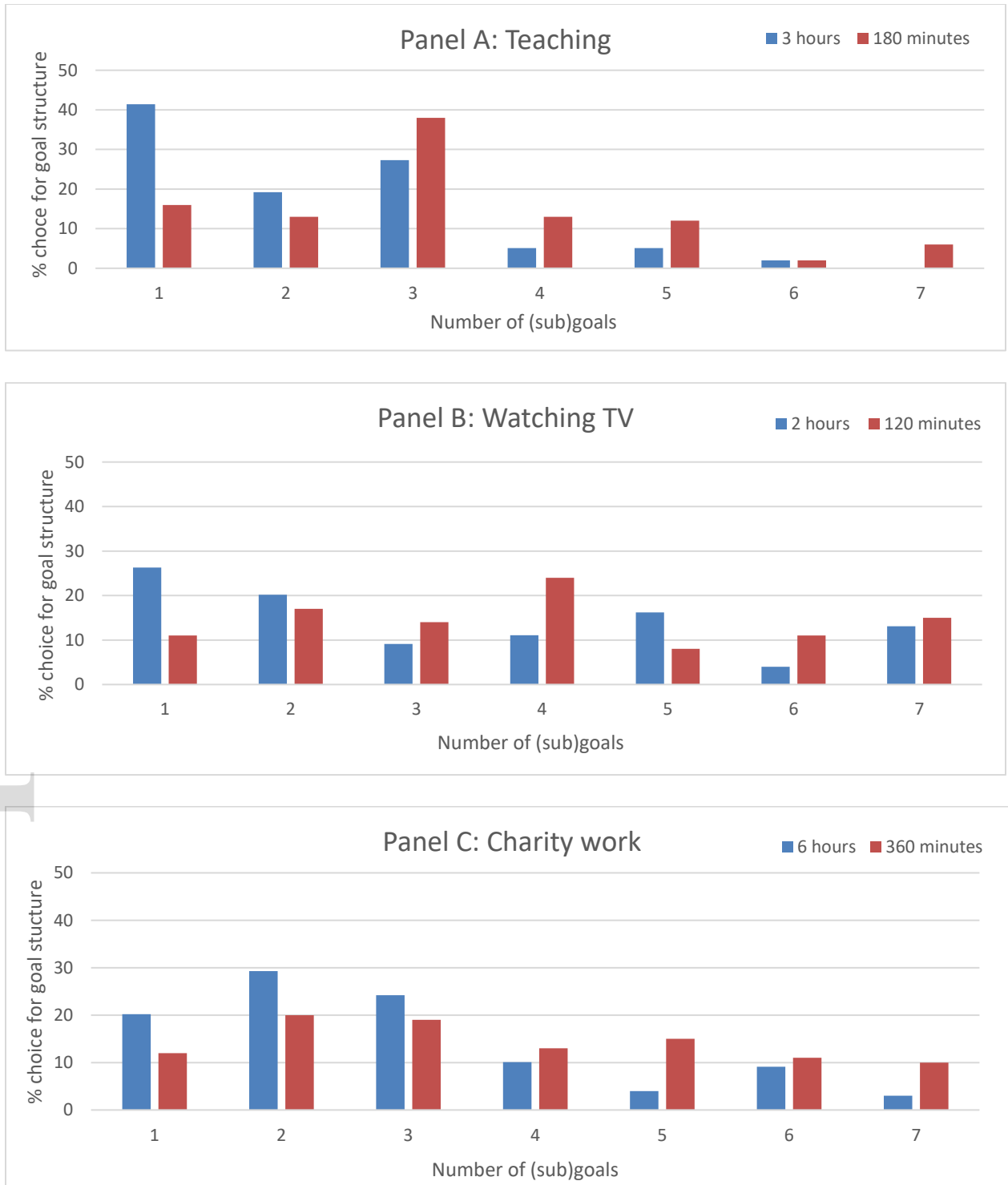
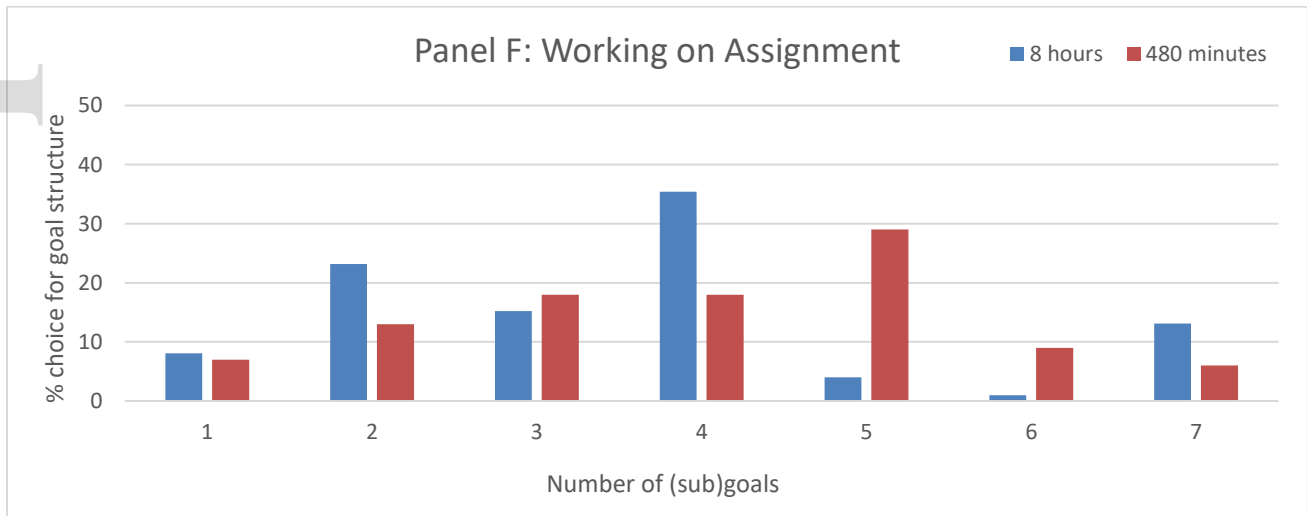
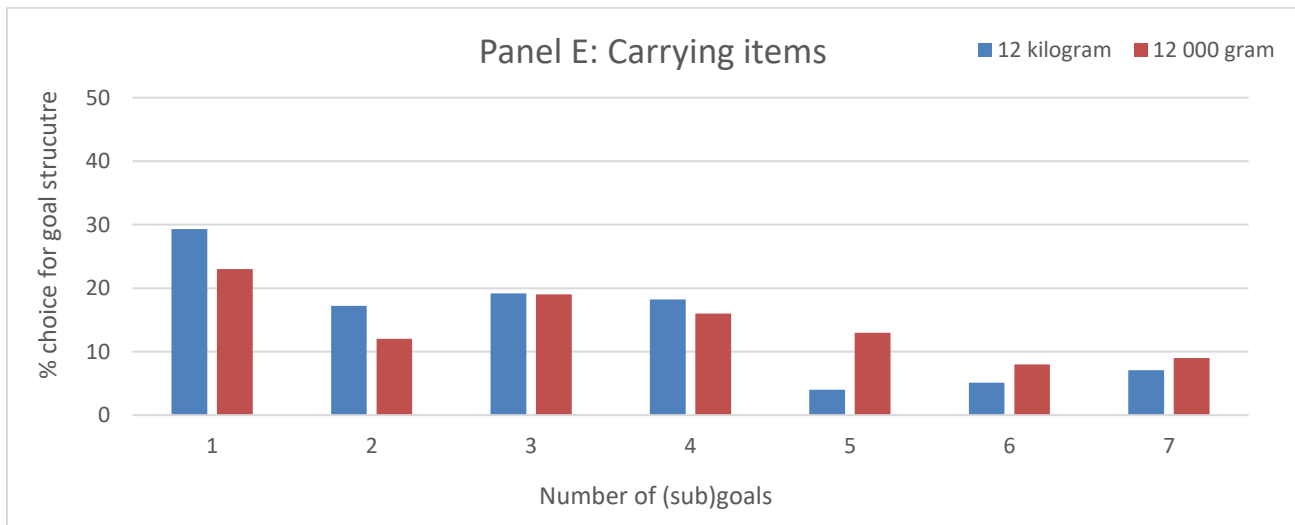
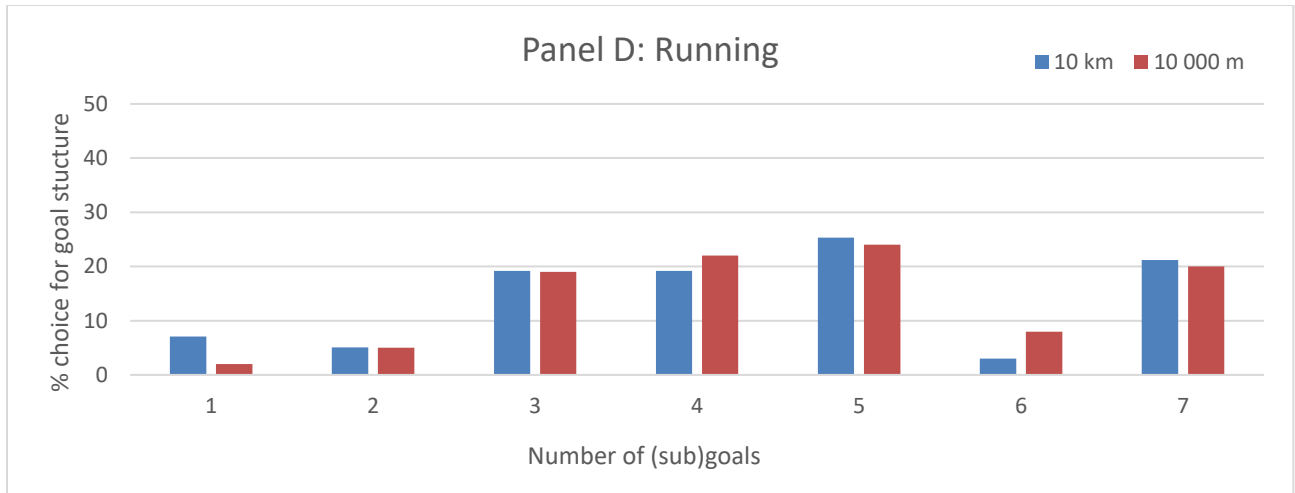


Figure 2

Mean number of (sub)goals per scenario as a function of (number) unit type (not preregistered):
Study 1





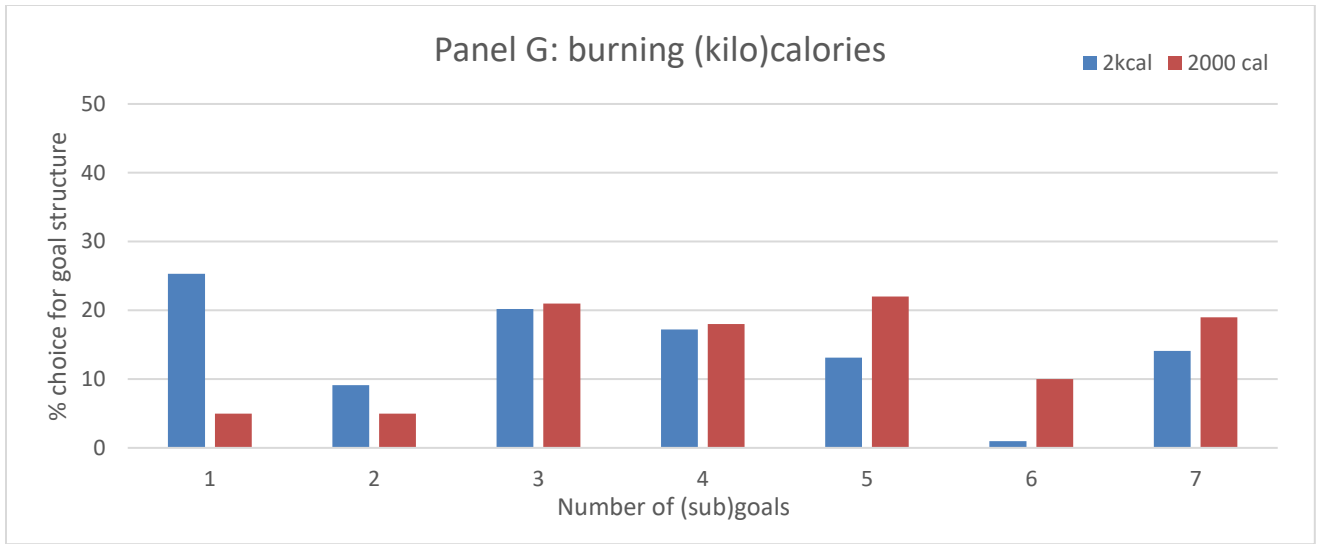


Figure 3

Number of (sub)goals as a function of (number) unit type and goal attainability: Study 2

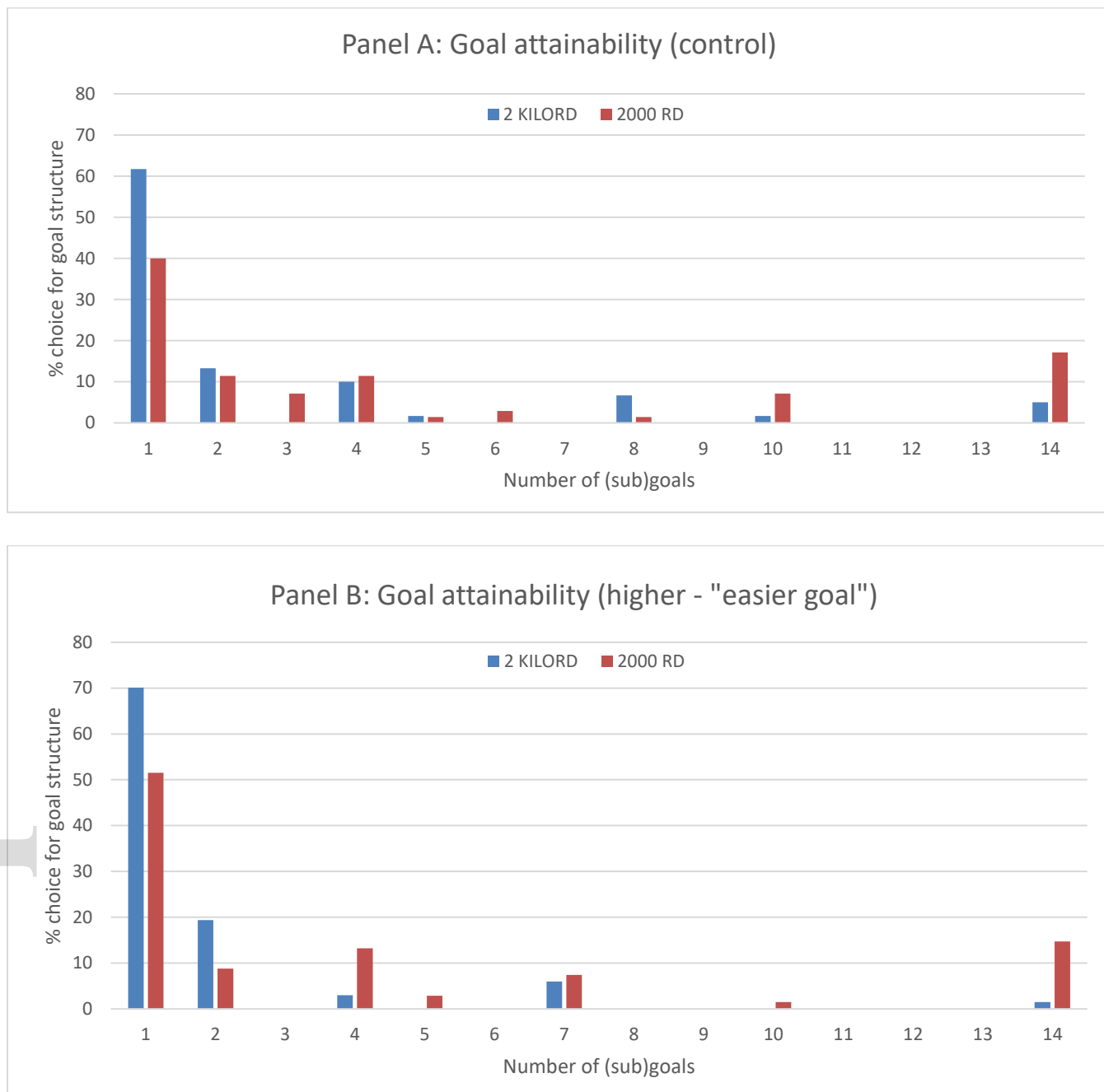


Figure 4

Number of (sub)goals as a function of (number) unit type: Study 3

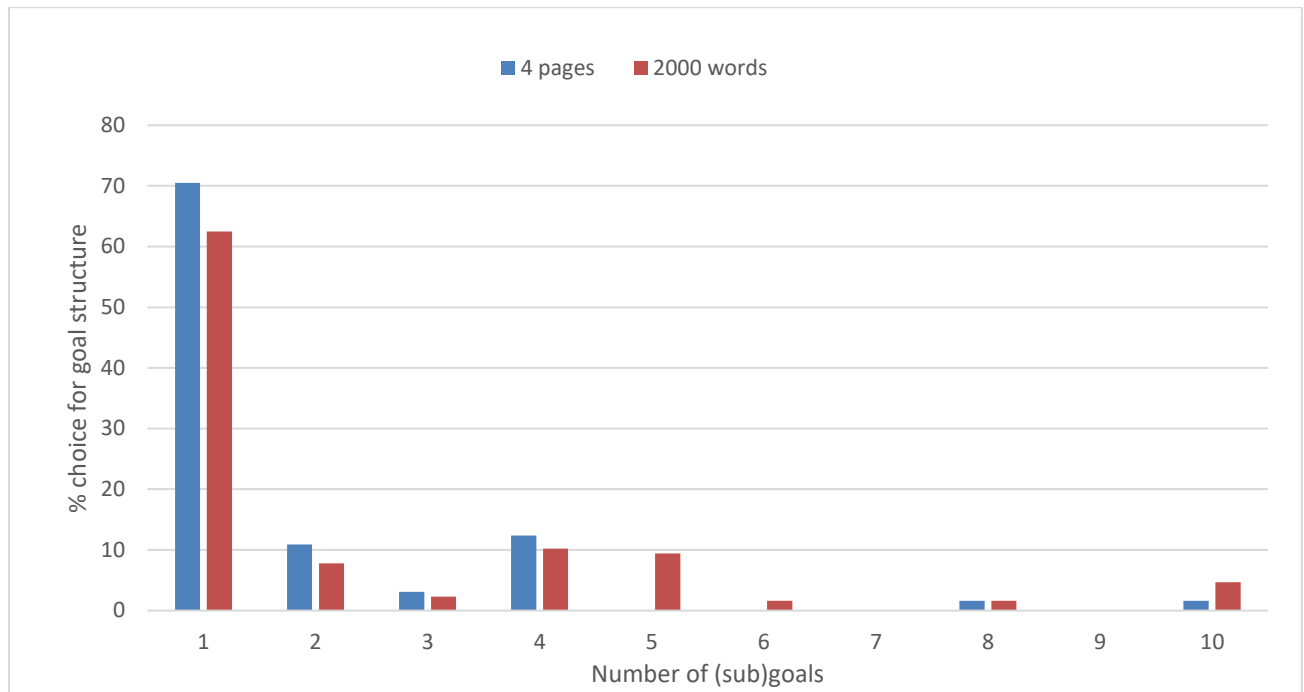
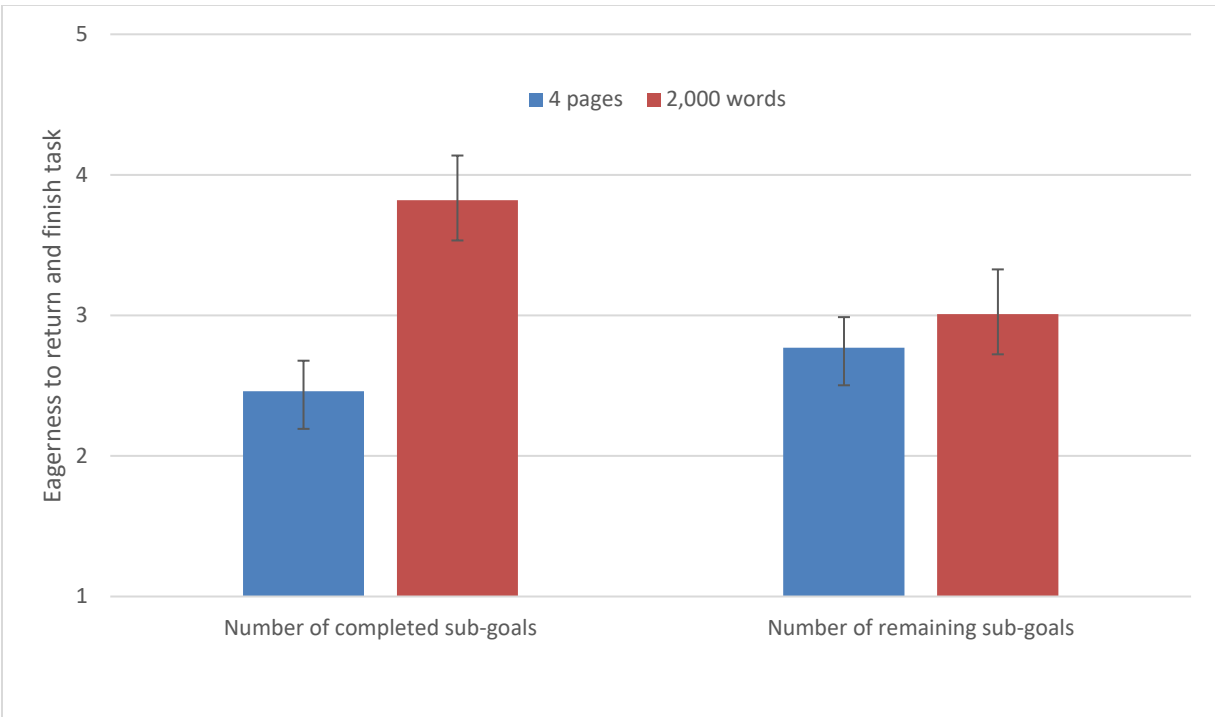


Figure 5

Eagerness to return and finish main task as a function of type of unit and focus on number of completed versus remaining subgoals.



Note. Error bars refer to standard errors.

Figure 6

Overview procedure: Study 4

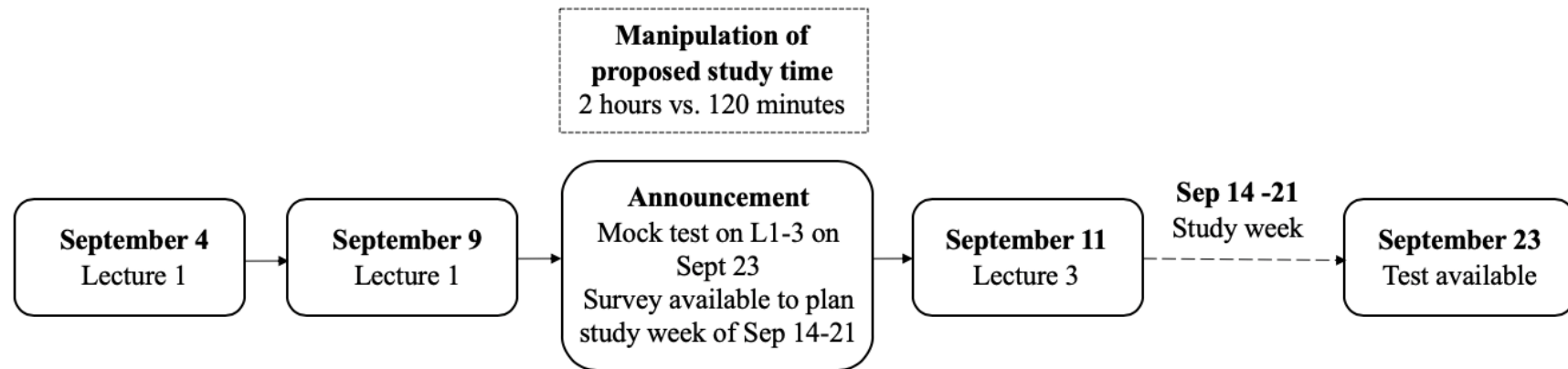


Figure 7

Number of (sub)goals as a function of (number) unit type: Study 4

