Difficulty-as-improvement in Daily Live: Believing That Difficulties are Character-building Supports Well-being, Effortful Engagement, and Experiencing Successes

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RUNNING HEAD: DAILY DIFFICULTY-AS-IMPROVEMENT AND WELL-BEING

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Abstract

People vary in how much they believe suffering unbidden life difficulties can strengthen their character; these “difficulty-as-improvement” beliefs carry over to differing preferences for more effortful means of attaining possible self-goals. We conducted four two-week diary studies (N=382), finding that on average people reported experiencing difficulty on 88.16% of the days they filled in a diary. Multilevel analyses document that on these days, within-person daily variability in endorsing difficulty-as-improvement is associated with daily action, outcomes, and self-judgments, controlling for the positivity-negativity of daily events. Lagged analyses suggest small-sized effects of yesterday’s difficulty-as-improvement on today’s self-esteem and sense of life as meaningful. We infer that endorsing difficulty-as-improvement supports meaning (difficulties happen for a reason) and worth (you are good enough).

Keywords: Difficulty-as-improvement; identity-based motivation, daily diary;

well-being; meaning in life; self-esteem

Believing Difficulties can Build Character Supports Daily Well-being

Unbidden difficulties, setbacks, and obstacles can make life feel hard. In the current paper, we build on identity-based motivation theory which predicts that people make sense of their experiences of ease and difficulty by drawing on whether the experience has self-relevance (Oyserman, 2007). In the case of life difficulties, people can infer that difficulties are the path to character strength and moral integrity "That which does not kill you makes you stronger." Indeed, on average, people living in more traditional societies (China, India, Iran, and Turkey) agree that life difficulties can improve character, while adults in Australia, Canada, the U.K., and the U.S. agree slightly (Yan, Oyserman, Kiper, & Atari, 2023). In each society, the more people endorse the idea that difficulty is a key means of character improvement, the more they also report well-being and a preference for using effortful means to attain their goals. We examine the robustness of these between-person associations and the implication of substantial between-person variability in endorsing difficulty-as-improvement. We then turn to within-person variability in difficulty-as-improvement beliefs. Identity-based motivation theory predicts but has not yet documented within-person variability in the inferences people draw from ease and difficulty. Because the processes that influence global evaluations and daily states are distinct at a statistical and psychological level (Affleck et al., 1998; Newman et al., 2021; Nezlek, 2001), studies documenting individual differences reveal little about difficulty-as-improvement in daily life. We

examine how common it is for students to experience daily difficulty, the extent difficulty-as-improvement varies within persons, and the associations between these fluctuations and daily well-being and effortful action. Before describing our studies and results, we summarize identity-based motivation theory, evidence of construct validity, and evidence of individual-difference effects.

Identity-based motivation theory

Identity-based motivation (IBM) is a social psychological theory of motivation, goal pursuit, and self-regulation (Oyserman, 2007, 2009). It predicts a recursive relationship between how certain people feel about an aspect of their identity, what they do, and what they infer from their experiences of ease and difficulty while thinking about self-relevant tasks and goals or thinking about their lives as having unbidden difficulties (Fisher & Oyserman, 2017; Oyserman, 2007; Oyserman & Yan, 2019; Yan, Oyserman, Kiper, & Atari, 2023). IBM theory predicts that people vary in how much they endorse difficulty-as-importance (no-pain-no-gain), difficulty-as-impossibility (path of least resistance), and difficulty-as-improvement (what does not kill us makes us stronger) and that situations affect which one of these mindsets is accessible at the moment of judgment. IBM links theories about thinking, motivation, and the self by focusing on people's inferences from their metacognitive experiences –the recursive relationship between identities and what people infer when thinking feels easy or difficult. IBM theory assumes situation-based and person-based variability

in both.

IBM theory articulates three inferences from metacognitive experiences of difficulty. When it feels hard to think about potentially self-relevant tasks or goals, that metacognitive experience can imply value and importance to an aspect of one's identity (difficulty-as-importance) but also a lack of identity-relevance, making engagement a waste of time (difficulty-as-impossibility). Parallelly, when it feels hard to endure life's unbidden hardships, that metacognitive experience can imply that enduring properly can yield a stronger spirit, soul, and character. People are sensitive to the inference they draw but not necessarily to its source, such that small cues, such as describing how often they make one or the other inference on a high- or low-frequency scale, shift their subsequent self-beliefs and actions (Smith & Oyserman, 2015). There is some evidence that people who endorse difficulty-as-improvement more also report more experiences of difficulty-as-improvement (Haque & Oyserman, 2024).

Relationship with Action and Self-judgments

People tend to find effort aversive and costly (Inzlicht et al., 2018) and loathe using effortful means (de Bruin et al., 2023). They commonly interpret having to exert effort as the opposite of having ability (O'Donnell et al., 2023) and motivation (Feldon et al., 2019). Even though engaging effortfully can yield better learning (more long-term recall after enduring "desirable difficulties," Bjork, 1994), they may not believe they have learned something if learning felt effortful and difficult (Baars et al., 2020).

In contrast, adopting a difficulty-as-improvement mindset is associated with seeing effortful means as effective --people who endorse difficulty-as-improvement seem to carry over the belief that life hardships can have character benefits to a preference for effortful means of attaining their possible identities. Thus, in three studies, Kiper, Oyserman, and Yan (2024) asked students to rate each of six distinct means to attain possible identities related to school, fitness, and health. Students who scored higher in difficulty-as-improvement (controlling for their difficulty-as-importance, and difficulty-as-impossibility scores) rated more effortful means as more effective and less effortful means as less effective. They said they would be more likely to use the former and less likely to use the latter. This pattern was not replicated for the other inferences from difficulty. Controlling for, difficulty-as-improvement and difficulty-as-importance scores, students who scored higher in difficulty-as-impossibility preferred less effortful means of attaining these possible identities. Controlling for difficulty-as-improvement and difficulty-as-impossibility scores, students who scored higher in difficulty-as-importance were agnostic as to means of goal attainment.

Whether or not the effortful way is better, the Leary and Baumeister sociometer theory of self-esteem predicts that using effortful means of goal attainment may benefit self-esteem and social regard if others approve (Leary & Baumeister 2000; Baumeister et al., 2003). We infer that this is the case. For example, people perceive hard workers to be honest and diligent (Amos et al., 2019) and people who expend more effort as

competent and cooperative (Celniker et al., 2023). They perceive self-control as a sign of moral fiber (Mooijman et al., 2018). Moreover, experiencing high self-esteem is associated with other aspects of well-being including life satisfaction, and finding life to have meaning and coherence. For example, self-satisfaction (self-esteem) and life satisfaction tend to co-occur people who feel satisfied with themselves also tend to feel that way about their lives (e.g., Kwan et al., 1997). The reverse pattern also holds. That is, people who do not find their lives meaningful are unlikely to find themselves worthy (self-esteem) (Chamberlain & Zika, 1988; Steger et al., 2006). Drawing on this literature, we predict that people who endorse difficulty-as-improvement experience a more positive sense of self-worth or self-esteem, evaluate their lives positively (e.g., more life satisfaction Pavot & Diener, 1993), and find their lives to make sense (meaning in life, Steger et al., 2006; and coherence, Martela & Steger, 2016).

Measuring Difficulty-as-improvement a Distinct Motivational Construct

Trait difficulty-as-improvement can be measured reliably and the scale shows measurement invariance, as detailed by Yan, Oyserman, Kiper, and Atari (2023) in ten studies using adult respondents in eight countries, four Western and four non-Western (N= 2,380). They report support for configural (construct structure), metric (item factor loadings), and scalar (item intercepts) measurement invariance for difficulty-as-improvement and support for configural and metric invariance for difficulty-as-importance and

difficulty-as-impossibility. That is, items load onto the expected single factor and can be assumed to load the same way across samples from countries that vary in traditionality and Westernization.

Regarding discriminant validity, trait difficulty-as-importance, trait difficulty-as-impossibility, and trait difficulty-as-improvement scores are distinct when simultaneously assessed. Using Kline's (2011) rule-of-thumb for discriminant validity (rs > 0.85), trait difficulty-as-improvement scores are distinct from trait difficulty-as-impossibility and trait difficulty-as-importance scores. The association between difficulty-as-impossibility and difficulty-as-improvement has a 95% confidence interval ranging from r =-.04 to -.39 (Yan et al., 2023, ten studies) and r=-.04 to -.26 (Kiper et al., 2024, across three studies). The association between difficulty-as-importance and difficulty-as-improvement has a 95% confidence interval ranging from r = 0.23 to 0.68 (Yan et al., 2023, ten studies) and r=0.62 to 0.74 Kiper et al., 2024, three studies). Moreover, controlling for trait difficulty-as-importance and trait difficulty-as-impossibility, trait difficulty-as-improvement is associated with seeing silver linings for oneself and one's community during the height of the COVID-19 pandemic (Kiper et al., 2022). These analyses use a structural equation model with latent constructs, including as controls the time of data collection, political conservatism, and as predictors difficulty-as-improvement, difficulty-as-importance, and difficulty-as-impossibility.

Researchers also document discriminant validity by examining

incremental effects of difficulty-as-improvement controlling for difficulty-as-importance and difficulty-as-impossibility scores. This reveals that the more people endorse difficulty-as-improvement, the more they see themselves as virtuous, optimistic, and conscientious people leading meaningful lives (small-to-moderate sized effect, ten studies, across eight countries, Yan, Oyserman, et al., 2023). As a check of discriminant validity, the researchers added a measure of growth mindset to the model, finding that results are robust to adding this control. Logically, people who believe that with effort, they cannot change their intelligence or abilities (fixed mindset) should be more likely to try to ferret out and avoid situations in which they or others could discover that their intelligence or abilities are low (O'Donnell et al., 2023). Conversely, people who believe the opposite, that with effort their intelligence or abilities can change, may be less likely to endorse the idea of difficulty-as-impossibility --that difficulty signals that a task or goal is a waste of one's time (Oyserman & Destin, 2010). Empirically, Yan and colleagues (2023) found small correlations between endorsing a fixed mindset and difficulty-as-improvement and no significant correlation with endorsing a growth mindset (fixed and growth mindset items do not load onto the same factor in their Chinese sample, see also O'Donnell et al., 2023). Controlling for associations with fixed mindset scores, difficulty-as-improvement scores explained a statistically significant additional variance in virtuousness and meaning in life (Yan et al., 2023). We infer from these results that differences in difficulty-as-improvement scores are uniquely

associated with these self-judgments, distinct from the contributions of difficulty-as-importance and difficulty-as-impossibility and growth-mindset scores.

Though believing that suffering can build character or purify the soul is congruent with religious and conservative world views, trait difficulty-as-improvement scores are distinct from religiosity, conservatism, belief in fate, belief in karma, and Protestant Ethic scale scores. Thus, Yan and colleagues (2023) document small-to-moderate-sized correlations with religiosity, conservatism, belief in fate, and belief in karma across ten studies while Haque and Oyserman (2024) document a small-sized positive association with Protestant Work Ethic scores in two studies. In these studies, Protestant Work Ethic scores but not trait-difficulty-as-improvement scores correlated with moralizing self-control successes and failures (Haque & Oyserman, 2024).

Current Studies

Pilot Test of Discriminant Validity

We started with two pilot convergent and discriminant validity studies to bolster prior evidence that trait difficulty-as-improvement is a distinct construct. The data are located in OSF and you can access them by cutting and pasting this link into your browser: https://osf.io/qs8dn/?view_only=b4c785b8ceb74adfa5f6d15473cfd040.

Adults on Mturk (total N = 730, 50% female) participated in November 2017 (n=345) and January 2018 (n=385). About half (51.6%) of

participants identified as Democrats (27.8% as Republicans, 20.5% chose the something else response). They were on the liberal side of the scale mid-point (M= 3.44, 1=very liberal to 7=very conservative). About half (46.4%) identified as Christian (most of the others identified as agnostic, 21%, or atheist, 21) and on the less religious side (M = 2.54 on a scale from 1=not at all religious to 6=very religious).

We obtained responses to six predictors and two predicted variables. Predictors were difficulty-as-improvement, the Fisher and Oyserman (2017) 4-item difficulty-as-importance, difficulty-as-impossibility, ease-as-possibility, and ease-as-triviality scales, Cacioppo et al.'s (1984) 18-item need for cognition scale, and Dweck's (2000) 8-item growth/ fixed mindset scale. Our predicted variables were the 9-item John and Srivastava (1999) conscientiousness and the 8-item Duckworth and Quinn (2009) grit scale. Though highly correlated, conscientiousness and grit are potentially distinct constructs describing a trait of following through on commitments (Hagen & Solem, 2021; Ponnock et al., 2020; Schmidt et al., 2018). As detailed in Supplemental Materials (Pilot Studies 1-2), our November and January data collection episodes differed somewhat in item wording, response scales, and scale order of presentation.

We first ran linear regressions. Then, following Westfall and Yarkoni (2016) we used structural equation modeling to evidence the incremental validity of difficulty-as-improvement. We detail methods and results in Supplemental Materials (Pilot Studies 1-2).

Linear regressions controlling for the six other predictors and the data collection episode revealed a significant association between difficulty-as-improvement scores, and conscientiousness and grit scores. Controlling for the six other predictors and the data collection episode and applying a Bonferroni correction, difficulty-as-improvement uniquely contributed to the prediction of conscientiousness in our SEM. In a second SEM using the same analytic plan with grit as the predicted variable, difficulty-as-improvement was a unique predictor of grit before the Bonferroni correction, but not after applying it. We conclude that difficulty-as-improvement is distinct from growth/ fixed mindset, need for cognition, difficulty-as-importance, difficulty-as-impossibility, ease-as-possibility, and ease-as-triviality.

Overview of Diary Studies

In conducting our daily diary studies, we followed the recommendation of Nezlek (2012) and used scales validated at the trait level by adapting their items for daily administration. Our predictions proceed in two steps. We make three predictions (H1 to H3) that replicate and extend prior between-person research:

H1: People respond analogously to the difficulty-as-improvement trait level scale when the scale items use secular (improve) or religious (purify) wording (scores on the two scales highly correlate). We tested H1 in Study 4.

H2: Variability in difficulty-as-improvement is more at the between-

person level (but meaningful within-person variability occurs). We tested H2 in Studies 1 to 4.

H3: People who score higher in trait difficulty-as-improvement also report more trait-level well-being. They see themselves as people whose lives have (a) meaning and (b) coherence. See themselves as (c) people of worth (self-esteem) and (d) feel satisfied with their lives. We H3 tested in Studies 1 to 4.

Second, we make three predictions (H4 to H6) regarding daily fluctuations.

H4: People who endorse trait difficulty-as-improvement experience average greater daily well-being (a) meaning in life, (b) coherence, (c) feelings of self-esteem, and (d) life satisfaction. They engage in daily (e) effortful strategies. They experience more daily (f) successes in possible identity-relevant domains. We tested H4 in Studies 1 to 4.

H5: Daily difficulty-as-improvement is associated with daily well-being even controlling for daily positive and negative events. On days people endorse difficulty-as-improvement more compared to their two-week average, they are more likely to report experiencing (a) meaning in life, (b) coherence, (c) self-esteem, and (d) life satisfaction, (e) engage in effortful strategies and (f) experience successes. We tested H5 in Studies 1 to 4.

Method

Open Science Framework

Study 1 provided evidence of the feasibility of our diary approach in our population. We pre-registered Studies 2-4 and placed the pre-registrations, the full set of items in each measure, all data, and our R script into this OSF link (cut and paste into your browser) https://osf.io/qs8dn/?view_only=b4c785b8ceb74adfa5f6d15473cfd040.

Sample

Each 14-day diary study took place in a different semester and with different subject pool participants who received subject pool course credit (final N=382; race-ethnicity was diverse, Table S1 Supplemental Materials for race-ethnicity by study). Study 1 (AY 2018-2019 second semester, n = 96, 76% female, M_{age} = 20.17), Study 2 (AY 2019-2020 first semester, n = 147, 79% female, M_{age} = 19.91), and Study 3 (AY 2019-2020 second semester, n = 59, 66% female, M_{age} = 20.47) took place just before the COVID-19 pandemic closed universities and subject pools. Study 4 started once campus life returned (AY 2021-2022 second semester, n = 80, 68% female, M_{age} = 20.71).

Power and Stop Rules

We pre-registered Studies 2 to 4 with the plan of collecting as large a sample as possible given our participant pool constraints. Given the attained sample size, at the between-person level, we were underpowered in each study (.39, .55, .26, and .33, respectively) but adequately powered at the aggregate level (.92) to detect trait-level correlations of r = .17 (the

smallest effect we detected). A sensitivity analysis indicated we were adequately powered (.80) to detect between-person correlations as small as $r = .14$, and powered at .92 to detect the smallest significant between-person correlations of $r = .17$. To maximize statistical power for between-person analyses, we aggregated the datasets and ran analyses on this combined dataset and presented both these and by-study results in figure-form (details in Supplemental Materials).

Our within-person analyses are powered at the study level (.99, 1.00, .94, and .97 respectively). For clarity, we used the same presentation format to present by-study and aggregate results. In doing so, we follow Fabrigar and Wegener (2016), who note that aggregated effects across studies are more reliable than any individual study. For within-person analyses, the size of the aggregated dataset was well above the recommendations by Nezlek (2012) and Maas & Hox (2005) for daily diary studies. Our aggregated sample was adequately powered at .80 to detect medium-sized ($r = .30$) between-person correlations (per a G*Power analysis). Within-person power analyses indicated we achieved 1.00 power to detect relationships between daily difficulty-as-improvement and daily successes, which was the smallest effect we detected (details, Supplemental Materials).

Procedure

Students watched an instructional video before starting and received an email each evening for fourteen days at 9:00 pm with a link to the daily survey to be completed as close as possible to bedtime. Students completed

the trait measures in two randomized chunks in Studies 1 to 3 (one half before and the other half after the diary portion of the study) and in a single chunk in Study 4 (before the diary study). Our initial rationale for dividing the survey into two chunks was that we wanted students to complete it without experiencing fatigue. Our rationale for varying order was to reduce spurious correlations. We did not expect order would matter and it did not (see Supplemental Materials, Exploratory Analyses).

Measures

Table 1 presents by-study descriptive information for scales and event checklists. We used the response options from the original scale author (see Tables 2 to 10).

Table 1
Trait and Daily Measures Descriptives by Study

Study Number	Trait Scale Descriptives			Daily Scale or Checklist Descriptives			
	Difficulty-as-Improvement Scale						
	α	*M*	*SD*	Reliability	*M*	*SD*	*ICC*
1	.89	4.50	1.00	.82	4.15	1.34	.68
2	.84	4.75	0.87	.81	4.36	1.23	.60
3	.84	4.72	0.99	.74	4.49	1.10	.59
4	.85	4.83	0.79	--	--	--	--
4 (secular)	.89	4.90	0.74	.87	4.71	1.13	.58
	Coherence Scale						
1	.80	4.89	1.10	.79	4.74	1.40	.44
2	.72	4.98	1.02	.82	4.79	1.38	.51
3	.68	5.31	1.00	.74	4.90	1.29	.50
4	.88	4.93	1.28	.82	5.05	1.37	.60
	Life Satisfaction Scale						
1	.87	4.45	1.33	--	4.67	1.63	.43
2	.89	4.43	1.44	--	4.65	1.59	.47
3	.88	4.73	1.41	--	4.69	1.56	.42
4	.85	4.72	1.19	--	4.61	1.59	.51
	Meaning in Life Scale						
1	.90	4.51	1.35	.87	4.19	1.67	.50

2	.87	4.57	1.23	.87	4.15	1.66	.54
3	.88	4.92	1.19	.86	4.16	1.66	.56
4	.90	4.89	1.25	.88	4.57	1.53	.57
Self-Esteem Scale							
1	.91	2.88	0.59	.57	4.92	1.42	.47
2	.90	2.88	0.54	.60	4.98	1.42	.48
3	.87	3.00	0.49	.55	5.10	1.33	.48
4	.86	2.84	0.48	.65	5.00	1.42	.55
Daily Engaging in Effortful Strategies Checklist							
2				–	0.94	0.72	.42
3				–	1.02	0.78	.50
4				–	1.11	0.92	.43
Daily Successes Checklist							
1				–	0.97	0.89	.43
2				–	1.19	0.96	.43
3				–	1.33	0.98	.46
4				–	1.48	1.05	.45
Daily Positive Events Checklist							
1				–	0.96	0.80	.51
2				–	1.59	0.93	.41
3				–	1.76	0.93	.50
Daily Negative Events Checklist							
1				–	0.40	0.62	.62
2				–	0.64	0.76	.28
3				–	0.67	0.80	.36

Note: -- = not assessed. Daily life satisfaction is a single item, Checklists do not have reliability

Difficulty-as-Improvement (4-item, Yan, et al., 2023; 3-item daily study developed)

Table 2 presents the items for the trait and daily secular (Study 4) and religious (Studies 1 to 4) difficulty-as-improvement scales. The daily scale focuses on difficulties that occurred that day. Participants could report not experiencing any difficulties. On 88.164% of daily entries, they reported experiencing difficulties, if they reported experiencing no difficulties, we treated that day as missing in difficulty-as-improvement analyses.

Well-Being

We assessed Coherence (4-item trait Costin & Vignoles, 2020; 3-item daily study developed), Satisfaction with Life (5-item trait, Diener et al., 1985; 1-item daily, Busseri & Newman, 2023), Meaning in life (5-item presence subscale, Meaning in Life Questionnaire, Steger et al., 2006; 2-item daily Kashdan & Nezlek, 2012; Newman et al., 2018), and Self-esteem (10-item Rosenberg, 1965; 4-item daily measure, Nezlek, 2005). Tables 3 to 6 present the items.

Daily Effortful Engagement (6-item scale study developed)

Table 7 presents the items.

Daily Checklists of Successes, Positive Events, and Negative Events (adapted from Butler et al., 1994, and Nezlek & Plesko, 2001)

Tables 8 to 10. Checklists are not scales so we did not calculate a reliability statistic.

Table 2

Studies 1-4 Trait (Yan, et al., 2023) and Daily (study developed) Difficulty-as-Improvement: Religious (Secular Study 4) Scale Items

Trait Difficulty-as-Improvement	Daily Difficulty-as-Improvement
In a way, the struggles you have today purify (*strengthen*) your character to meet tomorrow's challenges.	In a way, the struggles I had today will purify (*strengthen*) my character to meet tomorrow's challenges.
Every difficulty you overcome makes your spirit and soul grow stronger (*makes you grow stronger*).	Every difficulty I overcame today will make my spirit and soul grow stronger (*make me grow stronger*).
Difficulty is the strongest of teachers; difficulty might bend or break you temporarily, but it can purify (*strengthen*) you in the long run.	The difficulties I experienced today might bend or break me temporarily, but they can purify (*strengthen*) me in the long run.
Your spiritual journey through life (*journey through life*) cannot be complete without adversity, hardship, and overcoming suffering.	

Note. 1=Strongly disagree, 6=Strongly agree. 7=I did not experience any difficulties today. Scored NA if 7 was selected (day only).

Table 3

Studies 1-4 Trait (Costin & Vignoles, 2020) and Daily (study developed) Coherence: Scale Items

Trait Coherence	Daily Coherence
I can make sense of the things that happen in my life.	I can make sense of the things that happened in my life today.
Looking at my life as a whole, things seem clear to me.	Looking at my life today, things seem clear to me.
I can understand why the events of my life have occurred	I can understand why the events of my day occurred.
My life feels like a sequence of unconnected events. [a] (R)	

Note. [a]Not included in Study 4. Response: 1=Strongly disagree, 7=Strongly agree. In Study 4, we trimmed the last (reverse-scored) item.

Table 4

Studies 1 to 4 Trait (Diener et al., 1985) and Daily (Busseri & Newman, 2023) Satisfaction with Life: Scale Items

Trait Life Satisfaction	Daily Life Satisfaction
In most ways, my life is close to my ideal	How satisfied were you with your life today?
The conditions of my life are excellent.	
I am satisfied with my life.	
So far, I have gotten the important things I want in life.	
If I could live my life over, I would change almost nothing	

Note. Trait 1=Strongly disagree, 7=Strongly agree; Daily 1=Not at all, 7=Very satisfied.

Table 5

Studies 1 to 4 Trait and Daily Meaning in Life: Scale Items

Trait Meaning in Life	Daily Meaning in Life
I understand my life's meaning.	How meaningful did you feel your life was today?
My life has a clear sense of purpose.	How much did you feel your life had purpose today?
I have a good sense of what makes my life meaningful.	
I have discovered a satisfying life purpose	
My life has no clear purpose. (R)	

Note. Trait: 1=Absolutely untrue, 2=Mostly untrue, 3=Somewhat untrue, 4=Can't say true or false, 5=Somewhat true, 6=Mostly true, 7=Absolutely true. Day: 1=Not at all, 7=Very much.

Table 6

Studies 1 to 4 Traite and Daily Self-Esteem: Scale Items

Trait Self-Esteem	Daily Self-Esteem

I feel that I am a person of worth, at least on an equal plane with others.	Today, I felt like a failure. (R)
I feel that I have a number of good qualities.	Today, I felt that I had many good qualities
All in all, I am inclined to feel that I am a failure. (R)	Today, I thought I was no good at all. (R)
I am able to do things as well as most other people.	Today, on the whole, I was satisfied with myself.
I feel I do not have much to be proud of. (R)	
I take a positive attitude toward myself.	
On the whole, I am satisfied with myself.	
I wish I could have more respect for myself. (R)	
I certainly feel useless at times. (R)	
At times I think I am no good at all. (R)	

Note. Trait 1=Strongly disagree, 2=Disagree, 3=Agree, 4=Strongly agree; Daily 1=Very uncharacteristic, 7=Very characteristic of me.

Table 7

Studies 2 to 4: Daily Engaging in Effortful Strategies Checklist Items

Studies 2 and 3. Today, I …	**Study 4.** Today I…
Engaged in a difficult social interaction (e.g., with a stranger, with someone I feel awkward around, or on a topic that was difficult to discuss).	Engaged in a difficult social interaction (e.g., on a topic that was difficult but necessary to discuss, had to call someone out on their behavior).
Engaged with difficult schoolwork or homework or went to a difficult class.	Engaged with difficult schoolwork or homework or went to a difficult class.
Engaged with a difficult health or fitness routine or did strenuous exercise.	Engaged with a difficult health or fitness routine or did strenuous exercise.
Engaged in another type of difficult activity (not listed above) in a domain that I care about.	Engaged in another type of difficult activity (not listed above) in a domain that I care about.
Did schoolwork the hard way (e.g., I took notes,	Did schoolwork the hard way (e.g., I took notes, I read

I read the assignments before class).	the assignments before class).
Took the high road to engage in a health or fitness goal (e.g., figuring out a way to have balanced nutrition even if it slowed down progress on my health and fitness goals).	Took the high road to engage in a health or fitness goal (e.g., figuring out a way to have balanced nutrition even if it slowed down progress on my health and fitness goals).
	Started a necessary conversation that I was intimidated to have.

Note. 0= did not occur, 1 = occurred and not important, 2 = occurred and somewhat important, 3 = occurred and pretty important, and 4= occurred and extremely important. We did not obtain this measure in Study 1 due to researcher error.

Table 8

Studies 2 to 4: Daily Successes Checklist Items

Study 1. Today, I …	**Studies 2 and 3.** Today I…	**Study 4.** Today, I …
Completed work on an interesting project or assignment.	Succeeded in a social goal (e.g., making new friends, making a good impression).	Succeeded in a social goal (e.g., making new friends, making a good impression).
Met a daily fitness goal.	Succeeded at a work or school task.	Succeeded at a work or school task.
Performed well (sports, music, speaking, drama, etc.).	Succeeded in a health or fitness goal.	Succeeded in a health or fitness goal.
Got caught up (or ahead) in coursework or work duties.		Succeeded in another type of task or goal (not listed above) in a domain that I care about.
Did well on a school or work task (e.g., test, assignment, job duty).		

Note. Measures (Butler et al., 1994; Nezlek & Plesko, 2001), 0=did not occur, 1=occurred and not important, 2=occurred and somewhat important, 3=occurred and pretty important, 4=occurred and extremely important.

Table 9

Studies 1-3: Daily Positive Events Checklist Items by Study

Study 1. Today, I …	**Studies 2 and 3.** Today I…
Had especially good interactions with friends or acquaintances	Had a pleasant interaction with friends, family, or a romantic interest.
Went out socializing with friends/date (e.g., party, dance club).	Had a pleasant experience concerning performance at school or work.
Had especially good interactions with my steady date.	Had a pleasant experience regarding my health and fitness (e.g., was complimented on my fitness).
Did something special for a friend/steady date which was appreciated.	
Flirted with someone or arranged a date.	
A classmate, teacher, co-worker, or friend complimented me on my abilities.	
Went out to eat with a friend/date.	
Had another type of pleasant event (not listed above) with friends, family, or date.	

Note. 0=did not occur, 1=occurred and not important, 2=occurred and somewhat important, 3=occurred and pretty important, 4=occurred and extremely important.

Table 10

Studies 1-3: Daily Negative Events Checklist Items by Study

Study 1. Today, I …	**Studies 2 and 3.** Today I…
Did something awkward or embarrassing in a social situation.	Had an unpleasant interaction with friends, family, or a romantic interest.
Was excluded or left out by my group of friends.	Had an unpleasant experience concerning performance at school or work.
A disagreement with a close friend or steady date was left unresolved	Had an unpleasant experience regarding my health and fitness (e.g., a negative comparison

	or comment).
Classmate, teacher, co-worker, or friend criticized me on my abilities	
Got along poorly with peers (e.g., classmates, co-workers, roommates).	
Had plans fall through to spend time with someone special.	
Had another type of unpleasant event (not listed above) with friends, family, or date.	
Had another type of unpleasant event (not listed above) concerning schoolwork, or another activity.	

Note. 0=did not occur, 1=occurred and not important, 2=occurred and somewhat important, 3=occurred and pretty important, 4=occurred and extremely important.

Measure Summary Information Aggregated Across Samples

Table 11 presents each trait measure and the total number of respondents who filled out the scale across samples, the aggregated scale mean, standard deviation, and alpha reliability.

Table 11
Trait Scale and Descriptive Information

Scale	Study	*N*	*M*	*SD*	**α**
Difficulty-as-Improvement Religious Version	1-4	381	4.70	0.91	.86
Difficulty-as-Improvement Secular Version	4	80	4.90	0.74	.88
Meaning in Life	1-4	381	4.68	1.27	.89
Coherence 4-item	1-3	300	5.01	1.05	.74
Coherence 3-item	4	80	4.93	1.28	.88
Self-Esteem	1-4	381	2.89	0.53	.89
Life Satisfaction	1-4	380	4.54	1.36	.88

Table 12 does the same for the daily measures and checklists.

Table 12
Day Constructs and Descriptive Information

Construct	Study	# Daily reports	*M*	Variation		ICC	reliability
				Within-person	Between-person		
Difficulty-as-Improvement Religious Version	1-3	3284	4.32	0.57	0.98	.63	.80
Difficulty-as-	4	798	4.7	0.52	0.73	.58	.87

Improvement Secular Version			1				
Meaning in Life	1-4	4630	4.24	1.24	1.44	.54	.87
Coherence	1-4	4630	4.85	0.91	0.95	.51	.80
Self-Esteem	1-4	4629	4.99	0.99	0.96	.49	.59
Life Satisfaction	1-4	4627	4.65	1.37	1.16	.46	–
Effortful Engagement	2-4	3484	1.00	0.35	0.28	.45	–
Success	1-4	4632	1.21	0.52	0.43	.45	–
Positive Events	1-3	3722	1.43	0.43	0.46	.51	–
Negative Events	1-3	3722	0.57	0.34	0.21	.39	–

Note: If "I did not experience difficulties today" was chosen, the day was not counted on the difficulty-as-improvement daily measure, yielding fewer daily difficulty-as-improvement reports. Success, Positive, and Negative Events: 0 =*did not occur*, 1 = *occurred and not important*, 2=*occurred and somewhat important*, 3=*occurred and pretty important*, 4=*occurred and extremely important*

Data Exclusions

We prepared data for analysis following Nezlek (2012) and (Meade & Craig, 2012). Thus, we excluded participants with fewer than five daily entries, multiple entries completed the same day or after 10:00 a.m. the following morning, and incorrect answers to instructed response items. As detailed in Supplemental Materials, these criteria retained 94.96% of all daily entries (excluded n=246 of 4880, final N = 4634; M=12.33 reports per participant).

Analysis Plan

We used package *psych* (Revelle, 2024) for descriptive statistics and package *lme4* (v. 1.1-23; Bates et al., 2015) for multilevel models in the R (v. 4.1.2) programming language (R Core Team, 2021). We computed day-measure reliability per Nezlek (2012) by creating three-level models, nesting the items of each scale within days and days within persons. The estimate of true variance over total variance comes from the null model intercept. We used two-level multilevel models (nesting days within persons) to test our predictions. Per Nezlek (2012), we included random intercepts and random slopes in each model and trimmed the error term if the model failed to converge because there was not enough variation in the random effects. Following Rights and Sterba (2019; 2021) we calculated

effect sizes using the *r2mlm* function (Shaw et al., 2023), which provides a measure that is akin to a correlation when the square root is computed (the square root of the proportion of variance reduction, Hox, 2002; Kreft & de Leeuw, 1998; Raudenbush & Bryk, 2002). We report R_b^{f2} (the square root of the proportion of between-cluster variance explained by between-person predictors via fixed slopes) for between-person models and R_w^{f1v} (the square root of the proportion of within-cluster variance explained by within-person predictors via fixed slopes and random slope variation/covariation) for within-person models. We interpret effect sizes using Cohen's (1988) rule of thumb for interpreting Pearson's r (.10 small; .30 moderate; and ≥.50 large).

Results

H1: Difficulty-as-improvement can be assessed using secular or religious wording.

Supporting H1, people's responses to the secular and religious versions of the difficulty-as-improvement scale are functionally equivalent, r=.82, 95% CI [.73, .88], $p < .001$. We draw this inference both from Kline's (2011) discriminant validity cutoff rule of $r = .85$ and Campbell and Fiske's (1959) related constructs rule of converging patterns of correlation (Table S2, Supplemental Materials). Going forward, we use the term difficulty-as-improvement for both the religious (Studies 1 to 3) and the secular (Study 4) version of the scale.

H2: Difficulty-as-improvement varies more between persons than it

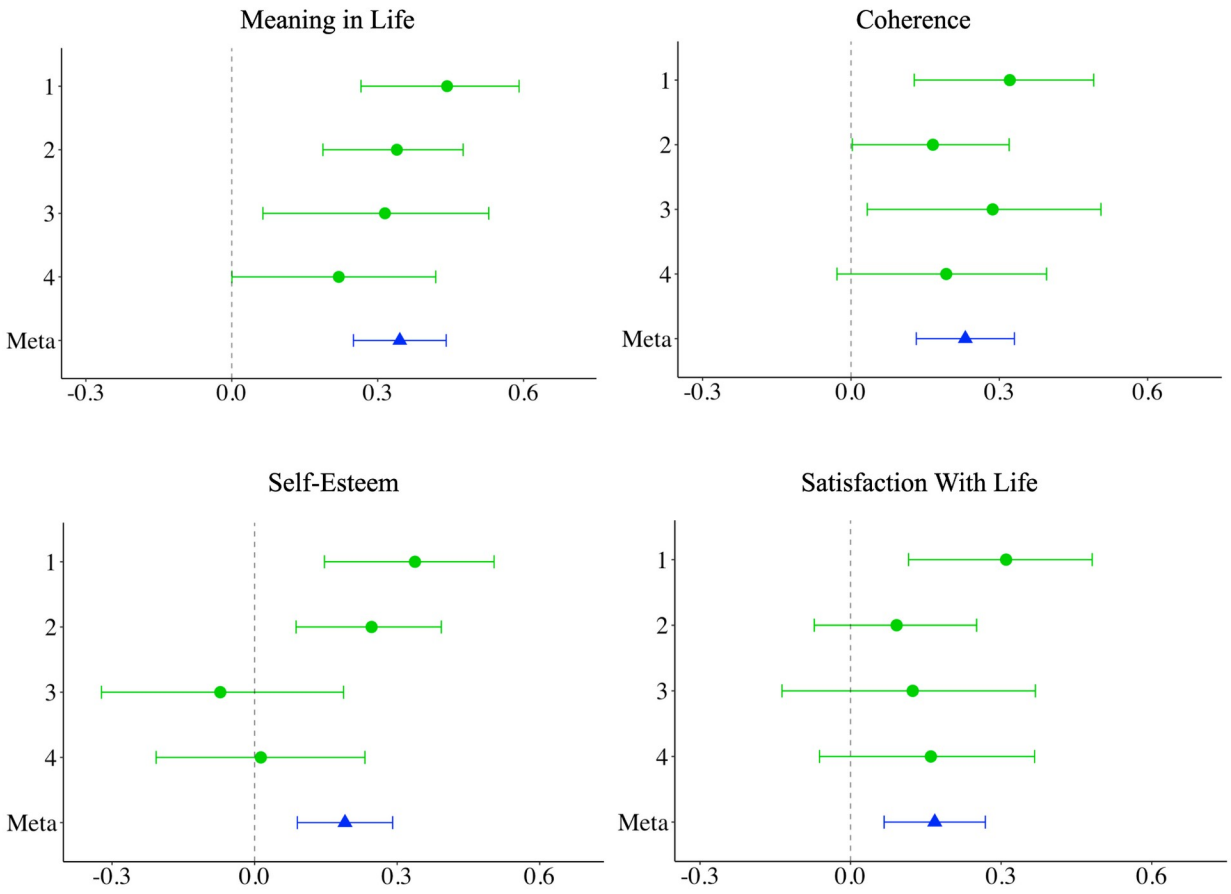
fluctuates by day within persons.

We ran fully unconditional multilevel models to test H2. Supporting H2, as detailed in Table 1 (by Study) and Table 12 (aggregated across the four studies), the variance in daily difficulty-as-improvement scores attributable to between-person differences ranges from 58% to 68%. Descriptively, this is higher than the other constructs we measure and is closest to the range for meaning in life.

H3: Trait difficulty-as-improvement is related to trait well-being.

We conducted linear regressions with standardized variables across the aggregated dataset with three dummy-coded study variables as controls. Supporting H3, and as presented graphically in Figure 1, in our synthesized data set, trait difficulty-as-improvement was positively related to trait meaning in life (H3a; r=.35, 95% CI [.25, .44], p < .001), life coherence (H3b; r=.23, 95% CI [.13, .33], p < .001), self-esteem (H3c; r=.19, 95% CI [.09, .29], p < .001), and satisfaction with life (H3d; r=.17, 95% CI [.07, .27], p=.001). Though underpowered, associations are consistent at the level of individual studies.

Figure 1
Trait Difficulty-as-Improvement is Correlated with Trait Wellbeing



Note: The x-axes represent the magnitude of the correlation between each outcome and trait difficulty-as-improvement. Y-axes represent the Study (circles) and meta-analytic (triangle) results. Whiskers represent 95% Confidence Intervals. The geometric shape represents the mean association. Table S2 in Supplemental Materials provides details.

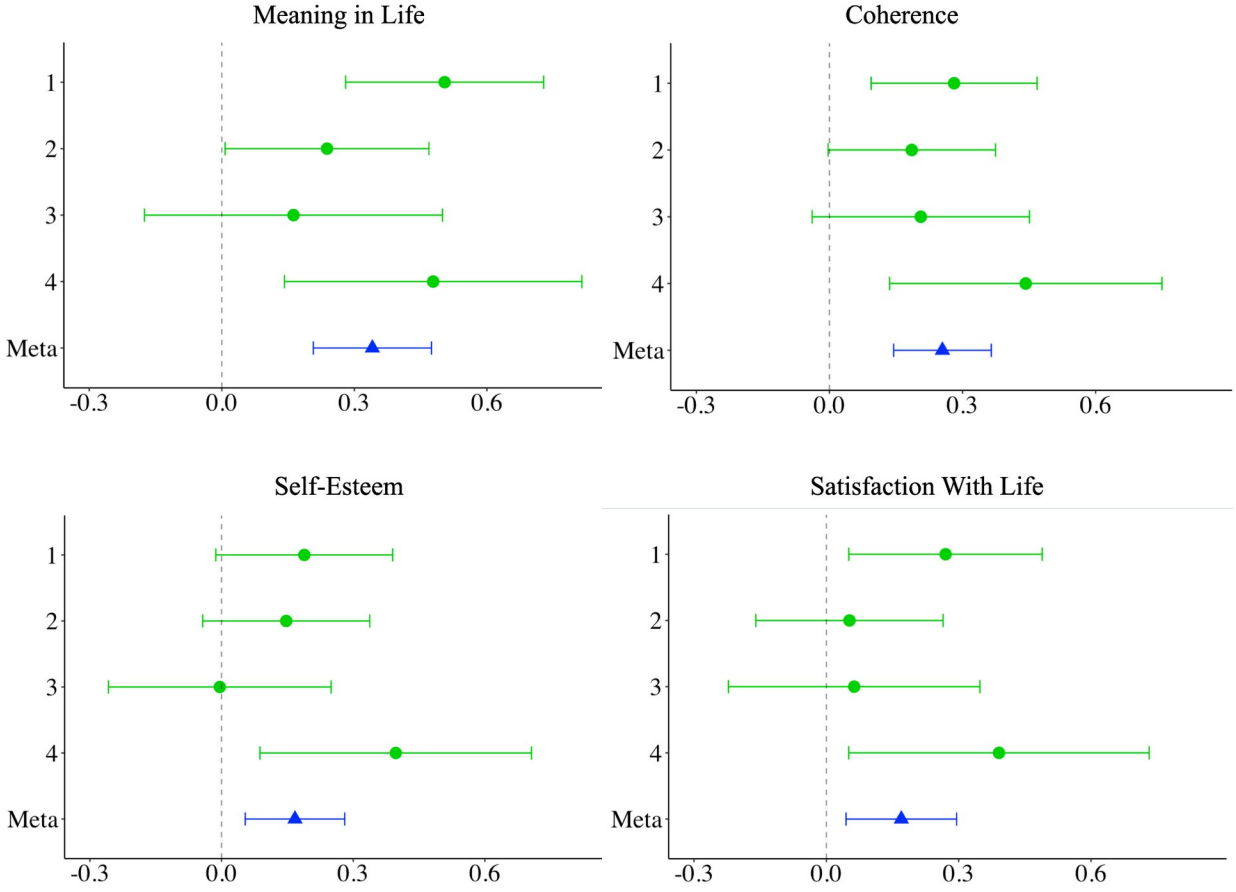
H4: Trait difficulty-as-improvement predicts greater daily well-being and experiences.

We created a set of two-level models with daily well-being or experience as the outcome and trait difficulty-as-improvement as an uncentered level-2 predictor (equations, Appendix A). Supporting H4, aggregated analyses (blue triangles, Figures 2 and 3), revealed that people higher in trait difficulty-as-improvement were more likely to experience

daily meaning in life (H4a; b=.34, t= 4.98, p < .001, R_b^{f2} = 0.29), life coherence (H4b; b=.25, t=4.52, p < .001, R_b^{f2} =0.27), self-esteem (H4c; b=.17, t= 2.88, p= .004, R_b^{f2} =0.16), and life satisfaction (H4d; b=.17, t= 2.65, p=.009, R_b^{f2} =0.14), use effortful strategies (H4e; b=.92, t=3.86, p < .001, R_b^{f2} = 0.27) and experience successes (H4f; b=.61, t=4.22, p < .001, R_b^{f2} =0.34). Studies 1, 2, and 4 reveal the same pattern; the Study 3 non-replication is not interpretable (each study alone is underpowered).

Figure 2

Trait Difficulty-as-Improvement Predicts Daily Wellbeing

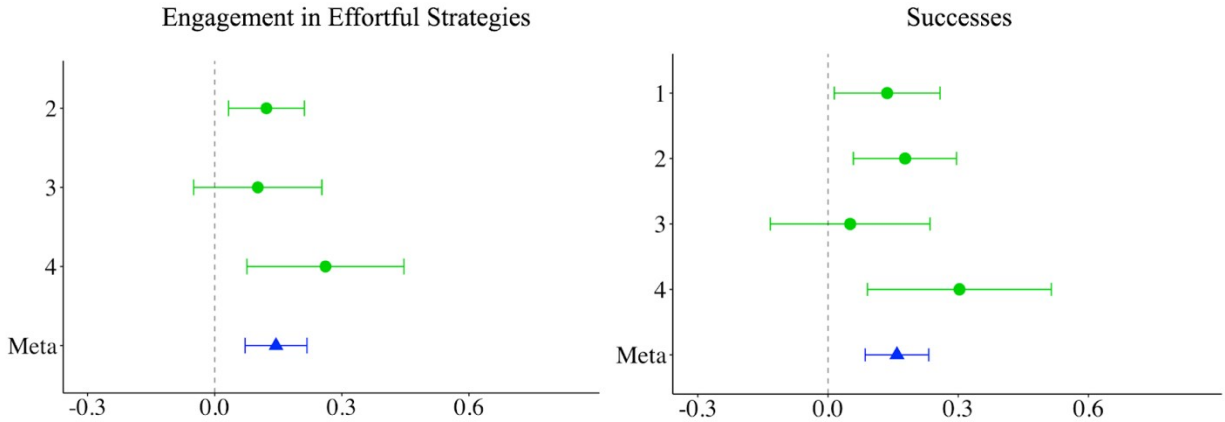


Note. The x-axes represent the magnitude of the unstandardized regression coefficient of trait difficulty-as-improvement for each outcome. Y-axes represent the Study (circles) and meta-analytic (triangle) results. In Studies 1-3 we used the religious version of trait difficulty-as-improvement and the

secular version in Study 4. For numeric 95% confidence intervals, see Table S3 Supplemental Materials).

Figure 3

Trait Difficulty-as-Improvement Predicts Daily Experiences



Note. The x-axes represent the magnitude of the unstandardized regression coefficient of trait difficulty-as-improvement for each outcome. Y-axes represent the Study (circles) and meta-analytic (triangle) results. We included a religious version of trait difficulty-as-improvement in Studies 1 to 3 and the secular version in Study 4. See Table S3 for numeric representations of 95% confidence intervals represented here as whiskers and other details. We did not collect Engagement in Effortful Strategies responses in Study 1.

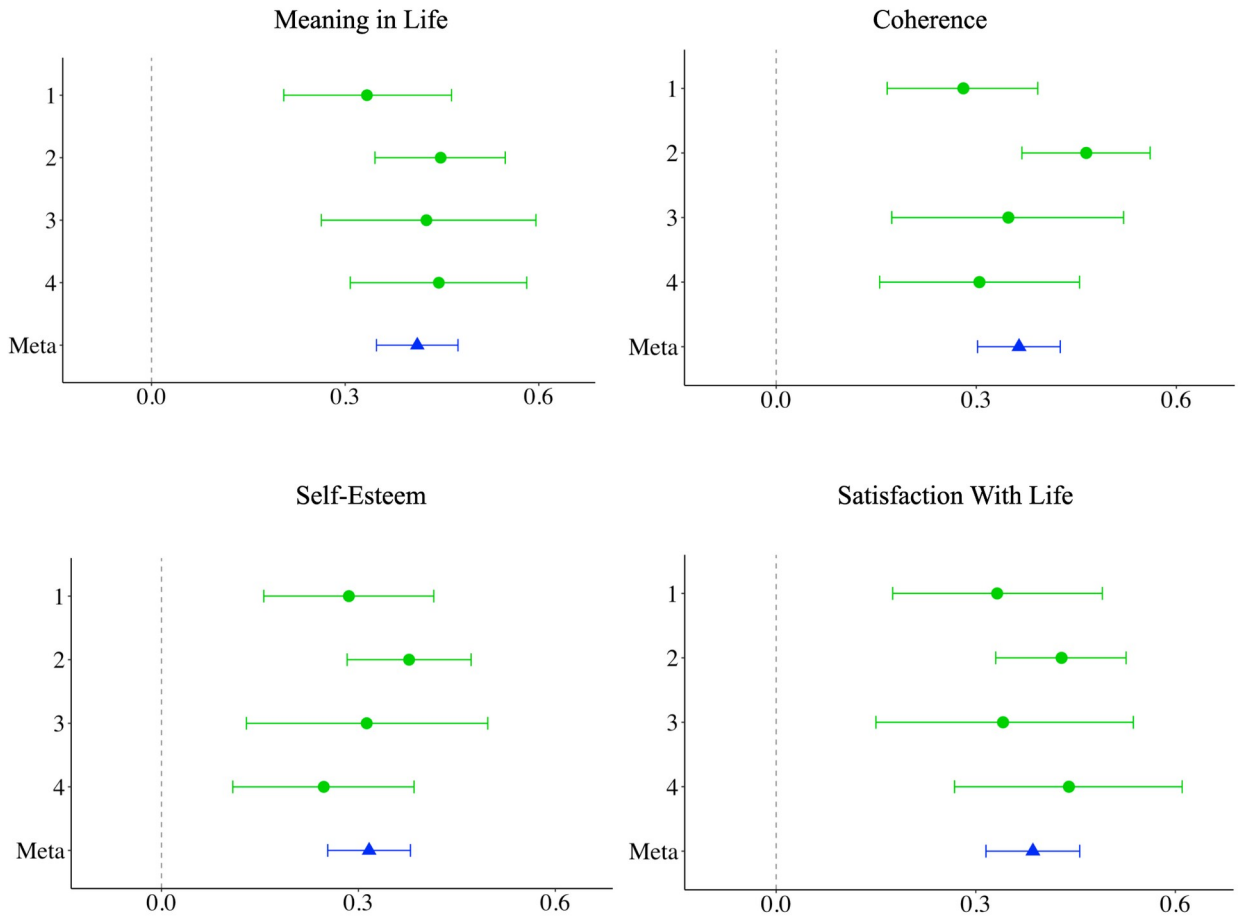
H5: Today's difficulty-as-improvement predicts today's well-being and daily experiences (with and without positive and negative daily event controls).

We created six two-level models with daily difficulty-as-improvement (centered around each individual's mean) as the level-1 predictor (equations, Appendix B) and a daily well-being or experience variable as the outcome. Results support H5. Figures 4-7 graphically present aggregated results as blue triangles and study-level results as green circles. On days people endorsed difficulty-as-improvement more strongly compared to their two-week average, they experienced greater meaning in life (H5a; b=.41,

t=12.98, p < .001; R_w^{f1v}=0.34), life coherence (H5b; b=.36, t=11.75, p < .001; R_w^{f1v}=0.40), self-esteem (H5c; b= .32, t=9.96, p < .001; R_w^{f1v}=0.35), and life satisfaction (H5d; b=.39, t=10.85, p < .001; R_w^{f1v}= 0.34). These patterns are robust to adding daily positive and negative events as controls (meaning in life b=.32, t=9.45, p < .001; R_w^{f1v}=0.28; life coherence b=.33, t=10.17, p < .001; R_w^{f1v}=0.32; self-esteem b= .24, t=7.36, p < .001; R_w^{f1v}=0.28; life satisfaction b=.27, t=7.45, p < .001; R_w^{f1v}= 0.27).

On days people endorsed difficulty-as-improvement more strongly compared to their two-week average, they also engaged in effortful strategies (H5e; b=.13, t=7.80, p < .001; R_w^{f1v}=0.21) and experienced successes (H5f; b=.15, t=8.19, p < .001; R_w^{f1v}=0.20) more compared to their two-week average. These patterns are robust, remaining when we add daily positive and negative events as controls (meaning in life b=.32, t=9.45, p < .001; R_w^{f1v}=0.28; life coherence b=.33, t=10.17, p < .001; R_w^{f1v}=0.32; self-esteem b= .24, t=7.36, p < .001; R_w^{f1v}=0.28; life satisfaction b=.27, t=7.45, p < .001; R_w^{f1v}= 0.27). Results are consistent in each study for each outcome except daily successes.

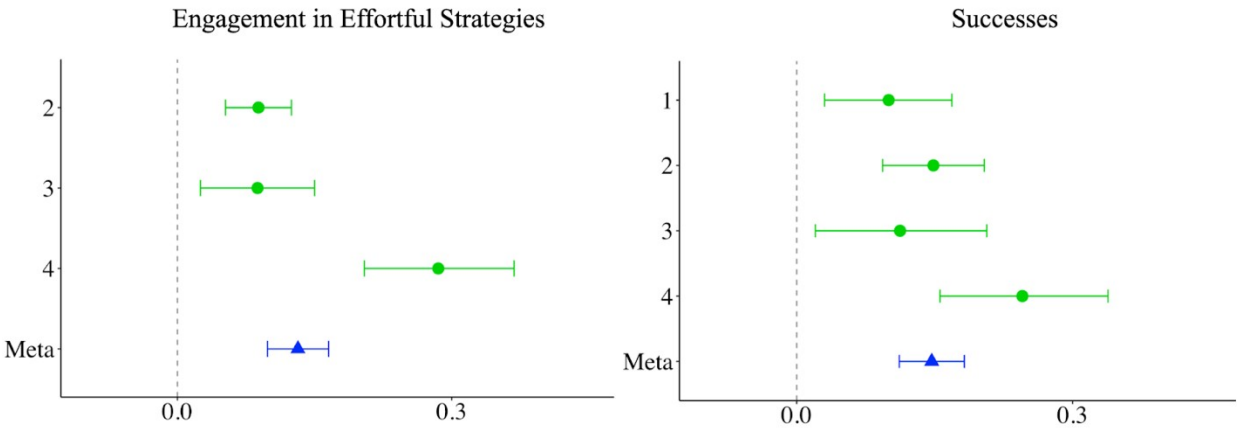
Figure 4
Daily Difficulty-as-Improvement Predicts Daily Wellbeing (Without Daily Event Controls)



Note. The x-axes represent the magnitude of the unstandardized regression coefficient of trait difficulty-as-improvement for each outcome. Y-axes represent the Study (circles) and meta-analytic (triangle) results. Table S4 (Supplemental Materials) provides 95% confidence intervals with numeric upper and lower bounds. We also ran fixed slope models without daily event controls, as an additional test, the results of which can be seen in Table S5 in Supplemental Materials. The findings are similar.

Figure 5

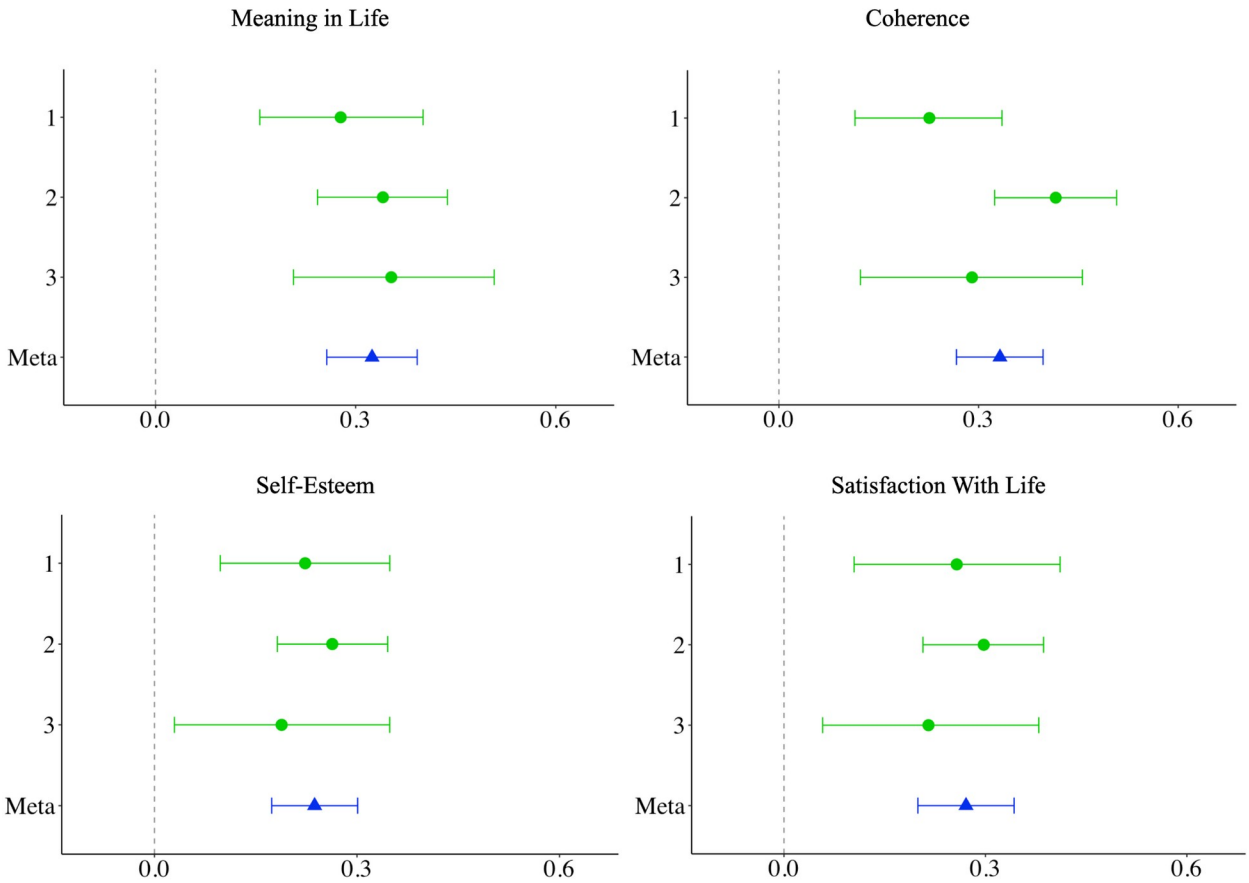
Daily Difficulty-as-Improvement Predicts Daily Experiences (Without Daily Event Controls)



Note. The x-axes represent the magnitude of the unstandardized regression coefficient of trait difficulty-as-improvement for each outcome. Y-axes represent the Study (circles) and meta-analytic (triangle) results. Table S4 (Supplemental Materials) provides 95% confidence intervals with numeric upper and lower bounds. Study 1 did not collect Engage in Effortful Strategies. We also ran fixed slope models without daily event controls, as an additional test, the results of which can be seen in Table S5 in Supplemental Materials. The findings are similar.

Figure 6

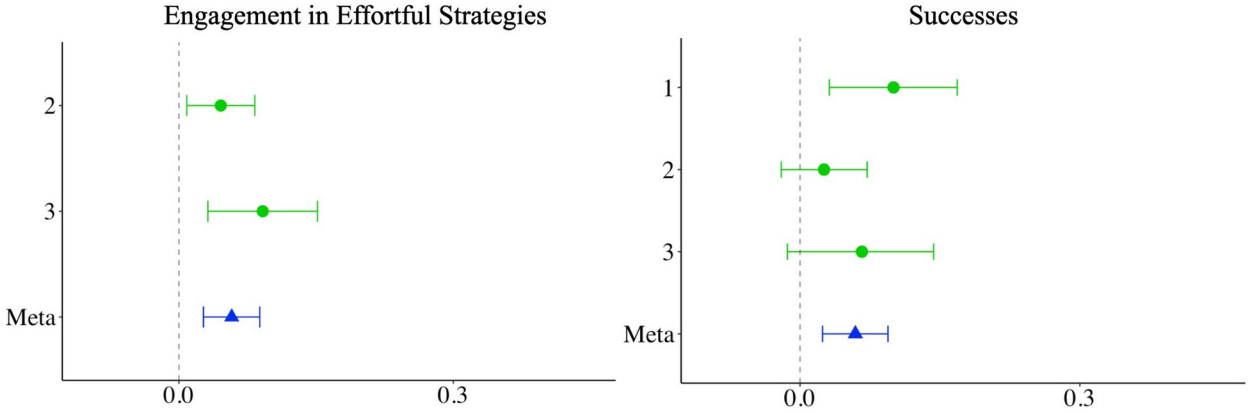
Daily Difficulty-as-Improvement Predicts Daily Wellbeing (With Daily Event Controls)



Note. We did not measure daily positive and negative events in Study 4. The x-axes represent the magnitude of the unstandardized regression coefficient of trait difficulty-as-improvement for each outcome. Y-axes represent Study (circles) and meta-analytic (triangle) results. Table S4 (Supplemental Materials) provides 95% CIs with numeric upper and lower bounds.

Figure 7

Daily Difficulty-as-Improvement Predicts Daily Experiences (With Daily Event Controls)



Note. The x-axes represent the magnitude of the unstandardized regression coefficient of trait difficulty-as-improvement for each outcome. Y-axes represent the Study (circles) and meta-analytic (triangle) results. Table S4 (Supplemental Materials) provides 95% confidence intervals with numeric upper and lower bounds. Study 1 did not collect Engage in Effortful Strategies.

H6: Yesterday's difficulty-as-improvement predicts today's well-being and experiences.

H6 examines directionality through lagged relationships from one day to the next. We tested H6 by examining the relationship between yesterday's difficulty-as-improvement and today's well-being, controlling for yesterday's well-being, and the lagged relationships in the reverse direction. In both model sets, we centered level-1 predictors around each individual's mean with no person-level predictors (equations Appendix C, by-study results Supplemental Materials, Table S6). We do not report effect sizes for models with multiple predictors (see Rights & Sterba, 2019).

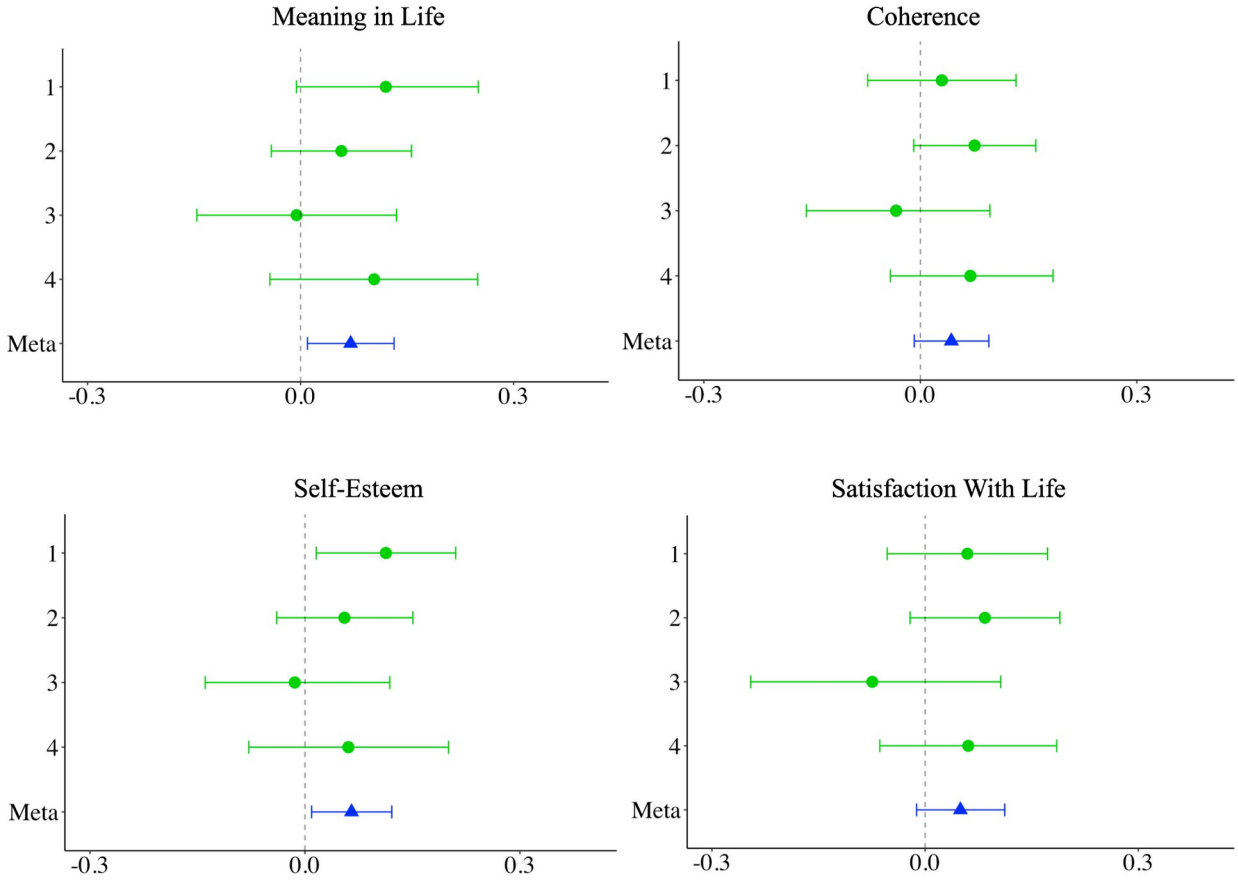
Partially supporting H6 (triangles in Figures 8 and 9), difficulty-as-improvement significantly predicted greater meaning in life (H6a; b=.07, t=2.32, p=.021) and self-esteem (H6c; b=.06, t=2.32, p=.021) on the next day, controlling for the present day's well-being. The lagged relationships between difficulty-as-improvement and life coherence (H6b; b=.04, t=1.70, p=.091) and life satisfaction (H6d; b=.05, t=1.60, p=.112) were not significant though directionally consistent while the lagged relationships with engaging in effortful strategies (H6e; b=.02, t=1.31, p=.191) or experiencing successes (H6f; b=.02, t=0.87, p = .385) was near 0 and not

significant. At the level of each study, we did not find a consistent non-zero-overlapping confidence interval pattern for any lagged relationship.

Looking at the reverse lagged relationships, yesterday's well-being and daily activities did not significantly predict today's difficulty-as-improvement with one exception. Yesterday's coherence predicted today's difficulty-as-improvement, controlling for yesterday's difficulty-as-improvement (b=.05, t= 2.71, p=.007; details in Supplemental Materials Table S10).

Figure 8

H6: Yesterday's Difficulty-as-Improvement Predicts Today's Meaning in Life and Self-Esteem (With Controls)

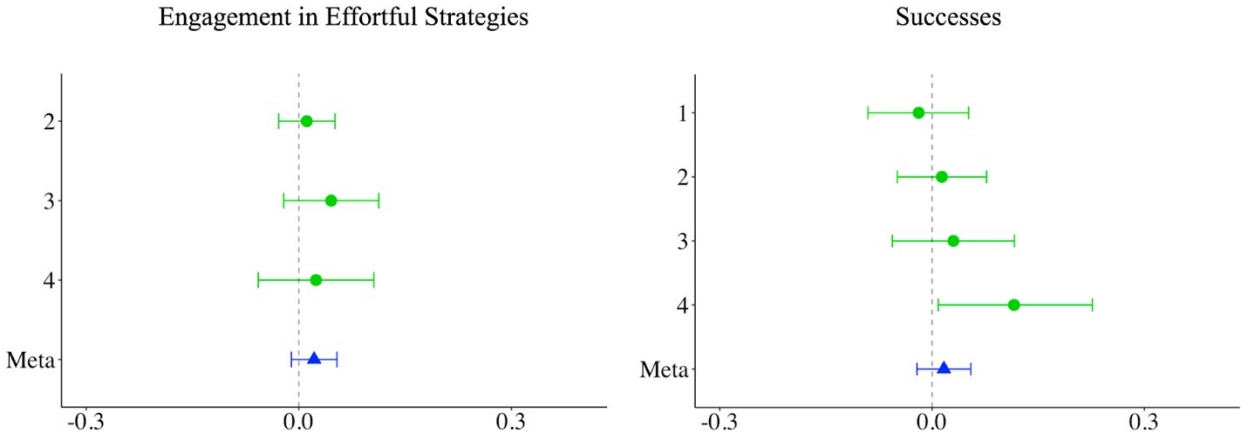


Note. The x-axes represent the magnitude of the unstandardized regression

coefficient of trait difficulty-as-improvement for each outcome. Y-axes represent the Study (circles) and meta-analytic (triangle) results. Table S6 (Supplemental Materials) provides 95% confidence intervals with numeric upper and lower bounds. As additional tests, we ran fixed slope models with controls (Table S7 in Supplemental Materials), random slope models without controls (Table S8 in Supplemental Materials), and fixed slope models without controls (Table S9 in Supplemental Materials). The findings are similar.

Figure 9

H6: Yesterday's Difficulty-as-Improvement Predicts Today's Wellbeing (With Controls)



Note. The x-axes represent the magnitude of the unstandardized regression coefficient of trait difficulty-as-improvement for each outcome. Y-axes represent the Study (circles) and meta-analytic (triangle) results. Table S6 (Supplemental Materials) provides 95% confidence intervals with numeric upper and lower bounds. Study 1 did not collect Engage in Effortful Strategies. As additional tests, we ran fixed slope models with controls (Table S7 in Supplemental Materials), random slope models without controls (Table S8 in Supplemental Materials), and fixed slope models without controls (Table S9 in Supplemental Materials). The findings are similar.

Exploratory Analyses

Religion and Religious Practice

We conducted pre-registered exploratory analyses on the relationship between difficulty-as-improvement beliefs, religiosity, and daily religious experiences (Supplemental Materials Table S11). Given that difficulty-as-

improvement themes as present in various religions, we asked if trait difficulty-as-improvement was associated with the likelihood of engaging in religious activities on any given day. We found no significant relationship (meta-analytic b=0.05, t=1.26, p=.210). However, religious people were modestly more likely to endorse difficulty-as-improvement (both assessed as traits, meta-analytic r=.17, t=3.35, $p < .001$). And, on days people participated in religious activities, they endorsed difficulty-as-improvement more (meta-analytic b=0.08, t=2.37, p=.019). We infer that religious activities and beliefs may modestly boost difficulty-as-improvement beliefs rather than the reverse.

Daily Failures and Using Less Effortful Means of Goal Attainment (Supplemental Materials S12 to S23)

We conducted pre-registered exploratory analyses on the relationship between difficulty-as-improvement beliefs and daily engagement with less effortful strategies (Table S12), and daily failures (Table S13). We found two distinct patterns. On the one hand, trait-level difficulty-as-improvement was not significantly associated with using less effortful strategies (b=0.05, t=1.54, p=.124) or experiencing failures (b=-0.03, t=-1.21, p=.228) on any given day. On the other hand, on days people reported higher than their average endorsement of difficulty-as-improvement, they were more likely to report using less effortful strategies (b=0.08, t=4.94, $p < .001$) and less likely to report failures (b=-0.07, t=-4.39, $p < .001$). We infer that daily fluctuations in difficulty-as-improvement beliefs capture nuances in lived

experience that trait associations cannot.

Temporal Patterns

Our pre-registered exploratory analyses of temporal patterns revealed that people higher in trait difficulty-as-improvement were also more likely to report daily difficulty-as-improvement (see Table S24). Two-week aggregated daily difficulty-as-improvement scores are associated with greater daily well-being (Table S25). Across the two-week study period, daily endorsement of difficulty-as-improvement slightly decreased (Table S26), and the association between difficulty-as-improvement and coherence became stronger; see Supplemental Materials for details. These patterns highlight a limitation of a diary method –with sufficient repetition, the nature of relationships may change by having participants repeatedly reflect.

Leveraging Daily Fluctuations to Examine Incremental Validity

A final set of exploratory analyses in Supplemental Materials concerns the ‘no difficulty today’ response option. When treated as a dichotomous predictor (1 = difficulty experienced, 0 = no difficulty experienced), we found that people report greater well-being on days when no difficulty occurred. On days they did report experiencing difficulty, as evidenced by H5 results, we found a positive association between well-being and difficulty-as-improvement scores, suggesting that the positive relationships between difficulty-as-improvement and well-being were not merely due to shared instances of positively valenced constructs. We provide details of

these models in Supplemental Materials.

General Discussion

People vary in how much they believe that enduring life difficulties can support their spirit and character, whether measured with secular (character) or religious (spiritual growth) wording. Variance in daily difficulty-as-improvement scores is more attributable to between-person than within-person fluctuations. People's trait-level difficulty-as-improvement score is associated with their trait and daily well-being, their daily use of effortful strategies, and their daily successes. But people also vary meaningfully across days in their endorsement of difficulty-as-improvement. Regardless of their general tendency, on days when people endorse difficulty-as-improvement more than their two-week average, they report more meaning in life, coherence, self-esteem, and life satisfaction, engage in effortful strategies, and experience success more. Each of these associations is moderate in size. Finally, in aggregate analyses, yesterday's higher difficulty-as-improvement predicted today's higher meaning in life and self-esteem. Lagged effects do not attain $p < .05$ significance in any individual study, implying that more research is needed to understand lagged impacts.

Theoretical Implications

Our results have implications for identity and well-being theorizing. Regarding identity, we advance theorizing on how identity-based motivation works by using a diary method. We document that difficulty-as-improvement

meaningfully fluctuates and that these fluctuations matter. In doing so we build on two sets of studies: studies documenting small-to-moderate associations between difficulty-as-improvement beliefs and preference for using effortful means to attain academic, physical fitness and weight possible selves (Kiper et al., 2024) and small-to-moderate associations between difficulty-as-improvement beliefs and well-being in adult samples in Australia, Canada, China, India, Iran, Turkey, the U.K., and the U.S., (Yan et al., 2023). Regarding effortful means, our results add to the prior finding that students who score higher in difficulty-as-improvement prefer effortful means of pursuing possible selves and disdain less effortful ones (Kiper et al., 2024). We document that even controlling for the day's general positivity or negativity, when daily difficulty-as-improvement is higher, people are more likely to use effortful strategies to pursue their daily goals. We infer that difficulty-as-improvement beliefs may carry over to effortful engagement with daily tasks and goals.

Regarding well-being research, our studies suggest that associations with well-being are robust to using secular or religious wording in the difficulty-as-improvement measure and generalize to a broad conceptualization of well-being as meaning in life, life satisfaction, life coherence, and self-esteem. Prior research links positive mental health with experiencing meaning in life and coherence (Schäfer et al., 2019; Winger et al., 2016) and with higher self-esteem and life satisfaction (Lewinsohn et al., 1991; Park, 2004; Sowislo & Orth, 2013). Moving beyond static

associations, we show that difficulty-as-improvement beliefs are associated with everyday well-being and self-regard. We find meaningful within-person and between-person variability in difficulty-as-improvement and document that on days that people are higher than their average difficulty-as-improvement beliefs, they are also higher than their average in meaning in life, life satisfaction, life coherence, and self-esteem. We found preliminary evidence that the temporal course is more from difficulty-as-improvement beliefs to well-being than the reverse. In exploratory analyses, we found an association between engaging in religious activities and believing in difficulty-as-improvement on any given day. In doing so, we add to the literature describing antecedents of meaning and coherence in life, life satisfaction, and self-esteem and to the literature on how religiosity relates to physical and mental health (e.g., Hoogeveen et al., 2023).

Limitations and Future Directions

Each set of studies has limitations; here we focus on limitations due to design, measurement, and sample. A strength of our design is that diary studies provide an ecologically valid approach to understanding how difficulty-as-improvement beliefs matter in everyday life. We show that daily fluctuations occur and are associated with fluctuations in well-being and action. However, the daily diary design cannot address whether the process is causal. To test causal processes, future researchers could make a difficulty-as-improvement mindset accessible using either an autobiographical recall task or a biased scale approach and test

consequences for well-being or action. While our diary design is ecologically valid, an experimental approach addresses causality once difficulty-as-improvement is made accessible or triggered.

Regarding measures, we used previously developed difficulty-as-improvement and well-being (meaning in life, coherence, self-esteem, and life satisfaction) measures. Measures behaved in our studies as in other studies using different populations, increasing our confidence in our findings. We were powered to test between-person effects at the aggregate, not the study level so we cannot address questions of study-level variability, which may be due to power, measurement error, or the inherent variability of results. Regarding within-person fluctuations, we have the same limitations of being powered in the aggregate. Here too, we cannot address whether study-level variability is due to power, measurement error, or the inherent variability of situated results. We used extant daily measures and created the daily difficulty-as-improvement measure. We know that on days that people engaged in religious activities, they were also more likely to endorse difficulty-as-improvement. However, this does not preclude that other daily situations might evoke higher or lower than average person-level difficulty-as-improvement. Future studies could use ecological momentary assessment to obtain information about other situations that could trigger variability of difficulty-as-improvement beliefs. We also know that religious people were more likely to endorse difficulty-as-improvement on any given day. Future studies could measure other social identities to obtain a

broader sense of the association between social or collective identities and endorsing difficulty-as-improvement.

A final limitation of daily use measures is that the common psychometric tests for construct validity at the trait level are difficult and sometimes impossible to run in daily diary methods. In our case, while incremental validity of the trait measure has been documented, it is particularly difficult to provide incremental validity over alternative constructs of the daily measure. A reader might wonder about the incremental validity of daily difficulty-as-improvement beliefs over other daily beliefs like a growth mindset. The strength of a daily method is that it highlights specific experiences. The problem in testing questions of incremental validity of daily constructs is that the relevant daily-level questions refer to different experiences. For instance, a daily growth mindset item could be “Your intelligence is something about you that you couldn’t really change very much today.” In contrast, daily difficulty-as-improvement items refer specifically to inferences from difficult situations such as “The difficulties I experienced today might bend or break me temporarily, but they can purify me in the long run” and participants had the option of saying that nothing difficult had occurred that day. While individual difference measures lend themselves to incremental validity tests, daily constructs that differ in reference points do not lend themselves to these tests.

Turning to sample-based limitations, our sample was diverse --roughly

a third described themselves as Asian or Asian American, another third as White or Euro-American, and the final third divided among people describing themselves as Hispanic/Latino, African American/Black, or other backgrounds. We were not powered to test differences by race-ethnicity, national heritage, religiosity, or other indicators including family socioeconomic status and age. For two reasons, each might be a fruitful avenue for future research. First, Yan and colleagues (2023) documented that difficulty-as-improvement is higher among people from more traditional cultures and cultures experiencing more harsh environments in cross-national surveys and is higher among more religious people. The implication is that people from different socio-economic and cultural heritage backgrounds in the U.S. might each arrive at difficulty-as-improvement beliefs through different socialization patterns. Second, while not yet studied, people gain a sense that suffering must be endured as they look back on their lives or as they look forward to their possible future lives and imagine difficulties to be endured. Preliminary evidence suggests that harsh environments are associated with higher difficulty-as-improvement scores (Malekabadi & Oyserman, 2023). Future qualitative research could help reveal the experience of endorsing difficulty-as-improvement under harsh life situations.

Conclusion

People who score higher in difficulty-as-improvement beliefs report more daily well-being and daily experiences. People who endorse difficulty-

as-improvement experience themselves and their lives more positively, engage in effortful strategies, and experience success more. Since these factors are associated with health, the implication is that believing that hardships can build character and hence are good for something may be protective of mental and physical health.

Appendix A

Day level: y_{ij} (outcome variable) = $\beta_{0j} + r_{ij}$

Person level: $\beta_{0j} = \gamma_{00} + \gamma_{01}$(trait difficulty-as-improvement)$_j + u_{0j}$

Where, y_{ij} is the 'j'th person's score on the outcome variable on the 'i'th day; β_{0j} is the jth person's 2-week average outcome score; and r_{ij} is the level-1 random error term. γ_{00} is the grand mean for the outcome score; γ_{10} is the regression coefficient of trait difficulty-as-improvement; and u_{0j} is the deviation of the mean outcome score of the jth person from the grand mean.

Appendix B

Daily difficulty-as-improvement entered as the level-1 predictor, centered around each individual's mean where:

Day level: y_{ij} (outcome variable) = $\beta_{0j} + \beta_{1j}$(difficulty-as-improvement)$_{ij} + r_{ij}$

Person level: $\beta_{0j} = \gamma_{00} + u_{0j}$

$\beta_{1j} = \gamma_{10} + u_{1j}$

Appendix C

Lagged relationship from difficulty-as-improvement to well-being/experience:

Day level: y_{ij} (well-being/experience day n) = $\beta_{0j} + \beta_{1j}$(difficulty-as-improvement day n-1)$_{ij} + \beta_{2j}$(well-being/experience day n-1)$_{ij} + r_{ij}$

Lagged relationship from well-being/experience to difficulty-as-improvement:

Day level: y_{ij} (difficulty-as-improvement day n) = β_{0j} + β_{1j}(difficulty-as-improvement day n-1)$_{ij}$ + β_{2j}(well-being/experience day n-1)$_{ij}$ + r_{ij}

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