

THE EFFECTS OF MOTIVATION AND PROGRESS FRAMING ON GOAL PURSUIT

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THESIS

Submitted in partial fulfillment of the requirements  
for the degree of Master of Science in Advertising  
in the Graduate College of the  
University of Illinois at Urbana-Champaign, 2016

Urbana, Illinois

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## ABSTRACT

Will different progress types of reports lead to goal commitment or digression? Does progress feedback focused on past progress, such as, “you have completed 50%” affect behavior differently than feedback focused on what remains to be done, such as, “you have 50% remaining”? People can feel achievement and discontinue goal pursuit when one step toward a goal is perceived as progress, not as commitment (Fishbach & Dhar, 2005). The primary goal of this research was to examine whether the extent to which people engage in goal-consistent activities after receiving different types of progress information depends on the nature of their motivation. The study employed a 2 (Motivation: Intrinsic/ Extrinsic)  $\times$  2 (Progress Framing: To-Date/ To-Go) between-participants experimental design. The results showed that participants who were given the different motivational components were similar in their choice and persistence. Motivation affected performance, such that extrinsically motivated participants performed better than intrinsically motivated participants. There was a main effect of progress framing on perceived pressure and on negative mood, such that participants exposed to a “to-go” progress message felt more anxiety and more negative mood. The implications of these findings and the direction of future studies are discussed.

## ACKNOWLEDGMENTS

I am incredibly grateful for the generous support of Dr. Patrick Vargas; I enjoyed each step I took toward this work thanks to his encouragement, mentorship, and trust. I would also like to thank Dr. John Wirtz, Dr. Kevin Wise, and Dr. Eva Pomerantz for their helpful comments and guidance. Finally, special thanks to my family who supported me in every way with everlasting love.

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## CHAPTER 1. INTRODUCTION

Big or small, goals in life are an influential driver for many day-to-day activities. A dedicated student decides to study for an exam instead of having fun with her friends in order to gain good grades, a determined dieter chooses balsamic vinaigrette over blue cheese dressing for salads in a restaurant, and a chronically late person sets his clock ten minutes fast to be on time. As can be inferred in these examples, pursuing goals indispensably incorporates a form of self-regulation. Self-control or self-regulation can be seen as the capacity to alter one's own responses or inner states in a goal-driven way (Baumeister, Schmeichel & Vohs, 2007).

Self-regulation can also be a process of behavioral change where one self-imposes behavioral standards, monitors one's own actions, and evaluates the actions by comparing with a set of standards (Carver & Scheier, 1982). The following example illustrates the processes of self-regulation; Sam decides to lose weight and get healthy. He resolves to work out for one hour everyday and eat healthy foods so as to lose five pounds in four weeks (*i.e.*, goal setting and initiation). Every time Sam wants to drink sodas or sees the luring fast food signs on the street, he consciously reminds himself of his goals and resists the cravings (*i.e.*, monitoring food intake). He also warns himself on a day he skips going to gym (*i.e.*, monitoring physical exercise). After the first week, Sam measures his body weight and BMI to check his achievement and see if he is getting closer to the goal (*i.e.*, evaluation).

During the evaluation phase people gauge their progress by confirming whether their efforts have been successful thus far, and assessing the likelihood of their future success (Carver & Scheier, 1982). Progress can be expressed in either a completed distance from the beginning to the current state or a remaining distance from status quo to the end state, depending on where the

reference point is anchored. Although the objective goal progress is one and the same, “to-date” frame that highlights completed actions can differ from “to-go” frame that highlights remaining actions in subjective evaluation of progress (Carver & Scheier, 1998; Koo & Fishbach, 2008). Emphasizing the completed progress evokes the physical or psychological sunk cost (Arkes & Ayton, 1999; Arkes & Blumer, 1985) or need for cognitive consistency (Cooper & Fazio, 1984; Festinger, 1957), whereas emphasizing the remaining progress reminds people of the discrepancy between their current state and their goal attainment (Carver & Scheier, 1998; Locke & Latham, 2002).

What is more interesting about the concept of progress is that it affects people’s motivation or persistence to achieve a goal. One classic notion, known as the goal gradient hypothesis, has shown that motivation for goal completion increases as one gets closer to the goal (Brendl & Higgins, 1996; Förster, Higgins & Idson, 1998; Hull, 1932). That is, as the distance between the current and the ideal state becomes smaller, the motivation for goal completion gets larger.

If people’s tendency to approach a goal increases with the proximity to the goal as the goal gradient hypothesis predicts, one’s motivation to achieve a goal is most heightened when taking the last step before reaching the goal. However, this is not always the case in real life where there is temptation or another goal. According to Fishbach and Dhar (2005), people tend to reduce their motivation to pursue the initial goal when they feel that sufficient progress has been made and when there are other goals. They explained that whatever translated to a sense of goal achievement can make one deviate from a goal.

However, I question this notion that people would digress from a goal if they feel they have made adequate progress. I argue that perception of progress does not necessarily counter

motivation or goal pursuit for those who truly enjoy what they are currently doing. Intrinsically motivated people would not put much emphasis on goal completion or consciously remind themselves of how far away they are from the goal. I assume that those who find intrinsic interest for doing the actions have a different mindset compared to those who pursue extrinsic rewards. This concept of intrinsic motivation can nullify the previously demonstrated effect of progress perception on deviation from goals, and thus lead to a different conclusion.

In the current study, I examined how different types of progress feedback leads to differing levels of commitment to, or digression from, focal goals. Does a progress message focused on past progress, such as, “you have completed 50%” affect behavior differently than a message focused on what remains to be done, such as, “you have 50% remaining”? I suggest that the extent to which people engage in goal-relevant activities after different progress messages depends on the nature of their motivation. That is, those who have intrinsic interest and enjoyment toward a task would engage in goal-congruent activity, regardless of how their progress report is framed. However, those who hold extrinsic motivation toward a task would be influenced by the direction of progress framing. I predict that extrinsically motivated people would tend to deviate from the goal when they are informed of their completed progress; however, when they are informed of progress remaining they would adhere to the goal. I reason that intrinsic motivation directs one’s attention to the processes and makes one appreciate each step toward the goal, whereas extrinsic motivation makes one focus on the outcome and may encourage people to skip the procedure if possible.

This thesis is organized in the following order: I review previous research on goals and self-regulation, progress perception, and orientation of motivation. I suggest my hypotheses, offering explanations of how people differently perceive progress and pursue goals given



different motivations. Then I illustrate the experimental design including participants, stimuli, and procedures, and present two experiments that examined the effect of motivation and progress framing on goal pursuit. Lastly I discuss the results, providing implications, limitations, and directions for future research.

## CHAPTER 2. LITERATURE REVIEW

### Goals and self-regulation

Broadly, goals are defined as an “internal representation of desired states,”(Austin & Vancouver, 1996) or simply put, “where I want to be.” As the definition of goals allows much latitude for interpretation, pursuing goals, or self-regulation<sup>1</sup>, can be conceptualized from various perspectives. One influential model illustrates self-regulation as continuous processes of reducing discrepancies between current and ideal states (Carver & Scheier, 1982). This model uses the term “feedback loops,” also known as TOTE (Test-Operate-Test-Exit), to describe multiple iterative steps that people go through to exercise self-regulation. According to this feedback-loop theory, people evaluate their current state relative to their ideal state (*i.e.*, test) and initiate actions in order to reduce the discrepancy. After they make efforts toward the ideal state (*i.e.*, operate) and sense that the discrepancy is diminished enough (*i.e.*, test), they terminate the processes (*i.e.*, exit). Self-regulation is, in essence, a series of processes that minimize mental incongruity by comparing one’s present state against some internal standard.

Since self-regulation stems from recognizing discrepancies, one important factor for self-regulation is self-awareness (Carver & Scheier, 1982); it is hard to change a behavior if one is not aware of it. When people drink alcohol, for example, people tend to have a reduced self-awareness that leads to self-regulation failures (Baumeister et al., 2007; Hull, 1981). Increased self-awareness enables people to identify conflicts, either pure temptation or other goals in different domains. For example, a chocolate bar for a dieter is just a temporary desire against the weight-watching goal. But an invitation to a friend’s dessert party poses a different dilemma; if

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<sup>1</sup> I will use the terms goal pursuit and self-regulation interchangeably because the most central aspect of goal pursuit concerns self-regulation.

the dieter turns down the offer, he feels like he may sacrifice social relationships for the sake of losing weight. People could, in these situations, either “balance” the goals and temptations (or multiple goals) by satisfying each at a time or “highlight” only a goal by consistently choosing goal-relevant options (Fishbach & Zhang, 2008). The highlighting strategy, rather than the balancing strategy, makes people discern conflicts better and exercise greater self-regulation (Fishbach & Converse, 2011).

### Perception of progress

Over the course of self-regulation toward a goal, people exert more persistence and employ more resources as they approach closer to the goal. The phenomenon is referred to the goal gradient hypothesis. According to this hypothesis, the tendency to reach a goal progressively increases as the goal becomes nearer. This was first observed among rats in a maze who ran faster when they moved closer to food (Hull, 1932). Consider that ten steps are required to reach a goal; then each one step should equally contribute to goal attainment. People see the progress, however, in terms of the magnitude of remaining discrepancy (Brendl & Higgins, 1996). The first step is perceived as 10% reduction in total discrepancy and the last step as 100% reduction in all discrepancy. People who have different regulatory focus (*i.e.*, promotion and prevention) also showed a similar pattern of goal gradient hypothesis such that they approach and avoid, respectively, with more effort as “the goal looms larger” (Förster et al., 1998, p. 1115).

Progress can be expressed in terms of either what has been achieved so far (to-date frame) or what is remaining to be done (to-go frame). People can be motivated either when they remind themselves of the invested time and effort or when they think about what remains to be

done to attain a goal (Koo & Fishbach, 2008). For example, dieters can maintain their motivation to reach their own target weights by thinking about the completed distance as well as remaining distance. Previous research suggests that emphasizing completed progress is conceptually linked to the sunk cost fallacy (Arkes & Ayton, 1999; Arkes & Blumer, 1985) or need for cognitive consistency (Cooper & Fazio, 1984; Festinger, 1957) whereas emphasizing the remaining progress makes people to better distinguish a discrepancy between their current state and their goal attainment (Carver & Scheier, 1998; Locke & Latham, 2002).

The notion that motivation increases with the closeness to the goal was further extended to a “small-area hypothesis” (Koo & Fishbach, 2012). The hypothesis suggests that highlighting completed actions is more motivating than highlighting uncompleted actions at the beginning of goal pursuit; but as people approach the end state, an indicator of remaining progress is more stimulating than that of completed progress. Why is this so? Because people are motivated to take actions that bring greater impact on goal attainment (Kivetz, Urminsky & Zheng, 2006; Koo & Fishbach, 2012). Consider the following example. A café customer has two stamps on her “buy 10, get one free” reward card. When she considers her goal progress (a free cup of coffee when the card is full of stamps) in terms of existing stamps, the third drink purchase will be viewed as adding 50% more to the existing ones. When she considers her goal progress in terms of the stamps that are remaining for a free drink, the same purchase will be viewed as removing 12.5%. A focus on completed progress, in this case, is more motivating than a focus on remaining progress. In contrast, if the customer has already earned eight stamps, the ninth drink purchase would mean either adding 12.5% of the existing stamps or removing 50% of the remaining stamps. Here a focus on remaining actions will be more motivating than a focus on completed actions.

The following study (Koo & Fishbach, 2012) illustrates how differently framed progress can affect people's motivation. A field experiment (Study 1) was conducted in a sushi restaurant where diners can receive one free meal after buying ten meals. Some people received reward cards that they can earn a sushi-plate-shaped stamp for every purchase (*i.e.*, accumulated progress) while others received reward cards that they can remove a sushi-plate-shaped picture for every purchase (*i.e.*, remaining progress). The results showed that participants who had a high level of initial progress were more likely to come back with the cards that highlighted remaining purchases, whereas for low progress participants the cards that highlighted accumulated purchases were more effective<sup>2</sup>.

However, progress reminders do not always make people motivated. Progress remarks can also play a role in leading people to think about their progress as an accomplishment and making them deviate from initial goal pursuit (Fishbach & Dhar, 2005). Female dieters in Fishbach & Dhar's (2005) first experiment were asked to indicate how much they deviated from their ideal weight. Perceived progress toward their goals was experimentally manipulated (*i.e.*, the scale endpoints for high progress were -25 and +25 pounds, and for low progress were -5 and +5). High progress participants perceived their discrepancy as small and tended to choose an unhealthy snack over a healthy one. In contrast, low progress participants perceived a large discrepancy tended to choose a healthy snack. Fishbach and Dhar (2005) explained that the visual stimuli of a wide scale made participants perceive their weight gap as small compared to a narrow scale, which elicits an illusory sense of high progress.

In their second experiment, student participants who made a downward comparison to those who study fewer hours (*i.e.*, 30 minutes) felt they were making more progress in academic

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<sup>2</sup> Level of initial progress was not randomly assigned in this study, but was assessed with the number of purchases made at the time a reward card was issued. Since a single customer often buys meals for others, the researchers reported that they obtained natural variations in the initial progress customers achieved on their first visit.

tasks those who compared themselves to a high standard (*i.e.*, 5 hours). When asked to indicate how much they were interested in pursuing non-academic (goal-irrelevant) activities, the former group showed greater interest in these activities than the latter group. In sum, people who experience greater sense of progress and achievement can be swayed by alternative goals and stop pursuing the initial goal.

Then how would motivation affect ongoing goal pursuit when the progress is right in the middle? Which progress marker between to-date frame and to-go frame would be more motivating? According to Bonezzi, Brendl, and De Angelis (2011), motivation for goal pursuit increases when the progress is near the beginning or the end and hits the lowest when it is about halfway. This tendency called “stuck-in-the-middle” is based on the idea that motivation is greatly influenced by perceived marginal value of progress, which is influenced by the anchoring point adopted to monitor progress (Heath, Larrick & Wu, 1999). This suggests that when the progress is in the middle, adding one unit to completed progress is not considered as more motivating than removing one unit from remaining progress, and vice versa. This phenomenon was echoed in another field experiment; presenting a loyalty card with five stamps out of ten (*i.e.*, highlighting completed progress) or one with the five punched-out slots (*i.e.*, highlighting remaining progress) did not have a differential effect on participants’ motivation or perception of progress. (Wiebenga & Fennis, 2013).<sup>3</sup>

The concept of motivation in the aforementioned studies on self-regulation and perceived progress was treated as a one-dimensional variable and as a synonym of the degree of strength in goal pursuit. However, we know that motivation can be defined in a different way, more

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<sup>3</sup> The study examined the effects of progress framing (*i.e.*, to-date and to-go progress frame) and construal level (*i.e.*, abstract and concrete mindset) on motivation for a goal pursuit. The study found an interaction effect, such that type of progress framing influences only participants with abstract mindset, not those with concrete mindset. Extending the construal level theories, they argued that an abstract mindset tends to overestimate distances toward a reference point of goal progress, which results in effect of progress framing on motivation.

specifically, by its orientation. For example, people can be motivated to lose weight because they want to be healthy and good-looking, or because their primary physicians told them to do so. In the next sections, I review the concept of motivation that addresses the “why” of goal pursuit and how it relates to goals and self-regulation will be explained.

## Motivation

One of the most prominent features in humans, intrinsic motivation has pushed people to explore their environment, to foster curiosity, and engage in novel activities. Early behavioral psychologists tried to understand human motivation with the help of drive-reduction theory (Hull, 1943), which posits that motivation is derived from an uncomfortable state resulting from a biological deficit such as hunger or pain (Dewey, 2007). Later theorists, however, abandoned this drive approach, criticizing that it cannot explain the general tendency to explore; people engage in activities not necessarily out of physiological needs. These researchers argued that what drives human behaviors is a motivation for effectance<sup>4</sup> (White, 1959), personal causation (DeCharms, 1968), competence and self-determination (Deci & Ryan, 1985).

By definition, intrinsic motivation is “the doing an activity for the inherent satisfaction of the activity of itself” (Ryan & Deci, 2000a, p. 71). Children show exemplary behaviors of intrinsic motivation; for instance, young children aged between one and five years old asked an average of 107 questions per an hour when they have conversations with adults (Chouinard, Harris & Maratsos, 2007). However, intrinsic motivation steadily decreases as children progress from third grade through ninth grade (Harter, 1981; Lepper, Sethi, Dialdin & Drake, 1997). The Scale of Intrinsic versus Extrinsic Orientation in the Room (Harter, 1981) was used to measure

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<sup>4</sup> Effectance is a motive or a need that “impels the organism toward competence and is satisfied by a feeling of self-efficacy” (Harter, 1978, p. 35)

children's two types of motivation in five dimensions<sup>5</sup>. This decrease in intrinsic motivation occurred in academic activities, but not in non-school-based activities (Sansone & Morgan, 1992). Adults do more tasks in order to gain external rewards such as money and recognition or in order to avoid negative consequences. These behaviors are more oriented toward extrinsic motivation or "performance of an activity in order to attain separable outcome" (Ryan & Deci, 2000a, p. 71). Extrinsic motivation generally includes a view of work as a means to some external end or instrumentality (*e.g.*, Calder & Staw, 1975; Lepper & Greene, 1978). The key elements of extrinsic motivation include, for example, concerns with competition, evaluation, recognition, and money or other tangible incentives (Amabile, Hill, Hennessey & Tighe, 1994).

As can be inferred from the definitions for each type of motivation, whether a behavior is done for an instrumental reason or not is what distinguishes intrinsic motivation from extrinsic motivation. According to DeCharms (1968, p. 328), "The crux of the distinction between extrinsic and intrinsic motivation lies in the knowledge or feeling of personal causation." It should be noted, however, the concept of motivation is not dichotomous (*i.e.*, intrinsic or extrinsic); rather it lies along on a continuum with a varying degree of internalization or perceived locus of causality (Ryan & Deci, 2000a). For example, a child can be motivated to play the piano to avoid the sanctions by parents if she does not do so. However, it could be possible that a child plays the piano because she thinks that playing the piano would be beneficial for her in the future. According to the Self-Determination Theory (SDT; Ryan & Deci, 2000a), the former illustrates external motivation with external perceived locus of causality and the latter illustrates external motivation with internal perceived locus of causality.

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<sup>5</sup> The five dimensions are specified by an intrinsic and extrinsic ends: "preference for challenge versus preference for easy work, curiosity/interest versus pleasing teacher/getting grades, independent mastery versus dependence on the teacher, independent judgment versus reliance on the teacher's judgment, and internal versus external criteria for success/failure" (p. 304, Harter, 1981).



What are the consequences for more autonomous and intrinsic motivation? In general, more self-determined motivation resulted in better learning, increased interest in subject matter, more effort and persistence, greater performance, higher self-esteem, increased life satisfaction, and better health outcome (for a review, see Vallerand, 1997). In a classroom context, making educational activities more intrinsically motivating increased students' learning and subsequent interest in the topics (Lepper & Cordova, 1992). A study by Lepper and Hodell (1989), for example, showed that students spent more time on a task and engaged in deeper learning when the activities were presented with motivational appeal (*e.g.*, hunting for hidden treasures buried on an island) than with control condition appeal (*e.g.*, finding hidden dots on a grid). Within a health domain, greater internalization and autonomous motivation led to better weight loss and weight-loss maintenance among obese individuals (Williams, Grow, Freedman, Ryan & Deci, 1996) and greater adherence to prescription medication (Williams, Rodin, Ryan, Grolnick & Deci, 1998). Self-determined motivation was also shown to be associated with autonomous regulation of eating behavior and with healthy eating among women (Pelletier & Dion, 2007).

Given that intrinsic motivation bring about positive, beneficial effect in such diverse domains, what can we do to facilitate and maintain intrinsic motivation? According to SDT (Ryan & Deci, 2000a), people have innate propensities to feel competent, to feel autonomous, and to feel related. Intrinsic motivation would be developed naturally when these psychological needs are satisfied. For example, supporting autonomy by providing explicit choices (Zuckerman, Porac, Lathin & Deci, 1978) or promoting competence by giving positive feedback (Vallerand & Reid, 1984) were both shown to increase intrinsic motivation. In contrast, an environment that hinders competence or gives pressure (Koestner, Ryan, Bernieri & Holt, 1984) can undermine intrinsic motivation.

When extrinsic rewards are given for doing an intrinsically driven activity, people tend to feel controlled by rewards and show less intrinsic motivation (Lepper, Greene & Nisbett, 1973). There has been a controversy on whether the provision of incentives does harm to intrinsic motivation because rewards can be perceived so differently depending on reward types and contingencies (for a review, see Cerasoli, Nicklin & Ford, 2014). Many experiments (e.g., Deci, 1971; Lepper et al., 1973) and meta-analyses (Deci, Koestner & Ryan, 1999; Rummel & Feinberg, 1988; Tang & Hall, 1995; Wiersma, 1992) that examined the effects of rewards on intrinsic motivation provide strong evidence that provision of extrinsic rewards can undermine intrinsic motivation.

### Intrinsic motivation and self-regulation

An extensive body of literature in developmental and educational psychology (e.g., Pintrich & De Groot, 1990; Zimmerman & Schunk, 2008) has suggested that motivation and self-regulation are closely interrelated. According to Bronson (2000), self-regulation is assumed or required in the activities that are considered intrinsic. The rewards for intrinsic motivation for self-regulation are competence and control (White, 1959). Self-regulation can also be an intrinsically motivated activity itself (Bronson, 2000). This link between self-regulation and intrinsic motivation is evidenced in toddlers' desire to control their bodies and influence other people around them. Intrinsic motivation for self-regulation can be described as "a generalized tendency to be rewarded by, and then seek mastery or control of, the self, others, or the physical and conceptual environment" (Bronson, 2000, p. 35).

Although conceptualized in a variety of ways, intrinsic motivation has been repeatedly associated with self-regulation and positive behavioral outcomes. For example, students who

reported greater use of self-regulatory strategies also reported higher levels of intrinsic motivation, self-efficacy, and achievement (Pintrich & De Groot, 1990). When teachers were supportive of autonomy but low in behavioral control, students in fourth- through sixth grades tend to hold intrinsic motivation toward learning, felt more competent at learning, and developed an increased level of self-esteem (Deci, Schwartz, Sheinman & Ryan, 1981). Similarly, when parents support children's autonomy, children became more intrinsically motivated, and motivation mediated teachers' ratings of children's self-regulation and performance (Grolnick & Ryan, 1989).

At its extreme of intrinsic motivation, the experience of total immersion into a task can occur, called "flow" (Csikszentmihalyi, 2000), "peak experiences" (Maslow, 1962, 1965, 1971), or "origin" state (DeCharms, 1968). The external goals, for those who experience this remarkable inner state, lose its original importance and serve as "mere tokens" for justification of the doing (Csikszentmihalyi, 2000). "Achievement of a goal is important to mark one's performance but is not in itself satisfying" to intrinsically motivated people (Csikszentmihalyi, 2000, p. 38).

Based on the preceding literature review, I came up with several research questions about the relations among motivation, perception of progress, and self-regulation. The present study addresses the following questions:

1. When the progress is in the middle, which progress information is more motivating: remarks about completed progress or remaining progress?
2. Which motivational orientation is more effective for better self-regulation given the same level of goal progress: intrinsic or extrinsic motivation?

3. Does the effect of progress framing on goal pursuit differ depending on motivational orientation?
4. Do behavioral outcomes such as persistence and performance differ depending on motivational orientation?

In the next section, I provide the hypotheses and rationale regarding each question above.

### CHAPTER 3. RESEARCH OBJECTIVES AND HYPOTHESES

The current research explores how people pursue their goals based on different motivations and progress framing. I examine goal pursuit by looking into subsequent choice following initial goal pursuit: A choice between goal-relevant option and goal-irrelevant option would manifest one's motivation and goal pursuit.

First, I test whether the effect of progress framing (*i.e.*, to-date frame v. to-go frame) on choice depends on motivational propensity. Would progress feedback that highlights already-achieved progress versus feedback that highlights yet-to-achieve progress be differently perceived and thus, result in a divergent behavioral outcome? I suggest that one's motivational orientation moderates the effect of progress framing.

I predict that people whose motivation is intrinsic or autonomous will be indifferent to progress framing. When people hold intrinsic motivation toward a task, they experience interest and enjoyment (Deci & Ryan, 1985; Ryan & Deci, 2000a) and immerse themselves in the process rather than focus on the outcome (e.g., Csikszentmihalyi, 2000). Therefore, either a reminder of how much progress has been accumulated or a reminder of how much progress is remaining should not make a difference in proceeding toward a goal.

In contrast, people with extrinsic motivation would be influenced by how the progress is framed.<sup>6</sup> Extrinsically motivated people are more vulnerable to external feedback because the rewards for self-regulation come from instrumental qualities outside of the task such as social approval or monetary incentives. They tend to be more oriented toward social comparisons (Patrick, Neighbors & Knee, 2004), contingent self-esteem (Kernis, 2003), and obtaining

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<sup>6</sup> With my primary interest on intrinsic motivation, I pitted intrinsic motivation against extrinsic motivation for a maximum contrast. The type of extrinsic motivation I aimed to manipulate was one with external perceived locus of causality, which situates on the most "extrinsic" end of the motivational continuum of Ryan and Deci (2000a).

external signs of self-worth (Kasser, Ryan, Couchman & Sheldon, 2004), which are likely to divert their attention from the activity at hand (Vansteenkiste, Simons, Lens, Soenens & Matos, 2005). Those who have extrinsic motivation toward a task, thus, should be more sensitive to progress report, which informs of how likely it is to achieve the goals and how close they are to the desired end state.

According to Fishbach and Dhar (2005), perceived high progress leads people to choose inconsistent actions. Extending this notion, I suppose that a “to-date” progress report highlights completed actions and thus, can elicit a sense of accomplishment, whereas “to-go” progress report highlights the actions that remain to be completed and thus, can remind people of their commitment to achieve a goal. If told about their accomplishment and that the focal goal is attainable, extrinsically motivated people would be more likely to switch to another activity, “balancing” (Fishbach & Converse, 2011; Fishbach & Zhang, 2008) among several goals. Therefore, I predict that extrinsically motivated people will be more likely to choose a goal-irrelevant option when they are informed of their completed progress, but not when they are informed of their remaining progress. This leads to my first hypotheses.

H1. The effect of progress reports on choice will depend on motivation type: intrinsically motivated participants will be unaffected by different progress reports, but extrinsically motivated participants will be differentially affected by “to-date” and “to-go” progress reports.

H1a. When informed of “to-date” progress, participants will be less likely to pursue their existing goals.

H1b. When informed of “to-go” progress, participants will be more likely to pursue their existing goals.

Previous research (Bonezzi et al., 2011; Wiebenga & Fennis, 2013) has demonstrated the “stuck-in-the-middle” phenomenon and its extensions; when the progress is in the middle, the level of motivation decreases to the lowest (Bonezzi et al., 2011) and type of progress framing is not differential on the motivational constructs (Wiebenga & Fennis, 2013). However, I expect that progress framing will make a differential effect on goal pursuit even in the middle of the progress. Since extrinsic motivation, by definition, focuses attention on consequences rather than process of a task, extrinsically motivated people would readily direct their attention toward the external stimuli (*i.e.*, progress report) and perceive their progress based on the reference point (*i.e.*, the beginning or the end state). Therefore, emphasis on completed actions rather than the actual progress (*i.e.*, 50%) would be more salient feature to them.

I also tap into persistence and performance measures to more fully understand goal pursuit. Persistence has been known as a motivational outcome (Wolters & Rosenthal, 2000; Wolters, 1999; Zimmerman & Cleary, 2009) and a self-regulated learned behavior (Zimmerman & Schunk, 2008). Performance has been also identified as an important outcome of motivation, especially for intrinsic motivation and in a long-term setting; participants who were manipulated to hold intrinsic task orientation showed deeper learning, an increased level of performance on tests, and free-choice persistence at activities related to the learning than those who held extrinsic orientation (Vansteenkiste, Simons, Lens, Sheldon & Deci, 2004). I predict that there would be a difference in persistence and performance between those who have interest in inherent properties and those who have outward orientations. I expect intrinsically motivated people to show a higher degree of persistence and performance than extrinsically motivated people. This leads to my second hypotheses.

H2a. Intrinsically motivated individuals will persist more on a task than do extrinsically motivated individuals.

H2b. Intrinsically motivated individuals will perform better on a task than do extrinsically motivated individuals.

The current research explores the effects of progress framing (proportion of task completed v. proportion of task remaining) and motivation (intrinsic v. extrinsic) on goal pursuit. Two experiments were conducted using an online platform (Amazon Mechanical Turk; Study 1) and in a lab setting (Study 2) in which participants were asked to engage in an anagram-solving task. The task consisted of two sessions and an intermission period between. The dependent measures were 1) the choice of intermission activities when participants had to choose between reading anagram solving tips (*i.e.*, goal-relevant activity) or reading the latest magazines (*i.e.*, goal-irrelevant activity), 2) persistence, and 3) performance. Persistence was operationalized as the amount of time participants spend on solving anagrams and performance as the number of correct responses.



## CHAPTER 4. PRETEST

Before conducting the main study, I received Institutional Review Board approval to pretest stimuli. I chose to recruit participants on Amazon Mechanical Turk (AMT) for pretest. I wanted to find a pair of stimuli, one anagram passage and one magazine article, which respondents would find equally interesting and useful. Sixty workers on AMT participated in a pretest assessing the interesting-ness and useful-ness of six different articles. Each participant read all six articles with a fixed order; two of them were experts' advice on how to solve anagrams effectively and four articles were excerpts from magazines which cover diverse topics such as winning games at the fair, how to wear men's shorts, or women's jeans (see Appendix A for stimuli and questionnaire). Participants were asked to read each article and indicate the level of agreement with "Reading the passage was interesting" and "The information is useful for me" on 7-point scales from *strongly disagree* (1) to *strongly agree* (7). Participants who spent less than 5 seconds on any reading ( $N = 7$ ) were excluded from further analysis, leaving a total of 53 respondents. Using paired t-tests, I selected an anagram article and a magazine article that had the most similar ratings. That is, the chosen pair was not significantly different in either interesting-ness ( $M_{\text{anagram2}} = 5.19$ ,  $M_{\text{magazine1}} = 5.40$ ,  $t(52) = -0.95$ ,  $p = 0.35$ ) or useful-ness ( $M_{\text{anagram2}} = 4.85$ ,  $M_{\text{magazine1}} = 4.45$ ,  $t(52) = 1.58$ ,  $p = 0.12$ ). The other pairs showed significant difference on at least one item,  $t_s > |1|$ ,  $p_s < 0.05$  (see table 1).

I also examined in another pretest how participants perceived the difficulty of solving anagrams, especially for ones that cannot be solved. The anagrams were divided into three sets by the number of unsolvable questions; the first batch consisted of 10 solvable questions, the second included 5 solvable and 3 unsolvable questions, and the third was composed of 6

unsolvable questions<sup>7</sup>. Participants first solved the questions, then they were asked to rate the set's difficulty on a 7-point scale from *very difficult* (1) to *very easy* (7) and confidence for the answers they provided on a 7-point scale from *very confident* (1) to *very unsure* (7). Using paired t-tests, I analyzed each set's perceived difficulty and participants' level of confidence. As expected, participants rated the third group as most difficult ( $M_{set3} = 1.30$ ,  $SD_{set3} = 0.75$ ), compared to the second ( $M_{set2} = 2.02$ ,  $SD_{set2} = 1.17$ ,  $t(52) = 9.76$ ,  $p < 0.001$ ) and the first one ( $M_{set1} = 3.70$ ,  $SD_{set1} = 1.67$ ,  $t(52) = 10.61$ ,  $p < 0.001$ ). The first set and second sets were also significantly different ( $t(52) = 5.39$ ,  $p < 0.001$ ), such that participants found the second set more difficult than the first set. Participants also felt more unsure about their solutions to the third group ( $M_{set3} = 5.28$ ,  $SD_{set3} = 1.76$ ), relative to the second ( $M_{set2} = 3.30$ ,  $SD_{set2} = 1.59$ ,  $t(52) = -7.91$ ,  $p < 0.001$ ), and the first one ( $M_{set1} = 1.93$ ,  $SD_{set1} = 1.21$ ,  $t(52) = 11.99$ ,  $p < 0.001$ ). The comparison of the first and second set was also significant ( $t(52) = -6.94$ ,  $p < 0.001$ ), such that participants were less confident about the solutions to the second group than the first group. The results indicate that participants found unsolvable questions more difficult and less confident to answer for. Accordingly, in the main experiments, I varied the number of solvable and unsolvable questions for the two sets of questions to manipulate the difficulty.

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<sup>7</sup> The question sets were always presented in this order (*i.e.*, all solvable questions – some solvable and some unsolvable questions – all unsolvable questions), which might have caused fatigue effects.

## CHAPTER 5. EXPERIMENT 1

### Method

#### *Participants and Design*

Two hundred participants<sup>8</sup> on AMT participated in the study in exchange for two dollars (69 men, 64 women; ages 18 to 68 years,  $M = 34.8$ ,  $SD = 10.5$ ). Participants were randomly assigned to the cells of a 2 (Motivation: Intrinsic/ Extrinsic)  $\times$  2 (Progress Framing: To-date/ To-go), between-participants experimental design. All participants solved anagram questions for two sessions marked by a brief break between. The responses from non-attentive participants<sup>9</sup> ( $N = 9$ ), those who admitted to using an external source to solve the anagrams ( $N = 12$ ), and those who provided no answers ( $N = 1$ ) were excluded from further analysis, leaving 178 participants (described in detail in Procedure section below). Since participants on AMT could start and end the study at their own convenience, unlike a lab study, it is possible that participants answered questions mindlessly and clicked through to finish as quickly as possible (for those who took very little time to complete the study) or they could leave their computers in the middle of the task and resume later (for those who took excessive time). Therefore, I eliminated those who spent an unreasonable amount of time (time taken for session 1 or session 2 was less than 25 seconds or more than 1000 seconds) on the task ( $N = 9$ ). Participants who engage in playing any type of word puzzles on a regular basis ( $N = 36$ ) were also excluded since their familiarity with

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<sup>8</sup> These participants were those who passed the initial screening based on the eligibility criteria and entered the main part of the study.

<sup>9</sup> One questionnaire item was inserted to screen out responses which indicates lack of attention for the study; it starts with questions about one's hobbies, but one item instructs participants to leave the checkboxes blank (for the complete questionnaire, see Appendix C). Participants who failed to leave a blank item here were considered non-attentive.

solving anagrams and performance on the task could be systematically different from those who do not practice. The final number of participants was 133.

### *Procedure*

Participants were first asked about their eligibility; the questions were 1) whether they are older than eighteen years old and 2) whether their native language is English. Only those who answered yes to both questions were allowed to proceed to the consent form (Appendix B) and decide whether they wanted to participate or not. Participants who provided consent then entered the main part of the study. Those who were randomly assigned to the intrinsic motivation conditions were asked a series of personal information questions, such as nickname, preferred color (among red, yellow, blue, green, and purple), and favorite animal (among cat, panda, penguin, sheep, and squirrel). This procedure was to gather information to be integrated into the questionnaire throughout the survey (Cordova & Lepper, 1996; see more explanation about the manipulations in the next section ). Participants in the extrinsic motivation conditions did not receive these questions; instead, participants in extrinsic motivation conditions proceeded straight to the instruction part.

All participants were instructed that the study consists of solving two sets of anagrams, with a short break in between the two sessions. Then they were given a brief introduction on how to solve anagrams, were asked to solve five practice questions, and then were informed of the correct answers. Following this, participants were randomly assigned to motivation conditions (explained in detail below).

Participants solved the 15 anagram questions for Session 1 and viewed a progress message upon completion. The progress message was either “Now you have finished the first

half, which is 50% of the task.” that highlights the completed progress or “Now you have the second half remaining, which is 50% of the task.” that highlights the remaining progress.

Participants then entered the intermission period where they could choose to view either a task-relevant (hints for solving anagrams) or –irrelevant (hints for winning games at the fair) article as a “mental break.” There was no time limit for reading an article of one’s choice.

Then they worked to solve another 15 questions for Session 2. Note that the latter set of anagrams included five unsolvable questions while there were only two unsolvable ones in the first set; the second set of anagrams should have been perceived more difficult to solve.<sup>10</sup> Upon completion of the anagram-solving task, participants completed the Intrinsic Motivation Inventory (Ryan, 1982), as well as a mood measure (PANAS scale; Watson, Clark & Tellegen, 1988), and basic demographic questions such as age and gender (for the complete questionnaire, see Appendix C). All procedures received IRB approval prior to data collection.

### *Independent Variables*

*Motivation.* As competence and autonomy are indispensable for intrinsic motivation to grow (Deci & Ryan, 1985; Ryan & Deci, 2000a), I incorporated these two components into manipulation throughout the experiment.<sup>11</sup> Extending manipulations used by Cordova & Lepper (1996), I attempted to increase participants’ intrinsic motivation by 1) providing a personalized task-setting, 2) giving non-pressuring instructions, and 3) giving a latitude to adjust goals. Those

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<sup>10</sup> This manipulation was to create a better experimental situation for measuring persistence. When the target task in the subsequent session becomes more difficult, participants could either quit or persist on solving questions. If one insists on solving difficult problems rather than discontinuing effort, I can safely assume that s/he is more “persistent.”

<sup>11</sup> The need for relatedness, which “encompasses a person's striving to relate to and care for others, to feel that those others are relating authentically to one's self, and to feel a satisfying and coherent involvement with the social world more generally” (Deci & Ryan, 1990, p. 243), was not included in the manipulation. A majority of related studies focused on autonomy and competence except research with children, and I assume intrinsic motivation would be sufficiently facilitated by manipulations with the two factors.

in the intrinsic motivation conditions were asked about their nicknames, preferred colors, and favorite animals. As Appendix D shows, the personal information was shown on the screen while they were doing the task. They were also instructed to think of the study as an opportunity to better understand their verbal abilities and themselves. Telling them that the study is not a test or a competition would reduce psychological pressure thereby, enhancing intrinsic motivation (Deci, Betley, Kahle, Abrams & Porac, 1981; Vallerand, Gauvin & Halliwell, 1986). In addition, participants were allowed to set their own target scores by adjusting the slider that appeared on the screen. This manipulation was intended to give them a sense of autonomy, which is known as an important factor for intrinsic motivation (Ryan & Deci, 2000).

The manipulation for extrinsic motivation was, in essence, creating a negative effect on one's competence and autonomy. Those in the extrinsic motivation conditions were instructed to pay full attention to the study and that doing one's best is very important. This instruction was intended to make them feel like the study is similar to a test and to provide them with psychological pressure to some extent. Participants were also told after solving practice questions that they should achieve a certain goal score for the main sessions, which they had to accept. In contrast to the manipulation for intrinsic motivation, autonomy was not supported here.

Another manipulation to increase the distinction between intrinsic and extrinsic motivation conditions was to present participants different kinds of rewards. Participants in the intrinsic motivation condition received positive verbal rewards on their performance (*e.g.*, "You're on the right track, (*nickname*). Keep it up!") after solving the seventh question in each session. Extrinsically motivated participants received a performance-contingent monetary incentive (*e.g.*, "Remember that there is a reward of a Gift Card for good work!") after solving

the seventh question in each session. Note that the feedback for the former group was given regardless of the actual performance (*i.e.*, task-noncontingent), which leaves intrinsic motivation unchanged (Deci, 1972; Deci et al., 1999).

As noted previously, rewards that are tangible (vs. verbal), and performance-contingent (vs. task-noncontingent) have detrimental effects on intrinsic motivation (Ryan & Deci, 2000b). Therefore, the manipulation used to invoke extrinsic motivation in this study accords with the extrinsic rewards that wanes intrinsic motivation.

*Progress framing.* After completing the first task session, participants viewed a message that highlighted either their completed progress (“to-date” progress condition; “Now you have finished the first half, which is 50% of the task.”) or what remained to be done (“to-go” progress condition; “Now you have the second half remaining, which is 50% of the task.”). Below the sentence there was a bar graph with the first half (or the second half) shaded in gray and an image of a running man on the midpoint. “50% completed” (or “50% remaining”) in larger and bold fonts was displayed below the bar graph (see Appendix E).

### *Dependent Variables*

*Goal Pursuit.* After finishing solving anagrams for session 1, participants were instructed to take a break during which they could choose to view either a goal-relevant article that was described as “expert tips on solving anagrams” or a goal-irrelevant article, which was “a recent magazine article on an interesting topic.” Note that choosing to read the anagram passage is fundamentally a goal-relevant activity and is pitted against the option that is seemingly pleasurable. Therefore, the choice of one article over the other should indicate whether one remains focused on the initial goal or not.

*Persistence.* The amount of time participants spent solving anagrams in sessions 1 and 2 was measured as an index of persistence, using the timer function of Qualtrics. Since session 2 had more unsolvable questions than session 1, participants should have felt more difficulty for the latter session. If one's intrinsic motivation is strong enough, I expect he or she tends to insist solving anagrams in spite of difficulty by investing more time and efforts than those who are extrinsically motivated. Note that there was no limit in time for solving anagrams in both session 1 and 2.

*Performance.* Participants' performance was assessed with the number of anagrams solved correctly during sessions 1 and 2. For unsolvable questions, the input of only "0" is coded as correct. The possible range for performance is from 0 (0%) to 30 (100%).

#### *Manipulation Check*

*Intrinsic Motivation Inventory (IMI)* IMI (Ryan, 1982) is a multidimensional self-report measure used to assess participants' intrinsic motivation for targeted activities in diverse experimental settings such as sport, education, and lab tasks ("Intrinsic Motivation Inventory (IMI)," 2016). I employed a standard 22-item version that gauges subjective experiences of interest/enjoyment, perceived competence, pressure/tension, and perceived choice (see Appendix F). Each item displays a statement regarding one's experience with the task and asks to indicate how true it is on 7-point scales from *Not true at all (1)* to *Very true (7)*.

#### *Other Measures of Interest*

*Positive and Negative Affect Schedule (PANAS) Scales* Developed by Watson, Clark, and Tellegen (1988), the Positive and Negative Affect Schedule consists of words that describe



emotions and feelings. I employed a brief version comprised of 20 items, with 10 items measuring positive affect (*e.g.*, interested, excited) and 10 items measuring negative affect (*e.g.*, upset, guilty). Each item was rated on 5-point scales that ranges from *Very slightly* or *Not at all* (1) to *Extremely* (5). Note that PANAS captures one's mood using different time frames, such as present moment, today, past few weeks, year, or general. Participants in this study were specifically asked about their current feelings, which was described as "right now, that is, at the present moment."

## Results

### *Manipulation Check*

I examined whether the motivation manipulation in fact made participants in the intrinsic motivation conditions more intrinsically motivated than those in the extrinsic motivation. All subscales (enjoyment, competence, perceived choice, and pressure) of Intrinsic Motivation Inventory were subjected to two-way ANOVAs. The results of ANOVA analysis on the enjoyment subscale showed no significant effects; motivation,  $F(1, 129) = 2.12, p = 0.15$ , progress framing,  $F(1, 129) = 0.59, p = 0.33$ , and motivation by progress framing,  $F(1, 129) = 0.10, p = 0.76$ . For the competence subscale, there were also no effects at all; Motivation,  $F(1, 129) = 0.40, p = 0.53$ , Progress Framing,  $F(1, 129) = 2.41, p = 0.12$ , and Motivation by Progress Framing,  $F(1, 129) = 0.01, p = 0.91$ .

For the perceived choice subscale, a main effect of progress framing was found,  $F(1, 129) = 7.80, p = 0.006$ , such that participants who were informed of "to-date" progress agreed more that doing the task was their own choice,  $M_{\text{to-date}} = 5.82, SD_{\text{to-date}} = 1.09$ , compared to those who were informed of "to-go" progress,  $M_{\text{to-go}} = 5.23, SD_{\text{to-go}} = 1.39$ . There was neither a main

effect of motivation,  $F(1, 129) = 2.69, p = 0.10$ , nor an interaction effect,  $F(1, 129) = 0.42, p = 0.52$ , on perceived choice.

For the pressure subscale, a significant main effect of progress framing was revealed,  $F(1, 129) = 8.22, p = 0.005$ , such that participants in “to-go” progress conditions felt a higher level of pressure and tension while they were doing the task,  $M_{\text{to-go}} = 3.59, SD_{\text{to-go}} = 1.45$ , than those in “to-date” conditions,  $M_{\text{to-date}} = 2.87, SD_{\text{to-date}} = 1.42$ . There was neither a main effect of motivation,  $F(1, 129) = 1.92, p = 0.17$ , nor an interaction effect,  $F(1, 129) = 1.91, p = 0.17$ , on pressure.

In sum, these results show that the manipulation for motivation did not have its intended effects on participants. Unpredicted main effects of progress framing on perceived choice and pressure were revealed, such that “to-date” progress report elicited more perceived choice and “to-go” progress report put more pressure on participants.

### *Choice as Goal Pursuit*

I tested Hypothesis 1, whether receiving different types of progress reports affected participants’ choices for activities during a break, and whether this effect would be moderated by motivational orientation. The distribution of participants’ choices by experimental condition is depicted in Table 2. First, I conducted a 2 (motivation: intrinsic v. extrinsic)  $\times$  2 (progress framing: to-date v. to-go) ANOVA with choice (1 = anagram article, 0 = magazine article; in this manner the dependent variable represents the percentage of participants choosing anagram article) as dependent variable.<sup>12</sup> The analysis showed no significant effects at all; motivation,

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<sup>12</sup> I referred to a study by Karremans, Stroebe, and Claus (2006) for the analysis techniques; they employed ANOVA and logistic regression to analyze an association between a categorical dependent variable (*i.e.*, choice: Lipton ice v. another drink) and categorical independent variables (*i.e.*, prime: Lipton ice v. control; thirst: thirsty v. not thirsty).

$F(1, 129) = 0.03, p = 0.85$ , progress framing,  $F(1, 129) = 1.76, p = 0.19$ , and motivation by progress framing,  $F(1, 129) = 1.36, p = 0.25$ .

I also conducted a logistic regression to further explore. Participants' choice (1 = anagram article, 0 = magazine article) was regressed onto progress framing condition (1 = to-go frame, 0 = to-date frame) and type of motivation (1 = intrinsic motivation, 0 = extrinsic motivation), and their interaction. This analysis showed that a test of the full model against a constant only model was not significant, chi-square = 3.11,  $p = 0.38$  with  $df = 3$ . Nagelkerke's  $R^2$  of 0.34 indicated a weak relationship between prediction and the groupings. However, the Wald criterion demonstrated that progress framing made a marginal contribution to prediction,  $\beta = 0.99, p = 0.087$ . The  $\text{Exp}(\beta)$  value of progress framing indicated that extrinsically motivated participants were 2.7 times more likely to select the target article (*i.e.*, anagram article) when given "to-go" progress feedback than when given "to-date" progress feedback. Other predictors, motivation,  $\beta = 0.48, p = 0.35$ , and an interaction term,  $\beta = -0.93, p = 0.25$ , had little contribution to predicting choice. The results, overall, show that motivational orientation or progress framing was not greatly associated with participants' choice.

### *Persistence and Performance*

I tested Hypothesis 2a – intrinsically motivated individuals would persist more on a hard task than do extrinsically motivated individuals – using a mixed model ANOVA. The amount of time spent on session 1 and session 2 was measured for persistence. The within-participants factor was time (session 1 v. session 2), and the between-participants factors were motivation (intrinsic v. extrinsic) and progress framing ("to-date" v. "to-go"). Tests of between-participants effects did not show any significant effects; motivation,  $F(1, 129) = 0.99, p = 0.32$ , progress

framing,  $F(1, 129) = 0.10, p = 0.75$ , and motivation by progress framing,  $F(1, 129) = 0.05, p = 0.83$ . Tests of within-participants effects showed neither an effect of testing session on persistence,  $F(1, 129) = 0.26, p = 0.61$ , nor any interaction effects; time by motivation,  $F(1, 129) = 0.002, p = 0.97$ , time by progress framing,  $F(1, 129) = 0.49, p = 0.49$ , time by motivation by progress framing,  $F(1, 129) = 0.67, p = 0.41$ . These results suggest that both motivations and progress framing did not influence participants' persistence on the task.

I also tested Hypothesis 2b that intrinsically motivated participants would perform better than do extrinsically motivated participants. The numbers of correct answers for anagram questions in session 1 and session 2 were assessed for performance. A mixed model ANOVA revealed a significant main effect of motivation,  $F(1, 129) = 9.36, p = 0.003$ . However, this was in the opposite direction than what was predicted, such that extrinsically motivated participants achieved a higher total score (ranging from 0 to 30),  $M_{\text{extrinsic}} = 24.47, SD_{\text{extrinsic}} = 4.78$ , than did those with intrinsic motivation,  $M_{\text{intrinsic}} = 21.58, SD_{\text{intrinsic}} = 6.22$ . There was neither a main effect of progress framing,  $F(1, 129) = 2.47, p = 0.12$ , nor an interaction of motivation by progress framing,  $F(1, 129) = 3.69, p = 0.057$ .

The tests of within-participants effects found no significant effect of testing session (*i.e.*, time) on performance,  $F(1, 129) = 2.26, p = 0.14$ . No interactions were significant; time by motivation,  $F(1, 129) = 1.89, p = 0.17$ , time by progress framing,  $F(1, 129) = 0.39, p = 0.53$ , time by motivation by progress framing,  $F(1, 129) = 0.10, p = 0.75$ . Taken together, these results suggest that extrinsic motivation have an influence on greater performance.

#### *Positive and Negative Affect Schedule (PANAS) Scales*

Two-way ANOVA analyses for both positive and negative affect were conducted to examine whether there was a disparity in participants' emotions depending on the experimental conditions to which they were assigned. For positive affect, no significant effects were found; motivation,  $F(1, 129) = 0.36, p = 0.55$ , progress framing,  $F(1, 129) = 1.28, p = 0.26$ , and motivation by progress framing,  $F(1, 129) = 0.07, p = 0.79$ . For negative affect, a strong main effect of progress framing was revealed,  $F(1, 129) = 4.92, p = 0.03$ . Participants exposed to “to-go” messages felt more negative emotions during the task,  $M_{\text{to-go}} = 1.41, SD_{\text{to-go}} = 0.56$ , than did participants exposed to “to-date” messages,  $M_{\text{to-date}} = 1.22, SD_{\text{to-date}} = 0.48$ . This main effect was modified by an interaction of motivation by progress framing,  $F(1, 129) = 4.71, p = 0.03$ . Intrinsically motivated participants reported a greater proportion of negative emotions when the progress was shown in “to-go” frame than in “to-date” frame and that extrinsically motivated participants showed no difference in negative emotion between the two types of progress messages (see Figure 2).

## CHAPTER 6. EXPERIMENT 2

Experiment 1 did not confirm my hypotheses that intrinsically motivated people would choose a goal-relevant activity, persist longer, and perform better on a task than those who are extrinsically motivated. Participants who were manipulated to have extrinsic motivation, in fact, performed better than those who were in the intrinsic motivation conditions. Participants' choice and persistence was not different across the experimental conditions.

Several factors might have affected these results. First of all, the manipulation for motivation was obviously unsuccessful; participants did not differ in experiencing interest and competence for the task. Undifferentiated in motivational propensity, participants in the extrinsic motivation conditions were, in essence, additionally given an extrinsic incentive (e.g., a chance to win a gift card) to be more motivated toward the task than those in the intrinsic motivation conditions. Therefore, it could be a receipt of the extrinsic rewards that drove the greater performance by those in the extrinsic motivation conditions. Based on an assumption that participants' motivation was identical, these results – “to-go” progress framing was more effective than “to-date” progress framing on performance – seems logical because highlighting what remains to be done reminds people of a goal and their commitment (Fishbach & Dhar, 2005; Koo & Fishbach, 2008). In addition, the results that a reminder of uncompleted work (v. completed work) elicited more psychological pressure and negative mood can also be explained by the anchoring bias; information about completed actions (*i.e.*, anchoring on the beginning) implies accomplishment, whereas information about uncompleted actions (*i.e.*, anchoring on the end state) implies lack of accomplishment (Fishbach & Finkelstein, 2012). Therefore, the former is likely to be associated with positive emotion, and the latter with negative emotion.

Lastly, I suspect, in retrospect, that an AMT sample might have been less-than-ideal for drawing inferences about the relationship between motivation and goal-pursuit. Although data collected from the crowdsourcing marketplace is known to be not greatly different from data obtained from traditional subject pool or national populations (Paolacci, Chandler & Ipeirotis, 2010; Shapiro, Chandler & Mueller, 2013) and AMT samples can also be more attentive than the traditional subject pool<sup>13</sup> (Hauser & Schwarz, 2016), I have two theoretical reasons to suspect that my experimental manipulations might have interacted with the characteristics of an AMT sample.

First, the AMT population might be more extrinsically motivated, in general. Although the primary reason for people to work on the online platform is not known to be solely the monetary incentives (Ross, Irani, Silberman, Zaldivar & Tomlinson, 2010), I noticed that AMT participants show more interest in taking part in studies with higher pay (*i.e.*, filling up tasks with higher pay more quickly).<sup>14</sup> MTurk respondents have a wide array of options in terms of the tasks they can do, and the amount of compensation serves as a quick and easy criterion for the decision to participate. I suspect that MTurk participants were more greatly driven by extrinsic motivation than the student sample or panel members; although they all receive a form of incentives for their participation, I think MTurk respondents have more ways (*i.e.*, sorting the tasks by amount of incentives) to maximize the rewards. The manipulations employed in my study, therefore, were perhaps not sufficient to draw out more intrinsic motivation from the already extrinsically motivated individuals.

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<sup>13</sup> This may be important in the current studies because participants who are inattentive and unmotivated would not pay close attention to the instruction and provide data of poor quality.

<sup>14</sup> For example, studies that paid a very small amount of reward (ranging from \$0.035 to \$0.05 per assignment) took from 7 days to 2 months to be completed, whereas my study (Experiment 1) that paid \$1.50 per assignment took less than 12 hours. The required time and effort were different for each assignment, though.

Second, the uncontrolled task environment could have affected the results of my study by influencing participants' involvement. The task setting for an online study could vary from person to person, and it could have been difficult for some people to focus on the task. For example, the participants could have had a TV on alongside while they answered the questionnaire or they might have been in and out (both mentally and/or physically) during the survey. I presume that participants who were distracted by other irrelevant stimuli would also be less likely to experience intrinsic motivation.

For the above reasons, I conducted Experiment 2 in a controlled lab setting with college undergraduate participants. In this experiment, I aim to re-investigate the effects of motivation and progress framing on goal adherence and to examine whether the effects shown in Experiment 1 were primarily driven by unique characteristics of MTurk participants and/or variations in participants' task environments.

## Method

### *Participants and Design*

Ninety-one undergraduate students (25 men, 66 women; ages from 18 to 23 years;  $M = 19.8$ ,  $SD = 1.16$ ) from a large Midwestern university participated in this study for extra course credit. This was a randomized mixed factorial design as in Experiment 1: the within-participants factor was time (session 1 v. session 2), and the between-participants factors were motivation (intrinsic v. extrinsic) and progress framing ("to-date" v. "to-go"). After discarding the responses



from non-attentive participants ( $N = 39$ )<sup>15</sup>, the final number of participants was 52 (13 men, 39 women; ages from 18 to 22 years;  $M = 19.5$ ,  $SD = 1.08$ ).

### *Procedure*

Upon arrival at the lab, participants were given a brief introduction about the study and the anagram-solving task and provided informed consent for the study. They were notified that there would be no time limit and they could leave after they finish answering all questions. Participants were then assigned to individual computers separated by partitions, and they started the experimental task on their own pace. The standard procedure on the computer screen was identical to that for Experiment 1.

### *Independent Variables and Dependent Measures*

The independent variables (Motivation and Progress Framing) and the dependent measures (participants' choice, persistence, and performance) were the same as Experiment 1.

## Results

### *Manipulation Check*

To assess whether the motivation manipulation had its intended effects on participants motivation, I conducted two-way ANOVAs for all subscales (enjoyment, competence, perceived choice, and pressure) of Intrinsic Motivation Inventory. The results of ANOVA analysis on the enjoyment subscale showed no significant effects; motivation,  $F(1, 48) = 0.32$ ,  $p = 0.58$ , progress framing,  $F(1, 48) = 0.86$ ,  $p = 0.36$ , and motivation by progress framing,  $F(1, 48) = 0.08$ ,  $p =$

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<sup>15</sup> Non-attentive participants were screened out by the “hobby” question as in Experiment 1. I acknowledge that there were a large number of participants who were not fully engaged in the task, which might have affected the validity of the data in Experiment 2.

0.78. For the competence subscale, there were also no effects at all; motivation,  $F(1, 48) = 2.08$ ,  $p = 0.16$ , progress framing,  $F(1, 48) = 0.46$ ,  $p = 0.50$ , and motivation by progress framing,  $F(1, 48) = 0.78$ ,  $p = 0.38$ .

For the perceived choice subscale, a main effect of motivation was found,  $F(1, 48) = 8.97$ ,  $p = 0.004$ . However, this was in an opposite direction of the manipulation, such that participants who were given manipulation for extrinsic motivation agreed more with that doing the task was their own choice,  $M_{\text{extrinsic}} = 5.35$ ,  $SD_{\text{extrinsic}} = 1.08$ , than did those who were given manipulation for intrinsic motivation,  $M_{\text{intrinsic}} = 4.34$ ,  $SD_{\text{intrinsic}} = 1.33$ . There was neither a main effect of progress framing,  $F(1, 48) = 0.10$ ,  $p = 0.75$ , nor an interaction effect,  $F(1, 48) = 0.03$ ,  $p = 0.86$ , on perceived choice.

For the pressure subscale, there was a significant interaction of motivation by progress framing,  $F(1, 48) = 4.35$ ,  $p = 0.04$ . Participants in the extrinsic motivation conditions displayed an increased level of pressure when they viewed the “to-date” message than when they viewed the “to-go” message,  $M_{\text{extrinsic/to-date}} = 4.63$ ,  $SD_{\text{extrinsic/to-date}} = 1.32$ ,  $M_{\text{extrinsic/to-go}} = 3.85$ ,  $SD_{\text{extrinsic/to-go}} = 1.57$ , whereas participants in the intrinsic motivation conditions showed a higher level of pressure when they were exposed to “to-go” message than were to “to-date” message,  $M_{\text{intrinsic/to-date}} = 3.72$ ,  $SD_{\text{intrinsic/to-date}} = 1.34$ ,  $M_{\text{intrinsic/to-go}} = 4.56$ ,  $SD_{\text{intrinsic/to-go}} = 1.33$ . I conducted t-tests on pressure by type of progress report within each type of motivation, but there were no significant effects at all<sup>16</sup>. There was no difference in perceived pressure between “to-date” and “to-go” progress messages for intrinsically motivated participants ( $t(21) = -1.52$ ,  $p = 0.14$ ) as well as for extrinsically motivated participants ( $t(27) = 1.46$ ,  $p = 0.16$ ). There was neither a main effect of

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<sup>16</sup> T-tests on pressure by type of motivation within each type of progress report did not also yield any significant effects.

motivation,  $F(1, 48) = 0.06, p = 0.81$ , nor a main effect of progress framing,  $F(1, 48) = 0.01, p = 0.93$ , on pressure.

Altogether, these results suggest that the manipulation for motivation was not successful in drawing out two distinguished orientations of motivation. Participants were not different in experiencing enjoyment and competence from doing the task. A main effect of motivation on perceived choice was found, but in the opposite direction of my prediction; manipulation for extrinsic motivation, rather than for intrinsic motivation, had a positive influence on perceived choice.

### *Choice as Goal Pursuit*

I tested Hypothesis 1, in which I assumed a difference in goal pursuit between those who were informed of their completed progress and of their progress remaining, and a moderating effect of motivation type. The distribution of participants' choices by experimental condition is depicted in Table 3. As in Experiment 1, I conducted a 2 (motivation: intrinsic v. extrinsic)  $\times$  2 (progress framing: to-date v. to-go) ANOVA with choice (1 = anagram article, 0 = magazine article) as dependent variable. The analysis showed no significant effects at all; motivation,  $F(1, 48) = 0.02, p = 0.90$ , progress framing,  $F(1, 48) = 1.95, p = 0.17$ , and motivation by progress framing,  $F(1, 48) = 1.05, p = 0.31$ .

I also conducted a logistic regression. The analysis showed that a test of the full model against a constant only model was not significant, chi-square = 2.87,  $p = 0.41$  with  $df = 3$ . Nagelkerke's  $R^2$  of 0.08 indicated nearly no relationship between prediction and the groupings. All predictors, motivation,  $\beta = 0.64, p = 0.48$ , progress framing,  $\beta = 1.84, p = 0.13$ , and an interaction term,  $\beta = -1.58, p = 0.30$ , had little contribution to predicting choice. The results,

overall, show that motivational orientation or progress framing did not influence participants' choices.

### *Persistence and Performance*

To assess whether having a different type of motivation led to varied persistence (Hypothesis 2a), I conducted a mixed model ANOVA. Tests of between-participants effects did not show any significant effects; motivation,  $F(1, 48) = 1.44, p = 0.24$ , progress framing,  $F(1, 48) = 2.14, p = 0.15$ , and motivation by progress framing,  $F(1, 48) = 0.61, p = 0.44$ . An interaction effect of time by progress framing was not significant,  $F(1, 48) = 3.34, p = 0.07$ . However, it is noteworthy that participants who were exposed to the “to-date” message reduced their time on solving anagrams for Session 2 compared to Session 1 (time difference = -214.46 seconds),  $M_{\text{to-date/session1}} = 890.85, SD_{\text{to-date/session1}} = 461.97, M_{\text{to-date/session2}} = 676.39, SD_{\text{to-date/session2}} = 311.73$ , while participants exposed to the “to-go” message increased the amount of time for the latter session (time difference = 21.72 seconds),  $M_{\text{to-go/session1}} = 639.71, SD_{\text{to-go/session1}} = 429.80, M_{\text{to-go/session2}} = 661.42, SD_{\text{to-go/session2}} = 250.11$  (see Figure 3). Neither an effect of testing session (*i.e.*, time) on persistence,  $F(1, 48) = 2.51, p = 0.12$ , nor other interactions were significant; time by motivation,  $F(1, 48) = 0.64, p = 0.43$ , and time by motivation by progress framing,  $F(1, 48) = 0.14, p = 0.71$ .

I also tested Hypothesis 2b, in which I assumed a difference in performance between the different motivation groups of participants. A mixed model ANOVA revealed a significant main effect of progress framing,  $F(1, 48) = 4.78, p = 0.03$ . Participants who viewed the “to-date” message,  $M_{\text{to-date}} = 20.57, SD_{\text{to-date}} = 4.75$ , outperformed participants who viewed the “to-go” message,  $M_{\text{to-go}} = 17.37, SD_{\text{to-go}} = 5.64$ . To examine which session the effect of progress framing

occurred, I conducted separate tests for session 2<sup>17</sup>. The results showed that the effect of progress framing was not significant for session 2,  $F(1, 48) = 3.23, p = 0.08$ . No other between-participants effects were significant; motivation,  $F(1, 48) = 1.46, p = 0.23$ , and motivation by progress framing,  $F(1, 48) = 0.15, p = 0.70$ . Tests of within-participants effects showed neither an effect of testing session (*i.e.*, time) on performance,  $F(1, 48) = 0.00, p = 0.99$ , nor any interaction effects; time by motivation,  $F(1, 48) = 0.06, p = 0.81$ , time by progress framing,  $F(1, 48) = 0.13, p = 0.72$ , time by motivation by progress framing,  $F(1, 48) = 0.22, p = 0.64$ .

#### *Positive and Negative Affect Schedule (PANAS) scales*

Using a two-way MANOVA analysis, I examined whether there was any difference in how participants felt during the task activity. The analysis showed no significant effects at all for positive affect, motivation,  $F(1, 48) = 0.05, p = 0.82$ , progress framing,  $F(1, 48) = 0.96, p = 0.33$ , and motivation by progress framing,  $F(1, 48) = 0.30, p = 0.59$ , as well as for negative affect, motivation,  $F(1, 48) = 0.86, p = 0.77$ , progress framing,  $F(1, 48) = 0.04, p = 0.84$ , and motivation by progress framing,  $F(1, 48) = 0.19, p = 0.67$ .

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<sup>17</sup> Note that the progress report was given after session 1. An effect of progress framing in session 1 would be due to random error.

## CHAPTER 7. DISCUSSION

This thesis attempted to address the question of which type of feedback is more motivating: feedback on completed or remaining progress. I expected one's motivational underpinning would moderate the effect of progress framing on behavioral outcomes following initial goal pursuit. In both studies, I did not find conclusive support for Hypothesis 1 in which I assumed interplay between motivation and progress framing on choosing a goal-relevant activity. I also did not find evidence for Hypothesis 2a that intrinsically motivated participants would be more persistent than those who are extrinsically motivated. Similarly, Hypothesis 2b was not supported; contrary to my prediction, those who were randomly assigned to extrinsic motivation conditions performed better than those who were assigned to intrinsic motivation conditions (Experiment 1). There was a main effect of progress framing on perceived pressure and emotion, such that those who received “to-go” progress information felt more pressure and more negative affect than those who received “to-go” progress information (Experiment 1). In sum, participants who were given the different motivational components were similar in their choice and persistence. The extrinsic motive manipulation led participants to perform better. The feedback emphasizing remaining progress elicited more anxiety and more negative mood.

There are several explanations for what might have contributed to these results. First and foremost, the motivation manipulations were not sufficient and/or appropriate to elicit intrinsic motivation from participants. Although I incorporated relatively interesting elements (*i.e.*, personalization and a few visual aids) into the task with an autonomy-supportive environment (*i.e.*, choice and positive feedback), I think, in retrospect, the anagram task still fell short of the participants' standard to be considered “interesting.” It is possible that a task like playing a video

game makes people instantly involved and get into a “flow” because they are loaded with engaging game ideas, sophisticated graphic design, and interactive communication. Unlike such commercial games, the stimuli in my study were by no means interesting. According to Malone (1981), an intrinsically motivating game requires a high degree of visualization and responsiveness; it also should be built around the theoretical concepts of challenge, fantasy, and curiosity. Given that the task stimuli used in the studies lacked these elements, it was unlikely to draw out participants’ inherent interest.

In addition, I borrowed and extended the manipulation of a study involving children (Cordova & Lepper, 1996), which might not have been appropriate for either AMT participants or an undergraduate sample in my studies. For example, referring to a participant by nickname or showing an image of one’s favorite animal might be effective for children to increase task engagement and curiosity. Nevertheless, these attempts at personalization could be seen as too crude by adults to generate interest or enjoyment in an anagram task.

Moreover, given that participants were not intrinsically motivated, the extrinsic rewards played a powerful role for self-regulation and performance. Decades of research on extrinsic rewards, as discussed earlier, demonstrated that the effects of extrinsic reward on motivation can be very different depending on types of the rewards, activities, contingencies, and participant populations (Cerasoli et al., 2014; Lepper & Henderlong, 2000).

The context of the extrinsic reward in my studies, therefore, needs to be considered. First, my studies involved a one-shot assignment in which engagement lasted for less than an hour. In a short-term task, extrinsic reward, rather than the “why” of goal pursuit, may be more motivating. Indeed, previous research suggests that offering extrinsic incentives may be more appealing for initiating behaviors (Calder & Staw, 1975; Lepper & Gilovich, 1981; Loveland &

Olley, 1979); for example, students who were given a free movie ticket were more willing to volunteer than those who were given a meaningful rationale for their participation (Sansone & Smith, 2000). It may be that intrinsic motivation helps maintain goal pursuit over a long-term period (Sansone & Smith, 2000), but not immediately afterward as in the current studies. Second, the studies employed unexpected extrinsic rewards (*i.e.*, participants were not informed of the extrinsic incentives until they started the task), which is less likely to produce a negative effect on intrinsic motivation (Deci et al., 1999; Lepper & Henderlong, 2000; Tang & Hall, 1995). Participants in the extrinsic motivation conditions, therefore, might have as equal inherent interest toward the task as those in the intrinsic conditions.

As an alternative theoretical explanation for the results, intrinsic and extrinsic motivation can work in tandem, not intrinsic “versus” extrinsic. This is because those who perform an activity for extrinsic reasons also utilize “strategies” to make activities more interesting for themselves (Sansone, Weir, Harpster & Morgan, 1992). For example, a student who is given homework on a boring topic can try to do the homework with his friend or he can set some sub-goals on his own to make it more challenging. It is important to be motivated by the experience of interest even for those see the activity as an instrument for an outcome (Sansone & Smith, 2000). Following this notion, participants who were assigned to extrinsic motivation conditions in my studies might have employed their own strategies to make the anagram-solving task more fun and/or might have come up with rationales for engaging in the task. This would help explain why those who were given the extrinsic rewards demonstrated a better performance.

Regarding the effect of progress framing, attention to completed actions (versus attention to remaining actions) was associated with a higher level of pressure and more negative emotion in the studies. According to Carver and Scheier (1990), a performance outcome itself produces



positive or negative feedback for a person, which in turn provides feedback for the self-regulatory system. “To-go” feedback highlights a discrepancy between the present and the desired state, which implies that the discrepancy has not been reduced yet. Therefore, receiving such feedback can serve as negative feedback on one’s goal pursuit, eliciting negative emotions.

### *Limitations and Future Directions*

The studies are subject to several limitations that can be further investigated in future research. First, as my manipulation of intrinsic motivation was not successful, no causal inferences can be made with regard to the relationship between motivation type and outcomes of goal pursuit. The current studies could only examine motivation and related outcomes within a short period of time, in which the quality of intrinsic motivation and self-regulation process could not be fully shown and measured. It may be necessary for future studies to utilize a context where people hold true intrinsic interest and a longitudinal design that measure motivations and outcomes at multiple points in time.

Second, the dichotomy of intrinsic “versus” extrinsic motivation in this study was perhaps oversimplified and did not operationalize the concepts of motivation to the fullest. Those who were given the extrinsic reward, for example, could be re-categorized into external, introjected, identified, and integrated regulation depending on the degree of internalization and the perceived locus of causality (Ryan & Deci, 2000a). Identified or integrated regulation can be viewed as more autonomous forms of extrinsic motivation, in which perceived locus of causality is within oneself and behaviors are internally regulated (Ryan & Deci, 2000a). Studies in education suggested that through internalization and integration, extrinsically motivated behaviors can also bring positive outcomes such as more engagement (Connell & Wellborn,

1991), lower course dropouts, and greater persistence (Vallerand & Blssonnette, 1992). In the current studies, although I tried to manipulate extrinsic motivation via external regulation, participants who were assigned to the extrinsic motivation conditions could have held, in fact, a more autonomous type of extrinsic motivation.

Varied motivations which exist on different levels of generality, namely the global (personality), contextual (domain), and situational (state) levels (Vallerand, 1997) can be another conceptualization which would uncover more subtle aspects of motivation in my studies. According to the hierarchical model of motivation, upper level motivation may affect lower level motivation (*i.e.*, top-down effect); global motivation could affect contextual or situational motivation, and contextual motivation could affect situational motivation (Vallerand, 1997). Following this, it could be possible that participants who had intrinsic motivation on the personality level shifted their intrinsic motivation toward a more situational extrinsic motivation, influencing the manipulation in the studies. It will be important for future research to examine intrinsic motivation with a more holistic approach that takes account of different types of motivation that may exist within an individual.

Finally, I did not assess personal factors that can serve as important boundary conditions for the effects of motivation. The concept of motivation is intertwined with other psychological factors such as sense of self-efficacy, or perceived competence in pursuing a goal. As “the types of outcomes people anticipate depend largely on their judgments of how well they will be able to perform in given situations” (Bandura, 1986, p. 392), self-efficacy is hypothesized to influence motivation. Bandura (1997) found that students who have a higher sense of self-efficacy participate more readily, put forth more effort, persist longer, and display less adverse reactions to challenging situations than those who have lower self-efficacy.

In addition, one's lay theories about willpower may affect self-regulation (Job, Dweck & Walton, 2010). Some people hold a global theory that willpower gets depleted after exercising self-regulation (*i.e.*, limited resource theory) and others do not think their willpower is limited (*i.e.*, nonlimited resource theory). A recent study showed that those with nonlimited resource theory showed better academic performance and less failure in everyday self-regulation such as procrastination and unhealthy eating (Job, Walton, Bernecker & Dweck, 2015).

Lastly, different motivational systems or temperaments, which are tendency to approach positive outcomes (*i.e.*, approach motivation) or to avoid negative outcome (*i.e.*, avoidance motivation), might interact with one's goal pursuit. There is evidence that a symmetry between temperament and achievement goals exists (Elliot & Thrash, 2002); those who have approach motivation are more likely to pursue performance approach goals and mastery goals, whereas those who have avoidance motivation are more likely to pursue avoidance goals. Further investigation is warranted in investigating the relationship among personality characteristics, motivation, and goal pursuit.

### *Concluding Comments*

The "overjustification" hypothesis proposes that people's inherent interest will be decreased by receipt of extrinsic rewards (Lepper et al., 1973). Vallerand (1997) showed that intrinsic motivation is an important predictor for positive consequences for cognitive, affective, and behavioral dimensions. In comparison, the findings presented here suggest that when people do not hold initial interest, granting incentives and external reasons are more powerful for performance than giving intrinsic rationales. Feedback on remaining progress would be associated with negative affect and psychological pressure even when the progress is in the

middle.

The results of the current studies have practical implications for various settings where personal goals and progress are monitored, such as the classroom, workplace, or weight loss programs. If a student/ employee/ dieter does not find the activity inherently interesting, providing external incentives can lead to a better performance. Consumer products and services are other domains where these ideas can be applied. Many mobile apps, web services, and fitness trackers are available to help consumers achieve fitness goals. However, most people, especially the obese who may have a greater need for an active lifestyle, may not be intrinsically motivated to engage in walking or exercising. Indeed, FitBit, one of the leading companies in the activity trackers market, provides a variety of virtual badges based on the number of steps taken, distance walked, and floors climbed. Users can also share the badges they earn with others through social media, text, or email (FitBit, 2016). All of these measures serve as external motivators for the activity and the goal, which are in line with the current finding that giving extrinsic incentives can stimulate people to be more motivated for the enhanced goal pursuit.

## TABLES

Table 1. Results of paired t-tests analysis on participants' ratings on reading materials in pretest

- Agreement ratings on "Reading the passage was interesting" on 7-point scales

Pairs	Mean difference	t-value	df	Significance (2-tailed)
Anagram 1 – Magazine 1	-0.47	-2.00	52	0.05
Anagram 1 – Magazine 2	0.96	3.36	52	0.001
Anagram 1 – Magazine 3	-0.70	-2.60	52	0.012
Anagram 1 – Magazine 4	1.13	-3.95	52	0.000
Anagram 2 – Magazine 1	-0.21	-0.95	52	0.35
Anagram 2 – Magazine 2	1.23	4.27	52	0.000
Anagram 2 – Magazine 3	-0.96	-3.77	52	0.000
Anagram 2 – Magazine 4	-1.40	-4.67	52	0.000

- Agreement ratings on "The information is useful for me" on 7-point scales

Pairs	Mean difference	t-value	df	Significance (2-tailed)
Anagram 1 – Magazine 1	0.23	1.01	52	0.32
Anagram 1 – Magazine 2	2.39	9.52	52	0.000
Anagram 1 – Magazine 3	-1.38	-4.74	52	0.000
Anagram 1 – Magazine 4	-1.28	-4.53	52	0.000
Anagram 2 – Magazine 1	0.40	1.58	52	0.12
Anagram 2 – Magazine 2	2.57	9.27	52	0.000
Anagram 2 – Magazine 3	-1.55	-4.99	52	0.000
Anagram 2 – Magazine 4	-1.45	-5.30	52	0.000

Table 2. Distribution of participants' choices (*i.e.*, goal pursuit) by experimental condition in Experiment 1

Group	Progress Framing Condition				n
	To-Date		To-Go		
	n	%	n	%	
<b>Intrinsic Motivation</b>					
Anagram	27	81.8	20	62.5	
Magazine	6	18.2	12	37.5	
<b>Total</b>	<b>33</b>	<b>100</b>	<b>32</b>	<b>100</b>	<b>65</b>
<b>Extrinsic Motivation</b>					
Anagram	23	74.2	27	73.0	
Magazine	8	25.8	10	27.0	
<b>Total</b>	<b>31</b>	<b>100</b>	<b>37</b>	<b>100</b>	<b>68</b>
<b>n</b>	<b>64</b>		<b>69</b>		<b>133</b>

Table 3. Distribution of participants' choices (*i.e.*, goal pursuit) by experimental condition in Experiment 2

Group	Progress Framing Condition				n
	To-Date		To-Go		
	n	%	n	%	
<b>Intrinsic Motivation</b>					
Anagram	11	91.7	7	63.6	
Magazine	1	8.3	4	36.4	
Total	12	100	11	100	23
<b>Extrinsic Motivation</b>					
Anagram	13	81.3	10	76.9	
Magazine	3	18.7	3	23.1	
Total	16	100	13	100	29
n	28		24		52

## FIGURES

Figure 1. Participants' mean performance scores (*i.e.*, the number of correct answers for both sessions combined) by experimental condition in Experiment 1 (All error bars represent  $\pm 1$  standard error above and below the means)

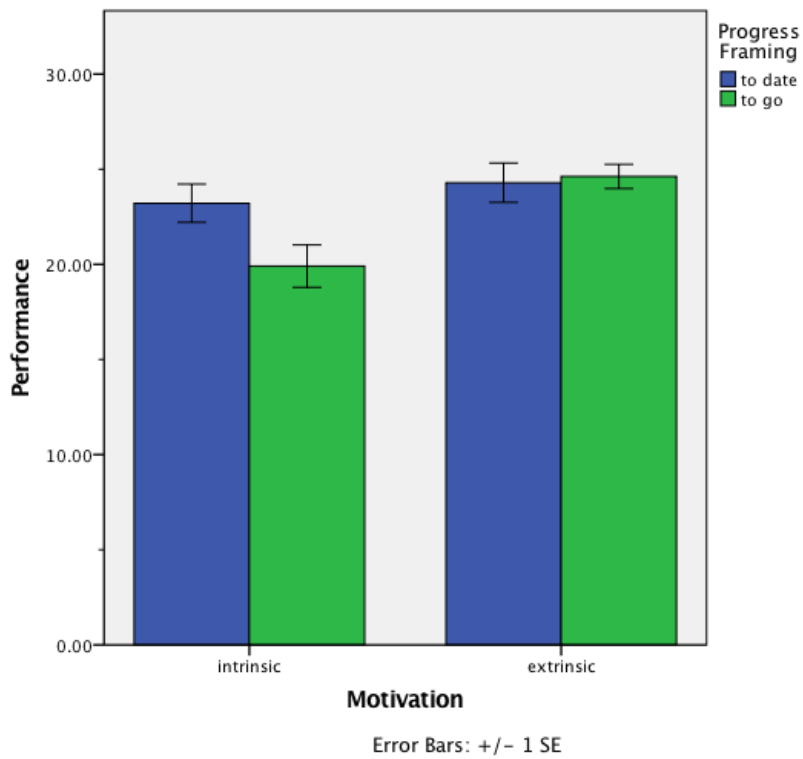




Figure 2. Means scores of participants' negative affect by experimental condition in Experiment 1 (All error bars represent  $\pm 1$  standard error above and below the means)

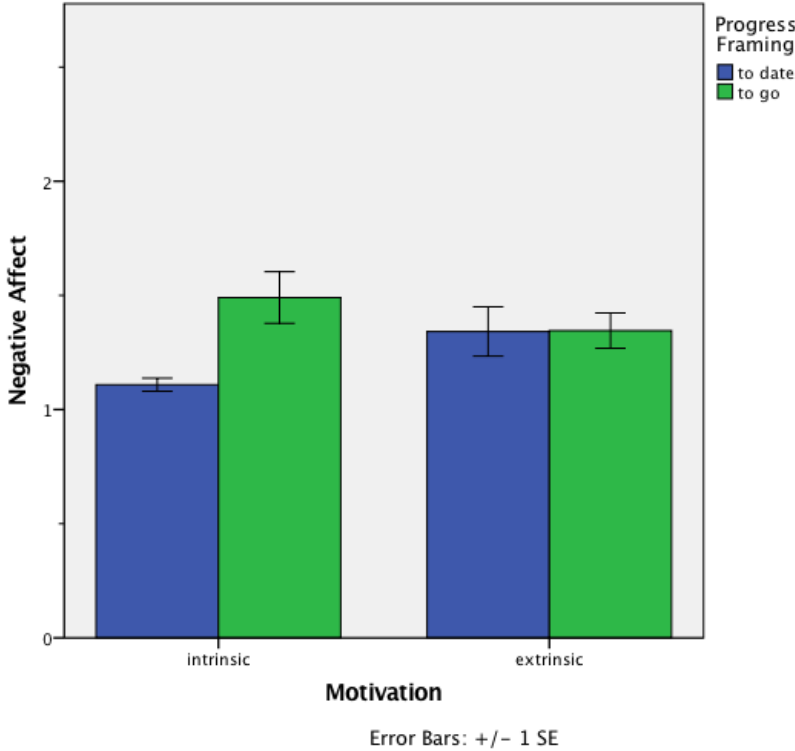
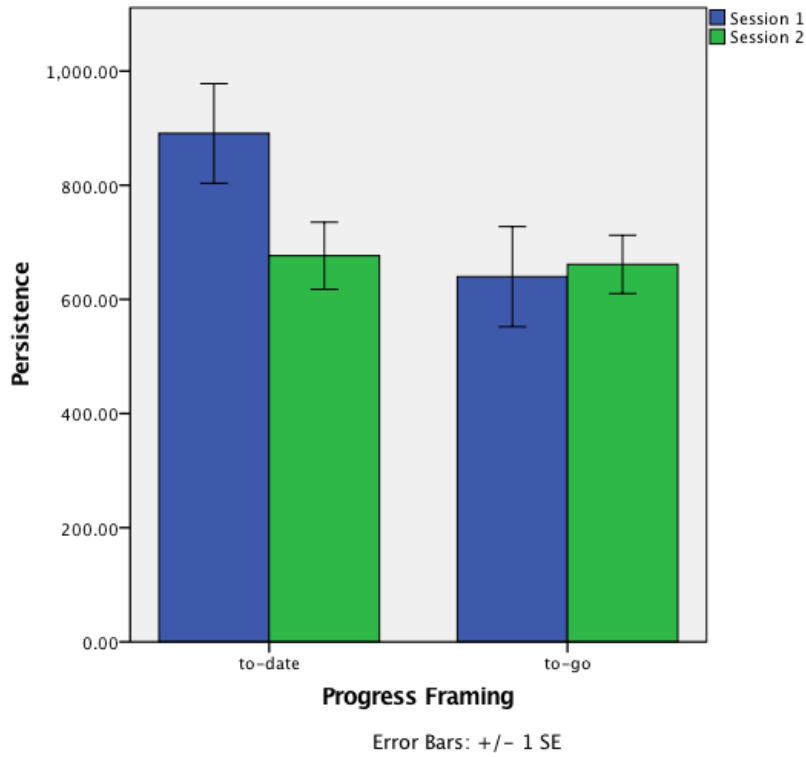


Figure 3. Participants' mean persistence scores (*i.e.*, amount of time spent on session 1 and session 2) by progress framing condition in Experiment 2 (All error bars represent  $\pm 1$  standard error above and below the means)



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## APPENDICES

### Appendix A. Pretest Stimuli and Questionnaire

#### *Instruction*

In this survey, you are going to read two passages on how to effectively solve anagrams (a type of word puzzle, which entails rearranging the letters of a word or phrase to produce a new word or phrase) and four magazine articles on various topics. After each passage and article, you will be asked about your thoughts or feelings.

Please read the passage below and answer the following questions.

#### *Article 1*

#### How to Unscramble Anagrams - Some Key Tips



Anagrams and word scrambles are a great brain teaser that everyone can enjoy. As the scrambled words get longer, it gets more and more difficult to figure out the what the scrambled word is. This article is a collection of tips and tricks to help you solve anagram puzzles more easily.

The key to a good anagram is in scrambling the letters of the word so that key sounds in the word are obscured. For example the word "LAUNDRY" has a prominent "AU" sound in the middle of the word which when realized leaves the rest of the anagram relatively easy to solve. A key to solving anagrams is in breaking the word up into common prefixes, suffixes and letter combinations.



Common word prefixes (letter combinations which start a word) are those such as "RE", "UN", "DE", "IN", "AB", "AD", "EX". If you separate these from the rest of the letters you will be left with a much smaller word to unscramble. Similarly you can pick out suffixes (word endings) such as "ING", "ISM", "ED", "ER", "RY", "OUS". If you write out the word you're trying to unscramble and separate out these common prefixes and suffixes you have a much better chance of deciphering the smaller word that remains. A clever anagram creator will try to avoid words which have these sorts of patterns for their harder puzzles. Over time you can gauge the types of words an individual anagram creator will use.

Another technique is to eliminate letter combinations that are very unlikely. Do you remember your old grammar rules from school such as "I before E, except after C"? Eliminating unlikely combinations - letters that rarely if ever appear next to one another in a word will yield good results. Letters such as 'S' and 'Y' are more frequently choices for the start or end of a word, so it's worth trying them there first. Discard these unusual word patterns and you should find you're left with useful ones.



If the anagram is based around a theme try to write out as many words as you can associate with the theme. For example, if the theme was "trains" you might list "track", "rail", "carriage" etc. Trying to apply these synonyms to the list will yield results. If the anagram is still too tough for you, as a last resort it is possible to try online word unscramble programs, which will give you the answer.

*Q.* What is your reaction to the passage you just read?

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Reading the passage was interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information is useful for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Instruction* Please read the passage below and answer the following questions.

*Article 2*

Five Simple Ways to Solve an Anagram



Whether you're playing Scrabble or Boggle, solving cryptic crosswords or attempting the numerous word puzzles that you might find in a daily newspaper, one thing is for certain: the ability to rearrange a set of letters into some kind of recognizable pattern -more easy: to solve an anagram- is a key skill.

Well, although it is undoubtedly true that some people are better than others (at finding a word or phrase hidden inside a jumble of apparently random letters), the good news is that there are some simple techniques we can use that, over time, will help us to improve our success rate.

So here, in no particular order are my top five tips for solving anagrams:



### 1) Circle

Wherever practical, attempt to place the letters randomly into a circular pattern. This not only breaks up the original order and any potentially misleading sound combinations but it also makes it easier to see all the different letter-groupings that you might be able to connect together.

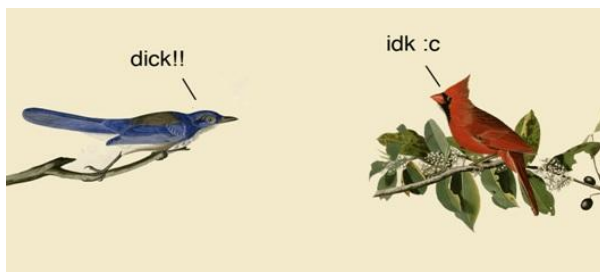
### 2) Suffix or Prefix

Search for any potential suffixes or prefixes in the letters. These are common letter groupings that either end or start other words. For example, you might find suffixes such as: -ING, -NESS, -LY, -ISM, -ED, -ER, -RY, -OUS, -MENT or -TION. Or you might look for prefixes such as UN-, DIS-, SUB-, RE-, DE-, IN-, AB-, AD- or EX-. If you separate these from the other letters, those that remain become easier to handle, being obviously fewer in number. Please be aware that the clever anagram compiler may often avoid words that begin or end in this way so if this does not work you will need to consider some other methods.

### 3) Common and Uncommon Pairings

Look for letters that frequently go together and try combining them. The most obvious of these is the letter Q which will almost always be followed by a letter U. Also, the letter H, unless it is at the start of a word, will tend to follow one of the letters C, G, P, S, T or W.

At the same time, it is a good idea to eliminate any unlikely pairings of letters, those that do not tend to appear next to each other in most English words.



### 4) Consonants Only

The key letters in any particular grouping tend to be the consonants. These give shape and sound

to a word. So ignoring vowels and concentrating on consonants can often pay dividends. Try placing the consonants in a circle so that you can more easily combine them.

Separating consonants from vowels can also have an additional advantage, in situations where the number of vowels is severely limited or alternatively, when the number of vowels compared to the number of consonants is unusually high.

Firstly, when the number of vowels is small, it is more than likely that consonant combinations will occur. So it helps to look out for consonant pairs such as PR-, SP- etc or even combinations of three consonants such STR- and -GHT.

On the other hand, when the number of vowels is relatively large, we should be looking for common vowel combinations such as IE, EA, OU etc or even triples such as IOU (often followed by a letter S). Three vowel combinations are relatively uncommon, however, so it might be worth learning some of the words that contain them (for example: BEAUTY and GAIETY)

### 5) Memorizing multiple words

If you spend any length of time trying to solve anagrams, certain multiple word groups (words that are anagrams of other words) will begin to crop up on a fairly regular basis. Trying to learn and memorize such multiple word groups can be useful in future. Here are some to get you started.

ANGEL = GLEAN = ANGLE

EMIRATE = MEATIER

CHESTY = SCYTHE

OVERNEAT = RENOVATE

MOROSE = ROMEOS

SPECIAL = PLAICES

Q. What is your reaction to the passage you just read?

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Reading the passage was interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information is useful for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Instruction Please read (or skim) the magazine article below as you normally would and answer the following questions.

Article 3



### 3

**ALL HAIL THE PRINTS**

Palm-tree-patterned pants? Maybe not. But with shorts: Yes, you can.

--> -->

shorts \$531  
Marc Jacobs

shirt Gilman Vintage  
boots Allen Edmonds  
bracelets from top  
David Yurman  
Vince Camuto

--> -->

shorts from top  
Cleved \$199  
Tommy Hilfiger \$89  
Scotch & Soda \$119

**SHORTS ADVICE FROM A MAN OF STYLE**

“Anything with a small pattern feels of-the-moment; we do plaids and tartans and gingham checks, which are a bit quirky and unexpected. The rule book was thrown away years back: If it makes you feel good, wear it. Just keep everything else you're wearing simple.”

—Tommy Hilfiger

### 7

**THE BAN ON CARGO SHORTS IS OFFICIALLY LIFTED**

Finally, the Great Slimming of menswear gets around to cargo shorts. This pair by Off-White (the label designed by Kanye's creative director, Virgil Abloh) requires, oh, about half the cotton used to make the ones Fred Durst once wore. And if you're not into the streetwear thing, they'd look just as good with an oxford.

price \$460  
Off-White c/o Virgil Abloh

hoodie John Elliott + Co / sneakers Nike  
hat Kangol  
watch TAG Heuer  
bracelet Telesteion

--> -->

shorts \$118  
AG

### 11

**NEVER BUY GOLF SHORTS AT THE PRO SHOP**

It's just golf—you don't need high-tech performance gear. A pair of regular gingham shorts and (to-die-for) you're the most stylish dude in the clubhouse.

shorts \$68  
Isod

polo shirt Marc Jacobs  
hat Orvis  
necktie and bracelet David Yurman  
watch Rolex

grooming by sunny campus, all-the styling by line and at hobby resorts

where to buy it? go to go.com/go/fashiondirectories

### 9

**DRESS SHORTS: NOT AN OXYMORON**

If your shorts have the same details as your sharpest chinos (see that rilly waist tab?), you can add a tie and not look like the gurland from AC/DC.

shorts \$198  
Steven Alan

shirt Dequard2  
tie The Tie Bar  
watch Hamilton  
bracelets from top  
George Frost / Miansai

--> -->

### 10

**PUT YOUR SWEATPANTS IN STORAGE UNTIL FALL**

And turn to their summer cousins for all your exercise and loungewear needs.

shorts \$85  
Sunek

tank top Go Software  
sunglasses Ray-Ban  
necklace Miansai  
bracelets Miansai  
Martin Margiela  
wristband Lacoste

### 12

**THE BARGAIN OF THE ISSUE**

Hey, penny-pinching billionaires and broke college students alike: These cheap-as-hell Dockers Alpha shorts have that slim GQ fit in countless bangin' colors. Don't think twice.

shorts \$58  
Dockers

### 13

**INTRODUCING: THE ESSENTIAL HYBRID**

This quick-drying shorts/swim-trunks combo will cover you from the ocean to lunch and off to a backyard keg party without leaving you soggy or in need of a change.

shorts \$125  
M.N.I.

Q. What is your reaction to the magazine article you just read?

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Reading the magazine was interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information is useful for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instruction Please read (or skim) the magazine article below as you normally would and answer the following questions.

Article 4

# DATING THE NANNY

So close to home: Jennifer Garner and Ben Affleck's sitter tells friends she's in love with him

BY SARAH GROSSBART

**I**t was a piece of gossip too juicy not to share. Seated at the glass-top bar in Santa Monica steakhouse Boa July 14, a pretty, blonde twentysomething told her friends all about her latest love interest. He's tall, dark and handsome, she said, and he happens to be a two-time Oscar winner going through a messy divorce. Once she let it slip that she was dating none other than Ben Affleck, the beauty couldn't stop gushing about him. "She was saying he was really cool and humble and chill," says a fellow diner. "She was like a giddy high school girl who's sleeping with the quarterback — and no one else knows."

The secret is out now. *Us* can exclusively confirm that Affleck's new flame is 28-year-old California native Christine Ouzounian — a woman he and estranged wife Jennifer Garner hired as a nanny for their three kids this spring. Weeks into the gig caring for Violet, 9, Seraphina, 6, and Samuel, 3, Ouzounian and the actor, 42, developed an attraction, a source tells *Us*. "They would hang out without the kids," explains the source. "And they were very flirty." (A rep for Affleck tells *Us* "all allegations of a romantic relationship are baseless and untrue." Ouzounian couldn't be reached for comment.) Then in the midst of a secret 10-month separation, Affleck and Garner, 43, had yet to announce the end of their 10-year marriage. When they did June 30, Ouzounian was there for Affleck. Literally. That was her in the Bahamas with Affleck and Garner and their kids during their post-breakup vacation. But her time in paradise was cut short when Garner saw something that confirmed her long-held suspicions Ouzounian was more interested in Affleck than she was in babysitting. Says a Garner insider, "She sent both Ben and the nanny home."

Though Ouzounian lost a job, the source says she felt she gained a potential long-term boyfriend. Affleck continued to pursue her, says the source, with texts, emails and carefully arranged meet-ups. Throughout his time in Atlanta, where his kids are living with Garner while she films *Miracles From Heaven*, the *Batman v Superman: Dawn of Justice* star has found ample opportunities to fly back to L.A. Ouzounian was seen July 14 at the Hotel Bel-Air — the five-star Los Angeles resort Affleck had used as a home away from home in the final days of his marriage. On July 17 she even made a late-night visit to his L.A.-area rental, spending two hours with her former boss. "She says Ben really, really likes her," says an Ouzounian pal. "They've even talked about living together. She's saying this is true love."

**LATE NIGHT AT BEN'S**

On July 17, Ouzounian, driving Affleck's Lexus, keyed in the security code to his L.A. pad (left). "He was clearly happy to see her," says an eyewitness of the actor (center), who accepted a bottle of champagne.

Garner (in Atlanta July 25) has been spending downtime with friends.

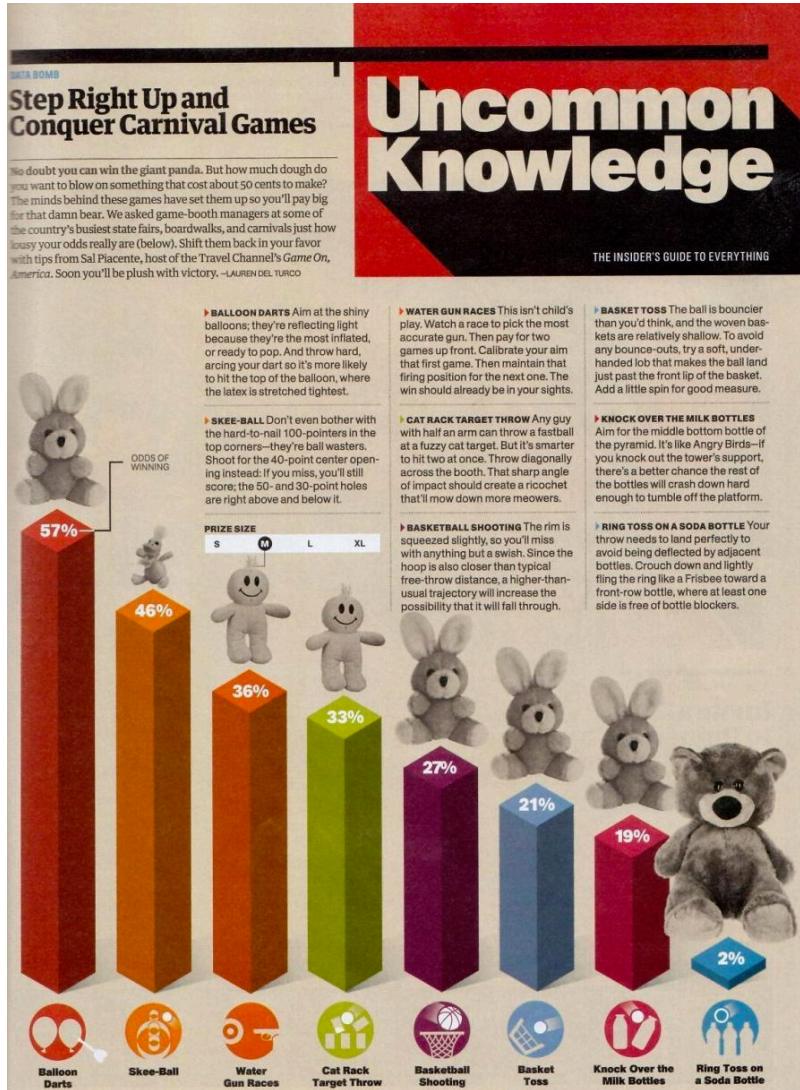
Ouzounian used Affleck's Lexus to run errands July 17.

Q. What is your reaction to the magazine article you just read?

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Reading the magazine was interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information is useful for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instruction Please read (or skim) the magazine article below as you normally would and answer the following questions.

Article 5



Q. What is your reaction to the magazine article you just read?

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Reading the magazine was interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information is useful for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instruction Please read (or skim) the magazine article below as you normally would and answer the following questions.

Article 6

your LOOK

# Jean Therapy

Got the denim doldrums? These of-the-moment outfit tweaks will rekindle the style spark you first felt for your go-to pair

if you always wear **SKINNY...**



*Try a MOD MOTO*



**Supersize YOUR BAG**

Not only does the bag create a striking proportion (hello, lean legs!), but its earthy hue brings out the best in blue. **Jeans** Simone Midrise, Industry Standard, \$95, industrystandardny.com. Cotton-nylon cardigan, Margen Nease, Zedden, \$467, mrazore.com. Leather bag, Creatures of Comfort, \$690, creaturesofcomfort.us.

**REFRESH YOUR STASH (at every price)**



**Express \$88** Performance Stretch Mid Rise Legging, express.com. **DKNY Jeans \$90** City Ultra Skinny Quilted Moto, at select DKNY stores, dkny.com. **Paige \$179** Hannon Ankle, paige.com.



**AG \$190** The Legging, ageans.com. **G-Star \$220** Lynn Mid Skinny, gstar.com. **Diesel \$218** Skincee High, shop.diesel.com.

Tune in to the season's '60s mood with a streamlined leather jacket. It may be light on hardware, but it certainly doesn't skimp on rock and roll attitude. **Jeans** High Rise Skinny, Koral, \$190, at Bloomingdale's. Lambakis jacket, Theory, \$1,190, at Theory, 212-524-6790, silk-cashmere sweater, A.P.C., \$325, at A.P.C., 212-966-0049.

your LOOK DENIM UPDATES

if you always wear **WIDE-LEG...**



*Tie on a BOW BLOUSE*



**DOUBLE UP on denim**

Give your platform wedges a break. What these shoes lack in height, they more than make up for in girlish charm. **Jeans** Someone Else Wide Leg, Blank NYC, \$80, blanknyc.com. Silk-cashmere turtleneck, Equipment, \$238, equipment.com. Polyurethane Belt, Forever 21, \$25, at select Forever 21 stores.

This polished top looks effortlessly feminine tucked in. **Jeans** Wide Leg, H&M, \$30, hm.com. Silk blouse, Alexa Chung for AG, \$268, agexpress.com. Quartz, aglets, and rhodium-plated earrings, Lizzie Fortunato, \$365, shop.lizziefortunato.com. Gold-toned ring, Lysell NYC, \$16 each, lysellnyc.com.

Once the ultimate faux pas, this power pairing is now the sexiest way to do '70s-inspired dressing. **Jeans** Hi-Rise Wide Leg, AVR, \$225, avr.com. Cotton shirt, Tani Collections, \$119, tanicollections.com. Gold-toned necklace, long, \$13, long.com. Leather belt, Levi's, \$36, levis.com.

**REFRESH YOUR STASH (at every price)**



**Calvin Klein Jeans \$70** Modern Bootleg, calvinklein.com. **Guess \$118** Tailored Flared Mid Rise, guess.com. **Samantha Pleet \$216** Port, bonedrag.com. **Miss Me \$90** Trouser Pants, missme.com. **Levi's \$9 \$140** Natasha High Rise Flare Trouser, levis.com. **J Brand \$228** Sabine, jbrand.com.

your LOOK DENIM UPDATES

# if you always wear BOYFRIEND...

**GO BEYOND BASIC**  
ballet flats

The ultimate in boy-meets-girl style: sultry lace-up shoes with wide, tomboyish cuffs.

**Jeans** Phoebe (Stk, 14H), \$250, mih-jeans.com. Leather lace-up flats, Aquazzuli, \$675, at Barneys New York.

The slouchy cut of your jeans may say "off-duty," but a luscious-looking structured accessory proves you're on point.

**Jeans** The Fling, Current/Elliott, \$228, currentelliott.com. Acrylic/merino wool sweaters turtleneck, Jen Taylor, \$80, amajoy.com. Available in sizes up to XXL. Metal chain and glass pearl brooch, Isaac Mizrahi New York, \$48, isaacmizrahi.com. Snakekin bag, Rebecca Minkoff, \$295, at Rebecca Minkoff, 212-677-7883.

**Carry a LADYLIKE BAG**

**REFRESH YOUR STASH (at every price)**

 <b>Gap \$79</b> 1669 Boyfriend, gap.com. Available in sizes up to 26.	 <b>Alpc \$89</b> Skinny Boyfriend, lordandtaylor.com.	 <b>True Religion \$208</b> The Boy, truereligion.com.	 <b>Rag &amp; Bone/Jean \$295</b> Marilyn Crop, ragandbone.com.	 <b>Lucky Brand \$129</b> Dylan Boyfriend, luckybrand.com.	 <b>7 for All Mankind \$215</b> Joanna, 7forallmankind.com.
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your LOOK DENIM UPDATES

# if you always wear STRAIGHT...

Have a tailor shorten just the front of your hems. It's an edgy GY detail that—bonus—also shows off your boots.

**Jeans** Jet Low Rise Straight Leg, Citizens of Humanity, \$246, citizensofhumanity.com. Cashmere sweater, Maday, \$562, luckystyeps.com. Patent leather boots, Hilfiger collection, \$490, at Tommy Hilfiger, 212-223-1824.

**TRIM A FEW INCHES off the front**

**Sub in a SCARF FOR A BELT**

**Layer on COLORFUL KNITS**

Put a playful spin on East Coast prep with vivid, contrasting hues.

**Jeans** W3 high Rise Channel hem, SKI, \$235, SKI.us. Acetate-polyester crease blouse, Jenni Kayne, \$495, jennikayne.com. Cashmere crewneck, Equipment, \$268, equipment.com. Cashmere turtleneck, Magaschera, \$245, magaschera.com. Rose gold-toned watch with leather strap, Citizen Watch, \$195, citizenwatch.com.

Why opt for worn-in leather when silk packs so much sophisticated nonchalance?

**Jeans** The Teen Slippy, Backline Denim and Collections, \$233, backlinedenim.com. Cashmere turtleneck, White x Warren, \$198, whitexwarren.com. Merino fur and cashmere bag, Nomadika, \$295, nomadika.hu. Silk scarf (worn as belt), Brooks Brothers, \$148, brooksbrothers.com.

**Lauren Ralph Lauren Jeans Co. \$79**  
5 Pocket, mrla.com. Available in sizes up to 22.

**Kit from the Klubb Bar**  
Steve Stragge, kitfromklubb.com.

**Big Star \$98**  
Brigitte Tipton, bigstarjean.com.

**NYDJ \$124**  
Marilyn Straight Leg, nydj.com.

**Levi's Vintage Clothing \$198**  
1969 K66 Jean, custommix.shoplo.com.

**Simon Miller \$115**  
Spokane, simonmillerusa.com.

Q. What is your reaction to the magazine article you just read?

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Reading the magazine was interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information is useful for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix B. Consent Form

You are invited to participate in a survey, entitled "Verbal Aptitude and Creativity Test." The study is being conducted by Patrick Vargas and EunKyoung Lee in the Advertising department of The University of Illinois at Urbana Champaign.

The Charles H. Sandage Department of Advertising  
119 Gregory Hall, 810 S. Wright St., Urbana, IL 61801  
(217) 333-1602

The purpose of this study is to examine English speakers' verbal aptitude and creativity. Your participation in the survey will contribute to a better understanding of psychology. We estimate that it will take about 40 - 50 minutes of your time to complete the entire questionnaire.

Risks to participants are considered minimal. You will be paid for the HIT you complete, but will not otherwise benefit from participating. A limited number of research team members will have access to the data during data collection. Any personally identifiable information will be stripped from the final dataset.

Please be aware that any work performed on Amazon MTurk can potentially be linked to information about you on your Amazon public profile page, depending on the settings you have for your Amazon profile. We will not be accessing any personally identifying information about you that you may have put on your Amazon public profile page. MTurk worker IDs will only be collected for the purposes of distributing compensation and will not be associated with survey responses.

In general, we will not tell anyone any information about you. When this research is discussed or published, no one will know that you were in the study. However, if required by laws or University Policy, study information which identifies you and the consent form signed by you may be seen or copied by the following people or groups: The university committee and office that reviews and approves research studies, the Institutional Review Board (IRB) and Office for Protection of Research Subjects, University and state auditors, and Departments of the university responsible for oversight of research.

Your participation in this survey is voluntary. You may decline to answer any question and you have the right to withdraw from participation at any time without penalty. If you wish to withdraw from the study or have any questions, contact the investigator listed above.

Please contact the Principal Investigator, Dr. Patrick Vargas at 217-333-0325 or via email [pvargas@illinois.edu](mailto:pvargas@illinois.edu) if you have any questions or concerns about this research.

This study has been reviewed and approved by The University of Illinois at Urbana Champaign Institutional Review Board. If you have any questions about your rights as a participant in this study or any concerns or complaints, please contact the University of Illinois Institutional Review Board at 217-333-2670 or via email at [irb@illinois.edu](mailto:irb@illinois.edu).

IRB Protocol Number and Expiration Date: 15768, 5/13/2016

- I decline to participate in this study.
- I agree to participate in this study.



Appendix C. Complete questionnaire (Intrinsic motivation condition, “to-date” condition)

*Consent Form: Appendix B*

*Personalization: Appendix D*

*Practice session – instruction*

This page provides some sample anagram questions. The sample questions below are similar to those in the actual sessions.

Please rearrange ALL the letters of the following words to create a different word and carefully type your solution in the space provided below. If you cannot find any solution to the anagram, please enter "0" (zero) in the space provided.

Q. NABAAN

Q. PEAR

Q. WORAR

Q. HRUHCC

Q. LIOOG

*Practice session – answers*

*<Image of favorite animal>*

The correct answers were

- NABAAN: banana

- PEAR: reap

- WORAR: arrow

- HRUHCC: church

- LIOOG: igloo

### *Setting up goals*

You got (number of correct answers) right answers, which is (percentage) in a 100-point scale. Your score is shown to be above average. Good job, (nickname)!

According to previous research in psychology, people tend to perform better when they have performance goals. So we would like to suggest that you achieve (percentage)% correct in the main sessions.

However, it is entirely up to you what score you want to achieve. **Please indicate a goal score you want to set up for yourself by adjusting the slider below:**



### *Instruction – Session 1*

Okay. Let's start Session 1 now.

The instruction is the same as for the sample questions: Please rearrange ALL the letters of the following word to create a different word and carefully type your solution in the space provided below. If you cannot find any solution to the anagram, enter "0" in the space provided. Please note that there are a few questions that cannot be solved; enter "0" in this case.

If you are ready to begin, please proceed to the next page.

### *Questions – Session 1*

SIRSCOSS

LEWFOR

TUIRAG

CORUNNI

LOPEVEEN

RAMHEM

MACREA

*Feedback – First, Session 1*

*<Image of favorite animal>*

You solved 7 questions out of 15 questions in Session 1.  
You're on the right track, (*nickname*). Keep it up!

*Questions – Second half, Session 1*

OLWGFNA

KINMUPP

BULAMANCE

SUTACC

RAMYDIP

TUNAPE

GEIDLH

RFALWATEL

*Feedback – Second, Session 1*

*<Image of favorite animal>*

You finished all of the questions in Session 1.  
Well done, a!

*Progress Feedback: Appendix E*

*Intermission – Choice*

Please take a short break before beginning the second session. Here you can either read expert tips on solving anagrams or refresh your mind by reading a recent magazine article on an interesting topic. Please indicate below which you prefer to do now.

- Read tips on solving anagrams
- Read an interesting magazine article

### *Reading an article of choice*

#### *Instruction*

Okay. Let's start Session 2 now.

The instruction is the same as for Session 1: Please rearrange ALL the letters of the following word to create a different word and carefully type your solution in the space provided below. If you cannot find any solution to the anagram, enter "0" in the space provided. Please note that there are a few questions that cannot be solved; enter "0" in this case.

If you are ready to begin, please proceed to the next page.

### *Questions – First half of Session 2*

LOPEHONYX

KOLCC

TOUNNAIM

ALLRGON

UTAFIE

ICIRMOSCC

RUTYEK

### *Feedback – First, Session 2*

<Image of favorite animal>

You solved 7 questions out of 15 questions in Session 2.  
You're doing well, (*nickname*). Continue the good work!

*Questions – Second half of Session 2*

SINTTEINE

AINNTRTSO

LINCEP

RABLER

COMEPR

TUBNOT

WERCS

TIPCHRE

*Feedback – Second, Session 2*

<Image of favorite animal>

You finished all of the questions in Session 1 and Session 2.  
(*nickname*), you did a great job!

*Instruction*

(*nickname*), thank you for completing the the anagram task!  
There are a few things left for you to answer. Please proceed to the next page.

*Intrinsic Motivation Inventory Questionnaire: Appendix F*

*PANAS scale*

The questionnaire below consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word.

Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers.

	1 Very slightly or Not at all	2	3 Moderately	4	5 Extremely
INTERESTED	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
DISTRESSED	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EXCITED	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
UPSET	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
STRONG	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GUILTY	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SCARED	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
HOSTILE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ENTHUSIASTIC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PROUD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	1 Very slightly or Not at all	2	3 Moderately	4	5 Extremely
IRRITABLE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ALERT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASHAMED	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
INSPIRED	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NERVOUS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
DETERMINED	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATTENTIVE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
JITTERY	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ACTIVE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AFRAID	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Questions – Previous Experience, Familiarity

Q. Do you engage in solving word puzzles or anagrams on a regular basis? (If yes, how often do you do the activity?)

- No
- Yes

Q. How familiar are you with anagram solving tasks?

- Not at all familiar
- Slightly familiar
- Moderately familiar
- Very familiar
- Extremely familiar

### Screening Question – Attentiveness

Q. What are your favorite hobbies?

Everyone has hobbies. Some people like to do active things, and other like to relax more. Normally we would invite you to select all that apply. However, if you are reading these instructions carefully please do not click on any of the boxes and simply move on to the next question. With this click we can eliminate data of less attentive participants from analysis. Thank you for understanding.

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> playing sports | <input type="checkbox"/> video games          | <input type="checkbox"/> suntanning    |
| <input type="checkbox"/> dancing        | <input type="checkbox"/> chatting             | <input type="checkbox"/> playing music |
| <input type="checkbox"/> reading books  | <input type="checkbox"/> travel               | <input type="checkbox"/> volunteering  |
| <input type="checkbox"/> watching TV    | <input type="checkbox"/> community activities | <input type="checkbox"/> other         |

### Questions – Demographic variables

Finally, we will ask about yourself and the experiment in general.

Q. What is your gender?

- Male
- Female

Q. How old are you?

*Q.* Did you make use of any anagram-solving tools or online help to answer questions in the previous sessions? (We need your honest answer. Please note that you will receive the compensation regardless of the answer to this question.)

No

Yes (If so, please provide the name of the tools or the website address below.)

*Q.* Did you notice anything about the experiment that seemed strange?

*Q.* Do you think any tasks were related?

*Q.* Do you think any earlier task affected your responses on later tasks?

*Q.* What do you think the purpose of this experiment was?



## Appendix D. Experimental Stimuli: Personalization

Thank you for participating in this study. Before beginning the main study, we want to get to know you. Please provide us pieces of information about yourself.

*Q.* What's your nickname? (It can be the name that your family/ friends call you, or one you wish to go by.)

*Q.* Which of these animals is your most favorite?



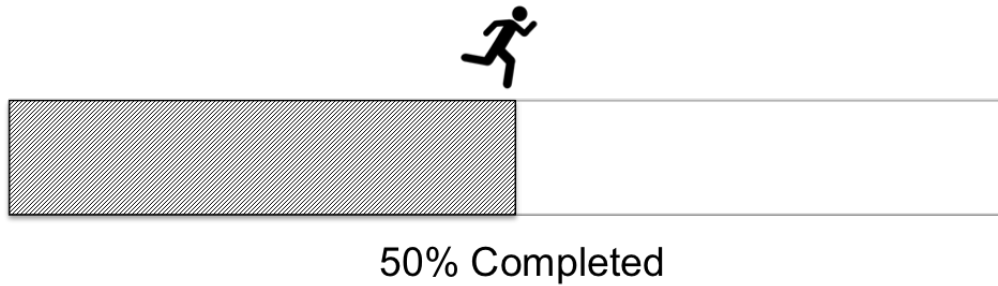
*Q.* What's your favorite color?

Red  Yellow  Blue  Green  Purple

Appendix E. Experimental Stimuli: Progress Report

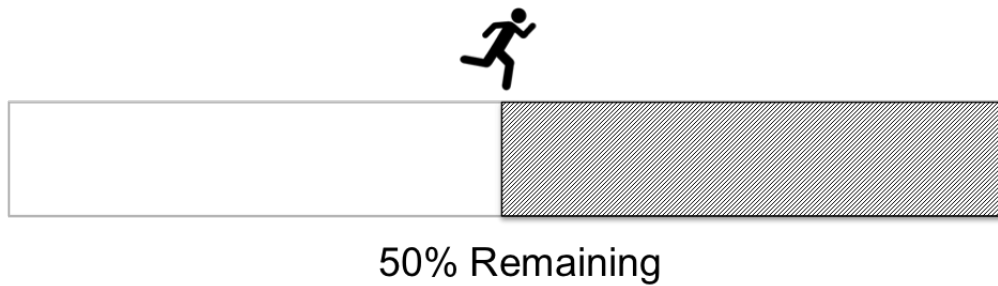
*“To-date” progress condition*

Now you have [finished the first half](#), which is 50% of the task.



*“To-go” progress condition*

Now you have [the second half remaining](#), which is 50% of the task.



## Appendix F. Intrinsic Motivation Inventory Questionnaire

The following items concern your experience with the task. Please answer all items. For each item, please indicate how true the statement is for you, using the following scale as a guide:

1	2	3	4	5	6	7
Not at all			Somewhat			Very
true			true			true

1. While I was working on the task I was thinking about how much I enjoyed it.
2. I did not feel at all nervous about doing the task.
3. I felt that it was my choice to do the task.
4. I think I am pretty good at this task.
5. I found the task very interesting.
6. I felt tense while doing the task.
7. I think I did pretty well at this activity, compared to other students.
8. Doing the task was fun.
9. I felt relaxed while doing the task.
10. I enjoyed doing the task very much.
11. I didn't really have a choice about doing the task.
12. I am satisfied with my performance at this task.
13. I was anxious while doing the task.
14. I thought the task was very boring.
15. I felt like I was doing what I wanted to do while I was working on the task.
16. I felt pretty skilled at this task.
17. I thought the task was very interesting.
18. I felt pressured while doing the task.
19. I felt like I had to do the task.
20. I would describe the task as very enjoyable.
21. I did the task because I had no choice.
22. After working at this task for awhile, I felt pretty competent.

### • Scoring Information

- Interest/enjoyment: 1, 5, 8, 10, 14(R), 17, 20
- Perceived competence: 4, 7, 12, 16, 22
- Perceived choice: 3, 11(R), 15, 19(R), 21(R)
- Pressure/tension: 2(R), 6, 9(R), 13, 18
- \* (R): reverse-coded items