

Supplemental Online Material (SOM) for:

**Categorizing Tasks Around a Break Reduces Rumination
and Improves Task Performance**

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A Summary Table of Main Descriptive Statistics**Table S1***Main Descriptive Statistics Across Experiments*

Experiment	Variable	Condition	Mean	SD	P	n
Pilot	Rumination	No Categorization Categorization	64.34 52.63	23.46 27.98	.012	126
1	Rumination	No Categorization Categorization	39.69 20.22	30.76 25.83	< .001	398
2	Rumination	No Categorization Categorization	24.49 20.47	24.11 21.44	.014	784
3	Rumination	No Categorization Categorization	36.66 33.37	30.74 29.36	.009	2,332
4	Rumination	No Categorization Categorization	29.63 24.40	26.23 23.27	.037	395
	Post-Break Performance	No Categorization Categorization	2.02 2.40	1.11 1.10	< .001	
5	Rumination (Pretest)	Passive Break Active Break	27.23 17.65	29.61 24.83	< .001	382
	Post-Break Performance	No Categorization, Passive Break Categorization, Passive Break	1.41 1.70	1.07 1.12	.011	760
		No Categorization, Active Break Categorization, Active Break	1.61 1.47	1.16 1.10	.239	

Pilot Study: Stimuli

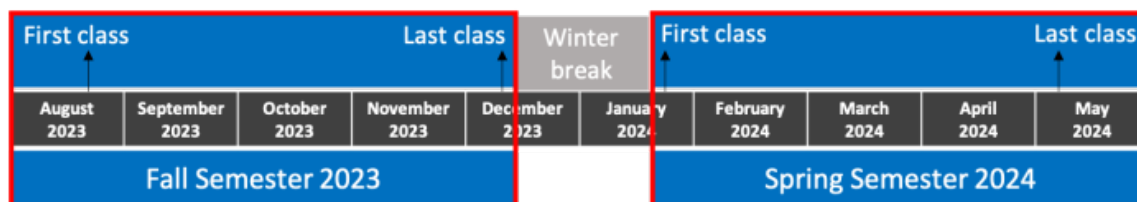
Figure S1

Manipulation of Categorization (Pilot Study)

A) No Categorization Condition



B) Categorization Condition



Pilot Study: Additional Items and Analyses

We explored whether the categorization manipulation influenced perceptions of winter break, using a three-item scale ($\alpha = .85$): “During the thought exercise, to what extent were you thinking of your winter break as refreshing?” “To what extent were you thinking of your winter break as restorative?” and “To what extent did thinking about your winter break make you feel energized?” (0 = *not at all*; 100 = *very much*). There was no significant effect of condition on how restorative participants believed their winter break to be, $t(124) = .03, p = .975, d = .01$, possibly because people had different experiences during winter break. However, we do find that rumination negatively predicted how restorative participants found their winter break to be ($r = -.21, p = .020$) and that rumination significantly mediated the effect of condition on how restorative winter break felt, $\beta_{\text{indirect}} = 2.25, SE = 1.37, 95\% CI = [.12, 5.42]$.

Experiment 1: Additional Analyses and Exploratory Measures

In Experiment 1, to explore whether categorization affected the direction of participants' rumination (e.g., on the preceding vs. upcoming task), we included the following exploratory item: "During the break, did you find yourself thinking more about words 1-5 (i.e., the previous words you found) or about words 6-10 (i.e., the upcoming words you will find)?" (0 = *thinking more about past words 1-5*; 50 = *thinking about all words*; 100 = *thinking more about upcoming words 6-10*). There was no significant effect of categorization on the direction of rumination ($M_{\text{Categorization}} = 56.41$, $SD = 31.71$; $M_{\text{No Categorization}} = 56.75$, $SD = 33.37$), $t(396) = .10$, $p = .917$.

As noted in the main text, we included six items assessing negative affect associated with the task (adapted from Van Boven & Ashworth, 2007). These items were pre-registered as exploratory, and we confirmed a two-structure factor loading using a factor analysis with oblique rotation and unrestricted extraction method based on "leveling off" the scree plot (Fabrigar et al., 1999). This factor analysis confirmed that the six items load onto two separate factors with factor loadings $> .92$ (Table S2).

Table S2

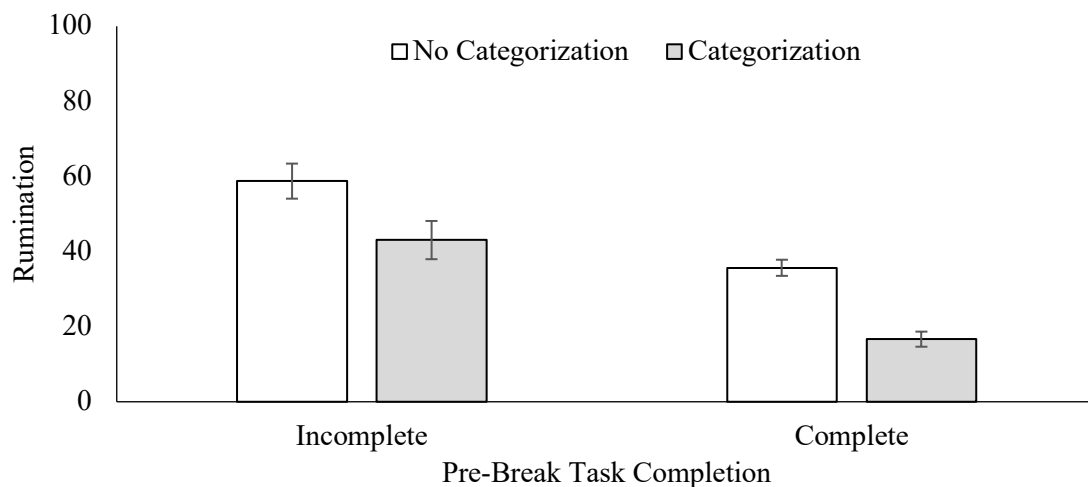
Factor Loadings in Experiment 1

Measures of Negative Affect	Factor 1 (high-arousal)	Factor 2 (low-arousal)
How stressed did this past activity make you feel?	.94	.33
How much anxiety did this past activity make you feel?	.95	.32
How stressed will this upcoming activity make you feel?	.96	.30
How much anxiety will this upcoming activity make you feel?	.93	.26
How boring was this past activity?	.30	.97
How boring will this upcoming activity be?	.31	.95

As a robustness check, in a non-pre-registered analysis, we examined whether the effect of task categorization on rumination was contingent on participants' completion of the pre-break task (i.e., finding all five words before the break; recall that participants advanced to the break either after finding all five words or after five minutes had passed). In Experiment 1, 337 participants completed the pre-break task; 61 participants did not. A 2 (categorization condition) $\times$ 2 (pre-break task completion) ANOVA revealed no significant interaction effect, $F(1, 394) = .19, p = .660$ (see Figure S2), and a significant main effect of task categorization, $F(1, 394) = 21.33, p < .001, \eta_p^2 = .05$. This finding supports our conclusion that the effect of task categorization on rumination is not contingent on actual completion of the pre-break task.

Figure S2

Pre-Break Task Completion Does Not Moderate the Effect of Categorization on Rumination (Experiment 1)



Notes. Error bars represent ± 1 standard error from the mean.

Experiment 2: Additional Analyses and Exploratory Measures

After the break, we measured perceptions of progress made and progress remaining by asking, “In thinking about the past and the exercises you have done so far, how much progress have you made toward your overall workout?” and “In thinking about the future and the exercises you have remaining, how much progress do you think you still have to make toward your overall workout?” (0 = *very little*, 100 = *a lot*). A repeated-measures ANOVA showed a significant main effect of time, such that participants thought that they had made more progress and had less progress remaining, $F(1, 782) = 63.59, p < .011$, qualified by a significant interaction, $F(1, 782) = 6.46, p = .011$. Whereas there was no effect of condition on perceptions of remaining progress, $p = .615$, participants in the No Categorization condition thought that they had made more progress ($M = 51.69, SD = 18.40$) than those in the Categorization condition ($M = 47.86, SD = 23.12$), $F(1, 782) = 6.59, p = .010$.

Similarly, we measured perceptions of effort made and effort remaining by asking, “In thinking about the past and the exercises you have done so far, how much effort have you put in toward your workout so far?” and “In thinking about the future and the exercises you have remaining, how much effort do you think you still have to put in toward your overall workout?” (0 = *very little*, 100 = *a lot*). A repeated-measures ANOVA found a significant main effect of condition, such that participants in the No Categorization condition thought they put in more effort than those in the Categorization condition $F(1, 782) = 7.13, p = .008$, which was qualified by a significant interaction, $F(1, 782) = 9.32, p = .002$. Similar to the progress measures, whereas there was no effect of condition on perceived effort remaining, $p = .293$, participants in the No Categorization condition thought they had put in more effort to date ($M = 69.48, SD = 25.36$) than those in the Categorization condition ($M = 62.39, SD = 29.19$), $F(1, 782) = 13.20, p < .001$.

This effect we observed between categorization and goal progress conceptually replicates an existing finding in the literature (Sharif & Woolley, 2020; Study 2). Previous research has shown that the relationship between progress and motivation is nuanced and not always straightforward. On the one hand, perceiving significant progress does not necessarily lead to increased motivation; at times, it can lead to slacking (i.e., goal balancing; Fishbach et al., 2006). On the other hand, feeling farther from a goal creates a discrepancy between the current state and the desired end state, which can motivate efforts to close this gap (Carver & Schier, 1998). Thus, the results from our exploratory analyses alone offer limited conclusions regarding post-break performance. For direct tests of the impact of task categorization on post-break performance, please refer to Experiments 4 and 5 reported in the main text.

We find no effect of condition on perceptions of time to complete the remaining exercises: “In thinking about the future and the exercises you have remaining, how much time do you think it will take to do the remaining exercises?” ($0 = \textit{very little}$, $100 = \textit{a lot}$), $p = .599$, or on participants’ evaluations of the workout instructor (3-item scale), “Please rate the workout instructor you saw in the videos” ($0 = \textit{very bad}$, $100 = \textit{very good}$), “I am satisfied with the instructor” ($0 = \textit{strongly disagree}$, $100 = \textit{strongly agree}$), and “I wish to change the instructor for the remaining exercises” ($0 = \textit{strongly disagree}$, $100 = \textit{strongly agree}$), $p = .241$.

Experiment 3: Post-Test

We conducted a post-test to Experiment 3 to rule out the possibility that differences in how much of an interruption the break was drove the effect.

Method

Participants

We pre-registered this experiment (aspredicted.org/qvyk-h632.pdf) and recruited 401 participants through Prolific. Using the same criteria as in Experiments 2–3, we excluded participants who did not complete the workouts ($n = 8$), leaving 393 participants ($M_{\text{age}} = 39.54$, $SD = 12.01$; 186 males, 202 females, and 5 non-binary).

Procedure

We randomly assigned participants to one of four conditions in a 2 (No Categorization vs. Categorization) $\times$ 2 (Expected Break vs. Unexpected Break) between-subjects design. The experiment proceeded identically as Experiment 3. Participants in all conditions were tasked with completing 10 seated exercises, about 30 seconds each, as instructed in a series of exercise videos. In the No Categorization condition, participants saw a list of 10 exercises, labeled “Workout Exercises.” In the Categorization condition, participants saw two lists of five exercises, labeled: “Workout Set 1: Arm Exercises” and “Workout Set 2: Ab Exercises.”

In the Expected Break condition, we informed participants at the beginning of the experiment that they would take a break during the workout at the halfway point (No Categorization condition) or in between the two workouts (Categorization condition). In the Unexpected Break condition, we did not inform participants until they finished the fifth exercise that they would be taking a break.

After the break and before participants started the next five exercises, we measured whether participants perceived the break as an interruption (2-item scale; $r = .89$): “To what extent did you feel that the break interrupted the exercises?” and “To what extent did you perceive this break as disruptive to the exercise task?” (1 = *not at all*; 7 = *very much*). We asked participants if they completed the workout videos; as noted earlier, we excluded participants who did not complete any workouts (there was no effect of categorization condition, break type, or interaction on this measure). Lastly, we included an attention check, “Which of the following exercises did you do?” (choice options: Ab exercises, Squat exercises, Arm exercises). The majority of participants (96%) passed this attention check (there was no effect of categorization condition, break type, or interaction on this measure).

Results and Discussion

We conducted an ANOVA of task categorization $\times$ break type on perceived interruption. As predicted, this analysis revealed no main effect of categorization condition, $F(1, 389) = .87, p = .352, \eta_p^2 = .002$, break type, $F(1, 389) = .35, p = .554, \eta_p^2 < .001$, or interaction effect, $F(1, 389) = .05, p = .816, \eta_p^2 < .001$. The mean disruption score was around the scale midpoint ($M = 4.37, SD = 2.04$).

This post-test addresses the alternative explanation that differences in how disruptive the break is perceived as (i.e., that it is perceived as more of an interruption in the No Categorization condition) drive the effect.

Experiment 4: Additional Analyses and Exploratory Measures

In Experiment 4, after participants completed the word search task, we measured, “Now that you’re done with the word search task, please think about how long it took in total for you to find all 10 of the hidden words. Time I spent in finding all the hidden words”: 0 = *very little*, 100 = *a lot*. We found that participants in the Categorization condition perceived that the task took significantly less time ($M = 39.84$, $SD = 27.08$) than those in the No Categorization condition ($M = 47.94$, $SD = 30.27$), $t(393) = 2.80$, $p = .005$, $d = .28$. The effect of categorization on the perceived task duration was mediated by rumination during the break, $\beta_{\text{indirect}} = -1.87$, $SE = .96$, 95% CI = [-3.88, -.10] (Hayes, 2012).

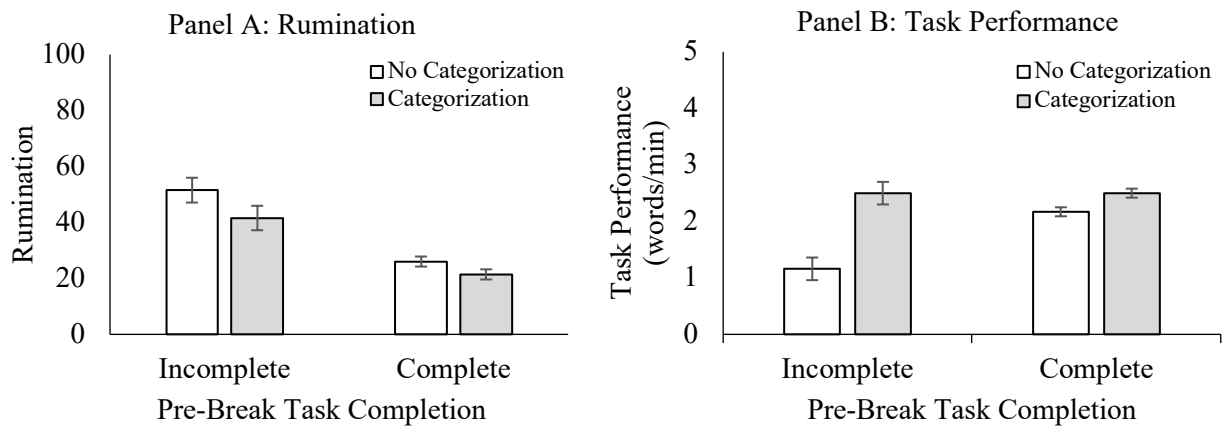
As in Experiment 1, we measured the direction of rumination; this time, we measured these items at the end of the task (rather than at the end of the break) with two exploratory measures: “While watching the video, how much did you think about the words you were searching for before taking the break?” ($M_{\text{Categorization}} = 21.91$, $SD = 28.80$; $M_{\text{No Categorization}} = 22.52$, $SD = 28.68$), $t(393) = .21$, $p = .834$, and “While watching the video, how much did you think about the words that would come after the break?” ($M_{\text{Categorization}} = 25.41$, $SD = 29.18$; $M_{\text{No Categorization}} = 30.65$, $SD = 32.24$), $t(393) = 1.70$, $p = .091$.

We found no significant effect of categorization on the desire to do another word search: “How much do you want to work on searching for five more hidden words?” (0 = *not at all*; 100 = *very much*) ($M_{\text{Categorization}} = 50.92$, $SD = 33.19$; $M_{\text{No Categorization}} = 44.72$, $SD = 35.38$), $t(393) = -1.80$, $p = .073$. Lastly, we found no significant effect of categorization on the desire to take another break before another word search: “How much would you want to take another break before working on more word search task?” (0 = *not at all*; 100 = *very much*) ($M_{\text{Categorization}} = 26.79$, $SD = 31.86$; $M_{\text{No Categorization}} = 25.12$, $SD = 32.26$), $t(393) = -.52$, $p = .605$.

As a robustness check, similar to Experiment 1, we examined whether the effect of task categorization on rumination and post-break task performance was contingent on participants' completion of the pre-break task (i.e., finding the first five words before the break). In Experiment 4, 338 participants completed the pre-break task; 57 participants did not. A 2 (categorization condition) $\times$ 2 (pre-break task completion) ANOVA revealed no significant interaction effect on rumination, $F(1, 391) = .64, p = .425$ (see Figure S3a) or task performance, $F(1, 391) = 1.00, p = .318$ (see Figure S3b). These results suggest that the effect of task categorization on rumination and performance is not contingent on actual completion of the pre-break task.

Figure S3

Pre-Break Task Completion Does Not Moderate the Effect of Categorization on Rumination (Panel A) or Task Performance (Panel B) in Experiment 4



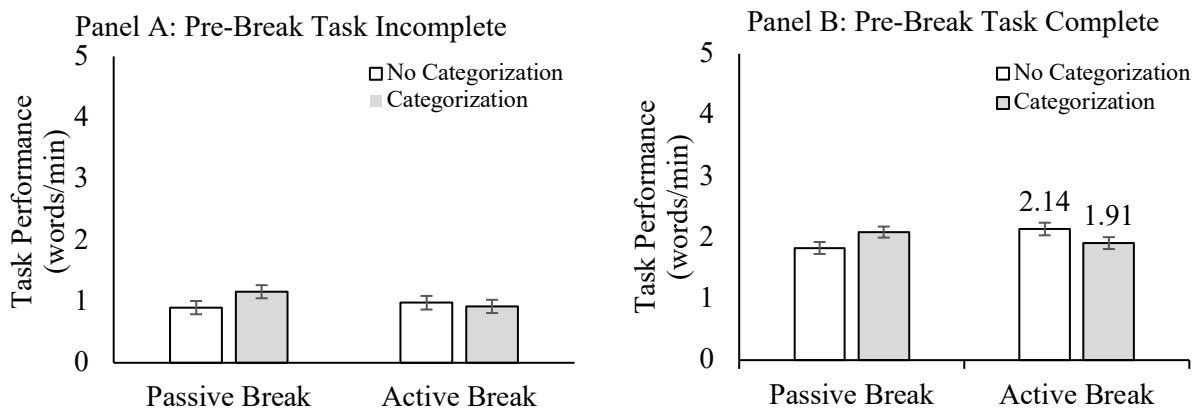
Notes. Error bars represent ± 1 standard error from the mean.

Experiment 5: Additional Analyses

As a robustness check, similar to Experiment 4, we examined whether the effect of task categorization on improved post-break task performance was contingent on participants' completion of the pre-break task. In Experiment 5, 423 participants completed the pre-break task, and 337 participants did not. A 2 (categorization condition) $\times$ 2 (pre-break task completion) $\times$ 2 (break type condition) ANOVA predicting post-break task performance revealed no significant interaction effect, $F(1, 752) = .34, p = .561$ (see Figure S4). We continued to find our hypothesized interaction between task categorization and break type among participants who completed the pre-break task (i.e., found all five words), $F(1, 419) = 4.41, p = .036, \eta_p^2 = .01$, and those who did not (i.e., advanced to the break without finding all five words), $F(1, 333) = 4.22, p = .041, \eta_p^2 = .01$.

Figure S4

Pre-Break Task Completion Does Not Moderate the Effect of Categorization on Post-Break Task Performance. Panel A Reflects Performance Among Those Who Did Not Complete the Pre-Break Task. Panel B Reflects Performance Among Those Who Completed the Pre-Break Task (Experiment 5)



Notes. Error bars represent ± 1 standard error from the mean.

Experiment 5: Post-Test

We conducted a post-test to Experiment 5 to confirm the categorization manipulation.

Method

We pre-registered this experiment (aspredicted.org/jkxq-3tc3.pdf) and recruited 200 participants through Prolific. Using the same criteria as in Experiments 1, 4, and 5, we excluded participants who did not engage in the word search task (either did not find any words or clicked on random letters; $n = 3$), leaving 197 participants ($M_{\text{age}} = 36.74$, $SD = 12.27$; 94 male, 101 female, and 2 non-binary).

We randomly assigned participants to one of two conditions in a two-cell (No Categorization vs. Categorization) between-subjects design. The experiment proceeded identically as Experiment 4. At the end of the word search, as a manipulation check, we asked participants, “When you were taking the break, to what extent did you think of the work you did before the break as on-going versus partitioned?” (1 = *on-going*; 7 = *partitioned*). We also measured, “If you could choose to have the break at a different time during the study, would you?” (77% reported “I would keep the break where it currently is” vs. “I would NOT keep the break where it currently is”). Lastly, we measured “Did you do this task for work” (50% selected yes).

Results and Discussion

As predicted, and confirming our manipulation, participants in the Categorization condition perceived the word search to be more partitioned (vs. on-going) ($M = 4.61$, $SD = 1.94$) than those in the No Categorization condition ($M = 3.90$, $SD = 2.07$), $t(195) = 2.51$, $p = .013$, $d = .36$.

SOM References

Carver, C. S., & Scheier, M. (1998). *On the self-regulation of behavior*. Cambridge University Press.

Fishbach, A., Dhar, R., & Zhang, Y. (2006). Subgoals as substitutes or complements: the role of goal accessibility. *Journal of personality and social psychology*, 91(2), 232–242.

Sharif, M. A., & Woolley, K. (2020). The effect of categorization on goal progress perceptions and motivation. *Journal of Consumer Research*, 47(4), 608–630.