# Goal Motives, Mental Contrasting with Implementation Intentions, and the Self-Regulation of Saving Goals: A Longitudinal Investigation

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**Abstract**

We investigated how autonomous and controlled motives for saving money contribute longitudinally to self-regulatory coping, goal progress, and psychological need satisfaction/frustration. We also investigated whether mental contrasting with implementation intentions (MCII) facilitates saving through interactions with controlled goal motives. We randomly assigned participants ($N$ = 364) to the MCII or control condition. We assessed self-reported motives, self-regulatory coping, saving goal progress, and need satisfaction/frustration over six months. Autonomous motives predicted greater task-based coping and, indirectly, goal progress and need satisfaction. Controlled motives predicted increased disengagement-based coping and decreased task-based coping, which indirectly predicted need frustration and reduced progress, respectively. MCII decreased the negative relations between controlled motives and task-based coping, and indirectly predicted saving progress. Autonomous motivation is associated with saving money and need satisfaction. Conversely, controlled motives predict the thwarting of psychological needs and decreased saving. MCII might improve self-regulatory coping and saving in individuals with controlled motives.

*Keywords*: autonomous motives, controlled motives, mental contrasting, implementation intentions, saving

# Goal Motives, Mental Contrasting with Implementation Intentions, and the Self-Regulation of Saving Goals: A Longitudinal Investigation

Over the last 50 years, there has been a global trend toward decreased personal savings in G20 countries (Organisation for Economic Co-operation and Development, 2023). For instance, according to the Office of National Statistics, households in the United Kingdom saved a median of £180 per month in 2022, and 25% of households held less than £2,100 in their savings account (Yurday, 2023). Having inadequate personal finances puts individuals at risk of experiencing severe hardship, and poses wider social and economic concerns. Saving money is a complex goal that is influenced by social, economic, and political conditions, as well as an individual's ability to manage their own behavior. Although it can be difficult to change one's external circumstances, developing an understanding of psychological factors that influence how people strive for saving goals could uncover ways to help them maximize their individual saving capacity (Wells, 2000).

## How Do Motives Predict Self-Regulation and Goal Striving Outcomes?

Motivation plays a key role in self-regulation—the process of directing one's thoughts, emotions, and behavior to achieve goals—and is an important building block for developing effective saving habits (Di Domenico et al., 2022). Sheldon and Elliot's (1999) self-concordance model (SCM; Sheldon & Elliot, 1999) details how the motives behind goal striving can influence the effectiveness of goal pursuit and ultimately personal fulfilment in the form of increased well-being. Within the SCM, goal motives are classified as autonomous or controlled. Autonomously motivated goals align with a person's values or self-concept and are pursued for their inherent interest or enjoyment, whereas controlled motives reflect goals driven by external and internal pressures or contingencies (Ryan & Deci, 2017). Individuals engage in more adaptive self-regulation (e.g., solution-focused coping efforts; Gaudreau et al., 2012) when pursuing autonomous goals, compared to goals underpinned by controlled motives (Werner & Milyavskaya, 2018).

Addressing the question of why autonomously motivated individuals are more effective goal strivers, Koestner et al. (2008) highlighted the potential of task- and

disengagement-based coping styles for explaining associations between goal motives and goal achievement. Individuals engaged in task-based coping use strategies to directly manage stressful situations. In contrast, disengagement-based coping entails attempts to avoid stressors by focusing on task-irrelevant cues, and behaviorally or cognitively withdrawing. Meta-analytic evidence indicates that both of these coping strategies are widely used, but yield discrepant outcomes (Kato, 2015). Task-based coping is predicted by autonomous motivation and is more likely to result in successful goal striving, whereas disengagement-based coping is associated with controlled motives and is detrimental to goal pursuit (Gaudreau et al., 2012). The effective regulation and attainment of autonomously motivated goals contributes to the fulfilment of the basic psychological needs of autonomy (sense of volition in one's own life), competence (feeling effective and capable in one's activities), and relatedness (feeling connected to and supported by others; Ryan & Deci, 2017). Conversely, striving for goals with controlled motives can contribute to frustration of these needs (Vansteenkiste et al., 2020). There are well-established links among autonomous motives, adaptive self-regulatory mechanisms, and need satisfaction (Hope et al., 2019), but the proposed associations among controlled motives, maladaptive regulation, and psychological need frustration have received less attention (Sezer et al., 2023; Vansteenkiste et al., 2020).

**Motivation and Self-Regulation of Saving**

Accumulating wealth has traditionally been seen as a goal underpinned largely by controlled motives (Kasser & Ryan, 1993, 1996). Consequently, many studies emphasise the detrimental impacts of striving for goals to increase one's wealth (e.g., Sheldon et al., 2004). Challenging this view, evidence has indicated that it is possible to have autonomous motives for bettering one's financial situation, and that striving with autonomous motivation is positively associated with indicators of sound financial management, saving money, investing, and financial self-awareness, as well as greater overall vitality, less depletion, and higher life satisfaction (Di Domenico et al., 2022). Clearly, when it comes to benefiting from wealth-oriented goals such as saving, the reasons behind goal striving matter.

Regarding the self-regulation of saving, strategies that encourage active engagement with saving goals (e.g., budgeting or tracking spending) have been advocated as ways for

increasing saving (Davydenko et al., 2021) and are positively associated with personal wealth (Chetty et al., 2014; Kim & Hanna, 2017; Rha et al., 2006). However, individual strategies are likely to differ between people and situations (Davydenko et al., 2021). The focus on specific strategies that predict saving may thus be overlooking a larger self-regulatory picture (Strömbäck et al., 2017). Rather than assessing specific behaviors, considering how coping strategies that emphasize engagement or avoidance, such as task-based and disengagement-based coping, might be a more generalizable way to differentiate effective and ineffective savers.

Most of the literature on relations among goal motives, self-regulation, and personal wealth has focused on goals to increase one's income capacity (e.g., earning more). The extent to which individuals differ in their autonomous and controlled motives for saving and how the quality of goal motivation affects self-regulation is understudied. Further, it is unclear whether striving for autonomously motivated saving goals constitutes a need satisfying experience. Establishing a link among saving goal motivation, effective self-regulation of saving, and need fulfillment is critical, as need satisfying experiences might help nurture wellbeing (Milyavskaya et al., 2014) and contribute to the development of sustained saving success. Conversely frustration of psychological needs can contribute to controlled motivation (Bartholomew et al., 2011; Vansteenkiste et al., 2020) and poor financial management (Manganelli & Forest, 2022).

**Mental Contrasting with Implementation Intentions as a Motivation-Based Saving Intervention**

An understanding of the interplay between motivation and goal striving offers opportunities to develop saving interventions that capitalize on adaptive self-regulation associated with autonomous motives or counteract maladaptive self-regulation associated with controlled motives (Peetz & Davydenko, 2021). Ntoumanis and Sedikides (2018) have advocated MCII as an established, trainable metacognitive strategy that can interact with goal motives to promote strategic goal pursuit. MCII, introduced by Oettingen and colleagues (2010), combines two techniques for achieving goals: mental contrasting and implementation intentions. In the mental contrasting phase, individuals imagine a positive future outcome that

they want to achieve (the "wish") and then contrast this with the potential obstacles that exist preventing them from achieving that outcome (the "reality"). In the implementation intentions phase, individuals form specific if-then plans (e.g., "If [specific trigger or cue], then [specific behavior]") that help them to specify how and when they will execute a behavior (Gollwitzer & Schaal, 1998). Whereas mental contrasting helps individuals to foster commitment to attainable goals and identify foreseeable obstacles (Kappes & Oettingen, 2014; Kappes et al., 2013), implementation intentions provide pre-emptive plans for overcoming potential barriers during goal striving (Gollwitzer & Schaal, 1998).

Meta-analytic evidence indicates that engaging in MCII has small-to-moderate positive effects on goal attainment across varying domains (Cross & Sheffield, 2019; Wang et al., 2021). According to Ntoumanis and Sedikides (2018), individuals who pursue attainable goals with controlled motives stand to benefit most, as MCII will bolster commitment, persistence, and active engagement with the goal, which are typically reduced under controlled motivation. Stated otherwise, for individuals with controlled motives, MCII will encourage a shift away from disengagement-based coping strategies toward task-based coping. The proposal that MCII will be more effective for individuals with controlled motives has received some support from lab-based and observational studies (Riddell et al., 2022; Riddell, Sedikides, et al., 2023), but has not been tested experimentally in an applied, real-world context, such as saving money.

**Overview**

We investigated associations among motives for saving, self-regulatory coping, goal progress, and psychological need satisfaction and frustration over six months. Furthermore, we examined whether MCII interacts with goal motives to promote adaptive changes in self-regulatory coping strategies. Our research makes two key contributions to the growing literature on the role of goal motives in personal finance. First, we probe how autonomous and controlled motives predict self-regulatory coping strategies longitudinally to determine saving goal progress and psychological need fulfillment. Second, we test whether MCII can facilitate saving by moderating associations between controlled motivation and self-regulatory behavior. We formulated the following hypotheses regarding goal motives:

H1. Autonomous motives for saving money will relate positively to goal progress (H1a) and need satisfaction (H1b).

H2. Controlled motives for saving money will relate negatively to goal progress (H2a) and positively to need frustration (H2b).

H3. Task-based coping will longitudinally mediate the relations predicted in H1.

H4. Disengagement-based coping will longitudinally mediate the relations predicted in H2.

Additionally, we tested the following hypothesis regarding MCII:

H5. MCII will relate to goal progress (H5a) and need satisfaction (H5b) via its moderating effects on the associations between controlled motives and coping.

## Method

### Transparency and Openness

We preregistered the study aims, methods, and hypotheses on the Open Science Framework (OSF). We also deposited data as well as analysis and study materials on the OSF project page (https://osf.io/cpgb6/). We followed journal article reporting standards (Kazak, 2018).

We made two departures from the preregistration due to insights gained after the registration. First, we adopted a Bayesian analytic framework (as opposed to a frequentist approach) to integrate recent meta-analytic evidence detailing the relevance of goal motives for goal progress, self-regulation, attainment, and need satisfaction (Sezer et al., 2023), and the influence of MCII on goal progress (Wang et al., 2021). These meta-analyses provide robust prior knowledge about several key relations addressed here. Second, in the preregistration, we proposed constructing an additional model to test participants who adjusted their saving goal partway through the study. However, over the course of the study, only 172 participants disengaged from their original goal and formed a new goal. This subsample would have provided inadequate power for our planned analysis (see Sample Size). Instead, we conducted a simplified exploratory analysis involving both participants who persisted with their saving goal and those who adjusted their goal ($N$ = 536) to test how

motives and coping strategies predicted the binary behavioral outcome of persistence versus adjustment at the midway point of the study.

**Sample Size**

We conducted a priori power analysis using Monte Carlo simulations (Wang & Rhemtulla, 2021) of the preregistered model. The analysis indicated that 200 participants would provide at least 80% power to detect the hypothesized effects at an alpha level of .05. Bayesian methods with informative priors typically provide improvements in statistical power over frequentist approaches (Miočević et al., 2017). Thus, departures from the preregistered analysis are unlikely to have reduced statistical power.

**Study Design**

The study entailed a three-wave longitudinal design. We measured participants at baseline, three-months after baseline, and six-months after baseline. We included the following predictors or independent variables: autonomous goal motives, controlled goal motives, MCII condition. We measured motives at baseline using self-report, whereas we manipulated MCII by assigning participants to receive training or act as controls (see *Procedure and MCII Training)*. We tested whether these variables predicted total amount saved, psychological needs satisfaction, and psychological needs frustration assessed at the six-month follow-up. We also tested whether these relations were mediated by changes in coping strategies between the first and second half of the study. We computed the residual change in coping scores (signified in the *Results* section by the symbol Δ) using measurements taken at three- and six-month follow-ups (see *Analytic Strategy*).

**Participants**

Individuals were eligible for the study if they lived in the United Kingdom[1], were employed full-time or part-time, and indicated that they either had a preexisting savings goal or were considering setting a goal to save. We initially recruited 500 participants via Prolific. Due to participants not responding or changing their saving goal at the three-month timepoint ($n$ = 230), we recruited a second wave of 271 participants three months after the first wave to

[1] We restricted sampling to the United Kingdom to preclude potential country-level confounds arising from differences in wages, cost of living, and public policy.

keep our sample size consistent with a priori power estimates. We removed one participant who reported an improbable monthly income that was more than three standard deviations above the sample mean and would have placed them in the top 0.1% of earners in the entire United Kingdom, and five participants who reported improbable goal progress, that is, greater than our preregistered outlier criteria of 2.5 standard deviations from the sample mean. We included in the analyses all other participants who completed all parts of the study and persisted with their original saving goal ($N$ = 364; 247 women, 116 men, 1 non-binary). Their age ranged from 20 to 71 years ($M$ = 39.78, $SD$ = 10.69). The ethnic makeup of the sample was: Caucasian (88%), Asian (5%), Black/African/Caribbean (5%), other/mixed race (2%). Most (73%) participants reported having completed an undergraduate degree or higher. Participants reported a median monthly income of £2,100 ($M$ = 2,512; $SD$ = 2,896), which is slightly below the median income in the United Kingdom (£2,691/month; Office for National Statistics, 2023). Most (66%) participants had a partner with whom they shared financial resources, and 45% reported having a financial dependent (e.g., children, elderly). The average participant household size was 2.80 members ($SD$ = 1.34).

## Measures

### *Savings Goal*

At the baseline, we asked participants to calculate their current monthly costs and spare cash using "Money Helper," an online budgeting tool provided by the UK government (Money and Pensions Service, 2023). We did not collect data from the budgeting tool, but we asked participants to report values for their monthly income, monthly costs, and spare cash they obtained from the tool. Next, they nominated a saving goal they thought they would realistically be able to attain over the following six months. We defined goal difficulty as the ratio of a person's goal to their reported income. Higher scores represent savings goals that are a larger proportion of the individual's income and thus theoretically more difficult to achieve. We used these scores to control for potential differences in coping and goal attainment that may be due to setting a more difficult goal. We confirmed that participants' goals were nominally feasible by checking that it did not exceed their reported income minus expenses over six months.

### *Goal Motives*

We measured autonomous and controlled goal motives for saving at baseline using a 10-item goal motives scale (Riddell et al., 2022). It consisted of four items relating to autonomous goal motives (e.g., "Because of the enjoyment or challenge the pursuit of the goal provides me") and six items relating to controlled motives for goal pursuit (e.g., "I will receive praise or other rewards for doing it"; 1 = *not at all*, 7 = *very much so*).

### *Task and Disengagement Coping*

We measured task coping (e.g., "I concentrated my efforts on the goal") and disengagement coping (e.g., "I stopped believing in my ability to reach my goal"; 1 = *not at all*, 7 = *very much so*) at three-month follow up. We adapted the two, three-item scales from Ntoumanis et al. (2014).

### *Goal Progress*

At three- and six-month follow-ups, we asked participants how much they had saved since the beginning of the study. We calculated progress as the proportion of current savings with respect to the original goal. For example, an individual who had the goal to save £1,000 but only managed to save £750 over six months would have a progress score of .75 (i.e., 75% of their original goal).

### *Basic Psychological Needs Satisfaction and Frustration*

We measured basic psychological needs satisfaction and frustration at baseline and again at the six-month follow-up using the 24-item Basic Psychological Need Satisfaction and Frustration Scale (Chen et al., 2015). The scale consists of four-item subscales that assess autonomy satisfaction (e.g., "I feel a sense of choice and freedom in the things I undertake"), competence satisfaction (e.g., "I feel confident that I can do things well"), relatedness satisfaction (e.g., "I feel connected with people who care for me, and for whom I care"), autonomy frustration (e.g., "I feel forced to do many things I wouldn't choose to do"), competence frustration (e.g., "I feel insecure about my abilities"), and relatedness frustration (e.g., "I feel excluded from the group I want to belong to"; 1 = *completely untrue*, 5 = *completely true*). We calculated two global scores from these subscales by averaging

autonomy, competence, and relatedness items for need satisfaction and frustration, respectively.

**Procedure and MCII Training**

Curtin University Human Research Ethics Committee approved this study. Participants were randomly selected from a pool pre-screened by Prolific to meet our eligibility criteria (see Participants). They began by completing the baseline section of the study, which recorded demographic variables, their savings goal, their goal motives, and their baseline psychological need satisfaction/frustration. Participants used an online budgeting tool to calculate their typical monthly expenses prior to setting their goal (see Savings Goal). Survey software (Qualtrics) randomly assigned participants to the MCII or control condition. Both participants and researchers were unaware of assignment to conditions throughout data collection and analysis.

Participants completed the first follow-up survey three months after the baseline survey. We reminded them of their initial goal and asked them to complete a survey measuring their goal progress over the last three months, their use of task-based/disengagement-based coping, and whether they were still pursuing their goal. We invited participants who completed the first follow-up to complete a second follow-up six months from the baseline. This survey measured the same variables as the first follow-up, as well as basic psychological need satisfaction/frustration. The study took place over the course of 2022. Participants received £3.50 for completing all three parts of the study.

We based the MCII training on publicly available online MCII interventions (WOOP, 2023) and published protocols (Adriaanse et al., 2010). It consisted of short videos, each followed by a written section, which asked participants to: (1) fantasize about the best outcome they could think of associated with the attainment of their goal; (2) reflect on the obstacles in reality that were preventing them from attaining their goal; (3) develop an "if-then" plan (implementation intention) to circumvent obstacles (e.g., "If I spend more than intended in one week, then I will keep my spending to the bare essentials for the next week"). The full protocol for the MCII training is available on the OSF page.

**Analytic Strategy**

We implemented Bayesian structural equation modeling using the "Blavaan" package (Merkle et al., 2021) in R (R Core Team, 2023) to test our hypotheses. We provide a brief overview of the advantages and interpretation of Bayesian statistics in an effort to clarify our analytic decision and results (for more information, see: Gill, 2015; Kruschke, 2015). Bayesian approaches estimate the probability of a parameter occurring by updating prior knowledge about the parameter with new information from the observed data. The result is a distribution that describes the relative probabilities of different values for the parameter, typically referred to as a posterior distribution. Properties of the posterior distribution can be used to make statistical inferences. We highlight two key advantages that motivated the use of a Bayesian approach for the current study.

First, the interpretation of Bayesian statistics is more intuitive than frequentist confidence intervals and p-values. Confidence intervals are commonly understood as the upper and lower limits in which the true value of a parameter is expected to lie with 95% certainty (Cumming et al., 2004). This is true of Bayesian intervals (which are based on the region of highest density in the posterior distribution), but not of frequentist confidence intervals (Hespanhol et al., 2019). The intervals provided by Bayesian analysis are interpreted in the way that many research (incorrectly) interpret a frequentist confidence interval. If the interval does not contain zero, the true value of the parameter is—with 95% certainty—non-zero, and thus the effect of this parameter should be considered meaningful or "significant". Another issue often raised by frequentists encountering Bayesian frameworks for the first time is the lack of p-values, which have come under criticism (Wagenmakers, 2007). Instead of p-values, comparisons between models can be conducted using Bayes factors to assess the evidence in favor of one model over another. Like Bayesian credibility intervals (and unlike p-values), Bayes factors have an intuitive interpretation. Bayes factors > 1 represent evidence in favor of the $H_1$ model (BF > 10 = moderate to strong evidence), whereas values < 1 represent evidence in favor of the $H_0$ model (BF < .10 = moderate to strong evidence) (Hoijtink et al., 2019). Interpretation is important: The misinterpretation of frequentist confidence intervals and p-values might have contributed to the recent replication crisis (Anderson, 2020).

Second, Bayesian methods enable researchers to use prior knowledge as a "starting point" for estimating the true size of an effect. In a hypothetical study examining a completely novel construct, researchers would have few preconceptions about what to expect and hence be uncertain about the potential effect sizes. A more realistic scenario is that researchers have some expectations about effect sizes. These expectations could derive from previous work in the field, pilot studies, or in the best-case scenario meta-analytic evidence compiled from multiple similar effects. The selection of priors in Bayesian analysis reflects the researchers' preexisting knowledge of the value of a parameter. Weakly informative priors indicate a high degree of uncertainty and exert less influence over the posterior estimate than informative priors, which reflect more comprehensive preexisting information. Taking into account this preexisting information typically increases statistical power and produces more accurate parameter estimates (Zondervan-Zwijnenburg et al., 2017). Additionally, a study that uses a Bayesian approach can be easily turned into a prior for future work or replication. With well-identified parameters and large sample sizes, reasonable choices of prior distributions will have a minor impact on posterior inferences, because of the robust evidence observed in the data and correct use of statistical techniques. Researchers can test this possibility by conducting sensitivity analyses in which they fit multiple priors reflecting different levels of uncertainty.

We derived informative priors for the effect sizes of goal motives on coping strategies, goal progress, need satisfaction, and need frustration in the SCM (Sezer et al., 2023, Supplementary Material, Table S1). We derived priors for typical effect sizes of MCII interventions from a meta-analysis on the effectiveness of MCII interventions (k = 24, $N$ = 15,907; Wang et al., 2021). We used non-informative priors for all other paths in the model. We provide a summary of all model priors in Supplementary Material. In accordance with best practice guidelines to check the stability of our results, we conducted a sensitivity analysis using all non-informative priors (Depaoli & van de Schoot, 2017; Supplementary Material, Table S2), which indicated that the results were robust to variation of the priors. We controlled for the influence of goal difficulty on goal progress and coping. We also controlled for baseline levels of psychological need satisfaction/frustration on end-of-study need

satisfaction/frustration. Given that these control variables are tangential to our hypotheses, we provide pertinent results in Supplementary Material. We calculated residual change scores (Castro-Schilo & Grimm, 2018) to quantify longitudinal changes in coping strategies across the course of the study (denoted as ΔTask Coping and ΔDisengage Coping in figures/tables). We defined statistically meaningful effects as coefficients with 95% highest posterior density region (HPD) that does not include zero. We report these intervals in brackets alongside beta coefficients for indirect effects or in Supplementary Material.

## Results

We present means, standard deviations, internal reliability estimates, and bivariate correlations in Table 1. Bayesian RMSEA (BRMSEA), gamma-hat, and the Bayesian McDonald Index (BMc) indicated adequate fit for our hypothesized model (for a detailed discussion of Bayesian fit indices see Garnier-Villarreal & Jorgensen, 2020). However, the posterior predictive p-value (PPP; Asparouhov & Muthén, 2021) was below the established .05 threshold (PPP = .001; BRMSEA = .033; gamma-hat = .992; BMc = .975). Based on modification indices, we added two theoretically plausible paths from baseline need satisfaction to end-of-study need frustration and from baseline need frustration to end-of-study need satisfaction, which improved the model fit, and in particular the PPP (PPP = .295; BRMSEA < .001; gamma-hat = 1.00; BMc = 1.00). The Bayes factor for the model comparison indicated extremely strong evidence in favor of this adjusted model (BF = $8.15 \times 10^4$). We depict the tested structural equation model and estimated path coefficients in Figure 1, with control variables omitted for presentation clarity. Full results, including exact HPD intervals for all modeled effects and control variables, are available in Supplementary Material.

### *Predictive Effect of Motives on Coping and Goal Progress*

We expected that autonomous motives would relate positively to overall saving goal progress at the end of the six month study (H1a) via changes in task-based coping (H3), whereas controlled motives would relate negatively to goal progress after six months (H2a) via changes in disengagement-based coping (H4). We found no meaningful direct relations between goal motives and six-month goal progress. However, autonomous motivation

predicted positive changes in task-based coping across the two halves of the study, which in turn were positively associated with goal progress. The indirect effect of autonomous motives on goal progress via task-based coping changes was significant (β = .037 [.010, .070]). Controlled motives predicted negative changes in task-based coping and positive changes in disengagement-based coping from the first to the second half of the study. We obtained a significant negative indirect relation between controlled motives and goal progress via task-based coping changes (β = -.036 [-.075, -.005]).

***Predictive Effect of Motives and Coping on Need Satisfaction and Need Frustration***

We expected that autonomous motives would positively relate to need satisfaction at six months (H1b) via changes in task-based coping (H3). We found evidence of a positive association between task-based coping change and need satisfaction and a negative association between disengagement-based coping change and need satisfaction. There was a positive indirect effect of autonomous motives on need satisfaction via task-based coping changes (β = .018 [.003, .039]). We also observed negative indirect effects of controlled motives on need satisfaction via both task-based coping changes (β = -.017 [-.040, -.001]) and disengagement-based coping changes (β = -.021 [-.047, -.002]).

Additionally, we expected that controlled motives would be associated with need frustration at the six-month follow-up (H2b) via changes in disengagement-based coping (H4). Both controlled motives and disengagement-based coping changes positively predicted need frustration. Further, controlled motives indirectly predicted need frustration at the six-month follow-up via disengagement-based coping changes (β = .037 [.008, .075]).

***Main and Moderating Effects of Mental Contrasting with Implementation Intentions***

We hypothesized that MCII would predict both goal progress after six months (H5a) and need satisfaction (H5b) by moderating the associations between controlled goal motives and self-regulatory coping changes. We found evidence of a significant interaction between controlled motives and MCII that predicted positive changes in task-based coping. A simple slopes analysis of the interaction effect (Figure 2) indicated that task-based coping development was not associated with controlled motivation in the MCII condition (β = .015 [-.146, .174]). Conversely, in the control condition, stronger controlled motives were

associated with greater negative changes in task-based coping from the first half of the study to the second half of the study (β = -.192 [-.352, -.045]). This interaction indirectly predicted goal progress (β = .039 [.0003, .063]) but not need satisfaction (β = .019 [-.0004, .035]) at the six-month follow-up. Additionally, MCII training alone predicted positive changes in task-based coping, which indirectly predicted goal progress (β = .048 [.004, .049]) and need satisfaction (β = .023 [.001, .028]), though we urge caution about interpreting main effects in the presence of significant interactions.

***Exploratory Analysis***

We conducted exploratory analysis to investigate how goal motives, MCII, and self-regulatory coping related to decisions to persist with one's goal at the midpoint of the study or adjust striving by reengaging with a new saving goal. We constructed a model that included all participants who took part in the study (*N* = 536), including those who opted to change their goal at the three-month time point. Autonomous motives, controlled motives, MCII condition, and the interaction between MCII and controlled motives predicted the use of task-based and disengagement-based coping in the first three months of the study, which in turn predicted the binary outcome of goal adjustment (i.e., persisting or adjusting). The model provided an adequate fit to the data (PPP = .029; BRMSEA = .017; gamma-hat = .998; BMc = .997). The model, and associated path coefficients are presented in Figure 3.

Autonomous motives were positively related to task-based coping midway through the study and negatively related to disengagement-based coping. Controlled motives were positively related to disengagement-based coping. Disengagement based coping in turn positively predicted goal adjustment. There were significant indirect effects of both controlled motives (β = .02 [.008, .067]) and autonomous motives (β = -.01 [-.037, -.001]) on goal adjustment after three months via disengagement-based coping.

## Discussion

We investigated how goal motives in combination with an MCII intervention for saving money predict self-regulatory coping longitudinally, and how coping relates to saving goal progress and psychological need fulfillment. The findings increase understanding of how goal motives and MCII are associated with self-regulation of saving. Autonomous and

controlled goal motives differentially predicted the development of self-regulatory coping, which in turn predicted saving progress and need satisfaction. MCII buffered the negative influence of controlled motives on coping, which also indirectly predicted goal progress.

### Finding a Dollar in Change: Motives Predict Self-Regulatory Strategy Development and Saving

Our hypotheses about how goal motives and self-regulatory coping strategies would relate to saving progress were largely supported. Task-based coping is typically beneficial for goal striving (Blouin-Hudon et al., 2016; Boileau et al., 2021; Gaudreau et al., 2012; Ntoumanis, Healy, Sedikides, Duda, et al., 2014). Accordingly, autonomous motivation for saving predicted increases in task-based coping over six months, which in turn were associated with more successful saving at the end of the study, supporting H1a and H3. These findings align with core tenets of the SCM and previous work (Chamandy & Gaudreau, 2019; Smith et al., 2011). Previous studies have examined the role of specific behaviors (Chetty et al., 2014; Kim & Hanna, 2017; Rha et al., 2006) for maximizing saving. Our study goes beyond specific behaviors and emphasizes how overarching coping styles associated with active engagement in one's saving goal predict saving progress. With regard to goal regulation more generally, the findings bridge the gap between studies showing that self-determination is associated with dynamic changes in task-based coping (Amiot et al., 2008) and that changes in task-based coping are associated with goal progress (Chamandy & Gaudreau, 2022).

### You Can Buy Happiness: Motives Predict Whether Financial Goals Foster of Thwart Psychological Needs

Challenging the view that wealth-related goals are typically detrimental to personal wellbeing (Kasser & Ryan, 1993, 1996), our work shows how striving for financial goals with autonomous motives can produce adaptive, need satisfying experiences. We observed an indirect effect of autonomous motivation on need satisfaction via task-based coping (H1b, H3). Given that need satisfaction plays a key role in fostering psychological wellbeing (Ryan & Deci, 2017), the associations between motives for saving and need satisfaction may

explain why autonomous motivation for financial goals is related to greater overall vitality, less depletion, and higher life satisfaction (Di Domenico et al., 2022).

Associations among extrinsic motivation, ineffectual self-regulation, and the frustration of psychological needs have received less attention in the goal striving literature (Costa et al., 2015; Mills et al., 2018; Warburton et al., 2020). Here, controlled goal motives for saving were positively related to disengagement-based coping and negatively related to task-based coping over six months. Patterns of self-regulatory coping linked to controlled motives further predicted decreased goal progress, increased need frustration, and decreased need satisfaction, supporting H2a, H2b, and H4. Associations between controlled motives and need thwarting can create a vicious cycle that depletes wellbeing over time (Holding et al., 2020). Our results provide evidence for the initial stages of this cycle and highlight the importance of producing successful goal striving experiences to combat this negative spiral in individuals with controlled motivation for saving.

**Metacognition Matters: MCII Buffers Effects of Controlled Motivation**

We aimed to test the viability of an MCII intervention for promoting saving in individuals who have controlled motives for saving. Participants trained in MCII reported weaker negative associations between controlled motivation and task-based coping than those in the control condition. This buffering effect predicted goal progress, supporting H5a. The result is consistent with hypotheses put forward in the Tripartite Model of Goal Striving (Ntoumanis & Sedikides, 2018), which posits that, when persisting with attainable goals, MCII will ameliorate the maladaptive influence of controlled motives on self-regulation. In previous work, interactions between MCII and controlled motives predicted increased effort, persistence, and ultimately goal progress in laboratory-based tasks (Riddell et al., 2022). We extended this work by producing similar findings in a real-world setting with tangible, participant-set goals. The literature on the utility of MCII has predominantly focused on health and academic contexts (Wang et al., 2021). We offer a promising new application for MCII, particularly given that many individuals engage in saving for extraneous reasons (Canova et al., 2005). Engaging in MCII produced lasting changes in behavior over six months. This finding concurs with meta-analytic evidence indicating that the effects of MCII

can persist over several months (Cross & Sheffield, 2019). Given that saving typically occurs over extended timeframes, MCII may be a simple, cost-effective strategy for encouraging long-lasting saving behavior.

We did not find evidence that MCII moderated negative associations between controlled motives and need satisfaction, inconsistent with H5b. Although MCII may have influenced the use of self-regulatory coping strategies over the course of the study (Oettingen & Gollwitzer, 2009), it is unlikely to have changed the underlying motivation for the goal. From a self-determination theory perspective, motivation, as opposed to goal success, is key for need fulfilment (Ryan & Deci, 2017). Even if an individual driven by controlled motivation succeeded with their saving goal, they may have been less likely to experience this success as a need satisfying experience.

Expectations may be central to the efficacy of mental contrasting, one of the key components of MCII (Oettingen & Mayer, 2002). In a recent meta-analysis of MCII studies (Wang et al., 2021), MCII effectiveness did not differ between individuals with high or low expectations of success. However, studies included in this meta-analysis had low variability in expectations of success, and most included studies asked participants to choose a feasible goal, a practice that might have influenced results pertaining to expectations. Here, we also asked participants to nominate a feasible goal, checked the goal's feasibility by comparing it to the participants' reported income, and controlled for goal difficulty in our analysis to mitigate potential differences due to striving for goals that are more versus less likely to be attained. Nonetheless, we did not measure subjective expectations of attainment. Such expectations may be a critical consideration, particularly when participants make decisions to persist with striving or adjust goals (Ntoumanis & Sedikides, 2018), and should be taken into account in future work.

### Feeling Forced and Flexing Finances: Motives Differentially Predict Saving Goal Adjustment

Not all goals are attainable, and persistence in the face of unattainable goals can be counterproductive (Brandstätter & Bernecker, 2022). Adjusting striving by disengaging from unattainable goals and reengaging with new, personally important goals can protect an

individual from failure experiences and improve personal functioning (Barlow et al., 2020; Wrosch et al., 2003). Autonomously motivated individuals in the current study were less likely to adjust their savings target midway through the study. Conversely, individuals with controlled motives were more likely to adjust their goal. Identifying unfeasible targets and modifying goals appropriately is common practice among those who successfully maintain personal budgets (Zhang et al., 2022). Adjusting savings targets is likely beneficial for the maintenance of striving when a person's progress is inadequate; however, given that adjusting savings goals may reduce net saving, this decision should be considered carefully.

**Strengths and Limitations**

Our study has several strengths, including employing a Bayesian framework to integrate prior knowledge about the effects of goal motives and MCII and using a longitudinal study design to measure self-regulation processes over time. Furthermore, by targeting saving money as a real-world behavior that is somewhat overlooked in the psychological science, our research provides insights into the robustness of hypotheses derived from the SCM.

We also acknowledge limitations. We conducted extensive piloting ($N$ = 149) aiming to obtain objective data on saving. Participants were either unwilling to join the study or did not comply when asked to upload redacted bank statements (without identifying information) from existing accounts, open new saving accounts to be used only for the purpose of the study, or use apps to report their savings, even if we offered additional payments to compensate for their increased burden. When asked, participants stated that they were reluctant to share this information, primarily due to privacy concerns. Consequently, we needed to rely on measurements of income and saving behavior that were self-reported and were potentially susceptible to biases or inaccuracies. Related to this issue, although we asked participants to use a budgeting tool to calculate their expenses before setting their goal at the beginning of the study, we had no method of tracking whether participants used this tool appropriately and thus set realistic goals. However, we did check that participants' goals were feasible, based on their reported income and expenses. We specifically recruited individuals from Prolific who had or intended to set a savings goal; these participants may

have been more motivated to save than the wider population. Finally, although we implemented an experimental manipulation and our theoretical approach was based on a well-established model (i.e., SCM), most results are correlational limiting causal inferences.

**Future Research**

Our findings are generative. A useful next step would be to replicate them with objective measures of saving progress, such as data from bank accounts or saving apps. It would also be of interest to understand how motives and MCII influence saving behavior on a day-to-day basis, as well as on an extended year-to-year basis. Evidence indicates that people can spontaneously generate MCII-like cognitions (Bieleke & Keller, 2021; Riddell et al., 2023; Sevincer & Oettingen, 2013). It would be interesting to test whether spontaneously generated MCII produces a similar pattern of results to the experimentally induced MCII presented here. People change their saving goals over time as circumstances and needs fluctuate. We offer initial evidence that motivation plays a role in the adjustment of saving goals; however, further research is needed to thoroughly investigate the long-term impacts of adjusting one's saving targets. Finally, research on how goal motivation affects personal financial behavior is burgeoning. Autonomous motivation for personal financial management is associated with a several outcomes in addition to saving, including investing, financial self-awareness, and overall financial wellbeing (Di Domenico et al., 2022). Our findings could be extended to account for these relations, and hence offer a broader understanding of how motivation facilitates the maintenance of healthy personal finances.

**Conclusion**

Autonomous motives predict money saving and need satisfaction, whereas controlled motives predict decreased money saving and the thwarting of psychological needs. However, MCII improves self-regulatory coping and saving among persons with controlled motives. We demonstrated how the SCM can be applied to explain self-regulation of a highly relevant, yet under-investigated behavior: saving money. We also extended the literature on MCII by illustrating that MCII can promote task-based coping, which mediated relations with goal progress. Additionally, although we did not find significant effects of MCII on need satisfaction, we empirically pioneered this potential association. Finally, we carried out the

first field experiment showing that MCII can moderate the maladaptive influence of controlled goal motives on coping, thus providing evidence in support of the applied utility of the tripartite model of goal striving (Ntoumanis & Sedikides, 2018). Most peoples' overall saving capacity is determined by external factors, such as their income and culture. Although changing broader social or economic circumstances may be out of reach, finding ways that maximize one's saving potential could help individuals to maintain a sense of agency over their personal finances and thus combat the trend of declining savings. When setting goals to save money, we suggest that people look for ways to construe such goals as personally meaningful and use MCII to help prepare for future challenges.

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**Table 1**

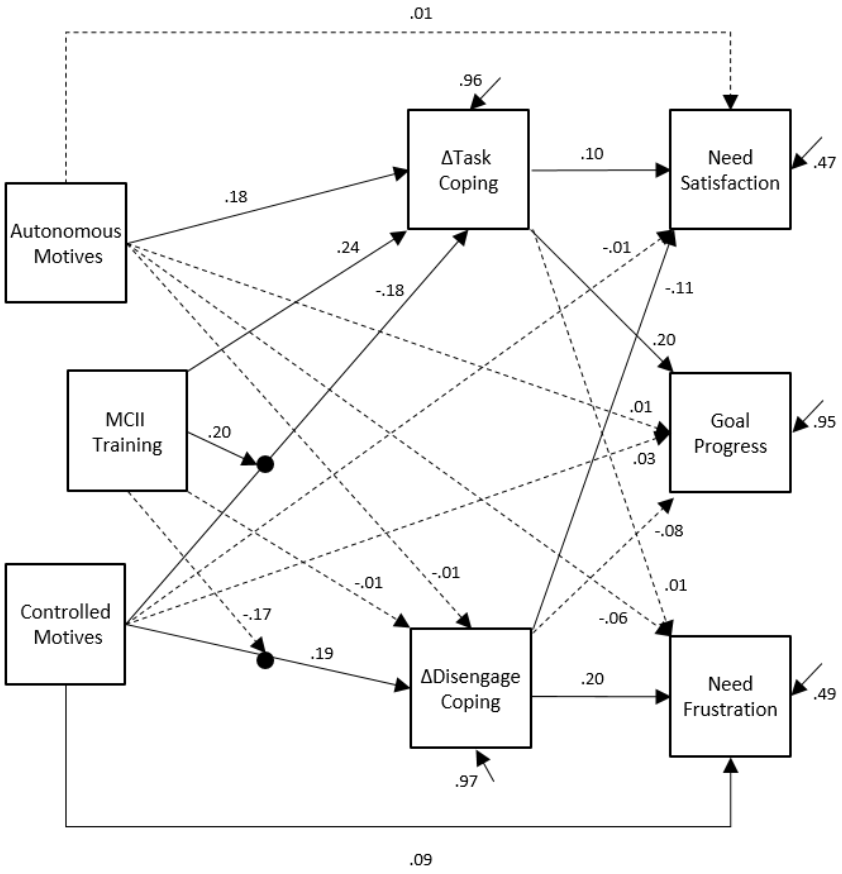
*Means, Standard Deviations, Internal Reliabilities, and Bivariate Correlations of Study Variables*

| | MCII (*n*=180) | | Control (*n*=184) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1. Autonomous Motives | 5.07 | 1.36 | 4.95 | 1.33 | .81 | | | | | | |
| 2. Controlled Motives | 3.94 | 1.28 | 3.85 | 1.26 | .53** | .78 | | | | | |
| 3. ΔTask-based Coping | .17 | 1.32 | -.17 | 1.33 | .15** | .02 | | | | | |
| 4. ΔDisengagment-based Coping | -.01 | 1.35 | .01 | 1.35 | .03 | .10 | -.39** | | | | |
| 5. Goal Progress | 1.45 | 1.08 | 1.37 | 1.22 | .02 | .03 | .21** | -.12* | | | |
| 6. Psychological Need Satisfaction | 4.08 | .59 | 3.95 | .59 | .18** | -.04 | .22** | -.28** | .05 | .90 | |
| 7. Psychological Need Frustration | 2.22 | .79 | 2.25 | .77 | -.08 | .20** | -.14** | .33** | -.01 | -.73** | .91 |

*Note*: internal reliabilities (Cronbach's alpha) are printed on the diagonal; ** = p < .01; * = p < .05

**Figure 1**

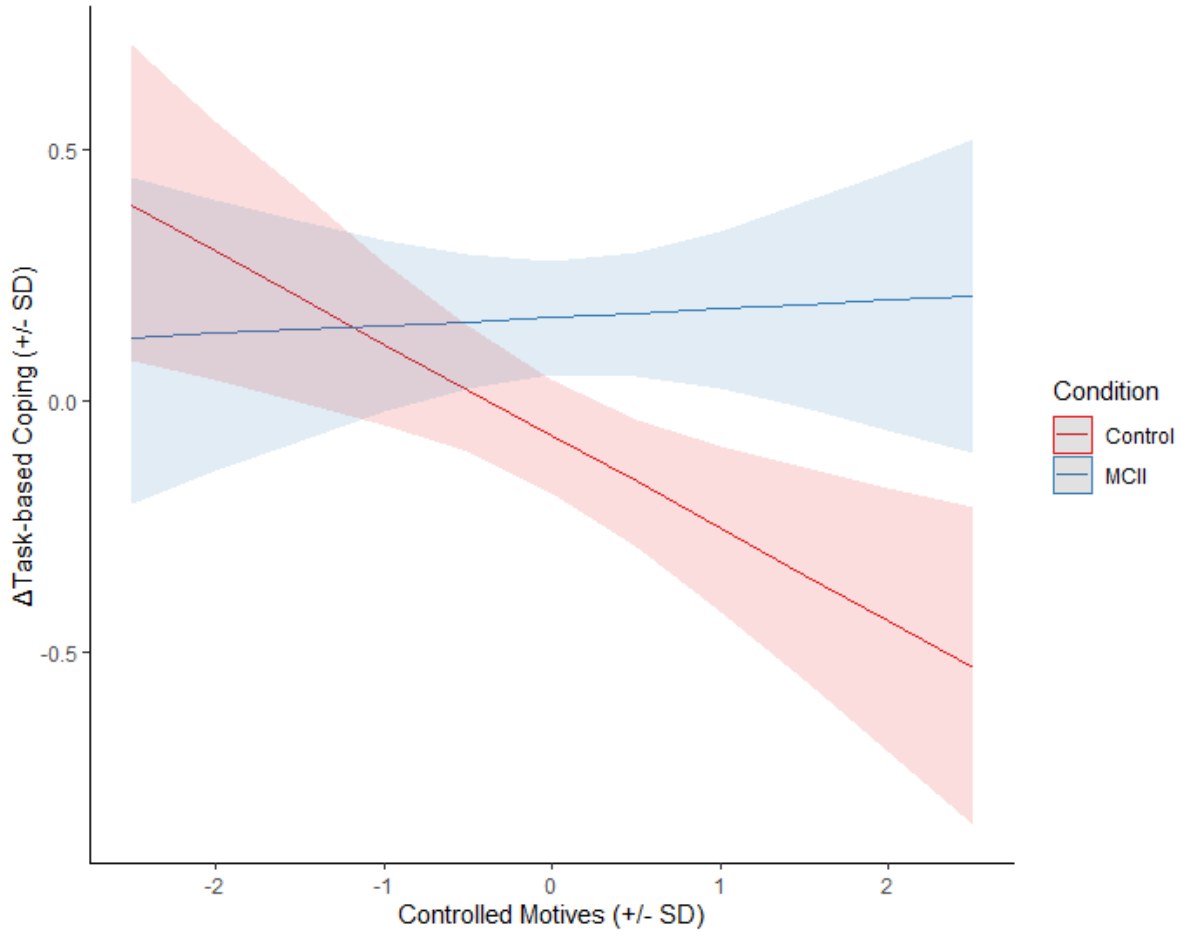
*Path Diagram and Parameter Estimates for the Tested Path Model*




*Note:* Unbroken lines represent statistically significant associations (90% HPD interval does not contain zero), dashed lines represent non-significant associations. Diagonal arrows represent residual variances. The Δ symbol indicates residual change in coping strategies between the first and second half of the study. We have omitted covariances and control variables for presentation clarity.

**Figure 2**

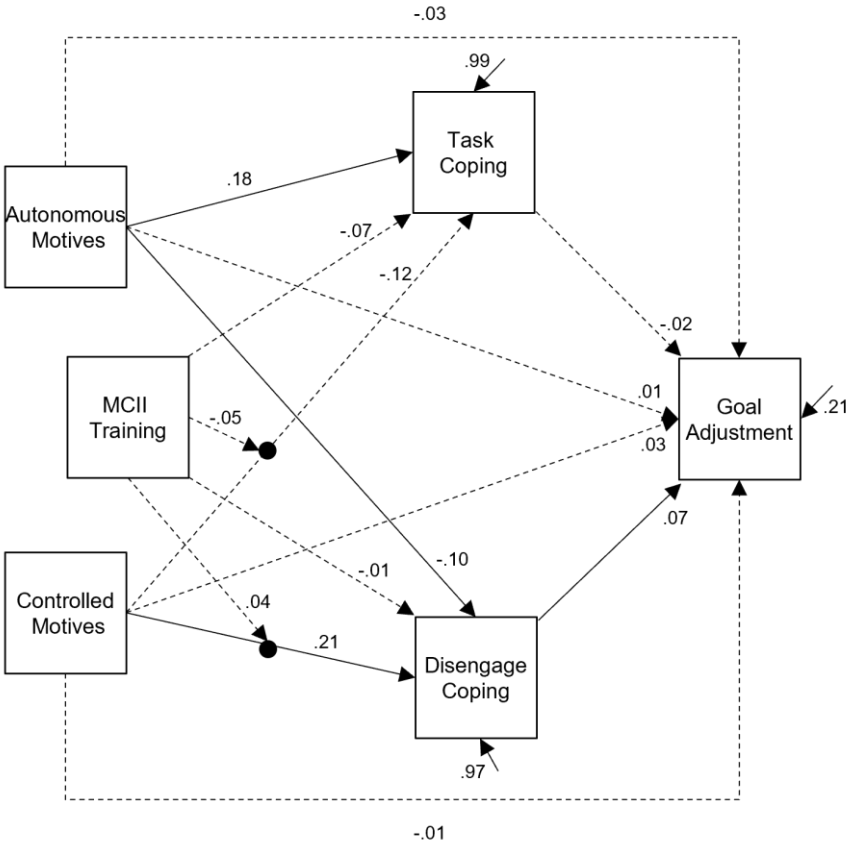
*Interaction Between Controlled Goal Motives and MCII Predicting Changes in Task-Based Coping*




*Note*: Shaded areas depict 95% HPD intervals.

**Figure 3**

*Path Diagram and Parameter Estimates for Exploratory Structural Equation Model*




*Note:* Unbroken lines represent statistically significant associations (90% HPD interval does not contain zero), dashed lines represent non-significant associations. Diagonal arrows represent residual variances.