Autonomous Motivation Promotes Goal Attainment through the Conscious Investment of Effort, but Mental Contrasting With Implementation Intentions Makes Goal Striving Easier

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Abstract

People with autonomous motives (e.g., personal importance) may use automated strategies to effortlessly sustain goal-directed behavior and overcome obstacles. We investigated whether conscious effort, ease of goal striving, physiological effort, and the number of obstacles encountered mediate relations between motives and goal attainment for a competitive cycling goal. Additionally, half the participants (*n*=57) were trained in Mental Contrasting with Implementation Intentions (MCII) – a technique that facilitates development of goal-directed behavior – with remaining participants (*n*=54) treated as controls. Conscious investment of effort mediated relations between autonomous motives and goal attainment. Subjective ease of goal striving and physiological effort did not. This result indicates that successful goal striving is not perceived as effortless for autonomously motivated individuals working on competitive goals. Conversely, MCII predicted a reduction in obstacles, which in turn was associated with easier goal striving but not goal attainment. Although MCII did not support goal attainment in the current study, its ability to minimize the influence of obstacles may still be useful for other types of goals or for sustaining long-term goal pursuit.

Keywords: Motivation, Effort, Obstacles

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In 1969, John Fairfax became the first person to cross the Atlantic Ocean solo in a rowboat. He accomplished this feat despite a slew of obstacles, ranging from a lack of funding and boredom to shark attacks and tornadoes encountered in the open sea (Fairfax & Cook, 1972). Effortful persistence is an integral aspect of successful goal striving (Locke & Latham, 2015). How is it that some individuals can persevere with goals, even in the face of what most would consider insurmountable difficulties, whereas others struggle to overcome seemingly minor inconveniences? A potential answer to this question lies in the motives that underpin goal pursuit; these motives can play a significant role in determining how people devote effort to their goal striving.

From the standpoint of the Self-Concordance Model (Sheldon & Elliot, 1999), which is based on Self Determination Theory (Deci & Ryan, 1985), goal striving can be driven by autonomous or controlled motives. Autonomous goal motives reflect internalized reasons for goal striving such as intrinsic interest or personal importance. Conversely, controlled motivation reflects goal striving driven by internal or external demands or pressures. There is a substantial body of evidence supporting the role of autonomous goal motives in promoting effortful persistence in the face of adversity, which culminates in higher rates of goal attainment (Gaudreau et al., 2012). For example, autonomously motivated participants who attempted an increasingly difficult, researcher-assigned cycling goal in a lab setting appraised their goal as a positive challenge and relied more heavily on task-based coping strategies, such as investing effort. Conversely, participants with controlled motives appraised their goal as a threat and were more likely to use coping strategies associated with giving-up and disengagement (Ntoumanis et al., 2014a). Similarly, effort mediated the relation between autonomous motives and goal attainment in athletes (Smith et al., 2007; Smith et al., 2011). The general idea behind the association between effortful persistence and autonomous motivation is that individuals are more likely to engage with and invest resources into goals that they find interesting or meaningful (Sheldon & Elliot, 1999).

Although effortful persistence is a hallmark of autonomous goal pursuit, Werner and Milyavskaya (2019) proposed that people may be more likely to perceive the pursuit of goals with underlying autonomous motives as effort*less*. Individuals with autonomous motives are more likely to perceive the time spent on a goal as enjoyable or rewarding (Gonzalez-Cutre et al., 2020; Peetz et al., 2020) and demonstrate greater attraction to goal-relevant stimuli than those with controlled motives (Milyavskaya et al., 2015). Such results indicate that autonomously motivated individuals may not perceive the exertion of effort towards a goal as difficult or strenuous. Rather, the maintenance of effort may occur subconsciously, making goal striving seem easy for these individuals (Werner & Milyavskaya, 2019). Werner et al. (2016) investigated both the perceived ease of goal pursuit and the perceived effort exerted by students on goals across the course of a university semester. Autonomous goals were easier to pursue relative to a person’s other, less autonomous goals and easier goal striving ultimately conduced to greater goal progress. Conversely, self-reported effort did not mediate the relation between autonomous motives and the efficacy of goal pursuit amongst a person’s various goals or between people. Similarly, in a lab-based task with an artificial goal, Milyavskaya et al. (2021) found that individuals with an interest in math were more willing to exert effort towards difficult problems but experienced less fatigue when doing so. These studies provide preliminary support for the notion that autonomous motives are tied to the perception of easier goal striving.

Autonomous goal pursuit might feel easier because the presence of obstacles is less salient (Werner & Milyavskaya, 2019). Compared to controlled motivation, autonomous motivation has been associated with fewer obstacles reported during goal pursuit (Milyavskaya et al., 2015). Additionally, when faced with a progressively difficult task, participants with strong autonomous motives experience less temptation to reduce their effort (Taylor et al., 2020) and persist even if obstacles are insurmountable and continued goal striving is detrimental to goal attainment (Ntoumanis et al., 2014b). When considering future obstacles, autonomously motivated individuals identify fewer obstacles and rate their likely disruptiveness as lower than individuals with controlled motives (Leduc-Cummings et al., 2017).

The reduced influence of obstacles when motives are autonomous has been proposed to arise because self-regulation under these conditions does not require taxing conscious control (Werner & Milyavskaya, 2019). The process of making and enacting behavioral decisions during goal striving can be demanding (Bagozzi et al., 2003). Autonomously motivated individuals are more likely to spontaneously set implementation intention plans (Koestner et al., 2002), which provide responses to obstacles that can be executed without conscious awareness to facilitate goal attainment (Gollwitzer & Sheeran, 2006; Webb & Sheeran, 2008). The propensity for autonomously motivated individuals to generate effective strategies like implementation intentions during goal striving could account for the reduced impact of obstacles on autonomously motivated goals (Koestner et al., 2002). This is in line with suggestions that effective self-regulation can occur unconsciously or habitually (Fujita, 2011; Gillebaart & de Ridder, 2015). These automated strategies may reduce the impact of potential barriers without an individual actively needing to employ cognitive resources, thus increasing the perceived ease of goal striving (Werner & Milyavskaya, 2019). Individuals with controlled motives are less likely to utilize effective strategies during goal striving, making it more probable that conscious control will be required to circumvent obstacles. Following this line of reasoning, having to actively deal with obstacles as they arise should have the effect of increasing the perceived number of obstacles when motivation is controlled, which should be related to more difficult goal striving.

The majority of research investigating the relations between motives, effort, obstacles, ease of striving, and goal progress has relied on self-report measures and investigated long-term life goals. Several questions as to how autonomous motivation promotes goal attainment remain unanswered. For example, it is unclear how perceived effort and ease of striving relate to the actual physiological effort required to achieve a goal. Additionally, it is unknown how these measures mediate goal progress when actively engaged in activities related to goal pursuit or whether the previous findings relating to ease of striving apply to competitive contexts, which engender goals with unique traits (Van Yperen, 2021). The first aim of the current study was to address these gaps by comparing how subjective measures of conscious effort, ease of goal striving, and objectively measured physical effort, mediate the association between goal motives and goal attainment when engaged with a brief, intense bout of competitive goal striving. The second aim of this study was to experimentally test whether trainable goal striving strategies can provide a means by which obstacles can be circumvented and easy goal striving can be facilitated. Specifically, we trained individuals in Mental Contrasting with Implementation Intentions (MCII; Oettingen & Gollwitzer, 2010) as a way to identify and develop responses to obstacles, and investigated whether this conduces to easier goal striving.

MCII is a two-part metacognitive strategy in which an individual first forms mental representations of attaining their goal and considers the positive implications of attainment. Subsequently, they compare this positive fiction to the impeding reality of their situation, which inevitably contains barriers that must be overcome before the goal is attained. The individual then forms implementation intentions (e.g., “If I encounter obstacle X, then I will execute action Y”) to help them overcome obstacles they identified during the mental contrasting phase (Oettingen & Gollwitzer, 2010). Where mental contrasting is thought to highlight obstacles to goal attainment and increase a person’s commitment to the goal (Kappes et al., 2012; Oettingen, 2012), the formation of implementation intentions serves to provide strategies that can be automatically initiated without conscious awareness when obstacles are encountered during striving (Gollwitzer & Sheeran, 2006; Webb & Sheeran, 2008). A recent meta-analysis found small to moderate (g=.34) effect sizes of MCII on goal progress (Wang et al., 2021). Importantly, MCII has been demonstrated to be effective in lab settings with competitive goals, even if these goals were externally assigned (e.g., Schweiger Gallo et al., 2018; Kirk et al., 2013).

Because people with controlled motives are more likely to experience obstacles during goal striving (Leduc-Cummings et al., 2017; Milyavskaya et al., 2015) and are less likely to spontaneously generate automated goal striving strategies (Koestner et al., 2002), they stand to benefit the most from MCII. In their Tripartite Model of Goal Striving, Ntoumanis and Sedikides (2018) propose that MCII should encourage persistence with controlled goals by providing strategies for overcoming obstacles. Training participants in MCII and investigating its influence on the associations between obstacles/effort will provide experimental evidence for the utility of such interventions for facilitating goal striving in by mitigating obstacles. Furthermore, by testing moderating effects of MCII on the relations between goal motives and effort/obstacles we assess the prediction that MCII is most beneficial for individuals with controlled motives.

The current study tests whether MCII and goal motives predict performance in competitive setting. Results related to effort-based coping strategies in competitive settings largely mirror those observed for non-competitive goals (e.g., Amiot et al., 2004; Ntoumanis et al., 2014a; Smith et al., 2011); however, it is unknown whether results related to ease of striving can also be generalized to these types of goals. In the current experiment, we asked participants to complete a competitive cycling challenge in an immersive virtual environment. Half of the sample was trained in MCII, and the other half were controls. We tested the following hypotheses:

H1. Autonomous goal motives will predict goal attainment and this relation will be mediated by conscious effort (H1a) and/or perceived ease of striving (H1b), as well as objective effort.

H2. Given that MCII provides automated strategies allowing individuals to overcome obstacles, those receiving MCII training will perceive fewer obstacles to goal attainment than participants in the control group (H2a). In turn, the number of obstacles encountered will be negatively related to ease of goal striving (H2b).

H3. Controlled motivation will predict fewer obstacles in the MCII group than in the control group. Autonomous motives will not interact with MCII.

Method

Open Data and Materials

Data, analysis code, and study materials have been made available on the Open Science Framework (https://doi.org/10.17605/OSF.IO/P7BWU).

Participants

We conducted *a priori* power analysis using Monte Carlo simulations (n=1000) of the proposed moderated multiple mediation model depicted in Figure 1 with pwrSEM (Wang & Rhemtulla, 2021). Parameter estimates for the power analysis were derived from existing literature on ease of striving and effort (Ntoumanis et al., 2014a; Werner et al., 2016) and meta-analytic data for MCII (Wang et al., 2021). It was estimated that 110 participants would provide 80% power to detect the hypothesized effects at α=.05.

The participants (*N*=115) were staff (*n*=37) and students (*n*=74) from a metropolitan Australian university campus. Competitive triathletes and cyclists were excluded to reduce the use of competitive cycling strategies in the experiment. We also excluded individuals with diagnosed cardiovascular conditions, respiratory conditions, or diabetes for health and safety reasons. Two participants withdrew before completing the experiment due to feeling unwell during the task. Due to software errors, another two participants were unable to complete the experiment and were removed. The final sample was *N*=111 (68 female, 44 male, and 1 non-binary). The mean age was 30.50 years (*SD*=13.93). On average participants did 1.24 hours of physical activity each day (*SD*=.75). Participants were randomly assigned to either the MCII (*n*=57) or control (*n*=54) condition using the software that administered the experiment. Student participants received course credit for their participation; non-student participants did not receive any compensation. This study was approved by the Curtin University Human Research Ethics Committee.

Procedure

Upon arriving at the testing facility, all participants were told that, following a warm-up, they would be completing two cycling trials in a virtual environment. They were fitted with a wrist-worn heart rate monitor, asked for their demographic data, and had their resting heart rate measured. Trials were conducted in an immersive virtual setup intended to emulate real-world conditions, while maintaining control over extraneous environmental variables, such as wind resistance. The setup also enabled us to exercise exact control over the speed of the artificially intelligent competitor in the second trial. An illustration of the experimental setup is provided in Supplementary Material. During the cycling trials participants sat on a cycling ergometer with a fixed resistance level that was positioned in front of a display with a 180-degree field of view. The display depicted the front of a bicycle frame standing on a straight road surrounded by shrubs and trees with a finish line 500 meters in the distance. The ergometer was connected to a computer and calibrated such that pedaling resulted in realistic acceleration through the virtual environment. Research assistants monitored participants during the cycling trials to ensure that they did not experience adverse health effects. Research assistants (2 males, 1 female) were positioned outside of the field of view and did not provide feedback or encouragement during the cycling trials. Participants were told that in the first cycling trial the goal was to attempt to set their own personal best time across the 500-meter track. After completing the first trial, heart rate was measured again.

Participants were then told that in the second trial they would be racing against an artificially intelligent opponent who was designed to be difficult but beatable. The researcher explicitly assigned the participant the goal of beating this opponent. Participants then rated their motives for attaining the goal of beating the opponent. All participants were told that they would complete a short, written training exercise designed to help them achieve their goal. Participants in the MCII condition watched videos and answered questions to guide them through the MCII process. Participants in the control condition completed a control writing task (see *MCII Training and Control Task*). The two conditions were timed to be approximately of the same duration (i.e., about 5 minutes) and allowed for an adequate amount of rest between the cycling trials.

The opponent in the second trial was a randomly generated female or male avatar on a bicycle, who appeared in the display next to the participant. The speed of the avatar was set to be 10% faster than the participant’s initial “personal best” first trial while following the same pattern of acceleration and deceleration that the participant had used. Pacing behavior during cycling can be influenced by virtual opponents (Crivoi do Carmo et al., 2021) and piloting was conducted prior to the experiment to ensure that the goal was challenging but attainable. The outcome of the race (win/loss) was recorded and constituted the measure of goal attainment. Heart rate was measured after the completion of the second trial. Following cool down, participants rated the ease of goal striving, conscious effort, and the obstacles encountered. Finally, participants were debriefed and thanked for their time. Each cycling trial took approximately 40 seconds to complete (*M*=38.69, *SD*=7.52). In total, the study took approximately 15 minutes.

MCII Training and Control Task

We developed MCII training based on published examples (Adriaanse et al., 2010; Oettingen & Gollwitzer, 2010) and online materials developed by experts in the field (woopmylife.org). Participants first restated their goal (i.e., to beat the virtual opponent in a cycling race). They then imagined attaining the goal and the most positive outcome they associated with this achievement. Next, they contrasted this positive fiction with the reality of their current situation (i.e., about to face a challenging opponent in a physically demanding task). Finally, participants developed implementation intentions (e.g., “if I see my opponent is pulling away, then I will not get give up and keep trying my hardest”). The instructions for each of these four steps were administered using videos and participants filled in text boxes to write down their experiences and responses at each step.

In the control condition, participants were told that “sometimes imagining or recalling a situation similar to what you are about to encounter can help you to achieve your goal”. They were asked to write a short story about a cycling race. Software was used to time the control condition so that the participants’ writing time lasted approximately as long as the MCII condition and did not allow for more or less recovery time between trials.

Measures

Goal Motives

Prior to the beginning of the second trial, the researcher explicitly assigned participants the goal of beating the AI opponent in the upcoming cycling race. Goal motives for attaining this goal were measured using 10 items adapted items from Sheldon et al.

(2017). Participants rated (*1 = not at all*, 7 = *very much so*) the extent to which they were pursuing their goal for controlled (e.g., "I feel like it is what I am supposed to do") and autonomous (e.g., "I find pursuing the goal interesting") reasons. Scholars have used both aggregated (Werner et al., 2016) and separated measures of autonomous and controlled motives (Koestner et al., 2008). As the aim of this experiment was to investigate the differential influences of autonomous and controlled goal motives, we constructed an autonomous motives score by averaging autonomous motivation items, and a controlled motives score by averaging controlled motivation items (Ntoumanis et al., 2014a). On average, participants reported higher autonomous than controlled motivation for the goal (see Table 1, $t(110)=6.24$, $p<.01$), suggesting there were reasonable levels of engagement with the goal despite it being assigned by the experimenter.

Ease of Goal Striving

Ease of goal striving was assessed using the same two items as Werner et al. (2016). These items were "how laborious and taxing did it feel to engage in activities related to this goal?" (reverse coded) and "how easy and natural was it for you to work on this goal?". Both were rated from 1 (*not at all*) to 7 (*very much so*).

Conscious Effort

The conscious effort that participants put into the task was measured using four items (e.g., "I gave my best effort"). Three items were originally adapted from the English version of the Inventaire des Strategies de Coping en Competition Sportive (ISCCS; Gaudreau & Blondin, 2002) and one item was from the Active Coping scale of the COPE (Carver et al., 1989). Responses ranged from 1 (*not at all*) to 7 (*very much so*).

Obstacles

Participants listed the obstacles they encountered during the experiment and rated its disruptiveness from 1 (*not at all*) to 7 (*very much so*). Obstacles reported by participants were both mental (e.g., feeling distracted or overwhelmed by the opponent) and physical, such as frustration (e.g., muscle fatigue). We reasoned that in a short physical trial, number of obstacles would be more susceptible to the influence of goal motives than disruptiveness, as participants with controlled motives would be less likely to automatically deal with smaller obstacles, whereas highly disruptive obstacles would require cognitive engagement regardless of motivation. Consequently, we chose to use number of obstacles in our analysis but report the descriptive statistics for disruptiveness here. On average, the obstacles were rated as moderately disruptive (*M*=4.64, *SD*=1.81).

Objective Effort

Objective effort was operationalized as the change in heart rate from a participant's baseline resting level to their heart rate at the end of the second cycling trial. We used this procedure in an attempt to control for individual difference in heart rate and physical fitness. Heart rate was measured using commercially available wrist worn heart rate monitors (Garmin Ltd) that participants wore throughout the entirety of the study.

Attainment Expectancy and Goal Importance

We measured the additional control variables *attainment expectancy* and *goal importance* after participants rated their goal motives. Attainment expectancy (e.g., "How confident are you that you will achieve your goal?") was measured using three items. Goal importance (e.g., "How important is it to you that you achieve your goal?") was measured using three items. Items for both scales were adapted from Ntoumanis et al., (2014b).

Results

We present descriptive statistics, bivariate correlations, and internal reliability estimates in Table 1. Reliabilities were above .70 for all measures except for ease of goal striving, likely due to the small number of items in the measure. We implemented a moderated multiple mediation path model with robust maximum likelihood estimation using the Lavaan package (Rosseel, 2012) in R to test our hypotheses (Edwards & Lambert, 2007). Figure 1 depicts the tested model. Additionally, age, gender, and hours of daily physical activity were entered as control variables to account for their potential effects on athletic ability, which could conceivably influence physical effort and the individual's ability to attain the goal. To improve clarity, control variables are not depicted in Figure 1.

The model provided a good fit to the data ($\chi^2(12)=11.79$, $p=.46$; RMSEA=.00 [95% CI=.00 – .10]; SRMR=.03; CFI=1.00). The results of the model are summarized in Table 2. Coefficients, standard errors, and p-values for control variables and the covariances between mediators are provided in the Supplementary Material.

Autonomous motivation significantly predicted conscious effort but did not predict ease of striving or objective effort. In turn, conscious effort and autonomous motives predicted goal attainment. The indirect effect of autonomous motives on goal attainment via conscious effort was significant ($\beta=.09$, $SE=.03$, $p<.01$). The indirect effect of autonomous motivation on goal attainment via ease of striving was not significant ($\beta=.02$, $SE=.02$, $p=.46$). These results support H1a but not H1b, suggesting that individuals with autonomous motives consciously apply effort towards their goals, which leads to higher rates of attainment. Objective effort did not mediate the relation between either controlled or autonomous goal motives and attainment, nor did it share significant covariance with any of the other mediator variables (see Supplementary Material).

Controlled motives positively predicted the number of obstacles that an individual encountered during goal striving. MCII negatively predicted the number of obstacles encountered, supporting H2a. Further, the number of obstacles encountered negatively predicted ease of goal striving and there was a significant indirect effect of MCII on ease of striving via the number of obstacles encountered ($\beta=.05$, $SE=.02$, $p=.03$), supporting H2b.

The interaction with controlled motives hypothesized in H3 was not significant and number of obstacles encountered did not predict goal attainment.[1]

Discussion

We demonstrated that conscious effort plays an important role in the attainment of autonomously motivated goals (hypothesis H1a), but found limited evidence for the proposal that autonomously motivated individuals find it easier to strive for their goals (hypothesis H1b). How can these results be reconciled with previous work showing that ease of striving, but not conscious effort, predicts goal progress?

One possible explanation may lie in the time-scales across which goal striving can occur and the type of goal investigated. In the current experiment, the goal was a short, but demanding competitive challenge. Although such goals are prevalent in a variety of performance-based settings (e.g., sports, school/university, jobs), they differ from longer-term goals that require effort to be applied across days, months, or even years. Previous

[1] Self-reported effort could have been influenced by the race outcome (e.g., participants who lost the race may have inferred they did not give enough effort). We conducted an exploratory analysis using the time difference between a participant's personal best trial and their race trial as an alternative measure of goal performance. The model, howeover, provided a poor fit to the data ($\chi^2(16)=21.31$, $p=.17$; RMSEA=.06 [95% CI=.00 – .11]; SRMR=.04; CFI=0.87; Hu & Bentler, 1999; Ximénez et al., 2022). We also tested a model controlling for attainment expectancy and goal importance on goal attainment/progress to account for participants' perceived competence and attachment to the goal. Again, model fit was poor ($\chi^2(20)=28.98$, $p=.09$; RMSEA=.07 [95% CI=.00 – .12]; SRMR=.04; CFI=0.85). Model misfit can produce biased parameter estimates (Lai, 2018). Consequently, we do not interpret these results further.

research has studied effort and ease of striving using both short, performance-based tasks, similar to the current study (e.g., Milyavskaya et al., 2021), as well as non-competitive longer-term goals (e.g., Werner et al., 2016). Our results extend these findings by showing that autonomously motivated individuals are conscious of their decisions to exert increased effort in physically demanding competitive settings. To remain consciously engaged and focused on performance over an extended period, however, is likely to be mentally exhausting and could lead to a drop in the performance of subsequent tasks (Francis & Inzlicht, 2016). In such cases, utilizing strategies to make striving seem less effortful and maintain commitment to the goal is likely to be beneficial. Even if participants consciously exert effort when actively engaged with a goal, the perceived ease of striving might predict longer or multiple engagements with the goal (Moshontz et al., 2019). This is consistent with the suggestion that individuals can switch between effortful and effortless modes of self-control (Fujita et al., 2020) and may explain why ease of striving has been found to be more important for long-term goals (Werner et al., 2016).

The present research has important implications for our understanding of self-control. Value-based models of self-control assert that applying effort carries costs, which are balanced by the rewards attained for doing so (Berkman et al., 2017; Galla et al., 2017). Autonomously motivated individuals who choose to exert more effort could conceivably do so because the effort required is perceived as less (i.e., striving is easier), or because the reward for the goal is perceived as greater (Milyavskaya et al., 2021). Our results favor the latter explanation, at least for demanding competitive goals. Putting effort towards a challenging goal can itself be rewarding (Inzlicht et al., 2018). In the current study, autonomous motivation did not lead to perceiving goal striving as easier; however, it may have enhanced the perceived value of striving (Milyavskaya et al., 2021). This interpretation could also explain why goals with controlled motives are seen as more taxing (Milyavskaya et al., 2021) and threatening (Ntoumanis et al., 2014a).

Techniques like MCII encourage the development of behaviors that can facilitate goal attainment (Oettingen & Gollwitzer, 2010; Wang et al., 2021). Here, we demonstrated that MCII is an effective tool for reducing the number of barriers perceived during goal pursuit, which in turn contributed to easier goal striving. These results supported both aspects of our second hypothesis (H2a and H2b) and are in line with the proposal that furnishing goals with strategies developed through MCII can help individuals counter temptations efficiently (Fujita, 2011). It has been suggested that autonomous motivation may promote the use of strategies to increase the ease of striving for personal goals (Werner & Milyavskaya, 2019). Ease of striving did not mediate relations between motives and goal progress in the current study. Nonetheless, the current results are encouraging for the utility of MCII for mitigating the influence of obstacles and increasing the ease of goal pursuit. As suggested in the previous paragraphs, this may have implications for goals pursued over longer periods.

Contrary to our final hypothesis (H3), there was no interaction between controlled motivation and MCII training. Both theoretical arguments (Ntoumanis & Sedikides, 2018) and data from the present study indicating that controlled motives engender more obstacles to goal striving support the contention that individuals with controlled motives stand to benefit most from MCII. Nonetheless, our results indicate that MCII provides advantages for goal striving regardless of whether an individual has strong controlled or autonomous motivation. Implementation intentions, the aspect of MCII that actively encourages goal-directed behavior, have previously been found to be beneficial for individuals with both autonomous (Chatzisarantis et al., 2010; Koestner et al., 2002) and controlled (Brandstätter et al., 2001; Chatzisarantis et al., 2008; Riddell et al., 2022) motives. It may be the case that MCII provides self-regulatory advantages independently of goal motives.

Interestingly, autonomously motivated individuals did not exert more objectively measured physical effort than those driven by controlled motives in the cycling task. Research has previously shown that when faced with a progressively difficult goal, autonomously motivated people cope by committing effort and display more persistent behavior (Ntoumanis et al., 2014a). Autonomously motivated individuals are also less likely to withdraw their efforts, even if a goal is unattainable (Ntoumanis et al., 2014b). We speculate that autonomously motivated individuals may be more successful goal strivers not because they exert greater effort (e.g., pedal harder), but because they make the decision to persist by sustaining effort (e.g., maintain a consistent rate of pedaling), particularly when goal striving becomes challenging. The length of the task used in the current experiment makes it difficult to detect differences in heart rate between participants who maintain a steady pace and those who initially accelerate hard but then a taper off their physical effort. The use of a longer trial and recording average heartrate for the duration of the trial would enable researchers to investigate this proposition more thoroughly. Even in the absence of a significant effect on physiological output, the psychological advantages autonomous motivation affords by consciously promoting effort exertion are still likely to be influential for goal striving. For instance, in demanding physical tasks like the one used in the current study, the majority of decisions to disengage from strenuous physical activity are due to psychological, rather than physiological limits (Marcora et al., 2009).

Limitations and Future Directions

As noted already, the task used in the current study was a brief, intense period of goal striving. Although such goals are common and it is valuable to investigate active bouts of goal pursuit, it may be the case that for longer-term goals the ease with which individuals are able to strive for their goal may be more relevant and physiological differences in effort may be more distinct. Another potential limitation is the fact that we operationalized goal attainment as a binary win/loss outcome. Many goals, even competitive ones, do not have such clear indicators of achievement. Furthermore, even for situations with a clear outcome like in the current study, some individuals may have goals that are not associated with winning (e.g., finishing or doing your best). Further evidence is required to extend our findings to such situations. Similarly, autonomy is often linked with competence. We cannot rule out competence as a factor affecting the observed relation between autonomous motivation and performance in the current study. We attempted to address this through exploratory analysis with additional control variables. Although the model fit was poor and parameter estimates cannot be trusted, it is encouraging to note that significance of paths did not change from those observed in our main analysis.

Although we attempted to increase the representativeness of our sample by recruiting university staff, the majority of our sample were young, physically fit undergraduate students, which may also limit the study's generalizability. The internal reliability for ease of goal pursuit was poor, which is likely because the scale only contained two items. This scale was chosen because it was used to measure ease of striving previously (Werner et al., 2016) and the items were deemed relevant for the current study; however, it should be noted that the scale was originally intended for investigating ease of striving towards long-term goals. There is clearly a need to develop a more thorough measure of ease of striving and test it in a variety of goal striving contexts. Similarly, although wrist worn heart rate monitors provide adequate measures of heart rate (Shcherbina et al., 2017) and are practical in terms of their affordability and usability, other methods, such as chest strap monitors typically provide more accurate results. Finally, given that we randomized the gender of the AI avatar for each participant and controlled for effect of participant gender, we expect differences due to participant-avatar gender mismatches to be normally distributed across both genders, but acknowledge that such mismatches may be the source of additional variance in the models presented here.

Despite these limitations, we argue that the current study makes a valuable contribution to the literature. It is the first study to compare and contrast conscious effort, physical effort, and the ease of goal striving, in order to investigate the mechanisms underpinning how perceived and actual effort relate to successful striving when motivation is autonomous. It also serves as an experimental test of the utility of MCII for reducing obstacles and easing goal striving in competitive settings. A natural extension of this research would be to use experience sampling methods to investigate how conscious effort and ease of goal striving predict persistence and goal attainment longitudinally, as this method would capture both active and inactive bouts of goal striving (Davydenko et al., 2019; Moshontz et al., 2019). Additionally, investigating physiological and subjective experiences of effortful persistence for goals where exertion is mental rather than physical, such as academic performance or problem solving, would be interesting. This is because it is more difficult to attain proprioceptive signals about one's effort expenditure during mental tasks, which may influence how people report their perceived level of effort. The use of methods such as electroencephalography (EEG) could be used to provide relatively reliable objective measures of effort in mentally strenuous tasks (Gevins & Smith, 2006).

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Data Availability

All data and materials associated with this project are publicly available on the project's OSF page (https://doi.org/10.17605/OSF.IO/P7BWU).

References

Adriaanse, M. A., Oettingen, G., Gollwitzer, P. M., Hennes, E. P., de Ridder, D. T. D., & de Wit, J. B. F. (2010). When planning is not enough: Fighting unhealthy snacking habits by mental contrasting with implementation intentions (MCII). *European Journal of Social Psychology*, *40*(7), 1277-1293. https://doi.org/10.1002/ejsp.730

Amiot, C. E., Gaudreau, P., & Blanchard, C. M. (2004). Self-determination, coping, and goal attainment in sport. Journal of Sport and Exercise Psychology, 26(3), 396-411. https://doi.org/10.1123/jsep.26.3.396

Bagozzi, R. P., Dholakia, U. M., & Basuroy, S. (2003). How effortful decisions get enacted: The motivating role of decision processes, desires, and anticipated emotions. Journal of Behavioral Decision Making, 16(4), 273-295. https://doi.org/10.1002/bdm.446

Berkman, E. T., Hutcherson, C. A., Livingston, J. L., Kahn, L. E., & Inzlicht, M. (2017). Self-control as value-based choice. *Current Directions in Psychological Science*, 26(5), 422-428. https://doi.org/10.1177/0963721417704394

Brandstätter, V., Lengfelder, A., & Gollwitzer, P. M. (2001). Implementation intentions and efficient action initiation. *Journal of Personality and Social Psychology*, *81*(5), 946. https://doi.org/10.1037//0022-3514.81.5.946

Chatzisarantis, N. L., Hagger, M. S., & Thøgersen‐Ntoumani, C. (2008). The Effects of Self‐Discordance, Self‐Concordance, and Implementation Intentions on Health Behavior. *Journal of Applied Biobehavioral Research*, *13*(4), 198-214. https://doi.org/10.1111/j.1751-9861.2008.00035.x

Chatzisarantis, N. L., Hagger, M. S., & Wang, J. C. (2010). Evaluating the effects of implementation intention and self‐concordance on behaviour. *British Journal of Psychology*, *101*(4), 705-718. https://doi.org/10.1348/000712609X481796

Chevalier, N. (2018). Willing to think hard? The subjective value of cognitive effort in children. *Child Development*, 89(4), 1283-1295. https://doi.org/10.1111/cdev.12805

Crivoi do Carmo, E., Renfree, A., Vieira, C. Y. N., Ferreira, D. d. S., Truffi, G. A., & Barroso, R. (2021). Effects of different goal orientations and virtual opponents performance level on pacing strategy and performance in cycling time trials. *European Journal of Sport Science*, 1-8. https://doi.org/10.1080/17461391.2021.1880645

Davydenko, M., Werner, K. M., Milyavskaya, M., & Donnellan, M. B. (2019). Frozen goals: identifying and defining a new type of goal. *Collabra: Psychology, 5*(1), 1-14. https://doi.org/https://doi.org/10.1525/collabra.194

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, *19*(2), 109-134. https://doi.org/10.1016/0092-6566(85)90023-6

Edwards, J. R., & Lambert, L. S. (2007). Methods for integrating moderation and mediation: a general analytical framework using moderated path analysis. *Psychological Methods*, *12*(1), 1. https://doi.org/10.1037/1082-989x.12.1.1

Fairfax, J. & Cook, S. (1972). *Oars across the Pacific: 8,000 miles by rowing boat*. Kimber.

Francis, Z., & Inzlicht, M. (2016). Proximate and ultimate causes of ego depletion. In E. R. Hirt, J. J. Clarkson & L. Jia (Eds.), *Self-regulation and ego control* (pp. 373-398). Academic Press. https://doi.org/10.1016/B978-0-12-801850-7.00018-4

Fujita, K. (2011). On conceptualizing self-control as more than the effortful inhibition of impulses. *Personality and Social Psychology Review*, 15(4), 352-366. https://doi.org/10.1177/1088868311411165

Fujita, K., Orvell, A., & Kross, E. (2020). Smarter, not harder: A toolbox approach to enhancing self-control. *Policy Insights from the Behavioral and Brain Sciences*, 7(2), 149-156. https://doi.org/10.1177/2372732220941242

Galla, B. M., Amemiya, J., & Wang, M. T. (2018). Using expectancy-value theory to understand academic self-control. *Learning and Instruction*, 58, 22-33. https://doi.org/10.1016/j.learninstruc.2018.04.004

Gaudreau, P., Carraro, N., & Miranda, D. (2012). From goal motivation to goal progress: the mediating role of coping in the Self-Concordance Model. *Anxiety Stress Coping*, *25*(5), 507-528. https://doi.org/10.1080/10615806.2011.628015

Gevins, A., & Smith, M. E. (2006). Electroencephalography (EEG) in neuroergonomics. in R. Parasuraman & M. Rizzo (Eds.), *Neuroergonomics: The brain at work*. Oxford University Press

Gillebaart, M., & de Ridder, D. T. (2015). Effortless self‐control: A novel perspective on response conflict strategies in trait self‐control. *Social and Personality Psychology Compass*, *9*(2), 88-99. https://doi.org/10.1111/spc3.12160

Gollwitzer, P. M., & Schaal, B. (1998). Metacognition in action: the importance of implementation intentions. *Personality and Social Psychology Review*, *2*(2), 124-136. https://doi.org/10.1207/s15327957pspr0202_5

Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta‐analysis of effects and processes. *Advances in Experimental Social Psychology*, *38*, 69-119. https://doi.org/10.1016/S0065-2601(06)38002-1

Gonzalez-Cutre, D., Megias, A., Beltran-Carrillo, V. J., Cervello, E., & Spray, C. M. (2020). Effects of a physical activity program on post-bariatric patients: A qualitative study from a self-determination theory perspective. *Journal of Health Psychology*, *25*(10-11), 1743-1754. https://doi.org/10.1177/1359105318770729

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55. https://doi.org/10.1080/10705519909540118

Inzlicht, M., Shenhav, A., & Olivola, C. Y. (2018). The effort paradox: Effort is both costly and valued. *Trends in Cognitive Sciences*, *22*(4), 337-349. https://doi.org/https://doi.org/10.1016/j.tics.2018.01.007

Kappes, A., Singmann, H., & Oettingen, G. (2012). Mental contrasting instigates goal pursuit by linking obstacles of reality with instrumental behavior. *Journal of Experimental Social Psychology*, *48*(4), 811-818. https://doi.org/10.1016/j.jesp.2012.02.002

Kirk, D., Oettingen, G., & Gollwitzer, P. M. (2013). Promoting integrative bargaining: Mental contrasting with implementation intentions. International Journal of Conflict Management, 24(2), 148-165. https://doi.org/10.1108/10444061311316771

Koestner, R., Lekes, N., Powers, T. A., & Chicoine, E. (2002). Attaining personal goals: Self-concordance plus implementation intentions equals success. *Journal of Personality and Social Psychology*, *83*(1), 231–244. https://www.ncbi.nlm.nih.gov/pubmed/12088128

Koestner, R., Otis, N., Powers, T. A., Pelletier, L., & Gagnon, H. (2008). Autonomous motivation, controlled motivation, and goal progress. *Journal of Personality*, *76*(5), 1201-1230. https://doi.org/10.1111/j.1467-6494.2008.00519.x

Lai, K. (2018). Estimating standardized SEM parameters given nonnormal data and incorrect model: Methods and comparison. *Structural Equation Modeling: A Multidisciplinary Journal*, *25*(4), 600-620. https://doi.org/10.1080/10705511.2017.1392248

Leduc-Cummings, I., Milyavskaya, M., & Peetz, J. (2017). Goal motivation and the subjective perception of past and future obstacles. *Personality and Individual Differences*, *109*, 160-165. https://doi.org/10.1016/j.paid.2016.12.052

Locke, E. A., & Latham, G. P. (2015). Breaking the rules: A historical overview of goal-setting theory. *Advances in Motivation Science*, *2*, 99-126. https://doi.org/10.1016/bs.adms.2015.05.001

Marcora, S. M., Staiano, W., & Manning, V. (2009). Mental fatigue impairs physical performance in humans. *Journal of Applied Physiology*, *106*(3), 857-864. https://doi.org/10.1152/japplphysiol.91324.2008

Milyavskaya, M., Galla, B. M., Inzlicht, M., & Duckworth, A. L. (2021). More Effort, Less Fatigue: The Role of Interest in Increasing Effort and Reducing Mental Fatigue. *Frontiers in Psychology*, *12*(5310-5325). https://doi.org/10.3389/fpsyg.2021.755858

Milyavskaya, M., Inzlicht, M., Hope, N., & Koestner, R. (2015). Saying "no" to temptation: Want-to motivation improves self-regulation by reducing temptation rather than by increasing self-control. *Journal of Personality and Social Psychology*, *109*(4), 677–693. https://doi.org/10.1037/pspp0000045

Moshontz, H., Hoyle, R. H., Marsh, J. S., Fitzsimmons, G., Komoski, S., Andrade, F., Novice, M., & Kwiatek, S. (2019). Resisting, recognizing, and returning: A three-component model and review of persistence in episodic goals. *Social and Personality Psychology Compass*, *15*(1), e12576. https://doi.org/10.1111/spc3.12576

Ntoumanis, N., Healy, L. C., Sedikides, C., Duda, J., Stewart, B., Smith, A., & Bond, J. (2014a). When the going gets tough: The "why" of goal striving matters. *Journal of Personality*, *82*(3), 225-236. https://doi.org/10.1111/jopy.12047

Ntoumanis, N., Healy, L. C., Sedikides, C., Smith, A., & Duda, J. (2014b). Self-regulatory responses to unattainable goals: The role of goal motives. *Self and Identity*, *13*(5), 594-612. https://doi.org/10.1080/15298868.2014.889033

Ntoumanis, N., & Sedikides, C. (2018). Holding on to the goal or letting it go and moving on? A tripartite model of goal striving. *Current Directions in Psychological Science*, *27*(5), 363-368. https://doi.org/10.1177/0963721418770455

Oettingen, G. (2012). Future thought and behaviour change. *European Review of Social Psychology*, *23*(1), 1-63. https://doi.org/10.1080/10463283.2011.643698

Oettingen, G., & Gollwitzer, P. M. (2010). Strategies of setting and implementing goals: Mental contrasting and implementation intentions. In J. E. Maddux (Ed.), *Social Psychological Foundations of Clinical Psychology* (pp. 114-135). Guildford Press.

Peetz, J., Milyavskaya, M., Davydenko, M., & Donnellan, M. B. (2020). When time on task is seen as a reward: Autonomous motivation increases preference for pursuing goals more often for less time. *Collabra: Psychology*, *6*(1), 1-10. https://doi.org/10.1525/collabra.285

Riddell, H., Sedikides, C., Gucciardi, D. F., Jackson, B., Thøgersen-Ntoumani, C., & Ntoumanis, N. (2022). Goal motives and mental contrasting with implementation intentions facilitate strategic goal persistence and disengagement. *Journal of Applied Social Psychology*, 1– 23. https://doi.org/10.1111/jasp.12915

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1-36. https://doi.org/10.18637/jss.v048.i02

Schweiger Gallo, I., Bieleke, M., Alonso, M. A., Gollwitzer, P. M., & Oettingen, G. (2018). Downregulation of anger by mental contrasting with implementation intentions (MCII). Frontiers in Psychology, 9, 1838. https://doi.org/10.3389/fpsyg.2018.01838

Shcherbina, A., Mattsson, C. M., Waggott, D., Salisbury, H., Christle, J. W., Hastie, T., Wheeler, M. T., & Ashley, E. A. (2017). Accuracy in wrist-worn, sensor-based measurements of heart rate and energy expenditure in a diverse cohort. *Journal of Personalized Medicine, 7*(2), 3. https://doi.org/10.3390/jpm7020003

Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: the self-concordance model. *Journal of Personality and Social Psychology, 76*(3), 482-497. https://doi.org/10.1037//0022-3514.76.3.482

Smith, A., Ntoumanis, N., & Duda, J. (2007). Goal striving, goal attainment, and well-being: Adapting and testing the self-concordance model in sport. *Journal of Sport and Exercise Psychology*, *29*(6), 763-782. https://doi.org/10.1123/jsep.29.6.763

Smith, A., Ntoumanis, N., Duda, J., & Vansteenkiste, M. (2011). Goal striving, coping, and well-being: A prospective investigation of the self-concordance model in sport. *Journal of Sport and Exercise Psychology, 33*(1), 124-145. https://doi.org/10.1123/jsep.33.1.124

Steel, R. P., Bishop, N. C., & Taylor, I. M. (2021). The effect of autonomous and controlled motivation on self‐control performance and the acute cortisol response. *Psychophysiology*, *58*(11), e13915. https://doi.org/10.1111/psyp.13915

Taylor, I. M., Smith, K., & Hunte, R. (2020). Motivational processes during physical endurance tasks. *Scandinavian Journal of Medicine & Science in Sports*, *30*(9), 1769-1776. https://doi.org/10.1111/sms.13739

Van Yperen, N. W. (2021). Achievement goals and self-regulation in the sport context. In P. A. M. Van Lange, E. T. Higgins, & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 589–606). The Guilford Press.

Wang, G., Wang, Y., & Gai, X. (2021). A meta-analysis of the effects of mental contrasting with implementation intentions on goal attainment. *Frontiers in Psychology*, *12,* 1299-1309. https://doi.org/10.3389/fpsyg.2021.565202

Wang, Y. A., & Rhemtulla, M. (2021). Power analysis for parameter estimation in structural equation modeling: A discussion and tutorial. *Advances in Methods and Practices in Psychological Science*, *4*(1), 1-17. https://doi.org/10.1177%2F2515245920918253

Webb, T. L., & Sheeran, P. (2008). Mechanisms of implementation intention effects: The role of goal intentions, self‐efficacy, and accessibility of plan components. *British Journal of Social Psychology*, *47*(3), 373-395. https://doi.org/10.1348/014466607X267010

Werner, K. M., & Milyavskaya, M. (2019). Motivation and self‐regulation: The role of want‐to motivation in the processes underlying self‐regulation and self‐control. *Social and Personality Psychology Compass*, *13*(1), 1-14. https://doi.org/10.31234/osf.io/yq2j7

Werner, K. M., Milyavskaya, M., Foxen-Craft, E., & Koestner, R. (2016). Some goals just feel easier: Self-concordance leads to goal progress through subjective ease, not effort. *Personality and Individual Differences*, *96*, 237-242. https://doi.org/10.1016/j.paid.2016.03.002

Ximénez, C., Maydeu-Olivares, A., Shi, D., & Revuelta, J. (2022). Assessing cutoff values of SEM fit indices: Advantages of the unbiased SRMR index and its cutoff criterion based on communality. Structural Equation Modeling: A Multidisciplinary Journal, 29(3), 368-380. https://doi.org/10.1080/10705511.2021.1992596

Table 1

Descriptive Statistics, Internal Reliabilities and Correlation Coefficients.

	M	*SD*	α	1	2	3	4	5	6	7	8	9
1. Autonomous Motives	5.08	.98	.71									
2. Controlled Motives	4.24	1.25	.82	.21*								
3. Ease of Goal Striving	3.92	1.35	.47†	.10	-.15							
4. Conscious Effort	5.95	.89	.86	.35**	-.06	.09						
5. Objective Effort	41.84	31.36	-	.12	-.13	.01	<.01					
6. Number of Obstacles	3.57	1.39	-	.17	.24*	-.19*	.19*	<.01				
7. Goal Importance	4.78	1.16	.88	.57**	.40**	-.06	.28**	.06	.28**			
8. Attainment Expectancy	4.71	1.29	.91	.46**	.10	.21*	.29**	.03	.14	.60**		
9. Condition (MCII/Control)	-	-	-	.10	.14	.00	.14	.02	-.18	.02	-.01	
10. Goal Attainment (Win/Loss)	-	-	-	.23*	-.05	.15	.25**	.10	.17	.06	-.03	.10

Note. * = p < .05, ** = p < .01, † = Spearman-Brown split-half correlation used to calculate reliability

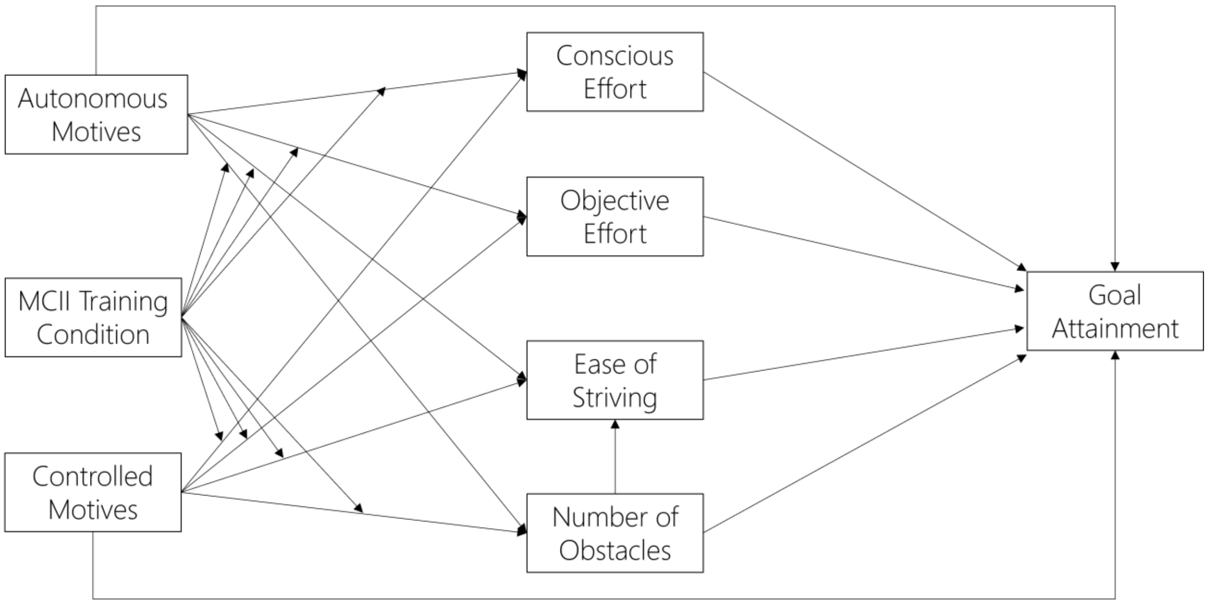
Table 2

Parameter Estimates for Figure 1.

Outcome	*Predictor*	β	*SE*	*z*	*p*	R^2
Conscious Effort						.17
	Autonomous Motives	.36	.08	4.52	<.01**	
	Controlled Motives	-.13	.09	-1.48	.14	
	MCII Condition	.12	.09	1.39	.16	
	Condition x Controlled Motives	.02	.09	.21	.83	
	Condition x Autonomous Motives	-.13	.08	-1.67	.10	
Objective Effort						.05
	Autonomous Motives	.14	.10	1.35	.18	
	Controlled Motives	-.17	.12	-1.46	.14	
	MCII Condition	.04	.10	.38	.71	
	Condition x Controlled Motives	-.04	.11	-.39	.70	
	Condition x Autonomous Motives	-.02	.10	-.20	.84	
Ease of Striving						.10
	Autonomous Motives	.18	.11	1.63	.10	
	Controlled Motives	-.11	.11	-1.07	.29	
	MCII Condition	-.04	.10	-.38	.70	
	Number of Obstacles	-.21	.10	-2.19	.03*	
	Condition x Controlled Motives	-.08	.10	-.83	.41	
	Condition x Autonomous Motives	-.12	.12	-1.04	.30	
Number of Obstacles						.15
	Autonomous Motives	.15	.09	1.62	.11	
	Controlled Motives	.26	.08	3.15	<.01**	
	MCII Condition	-.23	.09	-2.59	.01*	
	Condition x Controlled Motives	.04	.08	.52	.60	
	Condition x Autonomous Motives	-.16	.09	-1.74	.08	
Goal Attainment						.23
	Conscious Effort	.25	.09	2.84	<.01**	
	Objective Effort	.09	.08	1.23	.22	
	Ease of Striving	.08	.09	.86	.39	
	Number of Obstacles	-.08	.09	-.86	.39	
	Autonomous Motives	.25	.11	2.27	.02*	
	Controlled Motives	-.09	.10	-.87	.39	

Note. * = p < .05, ** = p < .01

Figure 1



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