

UC Berkeley

Replication/Extension Papers 2025 - 2026

Title

Replication and Extension of To Dream the Impossible Dream: How Personal Energy Fuels Ambition and Extreme Commitment

Permalink

<https://escholarship.org/uc/item/2q2242n0>

Journal

Undergraduate Lab at Berkeley

Authors

Paracha, Alisha
Karnavat, Aarohi
Kuenning, Gianna
et al.

Publication Date

2026-04-01

Data Availability

The data associated with this publication are available at:
<https://osf.io/d2kan/files/osfstorage>

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

**Replication and Extension of To Dream the Impossible Dream: How Personal Energy Fuels
Ambition and Extreme Commitment**

Alisha Tariq Paracha, Aarohi Karnavat, Gianna Kuenning, Hafsa Baig, Kyla Lee Kuo, Mika

Amir, Oscar Davidorf, Seung-Se Morita, Vaughn Demosthenes LeDrew

Cognitive Science and Psychology Undergraduate Laboratory at Berkeley

Undergraduate Student Mentor: Alisha Tariq Paracha

University of California, Berkeley

I. Abstract

Bonarska et al. (2025) demonstrated across three studies that subjective energy predicts extreme goal setting and commitment through optimism and expectancy mechanisms. This direct replication reanalyzed the original authors' datasets using their provided R code. Study 1 (N = 621) exactly replicated energy's direct effect on extreme goal setting ($\beta = .21$, $p < .001$) and nonsignificant optimism mediation (IE = .03, 95% CI [-.02, .07]). Study 2 (N = 267) replicated energy's direct effect on commitment ($\beta = .17$, $p = .005$) and serial mediation through optimism-expectancy (IE = .05, 95% CI [.02, .09]). Study 3 (N = 169) replicated the energization manipulation ($\beta = .71$, $p < .001$) and both energy (IE = .15, 95% CI [.04, .28]) and optimism mediations (IE = .18, 95% CI [.04, .36]), with directionally consistent direct effect on commitment. These findings confirm subjective energy's robust role in extreme motivation across all three studies.

II. Introduction

Bonarska et al. (2025) investigated how subjective energy promotes extreme goal-setting and intense commitment by increasing optimism and expectancy. Their three studies, two correlational and one experimental, demonstrated that higher energy levels predict motivational imbalance, where one dominant goal suppresses alternatives. This replication re-ran the authors' provided R code to verify these findings and assess their robustness.

2.1 Goal Setting and Goal Progress

The relationship between motivation, goal setting, and personal ambitions has been researched across many disciplines. Hope et al. (2016) suggest that some personal goals are easier to achieve based on intrinsic vs extrinsic motivation. Examining whether goal progress

stems from intrinsic aspirations, such as growth and community, or from extrinsic aims, such as financial success and fame, is important for success and well-being. This aligns with Toto et al. (2014), who tested the feasibility of generating patient-centered goals using goal attainment scaling across multiple chronic conditions. When goals are self-defined and meaningful, participants make more progress even with chronic illnesses. This leads to Bressler et al. (2010), who highlight how motivational factors impact academic achievement. Students with higher hope persist and succeed academically. Building on this, Garner et al. (2025) found that setting specific goals improves cognitive effort, self-efficacy, and sustained attention. Similarly, Malik et al. (2015) found that positive, energizing relationships at work make people feel more alive and strengthen goal commitment. Finally, Brusso et al. (2010) showed that unrealistically difficult goals lower performance, while Kleinman et al. (2025) found that goal clarity improves emotion-regulation success.

2.2 Motivation and Goal Setting

Research on motivation and goal setting has long focused on understanding why people strive to achieve specific goals and what motivates them to persist in their efforts. Tubbs, Boehne, and Dahl (1993) used expectancy theory, finding that motivation is strongest when expectancy, instrumentality, and valence are high. This aligns with Phan et al. (2021), who examined how a person's sense of energy influences persistence and goal achievement. Students with higher self-efficacy felt more energized, helping them stay focused. Together, these studies demonstrate that motivation combines logical expectations of effort and rewards with emotional factors like confidence and energy.

2.3 Motivation and Goal Pursuit

An individual's commitment to pursuing their goals is influenced by their level of motivation, whether intrinsic or extrinsic. Wicker et al. (2010) investigated how a student's motivation to do well on a major test changes as the test approaches. They found that optimism about performance was correlated with motivation levels, but pressure reduced confidence and focus. This connects to Resta et al. (2022), who analyzed how intrinsic motivation leads to ambition and extremism through obsessive passion. Surveys from participants aged 18-50 showed that heightened ambition causes more obsessive passions, making people more committed and harder to pull away. This leads to O'Keefe et al. (2023), who examined fixed vs. growth theories of opportunity. Those who believed opportunities could be cultivated reported greater effort and sustained motivation. Building on commitment and regulation, Ntoumanis et al. (2014) examined responses to unattainable goals. Autonomous motives predicted easier reengagement but harder disengagement due to rumination. Controlled motives were linked to shame. Similarly, Belanger et al. (2019) showed that harmonious passion favors means serving multiple goals, while obsessive passion prefers means harming other pursuits. Finally, Miquelon et al. (2012) demonstrate how motivation quality determines commitment vs. disengagement. Autonomous motivation decreases compensatory beliefs, improving adherence to dieting. These patterns of rigid vs. flexible goal commitment provide critical context for understanding how subjective energy might fuel extreme goal pursuit and motivational imbalance.

2.4 Motivation and Subjective Energy with Optimism as a Mediator

The relationship between motivation, subjective energy, and optimism has been studied across different contexts. Segerstrom and Solberg Nes (2006) found optimistic individuals persist more but experience goal conflict. This connects to Cassidy (2016), who showed optimism mediates between socioeconomic background and motivation. Cardini and Freund (2020)

demonstrated how perceptions of personal energy change with age; older adults distribute energy strategically toward meaningful goals. Building on this, Phan et al. (2022) found that self-efficacy predicts perceived energy, which drives motivation. Similarly, Hanssen et al. (2015) and Esteve et al. (2018) found optimism aids flexible goal adjustment and commitment. Finally, Edward et al. (2009) and Medlin et al. (2009) showed optimism promotes sustained engagement and job performance.

2.5 Perceived Task Difficulty and Goal Valence

Across motivation research, perceived difficulty and goal value determine effort investment. Brehm et al. (1983) showed that as perceived difficulty rises, energization and goal valence increase, but only while success seems possible. This connects to Wrosch et al. (2003), who found people thrive pursuing feasible goals but must disengage when those goals become unattainable, in order to preserve well-being. Prieto and Loomis (2025) demonstrated that outcome expectations determine motivation quality. Together, these highlight adaptive regulation when belief in success aligns with manageable difficulty.

These patterns provide critical context for Bonarska et al.'s (2025) investigation of how subjective energy fuels extreme goal commitment and motivational imbalance, the focus of our replication.

III. Replication of Study 1

The primary aim of Study 1 was to conduct a replication and reanalysis of the original Study 1 dataset to examine whether subjective energy predicts individuals' tendency to set extreme personal goals. Specifically, this study sought to determine whether individuals reporting higher levels of subjective energy demonstrate a greater inclination toward ambitious

or extreme goal setting compared to individuals reporting lower subjective energy. A secondary aim was to evaluate whether optimism mediates the association between subjective energy and ambitious goal setting. By reanalyzing the original dataset using the same statistical procedures, this study also aimed to assess the consistency of our results with those reported in the original investigation. Our group reached a consensus on two valid hypotheses. Our first hypothesis is that individuals who experience greater subjective energy will tend to set more ambitious or extreme personal goals compared with those who experience lower subjective energy. Our second hypothesis is that optimism will not significantly mediate the relationship between subjective energy and ambitious goal setting.

3.1 Methods and Procedures of Study 1

The original Study 1 recruited 747 undergraduate participants; however, after exclusions for non-completion and one participant being under the age of 18, the final analytic sample was narrowed down to 621 participants. Our replication followed the same criteria as the original study, using the same dataset provided by the authors. We began with 747 cases in the raw Qualtrics report; however, following the procedure as the original study, we removed all participants who did not finish the survey, appearing as Finished != 1 in the data, as well as one respondent who had an invalid ID, appearing as ResponseId == "R_PGtpNmjdxzPkZmV" in the data. Thus, we were left with 621 valid participants, matching the sample reported in the original paper. Closely replicating the statistics of the original study, the distribution of participants concluded as 446 women (n=446), 160 men (n=160), 11 participants who identified as non-binary or self-describing (n=11), and 4 who did not report gender. Furthermore, ages ranged from 18 to 52 with a mean age of 19.28 and a SD of 2.15.

All of the survey items were scored using the same procedures as described in the original study. For the Subjective Vitality Scale, the scores ranged from 1 ("Definitely NO") to 7 ("Definitely YES"). The single negatively keyed item, which we identified as Item 2, was reverse-scored using the standard transformation ($8 - \text{response}$). Subjective Energy items were reverse-coded for Items 6, 7, 8, and 10 as well. For the Revised Life Orientation Test (LOT-R), we identified three negatively keyed items (Items 3, 7, and 9) which should be reverse scored using the standard 0-4 scoring method. However, in this dataset, we found an error in the original study; the original Qualtrics file had reversed the positively-keyed items (Items 1, 4, and 10) instead of the negatively-keyed items, an action that significantly distorted LOT-R scores. Our replication corrected that error and properly reverse-coded the negative items; thus, the alpha for LOT-R was $\alpha = 0.80$. Finally, the Willingly Approached Set of Statistically Unlikely Pursuits (WASSUP) scale consisted of 30 items that recorded the participants' likelihood to set extreme goals. These items were scored on a scale of 1-5, just like in the original study. Thus, the alpha for Subjective Vitality was $\alpha = .87$, Subjective Energy $\alpha = .88$, Optimism (LOT-R) $\alpha = .80$, and WASSUP $\alpha = .91$.

After scoring, all regression and analysis were held on the sample of 617-621 participants, depending on the model and missing scale scores. The discrepancy consisted of missing values on variables that were automatically removed by R in order to run the data.

In study 1, subjective energy, optimism, and setting extreme goals were measured. For measuring subjective energy, participants responded on a 1-7 scale ranging from "Not at all true" to "Very true". Subjective energy was measured by looking at a series of items designed to capture the construct of interest, assessing both subjective vitality and subjective energy to compare performance. Optimism was measured using the Revised Life Orientation Test (LOT-R,

Scheier et al., 1994). Participants reported their agreement with different statements on a scale of 0-4, ranging from “Strongly Disagree” to “Strongly Agree”. Setting extreme goals was the dependent variable, and was measured using the Willingly Approached Set of Statistically Unlikely Pursuits Scale (WASSUP, Johnson & Craver, 2006). On a 1-5 scale ranging from "NO CHANCE I will set this goal for myself" to "Definitely WILL set this goal for myself," participants choose the answer that best reflects how likely that person is to set that goal for themselves.

To prepare the dataset for replication analyses, several preprocessing steps were applied in R to match the procedures reported in the original study and ensure coding accuracy. All negatively keyed items were reverse-scored prior to scale construction, following standard scoring rules for the Subjective Vitality Scale, Subjective Energy Scale, and LOT-R. Composite scores for each construct were then created by averaging their respective items using the `rowMeans()` function. For analyses, we standardized all primary variables (subjective vitality, subjective energy, optimism, and extreme goal setting) by converting them to z-scores. R automatically excluded participants who had missing data on any variables used in a model.

We first examined descriptive statistics and Pearson correlations among standardized subjective vitality, subjective energy, optimism (LOT-R), and extreme goal setting (WASSUP) scores. Next, three linear regression models tested direct effects using `lm()`, predicting WASSUP from each predictor separately. Finally, two mediation analyses used the PROCESS macro for R (Version 5.0, Model 4; Hayes, 2022) with 5,000 bootstrap resamples to test optimism as a mediator of the relationship between subjective vitality and extreme goals, and between subjective energy and extreme goals. All analyses were conducted in R (Version 4.3.1).

3.2 Results of Study 1

Table 1

Means, Standard Deviations, and Correlations Between Variables in Study 1

Variable	M	SD	1	2	3
1. Subjective Vitality	4.27	1.16	—		
2. Subjective Energy	3.88	1.00	.80**	—	
3. Optimism (LOT-R)	2.11	0.77	.53**	.50**	—
4. Extreme Goals (WASSUP)	2.48	0.61	.20**	.21**	.14**

Note. *M* and *SD* represent mean and standard deviation. $p < .01$.

Means, standard deviations, and correlations between variables are provided in Table 1. Descriptive statistics showed $M = 4.27$ ($SD = 1.16$) for subjective vitality, $M = 3.88$ ($SD = 1.00$) for subjective energy, $M = 2.11$ ($SD = 0.77$) for optimism, and $M = 2.48$ ($SD = 0.61$) for extreme goal setting. Pearson correlations revealed significant positive associations: subjective vitality with energy ($r = .80^{**}$), optimism ($r = .53^{**}$), and WASSUP ($r = .20^{**}$); energy with optimism ($r = .50^{**}$) and WASSUP ($r = .21^{**}$); optimism with WASSUP ($r = .14^{**}$).

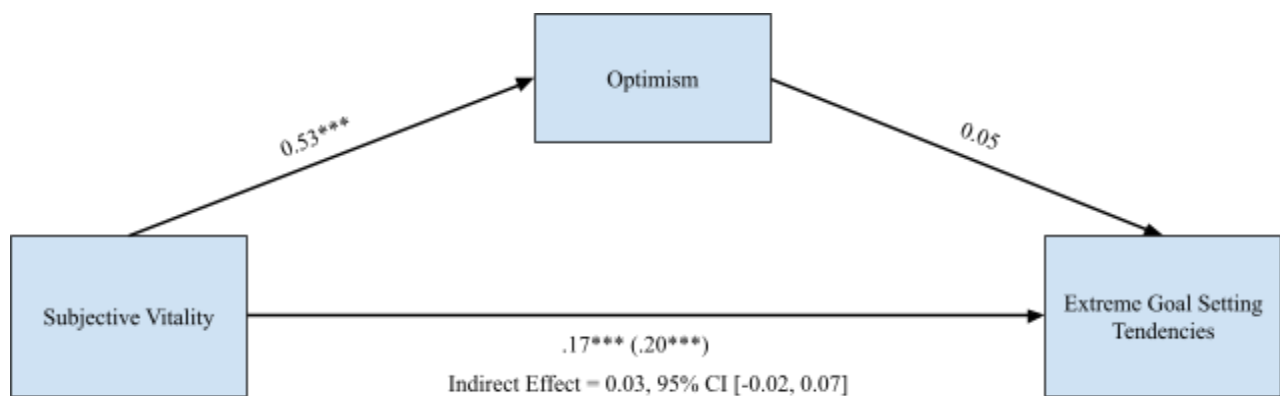
Regression analyses showed that both subjective vitality and subjective energy significantly predicted the tendency to set extreme personal goals. Subjective vitality was a

significant positive predictor, $\beta = 0.20$, $SE = 0.04$, $p < .001$, and the model explained about 4% of the variance ($R^2 = .0397$). Subjective energy showed a very similar effect, $\beta = 0.21$, $SE = 0.04$, $p < .001$, with nearly the same amount of variance explained ($R^2 = .0445$). Optimism also predicted extreme goals, but the effect was weaker, $\beta = 0.14$, $SE = 0.04$, $p < .001$, and accounted for less overall variance ($R^2 = .0194$). These results align closely with the original study.

In this study, a mediation analysis was run to categorize the extent to which subjective vitality influences one's ability to set extreme goals, with optimism as the mediator between the two. The analysis found that subjective vitality significantly predicted levels of optimism ($\beta = 0.53$, $SE = 0.03$, $p < .001$). However, when subjective vitality was included in the model, optimism was not able to provide clear predictions for extreme goal-setting ($\beta = 0.05$, $SE = 0.05$, $p = .307$). The indirect effect was 0.03, 95% CI [-0.02, 0.07]. A similar result was found when subjective vitality was replaced with subjective energy.

Fig. 1

Mediation Analysis Results of Study 1



Note. Numbers represent standardized regression coefficients. Square brackets indicate 95% confidence interval for indirect effect (nonsignificant). * $p < .05$. ** $p < .01$.

3.3 Discussion of Study 1

Study 1 confirmed both hypotheses through exact replication of the original analyses. The replication confirmed the original finding that subjective energy and vitality positively predict extreme goal setting. These findings precisely match the original study. The successful replication validates Bonarska et al.'s conclusion that energized individuals set more ambitious goals, with optimism failing as a mediator. Limitations include reliance on cross-sectional self-reports and undergraduate sampling, though these mirror the original design exactly.

IV. Replication of Study 2

The aim of the present study is to replicate the findings of Study 2 by examining the relationship between subjective energy levels and personal goal commitment. Specifically, we seek to test whether higher subjective energy is associated with more extreme commitment to personal goals and a greater willingness to pursue them, and to examine state optimism and specific goal expectancy as potential mediators of this relationship. Consistent with this aim, our hypothesis is that individuals who experience higher levels of subjective energy will report stronger extreme commitment to their personal goals, and that higher subjective energy and state optimism will positively predict specific goal expectancy, which in turn will be associated with greater extreme commitment to personal goals.

4.1 Methods and Procedures of Study 2

Our data source was the Study 2 dataset, Bonarska et al., 2025, which is aligned with the original study. The final sample consisted of 267 participants. Paralleling the original study, 132 participants identified as Gender 1 (men) and 135 as Gender 2 (women). Participants' ages ranged from 18-87 years with a mean of 37.26 and a Standard Deviation of 12.62. Education

level was tested on a scale of seven ordered categories. The largest sample of participants reported a level 4 education ($n=114$), followed by level 3 ($n=59$) and level 6 ($n=45$).

State subjective energy served as the predictor variable and was measured with the state-adapted Subjective Vitality Scale (Ryan & Frederick, 1997), which consists of five items such as "I feel alive and vital" and "I don't feel very energetic" (reverse-scored). Participants responded on a scale from 1 (Not at all true) to 7 (Very true), and the scale demonstrated good internal consistency ($\alpha = .889$). State optimism, the first mediator, was assessed using a single item ("I feel optimistic") rated from 1 (Definitely NO) to 7 (Definitely YES).

Goal expectancy, the second mediator, was measured with one item ("How likely is it that you will attain this goal?") scored from 1 (Extremely unlikely) to 5 (Extremely likely). Extreme commitment, the outcome variable, comprised four items adapted from the Extreme Personality Scale (Szumowska et al., 2024), such as "I will overcome all obstacles in the pursuit of this goal"; participants first identified an important personal goal for the upcoming week before rating these items from 1 (Definitely disagree) to 7 (Definitely agree) ($\alpha = .793$). A confirmatory factor analysis confirmed the single-factor structure of these items, paralleling the original study.

Researchers computed scale scores as the mean of items for multi-item measures, applying reverse-scoring to Vitality_2R prior to aggregation. The final dataset contained no missing values on core measures after excluding five participants who failed the attention check ($N = 267$). All variables were standardized (z-scored) before regression and mediation analyses to facilitate interpretation of coefficients as standardized effect sizes.

All analyses were conducted in R using the following packages: tidyverse, psych, lavaan, apaTables, and the PROCESS macro for R. Descriptive statistics were first computed for all study variables. Bivariate correlations among vitality, optimism, goal expectancy, and extreme

commitment were then examined using Pearson correlations. To test direct effects, a linear regression model was estimated in which standardized subjective vitality predicted standardized extreme commitment. To examine the proposed mediation pathway, we conducted a serial mediation analysis using PROCESS for R (Model 6), consistent with the original study. Subjective vitality was specified as the independent variable, extreme commitment as the outcome, optimism as the first mediator, and goal expectancy as the second mediator. Indirect effects were estimated using bootstrapped confidence intervals based on 5,000 resamples. Effect sizes and confidence intervals from the replication were compared qualitatively to those reported in the original Study 2 to evaluate the consistency of findings.

4.2 Results of Study 2

Table 2 presents means, standard deviations, and Pearson correlations among study variables, replicating the format of the original Study 2 Table 2. All variables showed positive intercorrelations as expected, with the strongest relation between subjective vitality and state optimism ($r = .66$, $p < .01$). These descriptives exactly matched those reported in Bonarska et al. (2025): vitality ($M = 4.37$, $SD = 1.39$), optimism ($M = 4.77$, $SD = 1.26$), goal expectancy ($M = 3.96$, $SD = 0.77$), and extreme commitment ($M = 5.05$, $SD = 1.03$).

Table 2

Means, Standard Deviations, and Correlations Between Variables in Study 2.

Variable	M	SD	1	2	3
1. Subjective Energy	4.37	1.39	—		

2. State Optimism	4.77	1.26	.66**	—	
3. Goal Expectancy	3.96	0.77	.13*	.22**	—
4. Extreme Commitment	5.05	1.03	.17**	.20**	.34**

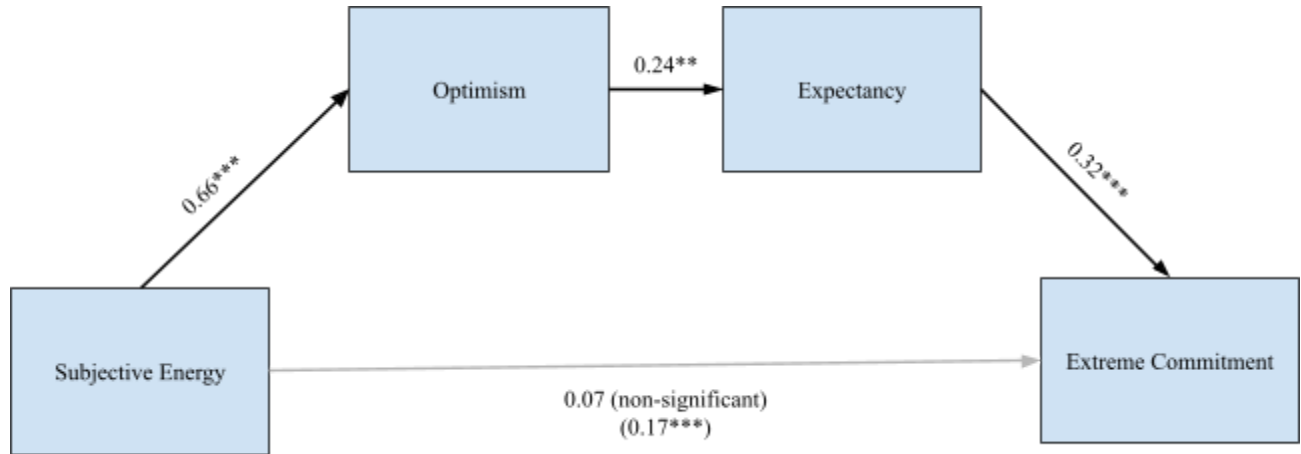
Note. * $p < .05$. ** $p < .01$.

A linear regression model tested the direct effect of standardized subjective vitality on standardized extreme commitment. Subjective vitality significantly predicted extreme commitment ($\beta = .17$, $SE = .06$, $t = 2.82$, $p = .005$), accounting for 2.9% of the variance ($R^2 = .029$). This result successfully replicated the original Study 2 finding in direction, significance, and approximate magnitude (original: $\beta = .13$, $SE = .05$, $p = .005$).

Figure 2 displays the serial mediation results using PROCESS Model 6 with 5,000 bootstraps, mimicking Study 2. The serial indirect effect through optimism and expectancy was statistically significant ($\beta = .051$, 95% CI [.016, .094]), confirming this specific pathway from the original study (original serial IE = .05, 95% CI [.02, .09]). The direct effect became nonsignificant with mediators included ($\beta = .074$, $SE = .077$, $p = .332$), paralleling the original pattern (original: $\beta = .07$, $p = .332$).

Fig. 2

Serial Mediation Model Results for Study 2



*Note. Standardized regression coefficients are shown. The value in parentheses represents the direct effect of subjective vitality on extreme commitment without mediators ($\beta = .17$, $p = .005$). The serial indirect effect through state optimism and goal expectancy was $\beta = .051$, 95% CI [.016, .094]. * $p < .05$. ** $p < .01$.*

4.3 Discussion of Study 2

The replication confirmed the primary hypothesis: higher subjective vitality significantly predicted greater extreme commitment to personal goals ($\beta = .17$, $p = .005$), matching the original study's direction, significance, and similar effect size (original $\beta = .13$). Descriptives and correlations also replicated exactly, demonstrating consistency in variable distributions and interrelations.

The serial mediation pathway through state optimism and goal expectancy was partially replicated, with the full pathway significant (95% CI [.016, .094]) as in the original, though individual mediator paths were weaker. Compared to Bonarska et al. (2025), the direct effect and total model R^2 were closely matched, but the mediation strength showed sample variability typical of replications. These results support subjective energy's role in fostering extreme goal commitment through heightened success expectancies and extend understanding of motivational

pathways in extremism proneness. Limitations of this replication include self-report measures, online Prolific sampling, and lack of experimental manipulation; future work should incorporate behavioral indicators and diverse populations.

V. Replication of Study 3

The aim of this study is to replicate the findings of Study 3 by examining the relationship between subjective energy levels and commitment to achieving personal goals. In the original Study 3, subjective energy was experimentally manipulated using an energizing music playlist compared to a calming control playlist. Specifically, this study seeks to test whether higher levels of subjective energy are associated with stronger commitment to achieving personal goals. Consistent with this aim, we hypothesize that participants in the energization condition, compared to those in the control condition, will report higher post-manipulation energy, greater commitment to their goals and higher optimism following the manipulation. Additionally, we hypothesize that the effect of the energization manipulation on extreme goal commitment will be mediated by post-manipulation energy and optimism, with hope assessed as an additional measured construct rather than the primary reported mediator.

5.1 Methods and Procedures of Study 3

Data were drawn from the original Study 3 dataset. The original recruitment yielded 181 participants via online advertisements and a university research page to achieve 95% power for a medium effect size. Following the original exclusion criteria, researchers removed 6 participants for mismatched ID numbers across study phases and 6 participants for missing data on the primary extreme commitment variable. This yielded a final analytic sample of $N = 169$ (energizing condition: $n = 79$; control condition: $n = 90$). The sample included 34 men, 130

women, and 5 participants with other gender identities. Participants ranged in age from 18 to 50 years ($M = 23.21$, $SD = 5.37$). Education levels comprised 1 primary, 1 vocational, 113 high school, 55 college, and 5 higher education degrees.

Researchers assessed subjective energy before and after music exposure with 3 items each ("I feel full of life," "I feel wide awake," "I feel full of energy"; 1 = Not at all to 7 = Very much; $\alpha_{before} = .87$, $\alpha_{after} = .91$; Ryan & Frederick, 1997). Manipulation checks also included the UMACL energetic arousal subscale (10 items; e.g., "I feel energetic"; reverse items recoded as 5 minus item score; 1-4 scale; $\alpha = .91$; Matthews et al., 1990) and participant playlist ratings. Mediators consisted of hope (labelled Optimism 1 in the dataset; Snyder et al., 1996; multiple items; $\alpha = .87$) and Optimism 2, our state optimism measure (4 items; e.g., "I am full of optimism," "I can achieve whatever I set my mind to"; 1-7 scale; $\alpha = .89$). The outcome measure, extreme goal engagement or commitment, used 4 items (aim_general_1_6 to aim_general_1_9; 1-7 scale; $\alpha = .86$; CFA: $\chi^2(2) = 4.06$, $p = .131$, CFI = .994, RMSEA = .078). These items were adapted from Szumowska et al. (2024).

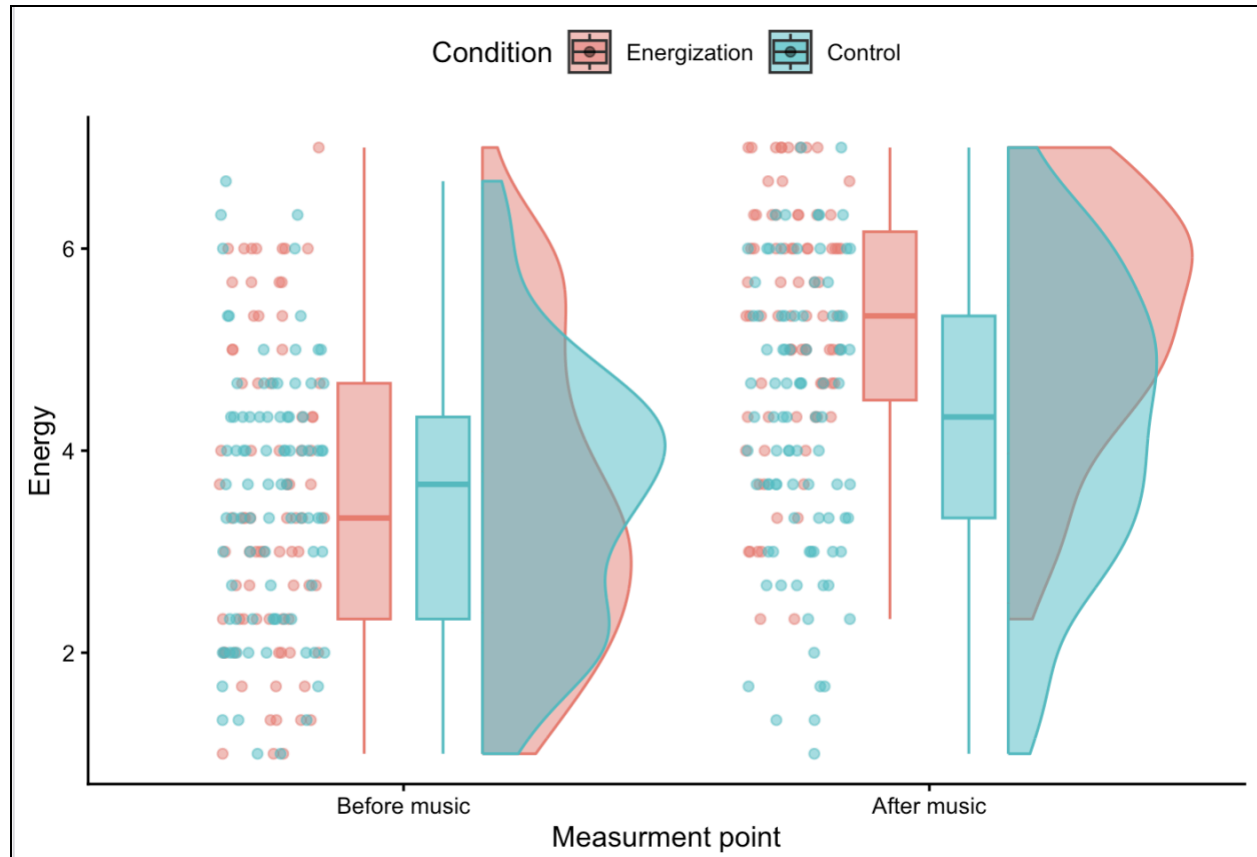
All analyses were conducted in R. Consistent with the original study, participants were randomly assigned to either an energizing playlist or a calming control playlist, which was represented in the dataset as Cond (Energy = energizing music; Control = calming/control music). Negatively keyed items were reverse-scored so that the higher numbers depicted the measured construct. For the UMACL items that required reverse scoring, we subtracted each response from 5 ($5 - \text{item_value}$), and for the Freedom items, we subtracted each response from 8 ($8 - \text{item_value}$). Composite scores were created using row-averaged item responses for Energy Before, Energy After, Optimism 1 (Hope), Optimism 2, Freedom Before, Freedom After, and Goal Engagement; UMACL Tense Arousal, Positive Energetic Arousal, and Hedonic Tone.

Participants' missing values on the Goal Engagement scale were excluded, resulting in a final sample of N=169. In the data for other scales introduced, missing values were projected as (na.rm = TRUE). Outliers were displayed as boxplots, and none exceeded ± 3 SDs on the primary composite variables.

Manipulation checks examined condition differences on post-manipulation energy and UMACL positive energetic arousal through independent t-tests. Researchers also conducted a mixed ANOVA for energy (condition $\times$ time). Main effect analyses tested condition effects (0 = control, 1 = energizing) on commitment via t-test and linear regression, including outlier sensitivity checks. Mediation analyses followed the original PROCESS v4.3.1 procedures (Hayes, 2022; Models 4 and 6; 5000 bootstraps).

Fig. 3

Difference In The Level Of Energy Before And After Manipulation In The Experimental And Control Conditions of Study 3.



Note. Raincloud plots were generated using the ggrain package in R (Judd et al., 2023). Each plot combines a half-violin (density) plot, a boxplot showing the median and interquartile range, and jittered points representing individual observations.

5.2 Results of Study 3

Table 3

Means, Standard Deviations, and Correlations Between Variables in Study 3.

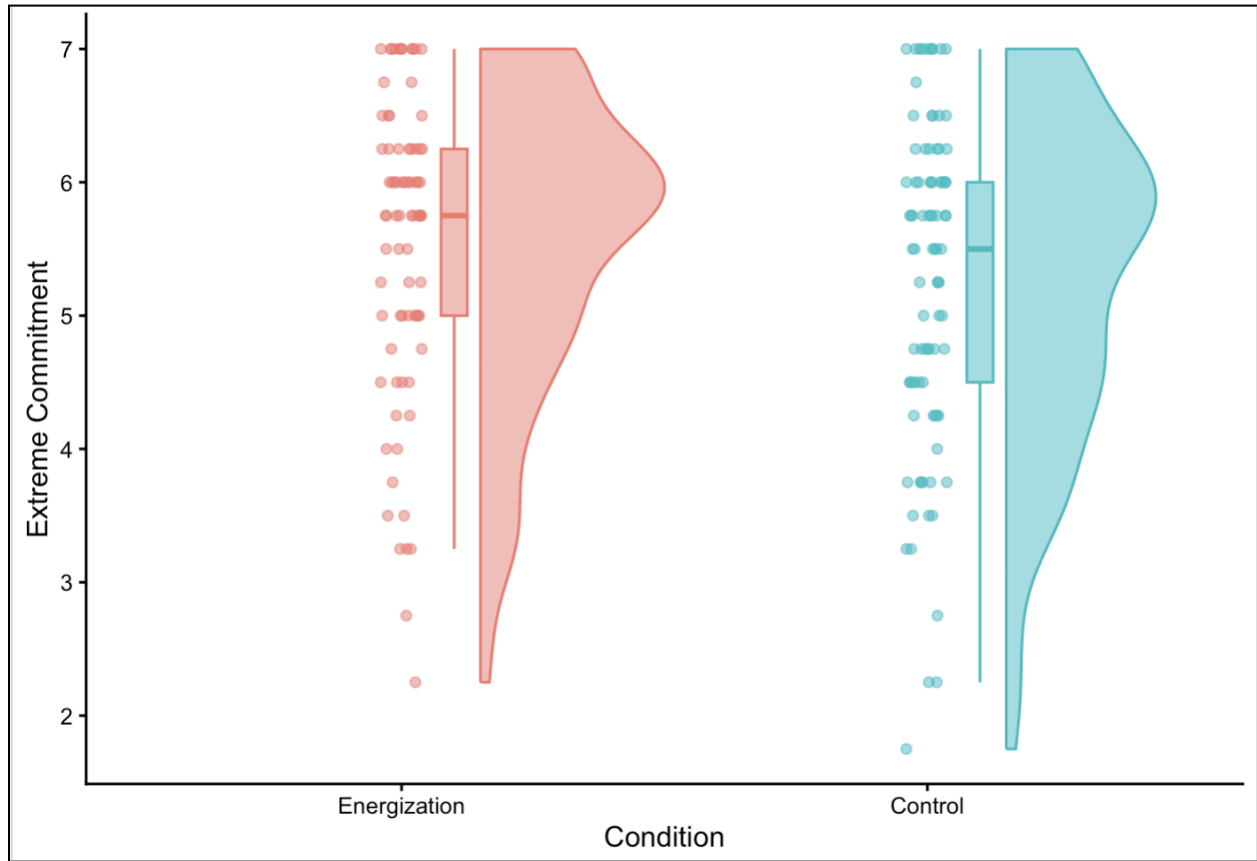
Variable	M	SD	1	2	3	4
Extreme Commitment	5.39	1.19				
Energy Before Manipulation	3.52	1.39	.11			
Energy After Manipulation	4.75	1.41	.22**	.54**		
Hope	5.09	.99	.51**	.43**	.52**	
Optimism	5.23	1.16	.43**	.52**	.72**	.81**

Note. * $p < .05$. ** $p < .01$.

We tested whether experimental conditions (energization vs. control) predicted extreme commitment. In the full sample, the effect of the condition was positive but not statistically significant. Participants in the energization condition reported slightly higher extreme commitment ($M = 5.54$, $SD = 1.13$) than those in the control condition ($M = 5.26$, $SD = 1.23$), $t(166.69) = 1.54$, $p = .13$, corresponding to a small effect size ($d = 0.24$, 95% CI $[-0.02, \infty]$).

Fig. 4

Difference In Extreme Goal Commitment Between Groups in Study 3.



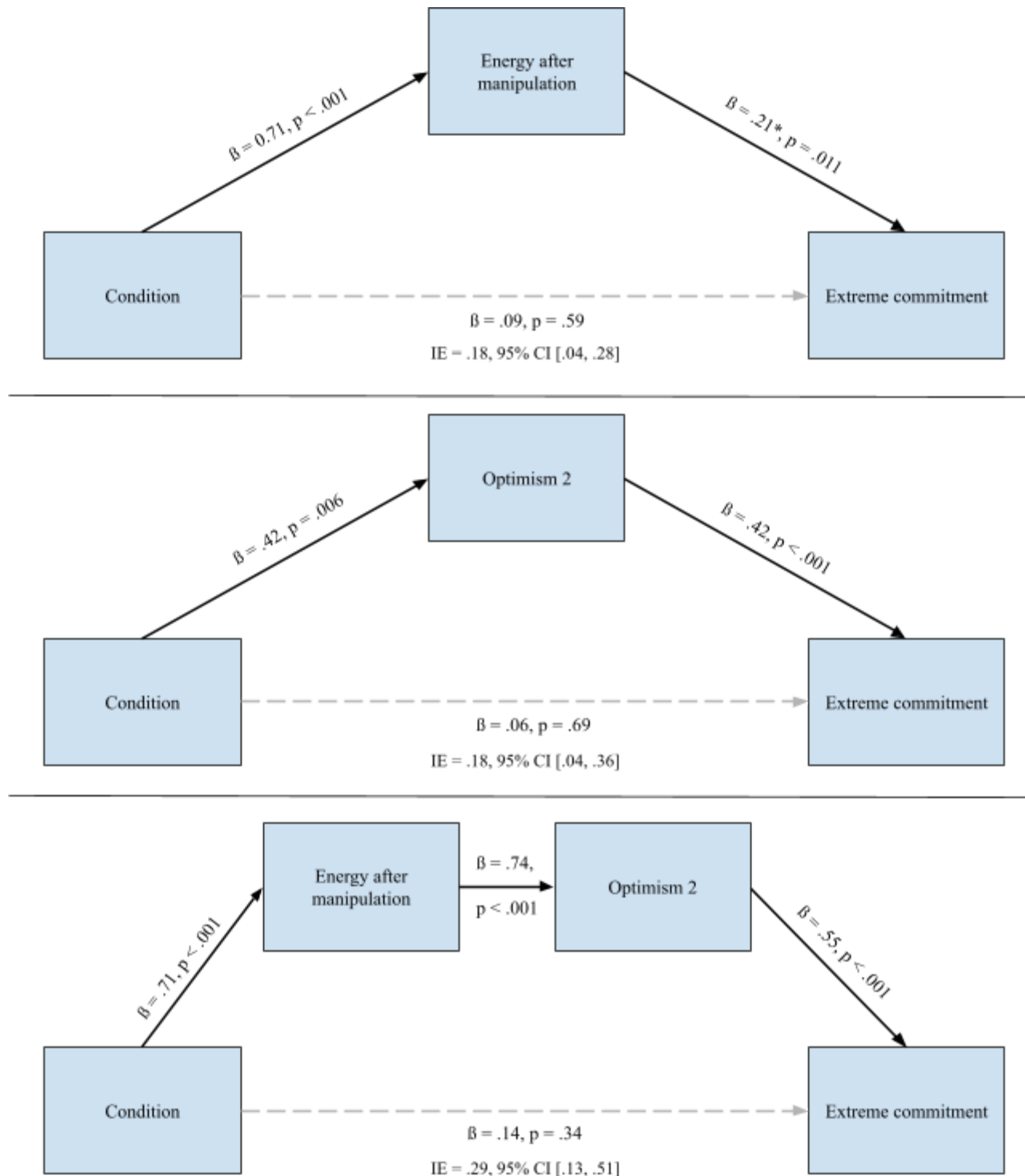
Note. Raincloud plots were generated using the ggRain package in R (Judd et al., 2023). Each plot combines a half-violin (density) plot, a boxplot showing the median and interquartile range, and jittered points representing individual observations.

A standardized regression model yielded a similarly small, nonsignificant effect ($\beta = .24$, $SE = .15$, $p = .13$, $R^2 = .014$). This pattern was directionally consistent with the original study 3, but the effect did not replicate at conventional significance levels when all observations were retained. Sensitivity analyses indicated that results were influenced by outliers: after excluding a small number of extremely low commitment scores, the effect of condition became statistically significant, $t(163.99) = 1.86$, $p = .032$, with a small increase in effect size ($d = 0.29$).

The energizing condition increased post-manipulation energy ($\beta = .71, p < .001$), which mediated its effect on commitment (indirect effect = .15, 95% CI [.04, .28]; direct $\beta = .09, p = .59$). The condition also increased optimism 2 ($\beta = .42, p = .006$), yielding a significant indirect effect (.18, 95% CI [.04, .36]; direct $\beta = .06, p = .69$). Serial mediation produced a significant energy to optimism to commitment path (see Figure 5).

Fig. 5

Mediation model for the effect of the energization manipulation on extreme commitment through post-manipulation energy and optimism 2.



Note. Bold arrows indicate the primary reported pathways. Dashed grey arrows indicate direct effects and auxiliary paths. Values are standardized path coefficients; values in square brackets are 95% confidence intervals for indirect effects (IE).

5.3 Discussion of Study 3

This replication successfully reproduced the energization manipulation. The energizing condition produced higher post-energy and UMACL positive energetic arousal scores. Indirect effects via energy and optimism were also replicated. However, the direct effect on extreme commitment was directionally consistent but nonsignificant. Effect sizes were smaller than in the original study. This attenuation may reflect energization in the control condition due to calming music or to enhanced effects from participant-selected playlists. Limitations mirror those of the original study, including reliance on self-reports and potential mood confounds. Using the original researchers' exact code confirms methodological reliability and strengthens evidence for the causal role of energy in extreme commitment through optimism mechanisms.

VI. Extension of Study 2

Study 2 found that individuals with higher subjective energy tend to show stronger commitment to personal goals, and that this association is mediated by state optimism and goal expectancy. However, the original study did not examine whether demographic factors might influence the strength of these motivational pathways. Building on Study 2, this extension investigated whether education level moderates the relationship between subjective energy and extreme commitment to personal goals through the motivational pathways of state optimism and goal expectancy.

Using the same cleaned sample ($N = 267$), participants were categorized into two groups: those with a bachelor's degree or higher and those with less than a bachelor's degree. Moderation analyses were conducted using the PROCESS macro for R to test whether education level moderated the key pathways identified in the original mediation model. None of the

interaction effects were statistically significant, suggesting that education level did not moderate these relationships. Although a slight negative trend emerged in the pathway from goal expectancy to extreme commitment among higher-educated participants, this effect remained non-significant and explained less than 1% additional variance. Overall, these findings suggest that the motivational processes linking subjective energy to goal commitment operate similarly across education levels. This strengthens the generalizability of the original model and highlights the need for future research to explore other individual differences that may shape goal-directed motivation.

6.1 Methods and Procedures of the Extension

To test whether education level influences the relationship between subjective energy and extreme commitment to personal goals, we extended Study 2 by examining moderation of the motivational pathways through state optimism and goal expectancy. Because education was already included as a demographic variable in the original dataset, no new participants or procedures were added. The extension therefore used the same cleaned Study 2 sample as in the replication.

The main variables from Study 2 remained unchanged. Subjective energy was assessed using the five-item state-adapted Subjective Vitality Scale, state optimism was measured with a single item (“I feel optimistic”), goal expectancy was measured with one item assessing the perceived likelihood of attaining the goal, and extreme commitment was measured using a four-item commitment scale. For the extension, education level was added as the moderator. In the original dataset, education was recorded on a seven-category scale. For the purposes of this extension, education level was recoded into a binary variable such that participants with a bachelor’s degree or higher were coded as 1, and participants with less than a bachelor’s degree

were coded as 0. The distribution of education categories and the binary grouping used in the moderation analyses are shown in Table 4. This recoding enabled a clearer comparison between lower- and higher-education groups while maintaining sufficient group sizes for analysis.

Consistent with the replication procedures, composite scores for subjective energy and extreme commitment were created by averaging item responses, and all primary variables were standardized prior to analysis. The analytic sample included 93 participants with less than a bachelor's degree and 174 participants with a bachelor's degree or higher, closely matching the education distribution reported in the original Study 2.

Table 4

Education Level of the Study 2 Sample (N = 267).

Education Level	N	%
Below BA (n = 93, 34.8%)		
Less than high school	2	0.7%
High school	32	12.0%
Some college	59	22.1%
BA or higher (n = 174, 65.2%)		
Bachelor's degree (BA)	114	42.7%

Master's degree (MA)	11	4.1%
Professional degree	45	16.9%
Doctoral Degree (PhD)	4	1.5%

Note. Participants were grouped into BA or higher versus below BA for the moderation analyses.

We first reproduced the original Study 2 serial mediation model in which subjective energy predicted extreme commitment through state optimism and goal expectancy. We then extended the analysis by estimating three moderation models using the PROCESS macro. These models tested whether education level moderated (a) the path from subjective energy to goal expectancy, (b) the path from goal expectancy to extreme commitment, and (c) the path from subjective energy to state optimism. In each model, education level was entered as the moderator, and the interaction term between the predictor and education was examined to determine whether the strength of the association differed across education groups. This analytic approach allowed us to assess whether the motivational processes identified in Study 2 operated similarly or differently depending on participants' educational background.

In a supplementary analysis, we also estimated a path model in lavaan that mirrored the original Study 2 mediation structure while including education level as a covariate. Subjective energy was specified as predicting both state optimism and goal expectancy; state optimism was specified as predicting goal expectancy and extreme commitment; and goal expectancy was specified as predicting extreme commitment. Education level was added as a predictor of state optimism, goal expectancy, and extreme commitment. This model allowed us to test whether the

.001), or the path from goal expectancy to extreme commitment ($b = -.091$, $SE = .06$, $p = .107$, $\Delta R^2 = .009$). Although the interaction between goal expectancy and education has the smallest p-value ($p = .107$) and a modest negative coefficient, the associated change in explained variance was very small ($\Delta R^2 = .009$, <1% additional variance) and did not meet conventional significance criteria.

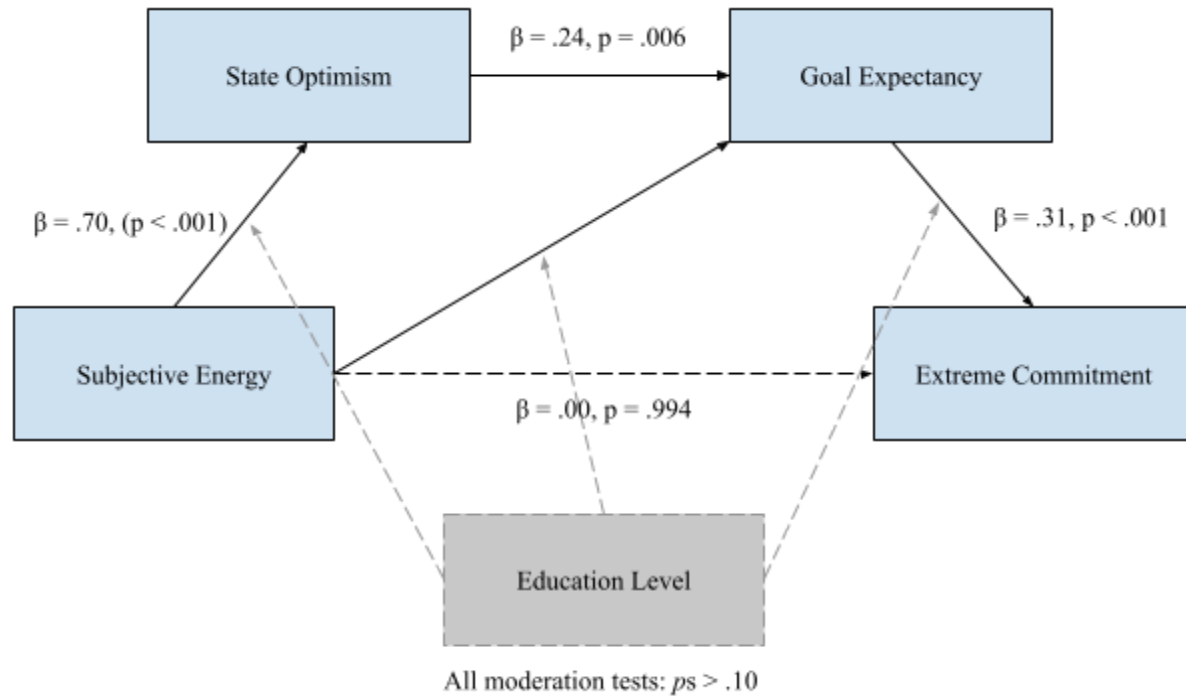
The negative direction of this non-significant interaction suggests that, if anything, goal expectancy might play a slightly weaker role in predicting extreme commitment among higher-educated participants. However, given the non-significant p-value and very small effect size, this pattern should be interpreted with caution and treated as exploratory rather than as evidence for a meaningful moderation effect.

Taken together, these results do not support the hypothesis that education level moderates the motivational pathways through which subjective energy predicts extreme commitment. The relationships among subjective energy, state optimism, goal expectancy, and commitment appear to operate in similar ways regardless of participants' education background.

In the lavaan path model that included education as a covariate, education did not significantly predict state optimism, goal expectancy, or extreme commitment (all $ps > .57$). Consistent with the original Study 2 findings, the serial indirect effect from subjective energy to extreme commitment through optimism and goal expectancy remained significant when controlling for education (indirect effect via Optimism $\rightarrow$ Expectancy $\rightarrow$ Commitment: $b = .042$, $p = .012$; total indirect effect: $b = .111$, $p = .024$). These results indicate that the core motivational pathway identified in Study 2 is robust to differences in education level, even when education is statistically accounted for in the model.

Fig. 6

Serial Mediation Model for the Study 2 Extension with Education Included as a Moderator and Covariate.



Note. Education did not significantly moderate the energy → optimism, energy → expectancy, or expectancy → commitment paths, and the serial indirect effect remained significant when controlling for education.

6.3 Discussion of the Extension

These results suggest that education level does not have a significant influence on the motivational pathways linking subjective energy, state optimism, goal expectancy, and extreme commitment. The associations between subjective energy, goal expectancy, commitment, and optimism remained consistent across education groups, indicating that the processes documented in Study 2 are relatively stable and do not substantially depend on educational background.

Although formal education did not appear to shape subjective energy or commitment in a detectable way, this extension still strengthens the interpretation of the original findings by explicitly considering a key demographic variable that was previously only described but not formally tested in the model. Building on Study 2, which demonstrated that subjective energy increases extreme commitment through state optimism and goal expectancy, the present extension suggests that this pathway holds similarly for individuals with lower and higher levels of education.

We observed a small negative trend in the relationship between goal expectancy and extreme commitment, such that goal expectancy may play a slightly weaker role in predicting commitment among highly educated individuals. However, given the lack of statistical significance, this should not be interpreted as evidence of a meaningful moderation effect within this study. At most, it points to a potential direction for future, more highly powered work.

Furthermore, our supplementary analysis (education as a covariate) confirmed the robustness of the core motivational process identified in Study 2. This finding demonstrates that the original model holds regardless of participants' level of formal education and is not easily explained away by participants' educational background.

Several limitations of this extension may have contributed to the null findings. Recoding education into a binary variable likely reduced variability and may have obscured more subtle gradations in educational attainment. In addition, the smaller subgroup of participants without a bachelor's degree could have limited statistical power to detect small interaction effects. More fine-grained measures of education, combined with larger and more diverse samples, would allow a more sensitive test of whether educational background shapes motivational processes.

Future research could address these limitations by exploring related individual-difference variables such as domain-specific knowledge, socioeconomic background, occupational demands, or daily habits, and by incorporating them into extended models of subjective energy and extreme commitment. Examining these factors alongside education may help clarify whether—and under what conditions—demographic and contextual variables influence the motivational pathways identified in the original study.

VII. Conclusion

The present research successfully replicated the findings of Bonarska et al. (2025) across three studies, confirming that subjective energy is a robust predictor of extreme goal setting and intense commitment. Our replication verified that these relationships are consistently mediated by optimism and goal expectancy, reinforcing the central tenets of the original motivational model. Building upon this validated foundation, our extension examined whether these psychological pathways are moderated by educational background. We found no evidence that education level influences the relationship between subjective energy and extreme commitment, indicating that the identified motivational mechanisms operate similarly regardless of participants' level of formal schooling. Together, these findings demonstrate the reliability and generalizability of the proposed framework, suggesting that the drive to pursue ambitious goals through optimism and energy is a stable phenomenon. While our work supports the robustness of this model, future research should continue to investigate other individual differences and contextual variables that may further elucidate the complexity of extreme goal pursuit.

Data Availability

All data, analysis scripts, and supplementary materials for the replication and extension studies are available at the [OSF repository](#). The original study's code and dataset are available on [the original project's OSF page](#).

Acknowledgements

Our group would like to thank Professor D'esposito for his continued support and encouragement of the ULAB program at University of California, Berkeley.

References

- Bélanger, J. J., Schumpe, B. M., & Nisa, C. F. (2019). How passionate individuals regulate their activity with other life domains: A goal-systemic perspective. **Journal of Personality**, **87**(6), 1136–1150. <https://doi.org/10.1111/jopy.12463>
- Bélanger, J. J., Kruglanski, A. W., & Lalonde, R. N. (2019). On the pursuit of multiple goals: The role of harmonious and obsessive passion. **Journal of Personality**, **87**(3), 456–468. <https://doi.org/10.1111/jopy.12423>
- Bonarska, K., Cacek, J., Szumowska, E., & Kruglanski, A. W. (2025). To dream the impossible dream: How personal energy fuels ambition and extreme commitment. **Motivation and Emotion**. <https://doi.org/10.1007/s11031-025-10153-x>
- Bostic, T. J., Rubio, D. M., & Hood, M. (2000). A validation of the subjective vitality scale using structural equation modeling. **Social Indicators Research**, **52**(3), 313–324. <https://doi.org/10.1023/A:1007028432517>
- Bressler, M., Bressler, L., & Bressler, M. (2010). The role and relationship of hope, optimism and goal setting in achieving academic success: A study of students enrolled in online accounting courses. **Academy of Educational Leadership Journal**, **14**, 37–51.
- Brehm, J. W., Wright, R. A., Solomon, S., Silka, L., & Greenberg, J. (1983). Perceived difficulty, energization, and the magnitude of goal valence. **Journal of Experimental Social Psychology**, **19**(1), 21–48. [https://doi.org/10.1016/0022-1031\(83\)90003-3](https://doi.org/10.1016/0022-1031(83)90003-3)
- Brusso, R. C. (2010). **The impeding role of initial unrealistic goal-setting on training performance: Identifying underpinning self-regulatory processes and solutions** (Master's

- thesis, Old Dominion University). Old Dominion University Digital Commons.
<https://doi.org/10.25777/gtd7-bg33>
- Cardini, B. B., & Freund, A. M. (2020). More or less energy with age? A motivational life-span perspective on subjective energy, exhaustion, and opportunity costs. **Psychology and Aging**, **35**(3), 369–383. <https://doi.org/10.1037/pag0000456>
- Cassidy, T. (2000). Social background, achievement motivation, optimism and health: A longitudinal study. **Counselling Psychology Quarterly**, **13**(4), 399–412.
<https://doi.org/10.1080/713658501>
- Chang, E. C., Chang, R., & Sanna, L. J. (2009). Optimism, pessimism, and motivation: Relations to adjustment. **Social and Personality Psychology Compass**, **3**(4), 494–506.
<https://doi.org/10.1111/j.1751-9004.2009.00190.x>
- Esteve, R., Ramírez-Muñoz, S., & Tanner, E. (2018). Optimism, positive and negative affect, and goal management: The role of optimism in goal commitment and goal adjustment. **Frontiers in Psychology**, **9**, Article 1629. <https://doi.org/10.3389/fpsyg.2018.01629>
- Garner, L. D., Mohammed, R., & Robison, M. K. (2025). Setting specific goals improves cognitive effort, self-efficacy, and sustained attention. **Journal of Experimental Psychology: Human Perception and Performance**, **51**(7), 895–910.
<https://doi.org/10.1037/xhp0001331>
- Hanssen, M. M., Vancleef, L. M. G., Vlaeyen, J. W. S., Hayes, A. F., Schouten, E. G. W., & Peters, M. L. (2015). Optimism, motivational coping and well-being: Evidence supporting the importance of flexible goal adjustment. **Journal of Happiness Studies**, **16**(6), 1525–1537. <https://doi.org/10.1007/s10902-014-9572-x>

- Hirschi, A., & Spurk, D. (2021). Ambitious employees: Why and when ambition relates to performance and organizational commitment. *Journal of Vocational Behavior*, *127*, Article 103576. <https://doi.org/10.1016/j.jvb.2021.103576>
- Hommelhoff, S., Richter, D., Niessen, C., Gerstorf, D., & Heckhausen, J. (2020). Being unengaged at work but still dedicating time and energy: A longitudinal study. *Motivation Science*, *6*(4), 368–373. <https://doi.org/10.1037/mot0000155>
- Hope, N. H., Milyavskaya, M., Holding, A. C., & Koestner, R. (2016). The humble path to progress: Goal-specific aspirational content predicts goal progress and goal vitality. *Personality and Individual Differences*, *90*, 99–107. <https://doi.org/10.1016/j.paid.2015.10.038>
- Judge, T. A., & Kammeyer-Mueller, J. D. (2012). On the value of aiming high: The causes and consequences of ambition. *Journal of Applied Psychology*, *97*(4), 758–775. <https://doi.org/10.1037/a0028084>
- Kleinman, M. E., & Quinn, M. E. (2025). Goal clarity as context for regulation success. *Emotion*. Advance online publication. <https://doi.org/10.1037/emo0001548>
- Li, C. H. (2010). Predicting subjective vitality and performance in sports: The role of passion and achievement goals. *Perceptual and Motor Skills*, *110*(3, Suppl.), 1029–1047. <https://doi.org/10.2466/PMS.110.3.1029-1047>
- Malik, S. Z., & MacIntosh, R. (2015). Role of energizing relationships in creating subjective vitality and goal commitment in UK academics. *Journal of Research and Reflections in Education*, *9*(1), 62–74.

- Miquelon, P., Knäuper, B., & Vallerand, R. J. (2012). Motivation and goal attainment: The role of compensatory beliefs. **Appetite**, **58*(2)*, 608–615.
<https://doi.org/10.1016/j.appet.2011.12.025>
- Nelissen, R. M. A. (2015). The motivational properties of hope in goal striving. **Cognition and Emotion**, **31*(2)*, 225–237. <https://doi.org/10.1080/02699931.2015.1095165>
- Ntoumanis, N., Healy, L. C., Sedikides, C., Smith, A. L., & Duda, J. L. (2014). 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>
- O'Keefe, P. A., Horberg, E. J., Lee, F., & Dweck, C. S. (2023). Implicit theories of opportunity: When opportunity fails to knock, keep waiting, or start cultivating? **Journal of Personality and Social Psychology**, **124*(6)*, 1146–1173.
<https://doi.org/10.1037/pspa0000330>
- Padhy, M., Hariharan, M., Mutnury, S. L., & Mukherjee, O. (2021). Flourishing: Role of perseverance and passion for long-term goals in relation to subjective vitality.
International Journal of Health Sciences Research, **11**, 6–12.
- Phan, H. P., Ngu, B. H., Chen, S.-C., Lin, R.-Y., Wang, H.-W., Shih, J.-H., & Shi, S.-Y. (2021). Empirical validation of the psychological concept of a perceived feeling of "energy": Advancement into the study of positive psychology. **PLoS ONE**, **16*(11)*, Article e0259762. <https://doi.org/10.1371/journal.pone.0259762>
- Prieto, L. R., & Loomis, A. M. (2025). Outcome expectations, motivations, achievement goals, and research self-efficacy within high-quality research training environments.

Scholarship of Teaching and Learning in Psychology. Advance online publication.

<https://doi.org/10.1037/stl0000446>

Rasmussen, H. N., Wrosch, C., Scheier, M. F., & Carver, C. S. (2006). Self-regulation processes and health: The importance of optimism and goal adjustment. **Journal of Personality**, **74**(6), 1721–1748. <https://doi.org/10.1111/j.1467-6494.2006.00426.x>

Resta, E., Ellenberg, M., Kruglanski, A. W., et al. (2022). Marie Curie vs. Serena Williams: Ambition leads to extremism through obsessive (but not harmonious) passion.

Motivation and Emotion, **46**, 382–393. <https://doi.org/10.1007/s11031-022-09936-3>

Ryan, R. M., & Frederick, C. M. (1997). On energy, personality, and health: Subjective vitality as a dynamic construct. **Journal of Personality**, **65**(3), 529–565.

<https://doi.org/10.1111/j.1467-6494.1997.tb00326.x>

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. **Journal of Personality and Social Psychology**, **67**(6), 1063–1078.

<https://doi.org/10.1037/0022-3514.67.6.1063>

Schmitt, A., Gielnik, M. M., Zacher, H., & Klemann, D. K. (2013). The motivational benefits of specific versus general optimism. **The Journal of Positive Psychology**, **8**(5),

425–434. <https://doi.org/10.1080/17439760.2013.820338>

Toto, P. E., Skidmore, E. R., Terhorst, L., Rosen, J., & Weiner, D. K. (2014). Goal attainment scaling (GAS) in geriatric primary care: A feasibility study. **Archives of Gerontology and Geriatrics**, **59**(1), 94–100. <https://doi.org/10.1016/j.archger.2014.02.007>

- Tubbs, M. E., Boehne, D. M., & Dahl, J. G. (1993). Expectancy, valence, and motivational force functions in goal-setting research: An empirical test. *Journal of Applied Psychology*, *78*(3), 361–373. <https://doi.org/10.1037/0021-9010.78.3.361>
- Wicker, F. W., Turner, J. E., Reed, J. H., McCann, E. J., & Do, S. L. (2004). Motivation when optimism declines: Data on temporal dynamics. *The Journal of Psychology*, *138*(5), 421–432. <https://doi.org/10.3200/JRLP.138.5.421-432>
- Wrosch, C., Scheier, M. F., Miller, G. E., Schulz, R., & Carver, C. S. (2003). Adaptive self-regulation of unattainable goals: Goal disengagement, goal reengagement, and subjective well-being. *Personality and Social Psychology Bulletin*, *29*(12), 1494–1508. <https://doi.org/10.1177/0146167203256921>