

# Motivating Personal Growth by Seeking Discomfort



Kaitlin Woolley<sup>1</sup> and Ayelet Fishbach<sup>2</sup>

<sup>1</sup>SC Johnson College of Business, Cornell University, and <sup>2</sup>Booth School of Business, The University of Chicago

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## Abstract

Achieving personal growth often requires experiencing discomfort. What if instead of tolerating discomfort (e.g., feeling awkward or uncomfortable), people actively sought it out? Because discomfort is usually experienced immediately and is easy to detect, we suggest that seeking discomfort as a signal of growth can increase motivation. Five experiments (total  $N = 2,163$  adults) tested this prediction across various areas of personal growth: taking improvisation classes to increase self-confidence, engaging in expressive writing to process difficult emotions, becoming informed about the COVID-19 health crisis, opening oneself to opposing political viewpoints, and learning about gun violence. Across these areas of personal development, seeking discomfort as a signal of self-growth motivated engagement and increased perceived goal achievement relative to standard instructions. Consistent with our theorizing, results showed that these effects occurred only in areas of personal growth that cause immediate discomfort.

## Keywords

motivation, self-control, self-growth goals, negative experience, open data, open materials, preregistered

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People commonly aspire to improve themselves and thus become a better version of themselves (Jain et al., 2015). Yet the process of personal growth can be uncomfortable. From building self-confidence through improvisation classes, to working through difficult emotions through expressive writing (Pennebaker & Smyth, 2016), to becoming informed about uncomfortable issues (e.g., a health crisis, gun violence), to opening oneself to opposing views, self-growth too often evokes discomfort (i.e., some form of negative experience; Crocker & Park, 2004; King & Hicks, 2007; Lyubomirsky et al., 2006).

How can people motivate themselves when experiencing discomfort? One approach involves reducing the negative experience. For example, people can mentally distance themselves from the negative experience through third-person self-talk (e.g., a person named Kaitlin might think “Why did Kaitlin feel this way?” instead of “Why did I feel this way?”). Distancing reduces anxiety and thus improves performance (Kross et al., 2014). Another approach involves adding immediate benefits (e.g., “a spoonful of sugar”) to counteract

discomfort. So, for example, adding colored pens and snacks has been shown to increase high school students’ engagement with a math task (Woolley & Fishbach, 2016), just as adding attention-grabbing videos has been shown to increase people’s toothbrushing persistence by counteracting boredom (Lieberman et al., 2021).

Yet a third approach involves cognitive reappraisal of discomfort. This emotion-regulation strategy alters the meaning applied to negative experiences before they occur to reduce their emotional impact (Gross, 1998, 1999). Reappraisal has a long history (for a review, see McRae, 2016; Uusberg et al., 2019) and has proven beneficial in managing emotions in lab studies (Gross, 1998; Jamieson et al., 2012), field studies (Jamieson et al., 2021), and clinical trials of affective disorders (e.g., cognitive behavioral therapy; Butler et al., 2006; Cuijpers et al., 2013; early models were developed by Beck, 1963, and Ellis, 1955). Through reappraisal, people may reinterpret

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### Corresponding Author:

Kaitlin Woolley, Cornell University, SC Johnson College of Business  
Email: krw67@cornell.edu

discomfort as a positive experience. For example, reframing anxiety as excitement improved amateurs' singing in front of a stranger (Brooks, 2014). Alternatively, research on stress mindsets suggests that people can shift their beliefs about the meaning of negative experiences. For example, perceiving stress as helping rather than hurting achievement helped stress management (Jamieson et al., 2018), and people giving speeches who adopted a "stress-is-enhancing" mindset were more open to feedback than those who adopted a "stress-is-debilitating" mindset (Crum et al., 2013). When people reinterpret negative experiences as functional, they are more willing to engage in tasks that evoke these experiences.

Building on cognitive-reappraisal research, we ask whether merely encouraging people to seek discomfort can motivate personal growth by transforming discomfort into a sign of progress. For example, in the context of improvisation training, would a person who seeks to feel awkward and uncomfortable be more motivated? We propose that they would.

### Discomfort as a Signal of Goal Progress

Progress on personal growth is notoriously hard to detect. How does a trainee know whether they are becoming more confident during improvisation training? People take improvisation classes to develop confidence, communication skills, and public-speaking skills (Evans, 2014; The Second City, 2020; Toohill, 2015), yet feedback on skill development is often lacking or delayed. Instead, trainees experience discomfort (e.g., awkwardness), which could be a cue to quit. Similarly, expressive writing about difficult emotional events can help people overcome trauma, improving their physical and mental health in the long run (Pennebaker & Smyth, 2016). Nonetheless, reliving these emotions in writing can be upsetting.

Relatedly, people may wish to learn about threats, but as they do, they experience discomfort and are tempted to avoid the information altogether (Trope & Neter, 1994; e.g., the "ostrich problem"; Webb et al., 2013). And although people might want to understand others, they are often repelled when hearing opposing political views (Finkel et al., 2020). These examples highlight the self-control conflict inherent to personal growth: The benefits are delayed and the costs are immediate. People will not know whether they are successful until later; in the present, they are uncomfortable.

Yet progress feedback—knowing whether one is advancing—is critical for maintaining motivation (Carver & Scheier, 1998; Locke & Latham, 1990). And although discomfort is undesirable (it is a negative experience), it can signal progress. Indeed, negative mood often signals task readiness—for example, preparing to fight (Tamir et al., 2008) or feeling sad at a

### Statement of Relevance

People frequently aspire to improve themselves, yet the process of personal growth can cause discomfort. For example, people taking improvisation classes to build confidence may feel awkward and uncomfortable while learning, and those journaling to cope with difficult emotions may feel upset while writing. Although people's initial instinct is to avoid discomfort, we tested whether they should embrace it instead. We explored this intervention—seeking and embracing discomfort to motivate personal growth—in a field experiment in collaboration with one of the most renowned improvisation clubs in the United States (The Second City) and in online experiments. People we invited to embrace discomfort were more motivated: They persisted longer in improvisation exercises, engaged more in an expressive writing exercise, and opened themselves up to challenging but important information. Personal growth is sometimes uncomfortable; we found that embracing discomfort can be motivating.

funeral (Tamir et al., 2019). Possibly, discomfort from personal growth can offer feedback that one is progressing on their goal. Although it is typically a positive experience that serves as a signal to persist (Turnwald et al., 2019; Woolley & Fishbach, 2016), absent a positive experience, people may harness discomfort to increase motivation.

Specifically, seeking discomfort when pursuing a goal could cause people to reappraise discomfort as goal progress. Although personal growth is difficult to detect, people know when they feel uncomfortable. They can use this as a cue that they are advancing toward their goal and be motivated to persist. Although reappraisal interventions traditionally focus on regulating emotion (e.g., decreasing negative emotion; Gross, 1998, 1999), we propose that this technique can motivate pursuit of personal growth and merely be activated by encouraging people to seek discomfort.

Accordingly, our main prediction is that seeking discomfort will motivate personal growth. Instead of seeing discomfort as unrelated to the goal or as a signal to stop, people will start perceiving it as a sign of progress toward their goal.

Five experiments tested this prediction, assessing motivation to pursue different growth goals. We first conducted a field experiment across 55 improvisation classes. We assessed students' motivation (persistence, risk taking) in pursuing an improvisation exercise when instructed to seek discomfort (i.e., feel awkward and

**Table 1.** Participant and Class Composition Across the Four Waves in Experiment 1

Characteristic	Wave A	Wave B	Wave C	Wave D
Female (%)	47.6	46.5	35.7	57.5
Mean age in years		28.25 (8.69)	29.27 (8.43)	39.53 (12.10)
Class description	Level A Second City	Level A Second City	Level A Second City	Behavioral Science and Improvisation Workshop hosted by Second City
Number of classes	17	16	14	8
Median class size	10	9	10	10
Class size range	7–17	6–13	5–14	5–18
Total participants	185	142	143	87

Note: We did not collect information on participant age during wave A. For level A classes, we conducted the experiment during Week 7 of the 8-week class to ensure that participants had some experience with the exercise. Values in parentheses are standard deviations.

uncomfortable) in pursuit of growth. We predicted that students instructed to seek discomfort would persist longer in an improvisation exercise and take more risks than participants in a control condition would. Moving to expressive writing, Experiment 2 assessed whether people writing about an emotional life event would be more motivated to reengage in the task and perceive greater achievement of the growth goal when seeking discomfort than participants who received typical instructions would (Pennebaker, 1997).

We predicted that seeking discomfort is motivating when it is inherent to and thus signals personal growth, which we tested via moderation. Experiment 3 examined whether seeking discomfort increases receptiveness to information about a dire health crisis (the COVID-19 pandemic) but not receptiveness to unrelated information, compared with seeking to learn about such information. Experiment 4 examined whether seeking discomfort, relative to seeking to learn, opens people to opposing political views but not views they agree with. Last, in the context of learning about gun violence, Experiment 5 tested whether seeking discomfort motivates people to be open to new information even in the absence of direct instructions to reappraise discomfort, presumably by prompting spontaneous reappraisals (Tamir et al., 2019). We preregistered Experiments 2 through 5; see <https://osf.io/2avtu/> for all data, syntax, and materials. Experiment 1 was approved by The University of Chicago Institutional Review Board; Experiments 2 through 5 were approved by the Cornell University Institutional Review Board.

### Experiment 1: Seeking Discomfort Motivates Persistence in Improvisation

Across 55 improvisation classes, we tested whether seeking discomfort as a sign of growth is motivating.

We compared instructions to seek discomfort (“feel awkward, uncomfortable”) with standard improvisation instructions and instructions to “feel skills developing.” We expected that seeking discomfort would be motivating, causing students to persist longer in the exercise and take more risks.

### Method

We conducted this experiment in four separate waves. Three waves were conducted at The Second City Training Center in Chicago (waves A–C), and one was conducted at a Behavioral Science and Improvisation Workshop hosted by The Second City (wave D). For waves A through C, we recruited all students during the seventh week of an 8-week beginner “level A” class at The Second City at different times of the year. Level A classes are designed for people who want to learn how to improvise, and they require no prior experience. In wave D, we recruited participants in a single Behavioral Science and Improvisation Workshop that was hosted by The Second City and that targeted employees looking to improve leadership and team building in their companies. In total, we recruited 557 adults from 55 classes (see Table 1).

**Intervention.** Before launching the experiment, we held a training session for class instructors on the experimental procedures. Instructors were unaware of the hypothesis. A week before the experiment, instructors notified students in level A classes that they would have an opportunity at the start of class to take part in an optional study that involved a recorded improv exercise. On the day of the experiment, a research assistant solicited verbal consent from students to record the exercise. Anyone who did not want to be filmed could sit out the exercise; everyone chose to participate.

During the experiment, instructors divided their classes into groups of three to seven students and assigned each group to one of two conditions (seeking discomfort vs. control) in a between-subjects design. Students were nested within groups, and instructors delivered the manipulation privately by bringing each group out one at a time into the hallway. Participants in the seeking-discomfort condition were given the following instructions:

Your goal for the next exercise is to feel awkward and uncomfortable. Feeling uncomfortable is a sign that the exercise is working. In the next game, your goal is to push past your comfort zone and put yourself in situations that make you feel awkward and uncomfortable.

We tested two different control instructions. Participants in the control condition in waves A, C, and D received baseline instructions typical of these exercises (“We’re going to play the exercise Give Focus. While you play, see if the exercise is working”); participants in the control condition in wave B received the following instructions to seek benefits:

Your goal for the next exercise is to feel yourself developing new skills. Developing new skills is a sign that the exercise is working. In the next game, your goal is to push yourself to develop new skills and feel yourself improving.

We expected that instructing participants to feel skills develop would be less motivating because it is harder to assess progress on skill development, a less tangible experience, and because such instructions shift people to think about the outcome of their performance instead of the process (Grant & Dweck, 2003).

Participants further received instructions specific to the Give Focus improvisation exercise. In this exercise, one person “has focus.” This person moves around the room while other members of the group are frozen in place. The person with focus holds onto their role for as long as they want and can make any movement during this time as they travel around the room. Once the person with focus decides to pass their role to another student, they use body language to signal to whom they are passing the focus. For example, the person with focus might touch, point to, or nod at another student to signal that they are passing their role to that person. The person with focus then freezes in place, and the person who received focus unfreezes and begins to move around. Each group performed the Give Focus exercise for 3 min. While one group was completing

this exercise, the other group sat and watched, as is typical in these classes. We counterbalanced which group went first.

We video-recorded all Give Focus exercises in all class sessions. Two independent coders who were unaware of hypothesis and conditions evaluated participants’ persistence ( $r = .99$ ) and risk taking ( $r = .74$ ). We averaged the coders’ ratings. For wave B, time with focus was measured using responses from 97 Amazon Mechanical Turk (MTurk) workers who viewed the videos and recorded the number of seconds students held focus for each occasion they received it. Each video was rated by at least three workers; interrater reliability was high ( $\alpha = .90$ ). We defined persistence as the number of seconds participants held focus for each occasion they received it. We calculated the average length of these occasions. We did not analyze the number of occasions students received focus because that was beyond their control (i.e., they received focus from another student). We coded risk-taking behavior on a 7-point scale: 1 = *no risks; the student with focus is walking around like normal*; 4 = *some risks; the student is pushing the boundaries somewhat, for example, walking very fast or very slow or moving arms around*; 7 = *many risks; for example, the student is pushing the boundaries and doing something extremely out of the ordinary or going out on a limb*.

We predicted that participants instructed to actively seek discomfort would persist longer in the improvisation exercise and exhibit greater risk-taking behavior than those receiving baseline instructions or instructions to seek delayed benefits. In addition to these two primary variables, participants in waves B through D completed a survey after the Give Focus exercise. Each wave completed a different survey, although some items were consistent across waves.

**Survey measures.** In wave B, we asked, “Did you feel awkward or uncomfortable at any point during the exercise?” (0 = *not at all*, 6 = *very much*). We expected everyone to feel a mild level of discomfort, which they did ( $M = 2.94$ , 95% confidence interval [CI] = [2.61, 3.26]).

In waves B through D, we confirmed that participants sought discomfort—“To what extent did you have the goal to feel awkward and uncomfortable during this exercise?”—and that they sought benefits in wave B—“To what extent did you have the goal to feel your skills developing during this exercise?” (0 = *not at all*, 6 = *very much*).

In wave D, we measured beliefs about achieving growth as a secondary outcome variable. We reasoned that if seeking discomfort causes people to persist longer in the growth goal, those seeking discomfort should

**Table 2.** Results of Manipulation-Check Items Across Waves B Through D in Experiment 1

Wave and manipulation-check item	Condition		<i>t</i>	<i>p</i>	<i>d</i>
	Seeking discomfort	Control			
Wave B					
Reported seeking to feel uncomfortable	4.21 [3.82, 4.60]	1.17 [0.78, 1.56]	$t(140) = 10.98$	< .001	1.84
Reported seeking to feel skills developing	3.27 [2.85, 3.69]	3.89 [3.50, 4.27]	$t(140) = -2.18$	.031	-0.37
Wave C					
Reported seeking to feel uncomfortable	4.28 [3.87, 4.68]	1.93 [1.49, 2.37]	$t(141) = 7.75$	< .001	1.30
Wave D					
Reported seeking to feel uncomfortable	4.18 [3.71, 4.65]	1.70 [1.10, 2.30]	$t(85) = 6.70$	< .001	1.45

Note: Participants in the control condition in waves A, C, and D received baseline instructions typical of these exercises, whereas participants in the control condition in wave B received instructions to seek benefits. Values in brackets are 95% confidence intervals.

have a greater subjective assessment of achievement of the growth goal. To examine this, we asked participants to write down their personal goal in taking the improvisation class. For example, some participants wrote “improve communication skills,” “improve team building,” or “be more comfortable in front of others.” We then asked participants, “Did you feel you accomplished this goal during this exercise?” (0 = *not at all*, 6 = *very much*). Additional exploratory items are reported in the Supplemental Material available online.

## Results

Supporting the manipulation, results showed that participants in the seeking-discomfort condition sought discomfort more than those in the seeking-benefits condition—wave B:  $t(140) = 10.98$ ,  $p < .001$ ,  $d = 1.84$ , 95% CI = [1.45, 2.23]—and more than those in the baseline-instructions condition—wave C:  $t(141) = 7.75$ ,  $p < .001$ ,  $d = 1.30$ , 95% CI = [0.93, 1.66]; wave D:  $t(85) = 6.70$ ,  $p < .001$ ,  $d = 1.45$ , 95% CI = [0.97, 1.93] (see Table 2). Participants in wave B were also more likely to report having a goal to feel their skills developing in the seeking-benefits than in the seeking-discomfort condition,  $t(140) = -2.18$ ,  $p = .031$ ,  $d = -0.37$ , 95% CI = [-0.70, -0.03].

Our primary measures of motivation (i.e., engagement in the exercise) were time spent holding focus and perceived risk taking. We conducted two mixed-model linear regressions predicting time spent holding focus and perceived risk taking (with responses from the four waves weighted equally) as a function of condition; random effects of condition were nested within each class (for a similar method of analysis for a multisite field study, see Turnwald et al., 2019).

As predicted, seeking discomfort increased time spent holding focus compared with receiving baseline

instructions (waves A, C, and D) or seeking less tangible benefits (wave B) by 0.44 standard deviations,  $\beta = 0.44$ , 95% CI = [0.32, 0.57],  $p < .001$ .

Seeking discomfort further increased observed risk taking compared with baseline instructions (waves A, C, and D) or seeking benefits (wave B) by 0.24 standard deviations,  $\beta = 0.24$ , 95% CI = [0.12, 0.36],  $p < .001$ . We summarize individual results across the four waves in Table 3. These results reveal that seeking discomfort in pursuit of growth is motivating. Because we observed this pattern across several waves, it is less likely that individual differences (e.g., in skill, prior experience, interest in comedy, baseline negative emotions, or dysfunctional regulatory strategies) drove the effect.

We next examined beliefs about achieving the growth goal, which we measured in wave D. Recall that we asked participants in wave D about their goal for taking the class (e.g., to improve communication) and their subjective assessment of achievement of this goal. If seeking discomfort signals growth, it should increase perceived achievement, which is what we observed (seeking discomfort:  $M = 3.52$ , 95% CI = [2.90, 4.13], baseline:  $M = 2.68$ , 95% CI = [2.01, 3.35]),  $b = 0.84$ , 95% CI = [0.13, 1.54],  $t(83) = 2.34$ ,  $p = .022$ ,  $d = 0.51$ , 95% CI = [0.07, 0.94]. Together, we found that seeking discomfort can motivate engagement in an improvisation exercise for people who perceive the discomfort of pursuing improvisation as positive feedback on goal pursuit. These findings are further consistent with research showing that being tolerant or mindful of negative experiences can be motivating (Alberts et al., 2012; Hayes et al., 1999). Indeed, mindfulness training can promote well-being by facilitating positive reappraisal (Hanley et al., 2021). We suggest that seeing discomfort as a sign of progress, beyond just being mindful of it, is motivating.

**Table 3.** Results for Behavioral Measures From Waves A Through D in Experiment 1

Wave and measure	Condition		$\beta$	$t$	$p$
	Seeking discomfort	Control			
Wave A					
Average seconds holding focus	14.09 [8.26, 19.92]	7.87 [2.05, 13.69]	0.45 [0.23, 0.67]	$t(167) = 4.06$	< .001
Observed risk taking	2.49 [1.97, 3.02]	2.17 [1.64, 2.69]	0.28 [0.13, 0.43]	$t(167) = 3.64$	< .001
Wave B					
Average seconds holding focus	10.40 [7.85, 12.94]	7.67 [5.12, 10.22]	0.44 [0.22, 0.67]	$t(125) = 3.85$	< .001
Observed risk taking	3.49 [2.95, 4.03]	3.64 [3.11, 4.18]	-0.13 [-0.36, 0.10]	$t(125) = -1.11$	.270
Wave C					
Average seconds holding focus	9.92 [7.70, 12.14]	8.51 [6.31, 10.72]	0.33 [0.12, 0.54]	$t(128) = 3.09$	.002
Observed risk taking	3.88 [3.13, 4.62]	3.06 [2.32, 3.80]	0.47 [0.23, 0.71]	$t(130) = 3.94$	< .001
Wave D					
Average seconds holding focus	14.96 [11.47, 18.45]	10.48 [6.84, 14.12]	0.57 [0.20, 0.93]	$t(82) = 3.06$	.003
Observed risk taking	3.63 [3.10, 4.17]	3.20 [2.64, 3.75]	0.38 [0.001, 0.76]	$t(80) = 1.96$	.053

Note: Participants in the control condition in waves A, C, and D received baseline instructions typical of these exercises, whereas participants in the control condition in wave B received instructions to seek benefits. Values in brackets are 95% confidence intervals. For each wave, we conducted separate hierarchical linear models to account for the nesting of students within classes.

## Experiment 2: Seeking Discomfort Motivates Expressive Writing

Writing about emotional experiences offers therapeutic benefits (Pennebaker, 1997; Pennebaker & Smyth, 2016) and improves mental and physical health (Lyubomirsky et al., 2006). Yet writing about these experiences can be upsetting. Experiment 2 tested whether seeking discomfort when pursuing therapeutic benefits through expressive writing, compared with merely seeking to write, would increase subjective assessment of growth and motivation to write in the future.

### Method

We preregistered this experiment (<https://aspredicted.org/va7yt.pdf>) and recruited 301 MTurk participants (150 per cell) in order to have high statistical power and reliability. Following our preregistration, we excluded participants with duplicate Internet protocol addresses and incomprehensible responses ( $n = 43$ ), leaving a final sample of 258 participants (age:  $M = 35.82$  years,  $SD = 10.29$ ; 38.8% female).

Participants learned that they would engage in a writing exercise about an extremely important emotional issue that affected their life. They learned that the goal of writing is to achieve therapeutic benefits and that writing tasks such as these “can help people work

through difficult emotional situations and develop coping skills.” Participants received the writing prompt, which asked them to explore their deepest thoughts and feelings about an extremely important emotional issue, and were instructed to write for as long as they liked. These instructions were adopted from prior research on the benefits of expressive writing (Pennebaker, 1997).

We then assigned each participant to one of two conditions (seeking discomfort vs. baseline instructions) in a between-subjects design. Participants assigned to seek discomfort read, “Your primary goal during this writing task is to feel awkward and uncomfortable. Feeling uncomfortable is a sign that the writing task is working. Your goal is to push past your comfort zone and embrace feeling uncomfortable while writing.” Participants in the control condition read, “Your primary goal during this writing task is to write. As you are writing, see if the exercise is working.”

Our key outcome measures were goal achievement and motivation to reengage in the writing task in the future. We assessed achievement on a three-item scale ( $\alpha = .87$ ): “Did you feel that while writing, you were achieving your goal of growing emotionally?” “Did you feel that you were developing coping skills while working on this writing task?” “Did you feel that this writing task was useful for working through a difficult situation?” We assessed motivation to reengage with a single item: “How interested are you in completing another

similar writing exercise in the future?" (for all items, 1 = *not at all*, 7 = *very much*).

## Results

We first confirmed in a separate pretest ( $N = 48$  U.S. Prolific participants; see the Supplemental Material for full details) that participants associated this expressive writing task with discomfort (0 = *not at all uncomfortable* to 6 = *very uncomfortable*;  $M = 4.08$ ,  $SD = 1.70$ ). Further, we confirmed that across conditions, participants were engaged in the task (minutes spent writing:  $M = 5.78$ ,  $SD = 5.66$ ,  $Mdn = 4.16$ , 25th percentile = 2.47, 75th percentile = 6.45; number of words written:  $M = 132$ ,  $SD = 143$ ,  $Mdn = 104$ , 25th percentile = 34, 75th percentile = 182).

Supporting our hypothesis, results showed that people reported greater goal achievement when seeking discomfort ( $M = 5.28$ , 95% CI = [5.05, 5.51]) than when receiving typical instructions ( $M = 4.82$ , 95% CI = [4.56, 5.08]),  $t(256) = 2.63$ ,  $p = .009$ ,  $d = 0.33$ , 95% CI = [0.08, 0.57]. Further, people seeking discomfort were more motivated to reengage in the writing task in the future ( $M = 5.88$ , 95% CI = [5.64, 6.12]) than those responding to typical instructions ( $M = 5.52$ , 95% CI = [5.27, 5.76]),  $t(256) = 2.06$ ,  $p = .040$ ,  $d = 0.26$ , 95% CI = [0.01, 0.50].

Because the length of the texts varied (from a maximum of 1,361 words to just a few; e.g., "I am extremely triggered by this"), as did time spent on the task, we repeated the analysis controlling for these variables. In these nonpreregistered analyses, when we controlled for word count, we found a significant effect of condition on perceived growth,  $F(1, 255) = 7.29$ ,  $p = .007$ ,  $\eta_p^2 = .03$ , and motivation to reengage in the writing task,  $F(1, 255) = 4.39$ ,  $p = .037$ ,  $\eta_p^2 = .02$ . When we controlled for minutes writing, we also found a significant effect of condition on perceived growth,  $F(1, 255) = 6.58$ ,  $p = .011$ ,  $\eta_p^2 = .03$ , and motivation to reengage in the writing task,  $F(1, 255) = 4.68$ ,  $p = .031$ ,  $\eta_p^2 = .02$ . We did not find significant interactions between condition and word count for growth,  $F(1, 254) = 0.02$ ,  $p = .899$ , or for motivation,  $F(1, 254) = 1.49$ ,  $p = .223$ , nor did we find significant interactions between condition and minutes writing for growth,  $F(1, 254) < 0.01$ ,  $p = .947$ , or motivation,  $F(1, 254) = 0.94$ ,  $p = .334$ . In combination with the findings from Experiment 1, these results suggest that seeking discomfort as a sign of self-growth is motivating.

### Experiment 3: Seeking Discomfort Increases Receptiveness to Information About a Health Crisis

For seeking discomfort to motivate personal growth, growth needs to be uncomfortable. Experiments 3 and

4 accordingly tested for moderation. First, Experiment 3 examined whether seeking discomfort motivates interest in potentially upsetting information about the COVID-19 pandemic, relative to seeking to learn, but seeking discomfort provides no motivation to read neutral information.

## Method

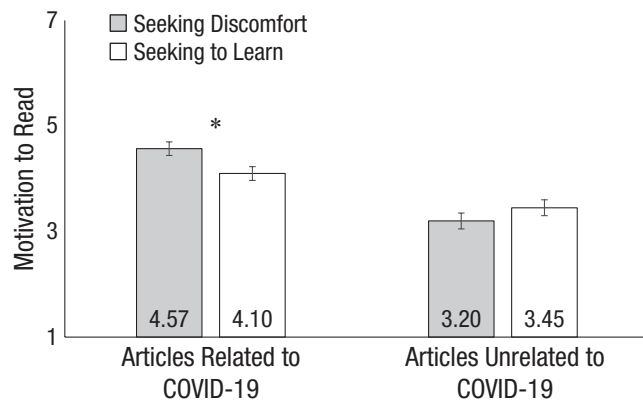
We preregistered this experiment (<https://aspredicted.org/bq3tq.pdf>) and recruited 302 U.S. Prolific participants (150 per cell). Following our preregistration, we included an attention check before assigning participants to condition. A total of 37 participants failed the attention check, leaving a final sample of 265 participants (age:  $M = 33.05$  years,  $SD = 12.70$ ; 52.1% female).

This experiment had a 2 (instructions: seeking discomfort vs. seeking to learn; between subjects)  $\times$  2 (news articles: COVID-related vs. COVID-unrelated; within subjects) mixed-model design. Each participant was randomly assigned to an instruction condition.

All participants were first reminded that the goal of reading the news is to "stay informed and up to date on what is happening with the current COVID-19 pandemic." Participants assigned to seek discomfort were asked to adopt "a goal to feel nervous and uncomfortable as you read about COVID" and further read, "feeling nervous is a sign that you are taking in new information - it's feedback that you are educating yourself on the global pandemic." Participants assigned to the control condition were asked to adopt "a goal to learn what's new" and further read, "learning what is new is a sign that you are taking in new information - it's feedback that you are educating yourself on the global pandemic."

Participants then viewed headlines and short synopses of six different news articles (see the Supplemental Material for the stimuli, including the procedure for selecting article headlines). Three news articles were related to COVID-19 (e.g., "Current COVID-19 projections paint bleak future during winter"), and three were unrelated to COVID-19 (e.g., "42 hilarious finalists in this year's Comedy Wildlife Photography Awards"). We measured how motivated participants were to read each article (1 = *not at all motivated*, 7 = *very motivated*; for COVID-19 articles,  $\alpha = .81$ ; for unrelated articles,  $\alpha = .79$ ).

After participants read the article synopses, we assessed their subjective goal achievement using two items (average  $r = .72$ ): "While reading the news in this study, did you feel that you were achieving your goal of becoming informed?" and "How much progress do you feel you made on your goal to be informed about the COVID-19 pandemic?" (1 = *not at all*, 7 = *very much*). We report additional measures preregistered as exploratory in the Supplemental Material.



**Fig. 1.** Mean motivation to read articles related or unrelated to COVID-19 in the experimental (seeking discomfort) and control (seeking to learn) conditions (Experiment 3). The asterisk indicates a significant difference between conditions ( $p < .05$ ); error bars indicate  $\pm 1$  SEM.

## Results

We first confirmed in a separate pretest ( $N = 52$  U.S. Prolific participants; see the Supplemental Material for full details) that participants associated learning about COVID-19 with discomfort (0 = *not at all uncomfortable*, 6 = *very uncomfortable*;  $M = 3.81$ ,  $SD = 1.70$ ). Moving to hypothesis testing, we conducted a repeated measures analysis of variance (ANOVA) with instructions (seeking discomfort vs. seeking to learn) and article type (related to COVID-19 vs. unrelated to COVID-19) predicting motivation to read news articles. This analysis revealed a main effect of article type,  $F(1, 263) = 49.64$ ,  $p < .001$ ,  $\eta_p^2 = .16$ , 95% CI = [.06, .24], and no significant effect of instructions,  $F(1, 263) = 0.64$ ,  $p = .424$ ,  $\eta_p^2 < .01$ , qualified by a significant interaction,  $F(1, 263) = 6.20$ ,  $p = .013$ ,  $\eta_p^2 = .02$ , 95% CI = [.001, .07] (Fig. 1). Participants were more motivated to read articles related to COVID-19 when they sought discomfort ( $M = 4.57$ , 95% CI = [4.30, 4.83]) than when they sought to learn ( $M = 4.10$ , 95% CI = [3.84, 4.36]),  $F(1, 263) = 6.23$ ,  $p = .013$ ,  $\eta_p^2 = .02$ , 95% CI = [.001, .07], but the instructions had no effect on their motivation to read articles unrelated to COVID-19 (seeking discomfort:  $M = 3.20$ , 95% CI = [2.92, 3.48]; seeking to learn:  $M = 3.45$ , 95% CI = [3.14, 3.76]),  $F(1, 263) = 1.33$ ,  $p = .250$ ,  $\eta_p^2 < .01$ . (In nonpreregistered analyses, we found a similar null effect for each of the three articles, which suggests that the interaction was not driven by any particular COVID-irrelevant content.)

Participants seeking discomfort reported greater achievement of their goal to learn about COVID-19 ( $M = 4.57$ , 95% CI = [4.35, 4.79]) than those seeking to learn ( $M = 4.17$ , 95% CI = [3.91, 4.44]),  $t(263) = 2.28$ ,  $p = .023$ ,  $d = 0.28$ , 95% CI = [0.04, 0.52]. Overall, we found that

seeking discomfort motivated reading about a dire health crisis more than seeking to learn did, but this manipulation did not affect motivation to read news that was unassociated with immediate discomfort.

## Experiment 4: Seeking Discomfort Increases Receptiveness to Opposing Political Views

We again examined moderation by whether discomfort is inherent to growth, this time in a between-subjects design. We recruited Republicans and Democrats from the United States to engage with viewpoints either consistent with or opposing their own political beliefs, presumably to crystallize their own position (consistent-views condition) or to understand the opposing position (opposing-views condition). We further manipulated whether participants sought discomfort in pursuit of openness or to learn. We predicted an interaction revealing that people would be more motivated to open themselves to viewpoints from the opposing party when seeking discomfort relative to seeking to learn, which would become attenuated for viewpoints from one's own party.

## Method

We preregistered this experiment (<https://aspredicted.org/2fc79.pdf>) and recruited 600 U.S. participants from Prolific (150 per cell), using filters on Prolific to recruit participants who identified as Republican or Democrat. As outlined in our preregistration, participants who reported not identifying with either political party at the time of the experiment were filtered to a different survey ( $n = 18$ ), leaving a final sample of 582 (age:  $M = 31.52$  years,  $SD = 11.52$ ; 60.0% female).

After indicating their political affiliation, each participant was randomly assigned to one of four conditions in a 2 (instructions: seeking discomfort vs. seeking to learn)  $\times$  2 (political viewpoint: consistent with one's beliefs vs. opposing one's beliefs) between-subjects design.

Participants assigned to read opinions from leaders of their own political party read,

Reading the news can help you crystallize your position and understand the opinions of fellow [Democrats/Republicans] who might have more informed positions or a different take on the issues at stake. Indeed, one goal of reading the news is to form a clearer position by understanding the views of fellow [Democrats/Republicans].

Participants assigned to read opinions from leaders of the opposing political party read,



Reading the news can help you to understand people on the opposite side of the political spectrum as you (e.g., [Democrats/Republicans]). While the country may feel divided, one goal of reading the news is to try and understand the other party's position.

As in our prior experiments, we assigned participants to either seek discomfort or learn something new. Participants assigned to seek discomfort read that one way they know they are understanding the position of either leading Democrats or leading Republicans (as a function of political-party condition) is as follows:

adopting a goal to feel anxious and uncomfortable as you read about [Democrat/Republican] positions. Feeling uncomfortable is a sign that you are taking in new information - it's feedback that you are educating yourself and getting an understanding of [your/the other] side's position.

This manipulation thus instructed participants to perceive discomfort as advancing growth. Participants assigned to learn something new read that one way to know they are understanding the position of either leading Democrats or leading Republicans (as a function of political-party condition) is as follows:

adopting a goal to learn what's new. Learning what is new is a sign that you are taking in new information - it's feedback that you are educating yourself and getting an understanding of [your/the other] side's position.

Participants then indicated their motivation to learn about different political opinions. Depending on condition and political affiliation, participants saw four political-opinion articles from *The New York Times* or from Fox News (see the stimuli in the Supplemental Material). For each article, we asked participants, "How motivated are you to read this news article?" (1 = *not at all motivated*, 7 = *very motivated*). Following our preregistration, we averaged motivation to read each of the four articles into a single index (*New York Times*:  $\alpha = .84$ ; Fox News:  $\alpha = .84$ ).

In the Supplemental Material, we describe the procedure for selecting these specific articles. Because we ran the study in the days leading up to the 2020 U.S. presidential election, we used articles about the two presidential candidates. We anticipated Republicans would generally support Trump and oppose Biden, and the opposite would be true of Democrats (Pew Research Center, 2020). Beyond specific headlines, we emphasized the article's news source (Fox News or *The New York Times*). Prior research found that Republicans and

Democrats differ in their news-source preferences (Iyengar & Hahn, 2009) and that these news sources have different political ideologies (Golbeck & Hansen, 2014), which we confirmed when selecting the articles.

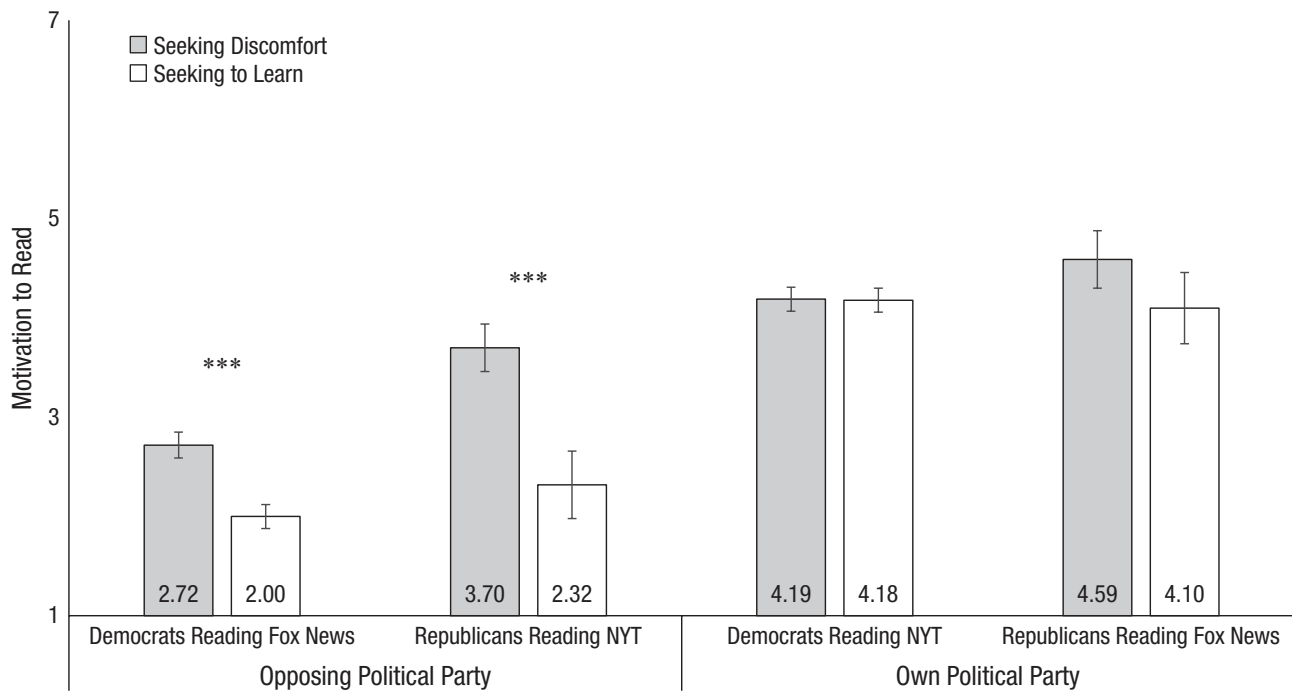
In a manipulation check, we asked participants, "How uncomfortable do you find it to read news articles from leading [Democrats/Republicans]?" (1 = *not at all*, 7 = *very much*). At the end of the experiment, we provided PDFs of the articles for participants to download and read later. We report additional preregistered exploratory measures in the Supplemental Material.

## Results

We confirmed that participants felt more uncomfortable opening themselves to viewpoints from leading members of the opposite political party ( $M = 4.27$ , 95% CI = [4.11, 4.43]) than their own party ( $M = 2.90$ , 95% CI = [2.76, 3.05]),  $t(581) = 12.55$ ,  $p < .001$ ,  $d = 0.52$ , 95% CI = [0.43, 0.61].

Following our preregistration, we conducted an ANOVA with instructions (seeking discomfort vs. seeking to learn) and political viewpoint (one's own political party vs. the opposing political party) predicting receptiveness to political opinions. This analysis revealed a main effect of instructions,  $F(1, 578) = 13.04$ ,  $p < .001$ ,  $\eta_p^2 = .02$ , 95% CI = [.005, .05], and viewpoint,  $F(1, 578) = 237.56$ ,  $p < .001$ ,  $\eta_p^2 = .29$ , 95% CI = [.23, .35], qualified by a significant interaction,  $F(1, 578) = 9.76$ ,  $p = .002$ ,  $\eta_p^2 = .02$ , 95% CI = [.002, .04]. Participants were more receptive to viewpoints from the opposing political party when seeking discomfort ( $M = 2.83$ , 95% CI = [2.61, 3.05]) than when seeking to learn ( $M = 2.07$ , 95% CI = [1.88, 2.26]),  $F(1, 578) = 22.31$ ,  $p < .001$ ,  $\eta_p^2 = .04$ , 95% CI = [.01, .07]. However, this effect became significantly attenuated for viewpoints from one's own political party (seeking discomfort:  $M = 4.22$ , 95% CI = [3.99, 4.46]; seeking to learn:  $M = 4.17$ , 95% CI = [3.93, 4.41]),  $F(1, 578) = 0.12$ ,  $p = .728$ ,  $\eta_p^2 < .01$ .

For a robustness check, we conducted an additional, nonpreregistered ANOVA with instructions (seeking discomfort vs. seeking to learn), political viewpoint (own side vs. opposite side), and political affiliation (Republican vs. Democrat). This analysis again revealed the predicted interaction between instructions and viewpoint,  $F(1, 574) = 5.77$ ,  $p = .017$ ,  $\eta_p^2 = .01$ , 95% CI = [.0003, .03] (Fig. 2), and no significant interactions involving political affiliation. These results suggest that the observed effect of seeking discomfort motivated people to read articles from the opposing political party regardless of whether Republican participants considered opening themselves to Democrat opinions or whether Democrat participants considered opening themselves to Republican opinions.



**Fig. 2.** Mean motivation to read political viewpoints from the opposing political party and from one's own political party when seeking discomfort and seeking to learn (Experiment 4). Asterisks indicate significant differences between conditions ( $p < .001$ ); error bars indicate  $\pm 1$  SEM. NYT = *The New York Times*.

### Experiment 5: Seeking Discomfort Motivates Receptiveness to Information About Gun Violence

In the context of learning about gun violence, Experiment 5 tested the effect of seeking discomfort with and without direct instructions to reappraise discomfort as signaling progress. If seeking discomfort leads to spontaneous reappraisal of discomfort as signaling growth, its motivational effect should emerge regardless of direct reappraisal instructions.

#### Method

We preregistered this study (<https://aspredicted.org/xa58x.pdf>) and recruited 401 MTurk participants (100 per cell; age:  $M = 40.44$  years,  $SD = 13.37$ ; 51.1% female). No participants were excluded from this experiment. Participants learned that they would read statements from people affected by gun violence. They read, "Gun violence is a complex issue with conflicting views on how to address it. But before we discuss how and whether it should be addressed, it is important to understand this issue."

Each participant was then assigned to one of four conditions in a 2 (instructions to seek discomfort vs. no instructions)  $\times$  2 (instructions to reappraise discomfort vs. no instructions) between-subjects design.

Participants in the seeking-discomfort condition read, "You should adopt the goal to feel upset and uncomfortable as you read," whereas the other half did not read these instructions. Participants in the reappraisal condition read, "Know that feeling upset and uncomfortable as you read is a sign that you are taking in new information - it is feedback that you are educating yourself about the issue of gun violence," whereas the other half did not read these instructions. Participants in the seeking-discomfort-with-reappraisal condition read a combined version of these instructions:

You should adopt the goal to feel upset and uncomfortable as you read. Feeling upset and uncomfortable as you read is a sign that you are taking in new information - it is feedback that you are educating yourself about the issue of gun violence.

Participants in the fourth (i.e., control) condition did not receive these instructions. All participants then read one statement from a victim of gun violence and chose what they wanted to read next. Specifically, they had to choose three out of six articles from a set of three articles about gun violence (taken from <https://dearamericaproject.org/gallery>; e.g., siblings telling their story of how they lost their mother) and three articles unrelated to gun violence (e.g., about the difference between cold brew and iced coffee; stimuli in the

Supplemental Material). Our key outcome measure was the number of gun-violence articles participants chose to read. Participants read the articles they selected before the end of the study.

## Results

A  $2 \times 2$  ANOVA with seeking discomfort and reappraisal predicting the number of articles on gun violence that participants chose to read yielded a main effect of seeking discomfort. As predicted, participants were more motivated to read about gun violence when they received instructions to seek discomfort ( $M = 2.46$ , 95% CI = [2.33, 2.59]) than when they did not ( $M = 1.51$ , 95% CI = [1.35, 1.67]),  $F(1, 397) = 79.85$ ,  $p < .001$ ,  $\eta_p^2 = .17$ , 95% CI = [.11, .23]. This pattern emerged both when participants were further instructed to reappraise discomfort as a signal of progress,  $F(1, 397) = 24.59$ ,  $p < .001$ ,  $\eta_p^2 = .06$ , 95% CI = [.02, .11], and without explicit reappraisal instructions,  $F(1, 397) = 59.10$ ,  $p < .001$ ,  $\eta_p^2 = .13$ , 95% CI = [.07, .19]. There was no significant effect of reappraisal condition,  $F(1, 397) = 1.87$ ,  $p = .173$ ,  $\eta_p^2 < .01$ , 95% CI = [.00, .03], and a marginally significant interaction,  $F(1, 397) = 3.61$ ,  $p = .058$ ,  $\eta_p^2 < .01$ , 95% CI = [.00, .04].<sup>1</sup>

We conclude that when seeking discomfort, people spontaneously reappraise discomfort as a positive cue, even when not explicitly prompted to do so. This finding is in line with research showing that activating an emotion-regulation goal, independent of reappraisal language, is sufficient to regulate emotion, presumably because people spontaneously adopt reappraisal strategies (Tamir et al., 2019).

## Posttest

We reasoned that seeking discomfort changes the meaning of discomfort to a signal of growth, which is motivating. We accordingly tested for mediation in a preregistered posttest ( $n = 100$  on MTurk; <https://aspredicted.org/72jq4.pdf>). Each participant was randomly assigned to one of two conditions from Experiment 5 (and which were the two key conditions in Experiments 1–4): control condition (no additional instructions) and seeking-discomfort-with-reappraisal condition. The study proceeded similarly to Experiment 5. After participants chose the three articles they wanted to read, we measured the mediator: “Feeling upset and uncomfortable when reading about gun violence is a sign that I am learning new information about the issue” (1 = *strongly disagree*, 7 = *strongly agree*).

We found a main effect of condition on the mediator (seeking discomfort:  $M = 5.48$ , 95% CI = [4.93, 6.02]; control:  $M = 3.35$ , 95% CI = [2.80, 3.90]),  $t(98) = 5.47$ ,  $p < .001$ ,  $d = 1.10$ , 95% CI = [0.67, 1.52], and on the number

of gun-violence articles participants chose to read (seeking discomfort:  $M = 2.30$ , 95% CI = [1.97, 2.64]; control:  $M = 1.00$ , 95% CI = [0.68, 1.32]),  $t(98) = 5.61$ ,  $p < .001$ ,  $d = 1.13$ , 95% CI = [0.70, 1.55]. Participants’ belief that discomfort signals learning mediated the effect of condition on the number of articles selected,  $b = 0.29$ ,  $SE = 0.15$ , 95% CI = [0.03, 0.63].

## General Discussion

Can discomfort motivate self-growth? A field experiment with an improvisation club (The Second City) suggests the answer to this question is *yes*. Seeking discomfort as a sign of progress increases engagement. Students taking improvisation classes to improve their confidence engaged more in the exercise when instructed to feel awkward and uncomfortable, compared with when they were given typical instructions or instructions to feel their skills develop.

Four additional experiments confirmed this conclusion. When instructed to seek discomfort, people writing about an emotional experience were more motivated to reengage in writing and felt that they had better achieved their coping goal, compared with when they were instructed to merely seek to write. Seeking discomfort motivates the pursuit of personal growth when growth is inherently uncomfortable. Illustrating this, results showed that people were more receptive to news about a health crisis and opposing political views when seeking discomfort but not when seeking to learn, an effect that was attenuated for other news or consistent views. Last, people were more motivated to learn about gun violence when seeking discomfort than when they were not seeking discomfort, even in the absence of explicit reappraisal instructions, suggesting that seeking discomfort in pursuit of growth prompts people to spontaneously view discomfort as a signal of progress.

Our intervention for motivating engagement in challenging tasks (e.g., improvisation training) expands the literature on cognitive reappraisal and stress mindsets (Crum et al., 2013; Jamieson et al., 2018; Uusberg et al., 2019). Prior research on stress mindsets primarily utilized two types of interventions—either providing information on how stress enhances health (Crum et al., 2013) or providing 2-hr stress-mindset trainings (Jamieson et al., 2018). What differentiates our approach is that it is more explicit and does not require extensive training. Furthermore, seeking discomfort motivates goal pursuit even without reappraisal instructions. We found evidence for this new intervention in motivating persistence in an underresearched domain—improvisation exercises—as well as in other growth goals that people value pursuing.

We further advanced motivation theory beyond the pursuit of personal growth. Research has demonstrated that more immediate positive experiences afford greater motivation than more delayed positive experiences (Milkman et al., 2014; Rothman, 2000; Turnwald et al., 2019; Woolley & Fishbach, 2017). We highlighted the critical role of immediacy in motivation. Immediate positive experiences, such as immediate negative experiences (discomfort), increase motivation by providing progress feedback. Although positive experiences are likely more motivating than negative ones, we suggest that perceiving negative experiences as a sign of progress is particularly motivating when positive experiences are delayed and discomfort is immediate.

Finally, we note two considerations regarding these findings. First there are times when discomfort should be a cue to stop rather than a sign of progress (e.g., sharp pain when exercising can signal injury, and extreme emotional pain when writing can signal a mental breakdown). In such cases, seeking discomfort could potentially be harmful—it could encourage people to ignore a cue to quit. Second, although we employed a diverse set of participants in our studies (i.e., adults enrolled in improv classes at The Second City, workers from different online panels), all of our participants were U.S. residents. It will be important to examine the generalizability of these results to participants from other cultures.

## Conclusion

These findings offer implications for people wishing to encourage growth in others or themselves. Whether through improvisation, writing about difficult emotions, seeking uncomfortable information, or relating to other people with opposite views, people should seek the discomfort inherent in growth as a sign of progress instead of avoiding it. Growing is often uncomfortable; we found that embracing discomfort can be motivating.

## Transparency

*Action Editor:* Leah Somerville

*Editor:* Patricia J. Bauer

### *Author Contributions*

Both authors developed the study concept and design. K. Woolley collected and analyzed the data. K. Woolley drafted the manuscript, and A. Fishbach provided critical revisions. Both authors approved the final version of the manuscript for submission.

### *Declaration of Conflicting Interests*

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

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## Open Practices

All data, analysis code, and materials have been made publicly available via OSF and can be accessed at <https://osf.io/2avtu/>. The design and analysis plans for the experiments were preregistered at AsPredicted (copies are available on OSF at <https://osf.io/2avtu/>). This article has received the badges for Open Data, Open Materials, and Preregistration. More information about the Open Practices badges can be found at <http://www.psychologicalscience.org/publications/badges>.



## ORCID iDs

Kaitlin Woolley  <https://orcid.org/0000-0001-8727-5370>

Ayelet Fishbach  <https://orcid.org/0000-0001-7923-4237>

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## Supplemental Material

Additional supporting information can be found at <http://journals.sagepub.com/doi/suppl/10.1177/09567976211044685>

## Note

1. Exploring this marginal interaction, we found that participants instructed to seek discomfort were similarly motivated regardless of explicit reappraisal instructions,  $F(1, 397) = 0.14$ ,  $p = .711$ ,  $\eta_p^2 < .01$ , 95% CI = [.00, .01], whereas participants not instructed to seek discomfort selected more articles when prompted to reappraise discomfort as progress,  $F(1, 397) = 5.54$ ,  $p = .019$ ,  $\eta_p^2 = .01$ , 95% CI = [.0002, .04].

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