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Is Difficulty Mostly About Impossibility?: What Difficulty Implies May Be Culturally Variant

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Abstract

Difficulty can signal low odds (impossibility) and high value (importance). We build on culture-as-situated cognition theory's description of culture-based fluency and disfluency to predict that the culturally fluent meaning of difficulty is culture-bound. For Americans, the culturally fluent understanding of ability is success-with-ease-not-effort, hence difficulty implies low odds of ability. This may disadvantage American institutions and practices—learning requires gaining competence and proficiency through effortful engagement. Indeed, Americans (Studies 1, 3–8; $N = 4{,}141$; Study 2, the corpus of English language) associate difficulty with impossibility more than importance. This tendency is not universal. Indian and Chinese cultures imply that difficulty can equally signal low odds and value. Indeed, people from India and China (Studies 9–11, $N = 762$) are as likely to understand difficulty as being about both. Effects are culture-based; how much people endorse difficulty-as-importance and difficulty-as-impossibility in their own lives did not affect results.

Keywords

interpretation of experienced difficulty, cultural fluency and disfluency, motivation, learning strategies, metacognition

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> Hard work is for people short on talent.
>
> —George Carlin (2015).

> . . . it's true–hard work pays off. If you want to be good, you have to practice, practice, practice. If you don't love something, then don't do it.
>
> —Ray Bradbury (in Beley, 2006).

> Chi Ku (Eat bitter)
> —Chinese Maxim.

> Everything that happens in the universe happens because of a reason. Nothing happens by accident.
>
> —Karma (Narayanswamy, 2011)

> Remember, nothing succeeds without toil.
>
> —Sophocles, 401 BCE/1894

As our opening quotes suggest, when a task or goal feels difficult to think about or do, that might imply a lack of talent or a chance to attain something worthwhile, with American culture more likely to highlight difficulty as a contrast to ability. In this article, we ask if this is the case—if cultures differ in which associations with difficulty they make accessible, separate from how much people within them endorse difficulty as implying importance or impossibility when considering difficulty working on their own tasks and goals. We propose that in American culture, ability is contrasted with difficulty, a culture-based assumption that may infuse culture-based practices and institutions. For example, it can set up a tension between the idea that education should be available to all and the culture-based assumption that only those who find learning easy are likely to have the ability to learn. A cultural bias to associating ability with ease and difficulty with low odds or impossibility may undermine educational institutions as

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meaningful learning requires engaging with difficulty (Kapur, 2008; Yan et al., 2016a).

What Do My Difficulties Imply for My Tasks and Goals

Rather than describe culture-based associations with difficulty, prior research focused on the individual and the inferences people draw when faced with a specific task- or goal-related difficulty. This research suggests that these inferences affect what people do (Oppenheimer, 2008; Schwarz, 2010, 2015), their performance on academic tasks (Oyserman et al., 2018), and their identities (e.g., whether they self-identify with academics; Smith & Oyserman, 2015). At the individual level, when people experience difficulty, they can understand their difficulty as signaling that a task or goal is important and worth their effort as well as that the task or goal is identity-irrelevant and not worth their effort (Oyserman, 2007). Experimental evidence supports this prediction that Americans can think about difficulty with their tasks and goals in both ways (Elmore et al., 2016 Study 1; Oyserman et al., 2018 Study 2). Students primed with a difficulty-as-importance mindset performed better on a fluid intelligence test (Raven's Progressive Matrices; Elmore et al., 2016) and a standardized writing task (better grammatical construction, more relevant content: Oyserman et al., 2018) than participants primed with difficulty-as-impossibility or a no-prime control.

An emerging body of work measures how much people endorse difficulty-as-importance and difficulty-as-impossibility when considering their own tasks and goals. These studies build on the availability of brief, reliable, and validated difficulty-as-importance and difficulty-as-impossibility scales (Fisher & Oyserman, 2017). These studies reveal, first, that how much people endorse difficulty-as-importance and difficulty-as-impossibility regarding their tasks and goals is distinct from how much they endorse other motivational constructs (Fisher & Oyserman, 2017). Second, these studies reveal that Americans tend to endorse difficulty-as-importance more than difficulty-as-impossibility when considering their tasks and goals, perhaps because in their own lives, they prefer not to think of themselves as quitters (Fisher & Oyserman, 2017). Endorsement matters, students who are low endorsers of difficulty-as-impossibility and high endorsers of difficulty-as-importance with regard to goals and tasks in their own lives do better academically over time (Oyserman et al., 2021). During the COVID-19 pandemic, high endorsers of difficulty-as-importance with regard to tasks and goals in their own lives reported masking, distancing, handwashing, and seeing silver linings for themselves in the pandemic (Kiper et al., in press).

Culture-as-Situated-Cognition Theory: What Feels Fluent Is Culture-Bound

While useful for predicting individual action, studying inferences people make about the difficulty they experience when working on their tasks and goals neglects how culture itself matters by providing a normative understanding of what difficulty implies. That is the focus of our current article. To make sense of how culture shapes people's normative understanding of difficulty, we start with culture-as-situated cognition theory (Oyserman, 2015a, 2017) which operationalizes culture at three connected levels.

At the highest level of abstraction, culture is a human universal, a set of "good enough" solutions to problems of survival (e.g., maintaining the group, ordering relationships, and securing space for innovation). At an intermediate level, culture is a salient theme related to these core solutions (e.g., collectivism evolves from maintaining the group and individualism evolves from securing space for innovation). At a more concrete level, within each society, culture is a blueprint for what to expect of others, how situations are likely to unfold in a particular social niche, and what actions to take (e.g., Oyserman, 2011). Culture-based knowledge at each level constrains and enables perception and reasoning (Hamedani & Markus, 2019; Nisbett & Norenzayan, 2002; Shweder, 1991; Triandis, 2007). Living in a culture yields expertise about what is valued and normative and how everyday life should unfold in that culture (Hamedani & Markus, 2019; Oyserman & Yan, 2019). What feels right will depend on what is valued, normative, and, hence, likely in a culture (Oyserman, 2017). Culturally, more common associations will be more fluent, come to mind more easily, and feel truer (Yan & Oyserman, 2018). When things proceed as expected, thinking feels easy (Mourey et al., 2015) and the way things are in the moment feels like the way they ought to be (Lin et al., 2019). This experience is culture-based because ease of processing comes from the fit with culture-based expectations (Oyserman, 2019). Using this notion of cultural fluency, we predict that the easier way for people to understand difficulty is the way that it is framed in their society. Hence, people will be faster to process difficulty in a typical way and find this way of interpreting difficulty more fluent than the alternative, no matter how they interpret difficulty when working on their own tasks and goals.

Americans' Default Association

In individualistic cultures like America, downward talent comparisons motivate and upward ones demotivate (Li et al., 2021). That is, the metric for talent is social comparison; people have relatively more or less talent than others (Ericsson, 2006; Ericsson & Lehmann, 1996; Nicholls, 1978, 1984). Theories of motivation developed in an American cultural frame conceptualize talent or ability in a domain as fundamentally comparative rather than absolute. Comparative conceptualizations have implications for what experiences of difficulty and effort imply for ability: People who can achieve more with the same effort or can reach the same achievement with less effort are understood to have more ability (Reeder et al., 2001). This formulation contrasts with the alternative, which is that social comparison provides metrics for improvement, with upward comparisons showing

that improvement is possible (Kemmelmeier & Oyserman, 2001a). While Americans value both ability and effort, within American culture, successes that seem to come from talent are valued more than successes from persevering (Jones, 1989; Nicholls, 1976; Oyserman & Markus, 1998; Reeder et al., 2001). Americans call talent "natural ability" for this reason and believe that not everyone can have it (e.g., Rattan et al., 2012). Our opening quote from George Carlin reflects this idea that high effort (hard work) is a signal of low ability (talent). Within American culture, people seek to discover the domains in which they have talent and then verify and affirm that talent (Li et al., 2021). Our opening quote from Ray Bradbury (if you don't love something, then don't do it) reflects this philosophy and underlies "play to your strengths" and "follow your passion" adages. These imply that people are better off focusing their efforts on goals that are easier for them to attain (Li et al., 2021). Indeed, Americans perform better in school when they follow this advice, but this is not so much the case for people from other cultures (Li et al., 2021).

The Alternative

From an evolutionary perspective, survival depends in part on being sensitive to when to persist (exploit investments to date) and when to shift (give up and explore other options; Charnov, 1976; Gopnik, 2020; Nesse, 2009). By suggesting that American culture sets Americans up to fluently associate difficulty with low ability, we are not suggesting that Americans cannot think about difficulty in other ways too. Rather, we are suggesting that in American culture, people may readily associate difficulty with impossibility unless they are in contexts that lead them to draw other inferences (e.g., they participate in interventions aimed at changing the fluent norm; Oyserman et al., 2021).

As Ray Bradbury clarifies in our opening quote from him, "it's true–hard work pays off. If you want to be good, you have to practice, practice, practice," Americans know that important goals (if you want to be good) require engagement with difficulty (it is true-hard work pays off). American sayings such as "no pain, no gain" are meant to motivate people to persist when they face difficulties so they can become better. As these sayings highlight, it is not just that practice makes perfect, but that persisting through a challenge is the way to attain competence (Ericsson, 2006; Nicholls, 1984). Americans value mastery, but mastery may not always be salient compared with finding a niche in which one can shine and succeed with ease relative to others.

Culture-Based Associations With Difficulty

We suggest that what is less fluent from an American cultural perspective may not be less fluent from other cultural perspectives that may accept multiple associations with difficulty. Chinese culture melds Confucianist, Buddhist, and Taoist beliefs (Guang, 2013; Teiser, 2002) to form what we term an "embrace difficulty" culture. Indeed, Chinese culture emphasizes effort rather than ability as the means to achievement (Leung, 2010) and defines emotional maturity as being able to endure suffering without becoming upset (e.g., Au & Savani, 2019). Chinese adolescents report better mental health and higher academic success if they endorse the idea that adversities and difficulties are reasonable (Shek, 2004). This attitude can be seen in a variety of everyday sayings such as "eating bitter," which implies suffering, sacrificing, enduring, facing hardships, and even seemingly insurmountable obstacles while working hard and fighting to attain success (Lai et al., 2020; Loyalka, 2013). Similarly, in karma-rooted cultures such as India, people are likely to assume that things happen for a reason and that enduring experiences of difficulty with good cheer, or at least with acceptance, can lead to good outcomes (Kaufman, 2005; White & Norenzayan, 2019). From a karma perspective, the difficulty might mean impossibility—change is not possible given that prior behavior led to the current state, and importance—current effort could allow one to advance in the future (Roy, 2020). Hence, difficulty may simultaneously signal the low odds and the importance of success at a task or goal in both cultures, making both culturally fluent.

"Both-and" Versus "Either-or" Cultures

We suggest that cultures may differ in the likelihood that people socialized within them assume that because difficulty implies impossibility, it cannot also imply importance. In doing so, we build on the work of Henrich and colleagues (2010) who coined the term WEIRD (Western, Educated, Industrialized, Rich, Democratic) to remind researchers that their participants need to come from diverse cultural backgrounds to justify generalizing theories. Moving beyond Americans highlights that societies differ in whether they socialize people to reason in terms of rules, person-based explanations, and "if-then" logic or in terms of family-based categories, context-based explanations, and "both-and" logic. People from Eastern cultures such as China are more likely to reason using a "both-and" dialectical logic in which two things can be true at the same time. In contrast, people from Western cultures such as the United States are more likely to reason using an "either-or" logic in which if one thing is true, another cannot be (e.g., Ji et al., 2001).

Societal Cultures Contain Subcultures and Individual Variability

In stratified societies, social class can form subcultural niches within societies (Oyserman, 2017). Wealth (e.g., Inglehart, 1997), education, and Westernization (Henrich et al., 2010) each matter, potentially increasing individualism. Thus, people who have a college education may be more likely to value individualistic patterns (Stephens et al., 2007).

In terms of difficulty mindsets, this literature could imply that higher social class affords people with the experience of choices, whereas lower social class reduces people's sense that they have choice and control; little choice and control could imply that when things are hard, they are not for you (Fisher et al., 2017). Relatedly, Heine and colleagues (2001) suggest that individualism may be associated with a preference to protect self-esteem, while collectivism may be associated with a preference for personal growth. In terms of difficulty mindsets, this literature could also imply greater salience of the possibility that difficulty means impossibility among Americans compared with people in more collectivistic societies.

The literature on cultural psychology also suggests individual differences in how much people within a society endorse the values of a society and the extent that their endorsement of these values matters for what they do (e.g., Kitayama et al., 2009). The implication is that we should test the effect of social class as a potential moderator of effects and look for the possibility that culture-based effects are moderated by individual differences. Hence, we test whether effects are more pronounced for Americans who live in working-class contexts (Fisher et al., 2017) and people who endorse difficulty-as-importance in their own lives (Oyserman et al., 2017) or reject a fixed theory of intelligence (Dweck et al., 1995).

Current Studies

Across 11 studies, we tested five specific hypotheses:

Hypotheses 1 (H1): Americans associate difficulty with impossibility (low odds) more than importance (high value)—people in other cultures may not have this bias. We measure free associations with difficulty (Study 1), word contiguity (Study 2), speed of processing (Studies 3–6), and understanding of definitions and synonyms of difficulty (Studies 7–11) as operationalizations of this prediction.

Hypotheses 2 (H2): When considering their own tasks and goals, people endorse a difficulty-as-importance mindset and reject a difficulty-as-impossibility mindset (Studies 3–11).

Hypotheses 3 (H3): How much people endorse difficulty-as-importance and difficulty-as-impossibility for their own tasks and goal will not matter much for their general associations with difficulty; general associations and endorsement in one's own life will be weakly to non-significantly correlated (Studies 3–11).

Hypotheses 4 (H4): People experiencing social-economic constraints will more readily associate difficulty with impossibility, affecting their general associations with difficulty (Studies 4–6).

We preregistered Studies 3–5 and 9–10. We share our data and syntax in openICPSR: https://www.openicpsr.org/openicpsr/project/143881/version/V1/view. We report all manipulations, measures, and data exclusion in each study. We analyze all collected data except in Study 6, where we analyzed only the relevant data from a larger project.

With the exception of H4, which has a directional prediction, we use Bayesian analyses to test the likelihood that a null hypothesis (no difference) is supported, something that *p* value hypothesis testing cannot do (Rouder et al., 2009). To test H1 and H2, we use the BayesFactor package in R (Morey & Rouder, 2018) to run Bayesian one-sample *t* tests (Studies 3–11). To test H3, we use correlations using the same package (Studies 3–6) and the brms package (Bürkner, 2017) to run multilevel regressions. We report Bayes Factors (BF_{10}) where subscript 1 refers to the alternative and subscript 0 refers to the null. The size of BF_{10} indicates the relative strength of the evidence. To facilitate interpretation, we use Jeffreys's (1961) 3 ⅓ rule-of-thumb such that $BF_{10} > 3$ indicates moderately strong evidence that scores are different from 0 and $BF_{10} < ⅓$ indicates moderately strong evidence that scores are not different from 0. This rule-of-thumb suggests that if $3 > BF_{10} > ⅓$, the data do not provide strong evidence in either direction.

Study 1

We used existing data (De Deyne et al., 2019) to visually inspect H1 (Americans associate the idea of difficulty with impossibility more than with importance).

Sample and Method

We provide sample descriptive information in Table 1 (first column). We analyzed the responses of the $n = 2{,}031$ American volunteers from De Deyne and colleagues (2019, smallworldofwords.com) who fit our criteria of being native American English-language speakers and free-associating with at least one of the synonyms of difficulty/difficult, impossible, and important (Table 2, top panel). De Deyne and colleagues (2019) asked adult volunteers to type in the first three words that come to mind given a cue word. Our participants provided 673 observations in which the word cue was a synonym of difficulty/ difficult, 440 observations in which the cue was a synonym of impossible, and 979 in which it was a synonym of important.

Analysis Plan

We used network analysis (Wasserman & Faust, 1994) to explore the underlying associative knowledge structure Americans have for the concepts of difficulty/difficult, important, and impossible and the typical linkages among these constructs. We included cue words and free-associative response words. We cleaned text using tidytext (Silge

Table 1. Participant Demographics in Studies 1 and 3–11.

Study	1	3	4	5	6	7	8	9	10	11
N	2,031	352[a]	254[b]	641[c]	1,428[d]	200	190	199	198	365
Preregistered	No	Yes	Yes	Yes	No	No	No	Yes	Yes	No
Sample source	De Deyne et al (2019)	U.S. MTurk adults	U.S. MTurk adults	U.S. MTurk adults	U.S. Middle and high schoolers	U.S. MTurk adults	U.S. MTurk adults	India MTurk adults	India MTurk adults	China adults
% female	59	52	63	49	52	51	50	28	27	63
M (*SD*) age	37 (17)	35 (11)	34 (9)	36 (12)	14 (1)	34 (10)	42 (12)	31 (7)	30 (5)	29 (13)
Race-ethnicity										
% White	—	69	71	80	59	71	73	—	—	—
% Asian	—	6	8	3	1	7	9	100	100	
% Black	—	12	9	8	9	12	11	—	—	—
% Hispanic	—	7	5	7	29	6	4	—	—	—
% BA or higher college degree	—	—	46	52	—	—	—			
% low income (under US$30,000)	—	—	35	33	41	—	—	—	—	—
GINI	—	—	.46 (.04)	.45 (.04)	—	—	—	—	—	—
Upward Mobility	—	—	41 (6)	42 (4)	—	—	—	—	—	—

Note. — denotes not collected. We only collected socioeconomic status (SES) data in the studies in which we made SES-based predictions (Studies 4–6). In Studies 4 and 5, we operationalized low income as income as income < $30,000 (about twice the poverty line). In Study 6, we operationalized low income as havomg a free or reduced-price lunch benefit (eligibility for free lunch in a single person household is an income of about $12,000).

[a]$n = 205$ completed adult-vocabulary. [b]$n = 143$ had complete data adult-vocabulary. [c]Following our preregistration, we dropped from analyses the data of participants who failed the attention check ($n = 19$) and who had accuracy below 75% on the Difficulty Associations Task ($n = 36$), resulting in a final $n = 246$. [d]n=1,210 with non-missing Difficulty Associations Task data.

Table 2. Cue Words Used in Study 1 and Studies 3–6.

	Cue groups		
Study number	Difficulty/Difficult	Impossible	Important
1	adversity, challenge, challenging, complication, difficult, difficulty, hard, hardship, hurdle, obstacle, problem, setback, strain, straining	can't, futile, helpless, hopeless, impossibility, impossible, impractical, improbable, inability, infeasible, unable, unachievable, unattainable, unlikely, unworkable	consequential, critical, crucial, essential, great, imperative, importance, important, informative, major, meaningful, needed, significant, useful, valuable, valued, vital, weighty, worthwhile, worthy
3–5	hardship, adversity, complication, hurdle, strain	hopeless, impractical, unattainable, futile, unlikely	worthy, valuable, informative, useful, weighty
6	setback, hurdle, hardship, obstacle, problem	unworkable, unlikely, can't, unable, hopeless	valued, major, great, needed, big

Note. We simplified the words in Study 6 so that they would be child-relevant. See Supplemental Materials for analysis showing that both sets of words function in the same way in two adult samples.

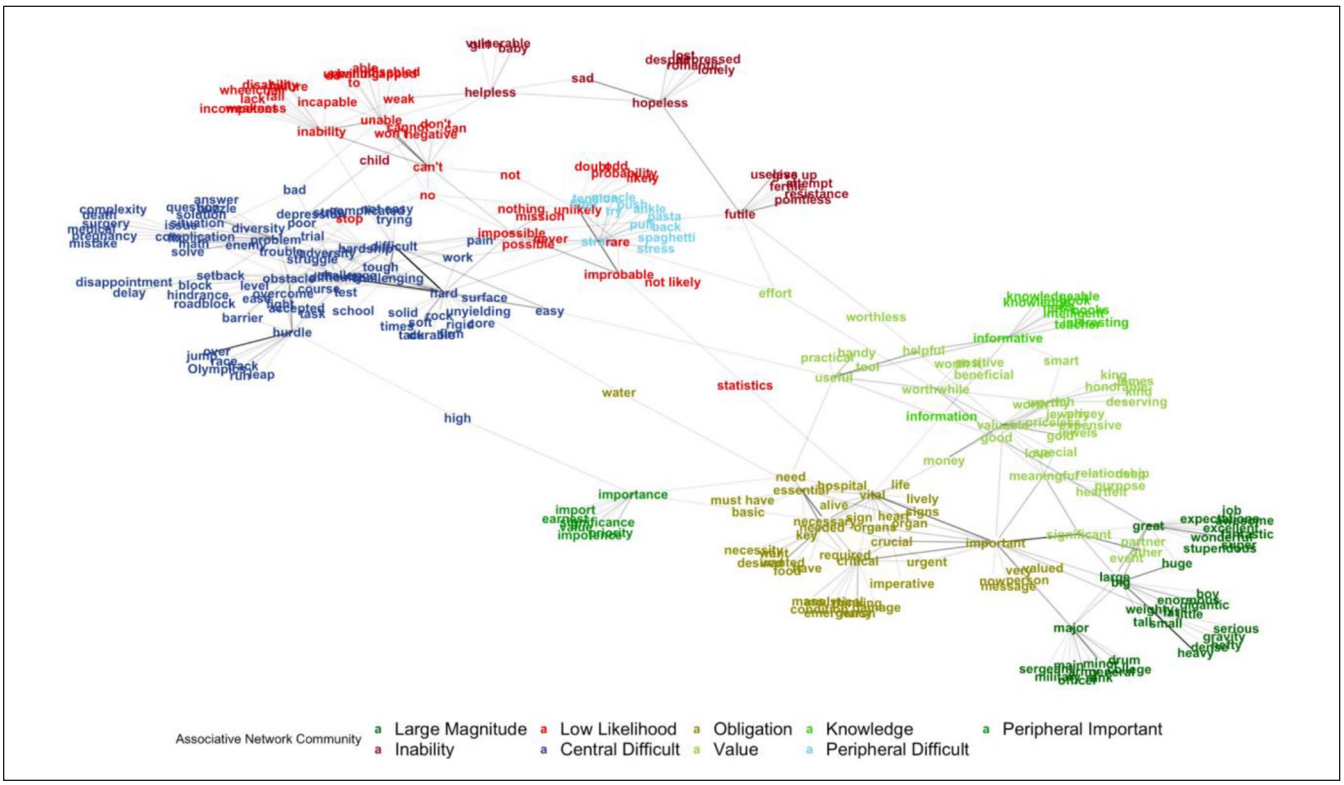

Figure 1. Network of words relating to difficulty/difficult, impossible, and important in Study 1.
Note. We show lines between words if three or more people linked those words and draw darker thicker lines weighted by association frequency. We colored communities of words based on their similarity to our three core concepts. We shade words relating to difficulty/difficult in blue, words relating to impossible in red, and words relating to importance/important in green. Our networks are based on the responses of $n = 2{,}031$ American volunteers; each volunteer responded to 14 to 18 cue words randomly drawn from a set of 12,292. Our participants provided 673 observations in which the word cue was a synonym of difficulty/ difficult, 440 observations in which the cue was a synonym of impossible, and 979 in which it was a synonym of important.

& Robinson, 2016). We constructed graphs using the igraph package (Csardi & Nepusz, 2006). We identified communities of densely connected words using the Walktrap community detection algorithm (see Pons & Latapy, 2005).

Results and Discussion

As depicted in Figure 1, our three core concepts are represented by nine word-communities. We describe each word-community and its connections to other word-communities next.

Difficulty: We found two not-well-linked difficulty word-communities. The larger central community (shaded dark blue) focused on trouble, obstacle, hardship, and challenge. The peripheral one, shaded light blue, focused on associations between the word strain and the body (strain my back) and pasta (straining pasta).

Impossibility: We found two interwoven impossibility word-communities (unlikely-unable shaded bright red, low agency shaded dark red). Both were associated with the central difficulty word-community, as shown by the multiple connecting lines between these communities.

Importance: We found five importance word-communities. These green-shaded communities were not well-linked to either difficulty or impossibility word-communities (few lines connect green-shaded with blue-shaded or red-shaded word-communities). The most central (dark khaki) importance word-community focuses on obligation (crucial, urgent, required, and imperative). An interwoven olive-green word-community focuses on value (worthwhile, valuable, and meaningful). A third forest-green word-community focuses on large magnitude (major, weighty, great, and ancillary associations with the word major). The small lime-green word-community focuses on knowledge (informative, books, and knowledge); the small leaf-green word-community focuses on the top three importance attributes (value, significance, and priority) and may reflect a play on importance and impotence.

We draw four conclusions from our descriptive results. Americans have dense associative knowledge networks for difficulty, impossibility, and importance. Their difficulty and impossibility associative knowledge networks overlap while their importance associative knowledge networks connect knowledge related to value and urgency. The links between the importance and difficulty word-communities seem weaker than the links between the impossibility and difficulty word-communities.

Study 1's strength is that it entails free associations, the words that came to peoples' minds when asked about difficulty, importance, or impossibility, increasing ecological validity. Descriptively, results support H1, that Americans associate difficulty with importance more than impossibility. In Study 2, we explore a potential source of these associations, the corpus of the English language.

Study 2

We test H1 (Americans associate the idea of difficulty with impossibility more than with importance) by examining the frequency with which words meaning "difficulty," "impossibility," and "importance" co-occur in the English-language corpus.

Sample and Method

We examined the frequency with which words about difficulty appear in proximity to variants of the word "impossible" compared with variants of the word "important" in the English-language corpus (available through Google N-grams, Michel et al., 2011; Pechenick et al., 2015). We used the corpora scanned by Google Books to obtain the association of the word difficult (difficulty) with the words important (importance) and impossible (impossibility), allowing any connecting word (represented as *). The database contained occurrences of seven of eight possible sets (*difficult*impossible, difficulty*impossible, difficulty*impossibility, difficult*important, difficulty*important, difficulty*importance, difficult*impossibility*). *Difficult*importance* was not found in the database.

Results and Discussion

Our analyses support H1. The words difficult and difficulty are 7.74 times more commonly associated with impossibility than with importance in the corpus, a significant and large difference, paired $t(200) = 11.91$ $p < .001$, $d = 0.84$. As a concrete example, the most common way that difficult and impossible are connected is the phrase difficult or impossible, which appears 11.90 times more frequently than the most common connection for importance, which is the phrase difficult and important.

Readers of the English-language corpus may come to associate difficulty with impossibility more because this association is more commonly encountered. In Studies 3–6, we test H1 by looking at the ease (speed) with which people associate difficulty and impossibility compared with importance.

Studies 3–6

We tested H1 to H4 across Studies 3 to 6, preregistering predictions H1 to H3 in Study 3 and predictions H1 to H4 in Studies 4 to 6.

Power, Stop Rules, and Exclusions

We determined our target sample sizes using three types of power analysis in G*Power (Faul et al., 2007) and based on the effect sizes observed in our pilot testing. First, we estimated the necessary sample size to detect a non-zero mean *D-score*, with effect size $d = .50$ and power of .80. Second, we estimated the necessary sample size to compare each of the mean *D-scores* for two versions of the task with $f = .20$ effect size, with moderate correlations between the task scores ($r = .30$) and with a power of .80. Third, we estimated the sample size needed to detect a small correlation ($|\rho| = .3$, power of .80) between the ease with which people associated difficulty with impossibility (vs. importance) in our sorting task and endorsed difficulty-as-importance and difficulty-as-impossibility in their own lives.

In Study 3, our approach yielded sample sizes of 34, 71, and 82, respectively. To be conservative, we aimed for at

least 100 participants. Participants in Study 3 were directed to our study based on a screener for an unrelated study that required a balanced number of Christian and non-Christian participants (Lin et al., 2021). In Study 4, we used the first two power estimates in Study 3 and added an estimate of the sample size needed to detect a small correlation ($|\rho| = .2$, power of .80) between *D-score*, income, intergenerational mobility, and difficulty-mindset scores, yielding sample sizes of 34, 71, and 200, respectively. We aimed to collect data on 200 participants, recruiting 254 and obtaining 205 participants with task scores. In Study 5, we used the same procedure as for the first and the third power analyses as in Study 4, adding an estimate of the sample size needed in multiple regression to detect task scores (effect size $f^2 = .03$ and power of .80) from inequality, mobility, difficulty-as-importance, and difficulty-as-impossibility. Sample size estimates were 71, 200, and 350, respectively. We aimed to recruit 400 participants and obtained data from 408 participants. Study 6 was not preregistered; instead, the sample ($n = 1{,}340$) was the baseline data collection sample in another study (Department of Education, Investing in Innovation Grant # U411C150011).

In Study 5, we excluded participants who failed an attention check at the end of the survey. In each study, we followed Karpinski and Steinman (2006), eliminating (a) nonresponses, (b) too fast (<350 ms) and too slow (>10,000 ms) responses, (c) and data from error-prone participants whose overall sorting accuracy was <75% (Supplemental Table S1 details these exclusions). We replaced error responses with the block mean plus an error penalty of 400 ms.

Sample and Procedure

We detail each study sample and preregistration status in Table 1. In Studies 3–5, our participants were American adults recruited from Amazon Mechanical Turk via the CloudResearch platform (formerly TurkPrime; Litman et al., 2017) and paid US$1.00 to "answer a short survey and to complete a computer task" in Qualtrics. We restricted our sample to people with IP addresses located in America. In Study 6, our participants were American middle and high school students who did the sorting task and completed the difficulty mindset measures as part of a larger unrelated school survey.

Studies 3–6 were similar in design and measurement, and participants in each study completed the difficulty-mindset scales, then the Difficulty Association Task, then demographics and socioeconomic information (Studies 3–5). In Study 6, we used school records of free/reduced-price lunch status instead of asking about socioeconomic information.

Measures and Task

Difficulty-as-impossibility and difficulty-as-importance. We used the Fisher and Oyserman (2017) six-item scales to assess how much people agreed (6 = *strongly agree*) or disagreed (1 = *strongly disagree*) with difficulty-as-impossibility (e.g., If a task feels difficult, my gut says that it may be impossible for me) and difficulty-as-importance (e.g., If a task feels difficult, my gut says that it really matters for me) as related to their own tasks and goals. We provide scale descriptive statistics in Table 3.

Difficulty associations task. We developed a sorting task to test whether Americans were more practiced associating difficulty with impossibility rather than importance. In Figure 2, we show examples of what participants saw while completing the task. Because the task assesses speed, we needed synonyms of impossible and important that were roughly equivalent in frequency, syllable length, and word length; we list the words we used in Studies 3 to 6 in Table 2. As we detail in Table 4, our words were roughly equivalent using these criteria, though descriptively, words for importance were a bit shorter and a bit more common.

We followed Karpinski and Steinman's (2006) standard procedure for single-category associations tasks, giving participants practice trials before testing their speed. We randomly assigned half of the participants to complete Blocks 1 and 2 (difficulty + important; depicted in the left panel of Figure 2) followed by Blocks 3 and 4 (difficulty + impossible; depicted in the right panel of Figure 2) and a half to the reverse order (3, 4 followed by 1, 2).

We instructed participants to press the "e" key for words on the left part of the screen and the "i" key for words on the right side of the screen. Unbeknownst to them, we showed words in the important category on the left, words in the impossible category on the right, and varied placement of words in the difficulty category by block as detailed in Table 5. We followed Karpinski and Steinman's method (2006), calculating the difference in latency to respond (*D-score*) between Blocks 2 (difficulty + important) and 4 (difficulty + impossible) divided by the standard deviation of all correct response-latencies in Blocks 2 and 4. This difference (*D-score*) represents the difference in reaction time when people used the same key to sort words into the difficulty and impossible categories versus when they used the same key to sort words into the difficulty and importance categories. A *D-score* of 0 means a person is equally fast in either situation; a negative *D-score* means a person is faster when difficulty is associated with impossible.

Socioeconomic constraints. We operationalized socioeconomic constraints as education, income, and free/reduced-price lunch status, as detailed in Table 1, which also provides descriptive information on these variables. We detail our education and income measures in the Supplemental Materials.

Results

Hypotheses 1 (H1): Supporting H1, *D-scores* were negative, which means that Americans experienced more ease

Table 3. Studies 3 to 11: Difficulty-as-Importance and Difficulty-as-Impossibility Scale Reliabilities, Means (With 95% Credible Intervals), and One-Sample *t*-test Bayes Factor (BF_{10}) Revealing Scores Differ From the Neutral Midpoint.

			95% CI of *M*			
Difficulty mindset	Study number	α	*M*	LB	UB	BF_{10}
Difficulty-as-importance	3	.91	4.31	4.21	4.41	2.99×10^{40}
	4	.90	4.35	4.23	4.46	1.78×10^{31}
	5	.88	4.33	4.26	4.40	9.20×10^{86}
	6	.87	3.32	3.28	3.36	2.33×10^{40}
	7	.85	4.39	4.26	4.50	7.45×10^{28}
	8	.91	4.32	4.18	4.47	1.67×10^{18}
	9	.79	4.43	4.30	4.55	5.16×10^{29}
	10	.77	4.50	4.37	4.61	8.47×10^{34}
	11	.81	4.09	3.99	4.19	1.81×10^{22}
Difficulty-as-impossibility	3	.91	2.76	2.61	2.87	4.22×10^{27}
	4	.92	2.76	2.63	2.90	1.02×10^{18}
	5	.88	2.67	2.59	2.74	1.76×10^{73}
	6	.85	2.46	2.42	2.50	1.25×10^{105}
	7	.92	3.25	3.08	3.40	4.19×10^{0}
	8	.93	2.94	2.78	3.11	5.24×10^{6}
	9	.90	3.85	3.68	4.02	1.53×10^{1}
	10	.83	4.25	4.10	4.39	3.76×10^{17}
	11	.76	3.09	2.99	3.18	1.32×10^{12}

Note. Scale midpoint is 3.0 in Study 6 and 3.5 in all the other studies. BF_{10} = Bayes Factor in favor of non-zero mean difference from the midpoint over the null. $BF_{10} > 3$ indicates strong support for the alternative hypothesis. Each BF_{10} score represents very strong support for the alternative that people endorse difficulty-as-importance (above the midpoint) and reject difficulty-as-impossibility (below the midpoint) when considering their own tasks and goals. CI = credible interval; LB = lower bound; UB = upper bound.

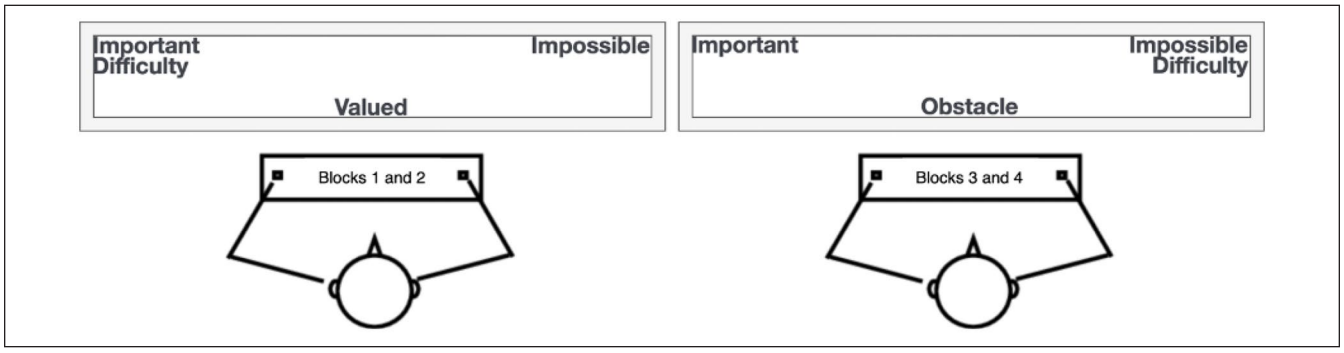

Figure 2. Visual representation of difficulty associations task.

associating difficulty and impossibility than difficulty and importance. *D-score* credible intervals did not include 0 and all BF_{10}s > 3, yielding strong support for H1 (for detailed test-statistics, see Table S4, Supplemental Materials). As illustrated in Figure 3, results are robust to including people whose responses are error-prone, that is, they did not follow task instructions 25% or more of the trials.

Hypotheses 2 (H2): Supporting H2, Americans endorsed a difficulty-as-importance mindset and rejected a difficulty-as-impossibility mindset when considering tasks and goals in their own lives. As detailed in Table 3, Bayesian *t*-test BF_{10} values were >3 and credible intervals did not include the midpoint, suggesting strong support for H2.

Hypotheses 3 (H3): Supporting H3, how much people endorsed difficulty-as-impossibility and difficulty-as-importance when considering their own tasks and goals did not have a reliable effect on the extent to which it was more fluent for them to associate difficulty with impossibility. As detailed in Figure 4 and supplemental Table S2, Bayesian correlation coefficients had credible intervals including zero and all BF_{10} values indicate support for the null hypothesis (even for the weakest effect, which is in Study 5, $BF_{10} < 1.00$, so still supports the null).

Table 4. Characteristics of Words in the Difficulty Associations Task.

	Word list		
Word characteristic	Difficulty	Important	Impossible
Mean length	8.2	7.4	9
Mean number of syllables	2.4	2.6	3.4
Frequency (ngram)	.001%	.003%	.001%

Table 5. Difficulty Association Task Blocks, Trials, and Pairings.

Block			Response key	
Number	Trial type	Number of words	Left-key	Right-key
1	Practice	15	Difficulty words, importance words	Impossibility words
2	Test	45	Difficulty words, importance words	Impossibility words
3	Practice	15	Importance words	Difficulty words, impossibility words
4	Test	45	Importance words	Difficulty words, impossibility words

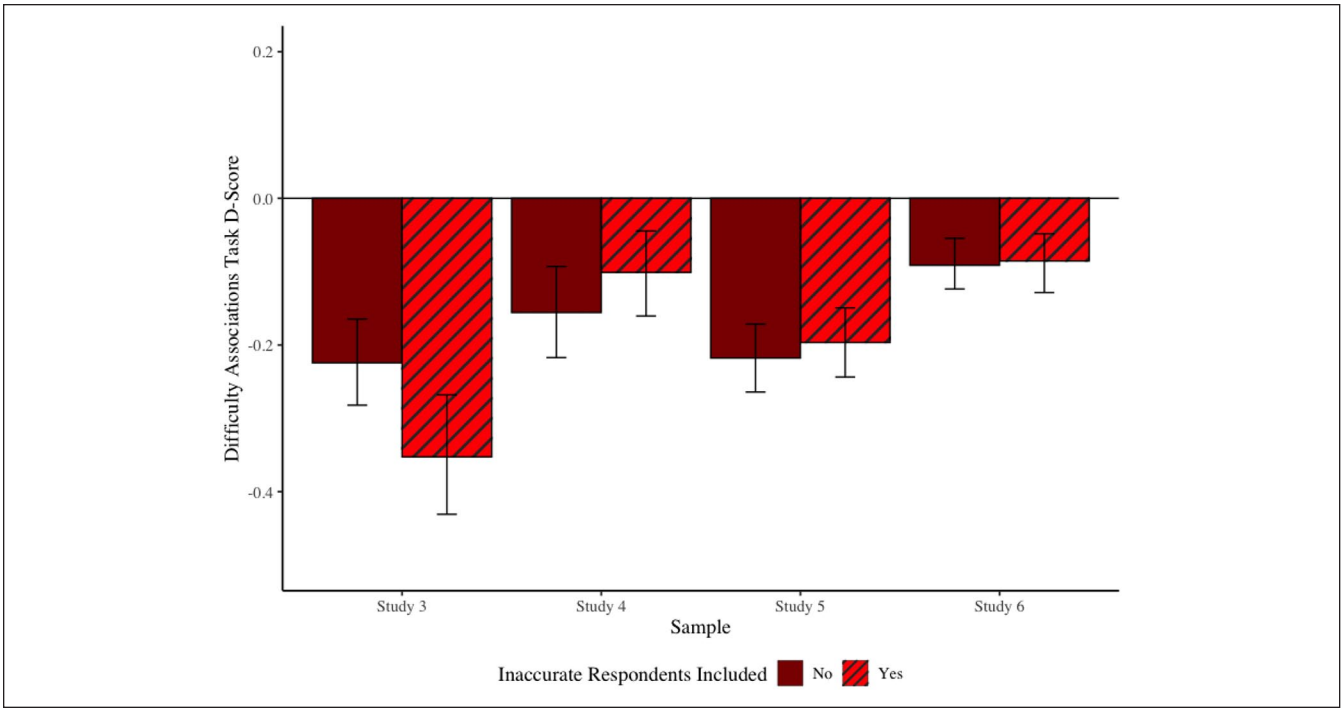

Figure 3. Adults and adolescents more readily associate difficulty with impossibility than with importance in Studies 3–6.
Note. Lower values on the *y*-axis represent a greater tendency to associate difficulty with impossibility than with importance. Error bars represent 95% credible intervals. All different from zero, BF_{10}s >3.

Hypotheses 4 (H4): We predicted but did not find consistent support for our subculture prediction that socioeconomic constraints shape Americans' association of difficulty with impossibility. As we show in Figure 5, only 4 of 11 correlation coefficients had confidence intervals that did not include zero, and even for these, the variables showing an effect varied across studies (see Table S3 for detailed test statistics). In Study 4, but not in Study 5, higher inequality was related to a greater readiness to associate difficulty with impossibility than importance. In Study 5, but not in Study 4, participants reporting higher income, education, and subjective social status showed less readiness to associate difficulty with impossibility compared with importance. While socioeconomic constraints do not seem to create subculture-based associations with difficulty, they may shape people's beliefs about

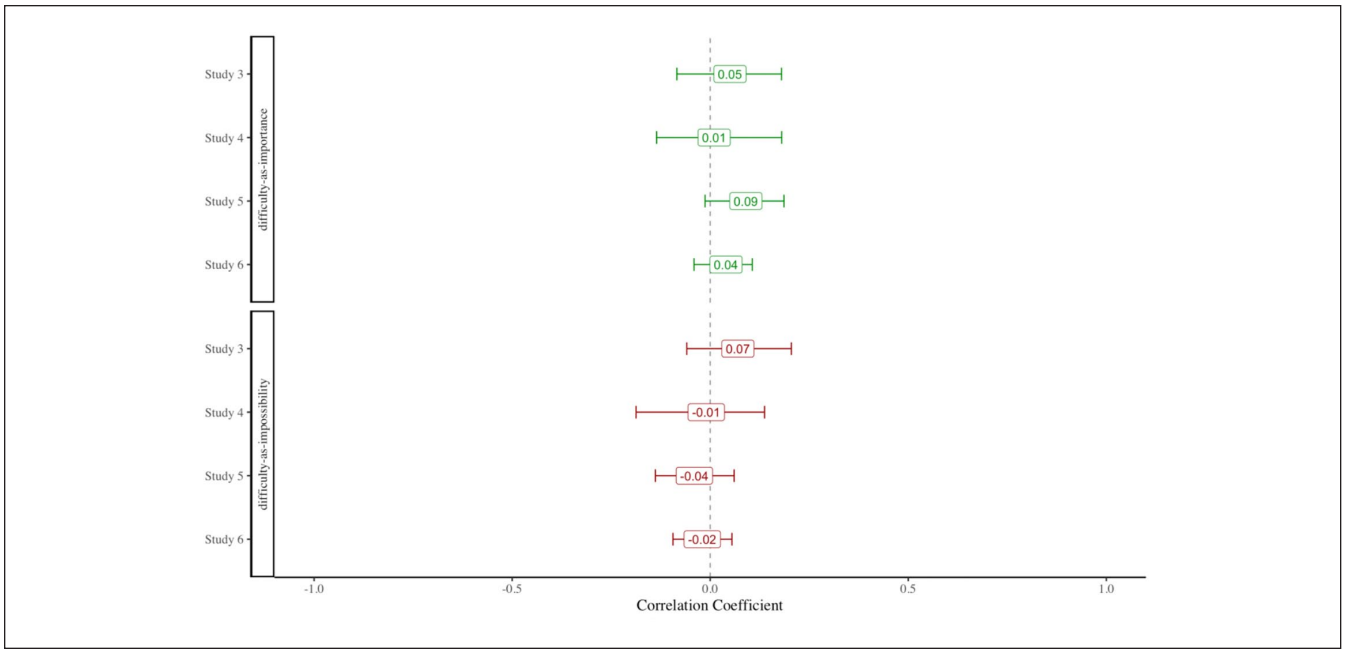

Figure 4. Studies 3 to 6: Pearson's correlations between the difficulty associations task D-score and endorsing difficulty-as-impossibility and difficulty-as-importance when considering one's own tasks and goals.
Note. Error bars are 95% credible intervals, mean values are presented inside each box. Line segments that cross the horizonal 0-correlation coefficient marker visually represent non-significant associations. Results are robust to including inaccurate responders (see Supplemental Figure S2).

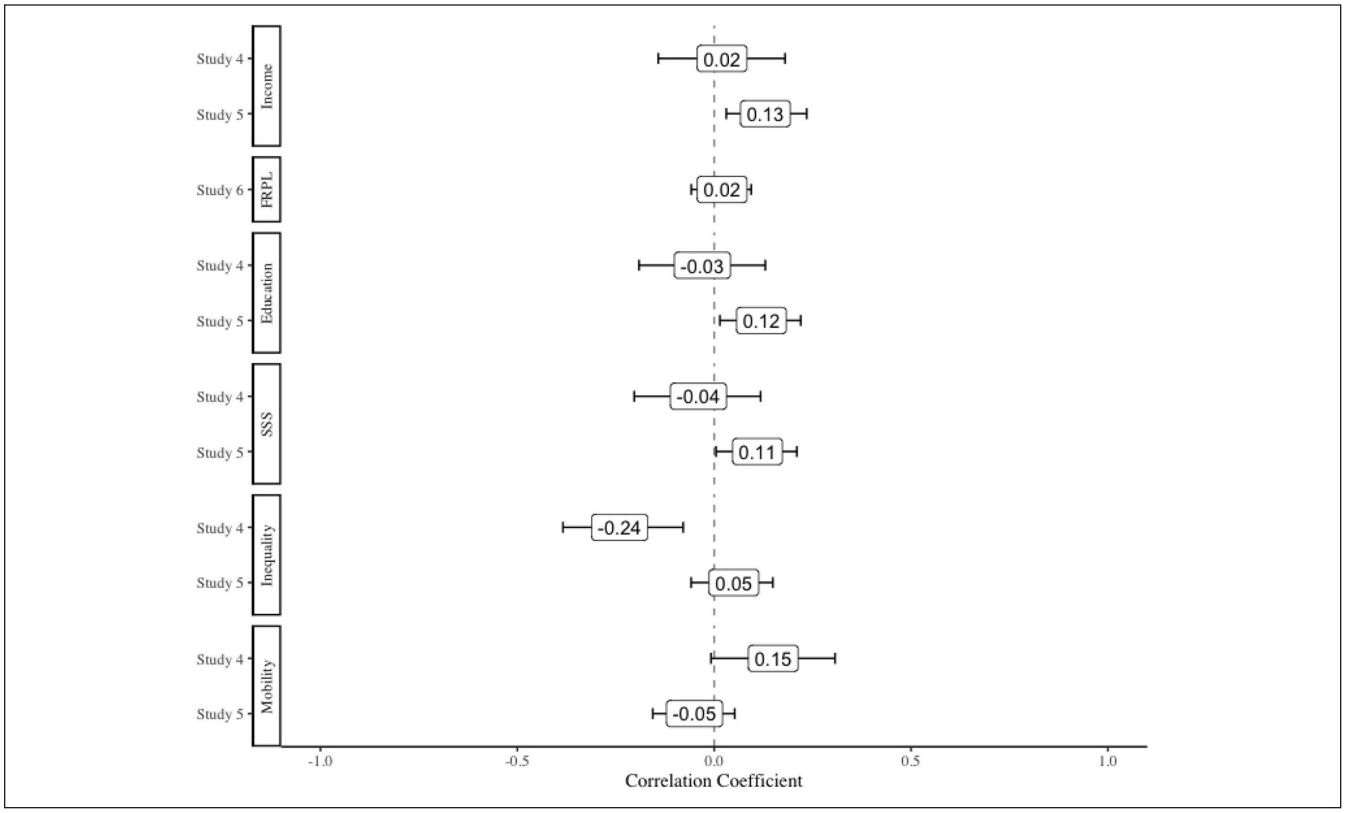

Figure 5. Studies 3 to 6: Pearson's correlations between the difficulty associations task D-score and markers of socio-economic status and economic context.
Note. Error bars are 95% confidence intervals, mean values are presented inside each box. Line segments that cross the 0-correlation coefficient horizontal line marker visually represent non-significant associations. Results are robust to including inaccurate responders (see Supplemental Figure S3). Mobility = county-level absolute upward mobility; Inequality = county-level GINI coefficient; SSSL = subjective social status ladder; FRPL = Free and reduced lunch status.

what difficulty implies when working on their own tasks and goals. We explored this possibility in exploratory analyses that we detail in Figure S4 in our Supplemental Materials. In brief, we found a small negative association between having low income and endorsing difficulty-as-impossibility when working on one's own tasks and goals.

Discussion

Our results imply that for Americans it is more fluent (easier) to associate difficulty with impossibility than with importance. This ease of association is not a feature of how much Americans endorse difficulty-as-importance and difficulty-as-impossibility when considering their own tasks and goals and is not a function of their socioeconomic status. Our results support our prediction that American culture makes it more fluent to see difficulty as being about impossibility rather than importance. We did not find that these results were moderated by subculture operationalized as social class or by individual differences in how much Americans endorse difficulty-as-importance and difficulty-as-impossibility when considering their own tasks and goals.

However, because we measured Americans' ease of association rather than directly asking them what difficulty means, it might be that difficulty really does reflect the impossibility (or at least the low odds) of success more than the importance or high value of success. Moreover, while we measured social class using a variety of indicators, we might have failed to measure the relevant individual difference moderator. Hence, in Studies 7 and 8, we asked Americans to tell us whether definitions or synonyms of the word difficult were more about impossibility (low odds) or importance (high value) and added theory of intelligence (Dweck et al., 1995) as an individual-difference measure.

Study 7 and Preregistered Study 8

Study 7 was exploratory; Study 8 was a preregistered replication of Study 7. We preregistered H1 (Americans will on average see definitions and synonyms of difficulty as being more about impossibility than about importance). We also preregistered an individual differences exploratory analysis as detailed below.

Sample

We detail our samples in Table 1. Our participants were American adults (IP addresses located in the United States) with 95% or higher HIT approval ratings, recruited via Amazon Mechanical Turk's CloudResearch platform and reimbursed US$0.70 (Study 7) or US$1.20 (Study 8).

Power, Stop Rules, and Exclusions

We used G*Power to calculate the sample size needed to detect a small effect ($d = 0.20$) at alpha level = .05 with 80% power for a one-sample *t* test of prediction that people would associate difficulty with impossibility more than a 50% even split. This directional prediction requires a sample of $n = 156$. To be conservative, we planned to recruit 200 participants to each study. Our preregistered analysis plan was to drop from our one-sample *t* test analysis any participant who had failed to categorize all words they were presented. However, many participants had missing data for a small few of the presented word categorizations. Rather than discard most of our data, we included all participants in our analyses. We provide descriptive statistics on the number of categorizations in each study in Supplemental Materials Table S7.

Method

Measures

Word task. We created our difficulty definition and synonym list in three steps. First, we searched the websites of three popular dictionaries: Dictionary.com, the Merriam-Webster Dictionary (https://www.merriam-webster.com/), and the Oxford English Dictionary (https://en.oxforddictionaries.com) for definitions and synonyms of "difficult" and "difficulty." Second, we removed duplicates. Third, we added the words "difficult" and "difficulty." Together, this yielded a total of 82 definitions and synonyms. We provide the full list in our Supplemental Materials, Table S9.

Individual differences. We used 4-item scales from Fisher and Oyserman (2017) to measure difficulty-as-importance and difficulty-as-impossibility mindsets (Table 3 shows descriptive statistics) and a three-item scale from Dweck and colleagues (1995) to measure theory of intelligence (Table S8, Supplemental Materials provides descriptive statistics). All responses 1 = *strongly disagree* to 6 = *strongly agree*.

Procedure. Participants completed our 20-item (Study 7) or 40-item (Study 8) categorization task and then our individual difference scales. We told participants they would see a word or phrase on the screen (a randomly drawn subset of the 82-item full set). Their task was to read it and use their first instinct (they had 10 s to respond) to categorize it as being either more closely related to impossibility (low odds of success) or importance (high value). After 10 s, the screen refreshed, and the next word or phrase appeared. We controlled for other possible influences on categorization by randomly assigning participants to either see the impossibility key on the left (see Figure 6) or the right side of the screen. We controlled for other possible influences on our individual difference measures by randomizing the order of presentation of scales and items within scales.

Results

Supporting H1, Americans categorized definitions and synonyms of difficulty as being about impossibility more than about importance (Study 7, $BF_{10} = 2.91 \times 10^7$; Study 8,

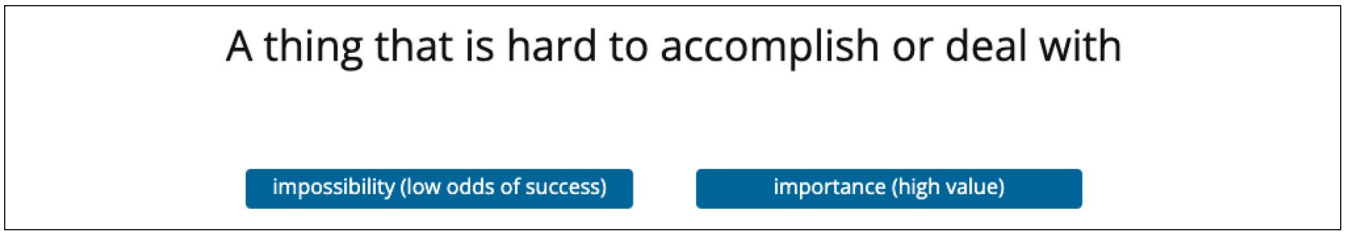

Figure 6. Screenshot of an impossibility-left categorization trial in Studies 7–11.
Note. We presented words in Chinese using definitions and synomns drawn from Chinese dictionaries in Study 11.

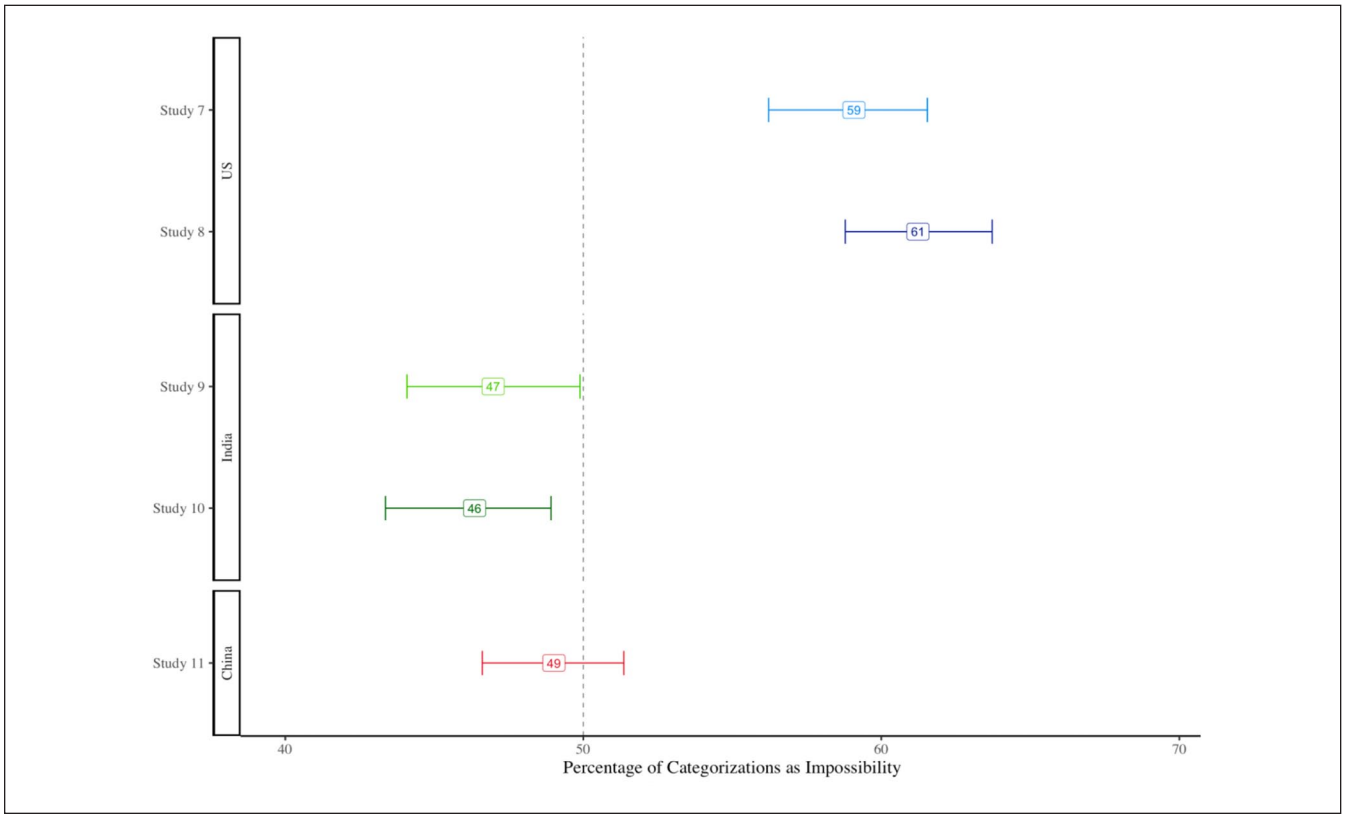

Figure 7. Studies 7 to 11: Average percentage (and 95% confidence intervals) of categorization of definitions and synonyms of difficulty as being about impossibility (not importance).
Note. Values above 50% represent a propensity to categorize synonyms and definitions of difficulty as being closer to impossibility than to importance, and values below 50% represent a propensity to categorize synonyms and definitions of difficulty as being closer to importance than to impossibility. Error bars are 95% credible intervals, mean values are presented inside each box.

BF_{10} =1.11×10^{13}). We show these data as mean percentages with 95% credible intervals in Figure 7 (top panel; see Supplemental Figures S5–S6 for corresponding posterior distributions). Results are robust; we get the same pattern of results analyzing at the level of words (the proportion of the 82 definitions and synonyms of difficulty that were more likely to be categorized as being closer to impossibility, see Supplemental Materials). To concretize our results, in Table 6, we present the three definitions and synonyms of difficulty that people were most likely and the three they were least likely on average to categorize as being about impossibility, along with the two seed words (difficult, difficulty). Interested readers can find the full list of words and their categorizations in Table S9, Supplemental Materials.

Supporting H3, we did not find any reliable moderating effects of individual differences in how much people endorsed difficulty-as-importance and difficulty-as-impossibility in their own lives or their theory of intelligence. Interested readers can find these null results in Figure S10 and Table S11 in Supplemental Materials.

Discussion

Our results support H1, compared with a null prediction of 50%, Americans understand the concept of difficulty

Table 6. Studies 7 to 10: The Three Definitions and Synonyms of Difficulty Most- and Least Likely-Likely, on Average to be Categorized as Being About Impossibility.

Word or phrase	Study 7	Study 8	Study 9	Study 10
unmanageable	93%	89%	81%	68%
reluctance or unwillingness	88%	84%	63%	69%
nuisance	75%	82%	64%	63%
difficult	**80%**	**71%**	**57%**	**59%**
difficulty	**68%**	**64%**	**68%**	**63%**
testing	19%	21%	12%	23%
exacting	14%	16%	26%	24%
great effort	7%	16%	10%	22%

Note. The three definitions and synonyms people were most likely (above) and the three least likely (below the seed words difficult and difficulty), which are printed in bold for clarity).

(difficult) to be about impossibility. We looked for but did not find evidence for the moderation of effects due to individual differences in how much people endorsed difficulty-as-importance and difficulty-as-impossibility when considering their own tasks and goals or their theory of intelligence. In Studies 9 to 11, we switched to other cultures to more directly test our culture-based prediction.

Studies 9 to 11

In Studies 9 to 11, we followed the design of Studies 7 and 8. Studies 9 and 10 (India) were preregistered with the same core and exploratory analyses as for Study 8. We added to our preregistration exploratory analysis comparing our Indian and Chinese (Study 11) participants to our U.S. participants on their propensity to classify definitions and synonyms of difficulty as being about impossibility. In Study 9, people completed 20 sorting tasks, and in Studies 10 and 11 they completed 40. The tasks were randomly drawn from the total set as in Studies 7 and 8.

Sample and Recruitment

We detail our samples in Table 1. Our English-language study participants were Indian adults (IP addresses located in India) with 95% or higher HIT approval ratings, recruited via CloudResearch platform and reimbursed US$1.20 (Studies 9, 10). Our Chinese language study participants were Chinese adults recruited October 13 to 16, 2020, via the Chinese popular social media site *Wechat* and reimbursed 6.8 RMB, roughly US$1.02 (Study 11).

Power, Stop Rules, and Exclusions

We aimed to recruit 200 participants (Studies 9, 10). In Study 11, because we recruited via social media, we used a time window as our stop rule, collecting data for 4 days. Although preregistered, we did not exclude participants who missed one or more trials as that turned out to be unnecessarily stringent (see Supplemental Material Table S7).

Method

Measures

Word task. In Studies 9 and 10, we used our previously developed list of 82 English-language definitions and synonyms. In Study 11, we created a Chinese-language definition and synonym list using the same procedure as in English. We used *The Contemporary Chinese Dictionary* (Chao & Jingti, 2005) definitions of the words difficult/difficulty and then two dictionaries (Mei et al., 1996; Xia & Chen, 2009) to find synonyms. We show our full list of 97 Chinese definitions and synonyms in Supplemental Materials Table S10.

Individual difference measures. Across studies, we used the same measures difficulty-as-importance and difficulty-as-impossibility measures (see Table 3 for reliability statistics and descriptive information) and revised our theory of intelligence measure to include items reflecting fixed and growth beliefs (see Supplemental Materials for the full set in English and Chinese).

Procedure. As in Studies 7 and 8, participants rated a randomly selected subset of 20 (Study 9) or 40 (Studies 10, 11) definitions or synonyms of difficulty (difficult) and then completed our individual differences measures.

Results and Discussion

Supporting H1, Indian and Chinese participants did not categorize definitions and synonyms of difficulty as being about impossibility more than about importance. We show these data as mean percentages with 95% credible intervals in Figure 7 (middle and bottom panels; see Figures S7-S9 for corresponding posterior distributions). Our results for China are simple, Study 11 shows support to favor the null. It is 12.5 times more likely, given the data, that participants are not biased toward associating difficulty with either importance or impossibility (BF_{10} =.08). Our results for India are a bit more complex because they suggest some likelihood of a bias toward associating difficulty with importance rather than no bias. Study 10 shows this pattern is 2 times more

likely than no bias (BF_{10} =2.17). Study 9 shows this pattern is half as likely as no bias (BF_{10} =.50). Neither of these results is as strong as the evidence that Americans are biased toward associating difficulty with impossibility. The implication is that, unlike American culture, Chinese and Indian cultures do not make a difficulty-impossibility association fluent, rather these cultures allow for a "both-and" logic in which difficulty and mean both impossibility and importance. Results are robust; we get the same pattern of results analyzing at the level of words (see Supplemental Materials).

Supporting H3, results are not moderated by individual differences (detailed in Figure S5, Supplemental Materials). The implication is that the differences between the association patterns we found in the United States may be culture-specific, not culture-general, setting up culture-specific experiences of fluency. We tested this possibility more directly by combining data across Studies 7 to 11 and comparing the percentage of definitions and synonyms of difficulty categorized as being more closely related to impossibility. In these exploratory analyses, we employed a one-way Welch's analysis of variance,[1] which revealed a significant between-country difference, $F(2, 748.62) = 52.97$, $p < .001$. Follow-up Bonferroni-corrected post hoc t tests revealed that our American participants differed from our participants from India, $t(778) = -9.69$, adjusted $p < .001$, and China $t(685) = -7.12$, adjusted $p < .001$. Americans were more likely to sort definitions and synonyms of difficulty as being about impossibility than people from India and China who did not differ from each other, $t(719) = 1.44$, adjusted $p = .45$. We used the common language effect size (McGraw & Wong, 1992), derived from Cohen's d, to compute the probability that a randomly drawn participant from the United States has a higher score than a randomly selected participant in another country. The probability is 69% when comparing the United States and India and 64% when comparing the United States and China.

General Discussion

In American culture, the association between difficulty and impossibility is more fluent than the association between difficulty and importance. Americans in our studies absorbed this culture-rooted sense that difficulty is more about impossibility than importance. They free-associated difficulty with impossibility more than with importance (Study 1) and were faster at responding when difficulty and impossibility words were paired compared with difficulty and importance words (Studies 3–6). This association is reflected in writing; difficulty and impossibility words are likely to be proximal (close together) in the corpus of the English language than difficulty and importance (Study 2). When asked directly, Americans were more likely to report that definitions and synonyms of difficulty are related to impossibility than to importance (Studies 7 and 8). This pattern is culture-based and culture-specific. People from India (Studies 9 and 10) and China (Study 11) do not associate difficulty more with impossibility than importance. We did not find any effect of individual differences on these culture-based patterns. People's tendency to follow their culture did not vary as a function of how much they endorsed the idea that difficulty implies importance or impossibility when considering their own tasks and goals (Studies 3–11) or their theory of intelligence (Studies 7–11). We also considered the possibility that social class creates subcultural niches within the U.S. culture, making the difficulty and impossibility association more pronounced in some niches rather than others. We did not find consistent evidence for this. What we did find is that people living in straitened economic circumstances may be more likely to infer that difficulty means impossibility when working on their own tasks and goals.

Creating Space for Culture-Sensitive Research on Motivation

Our results contribute to the literature on the interface between culture, motivation, self-regulation, and beliefs about ability and competence. We synthesize culture-as-situated-cognition and identity-based motivation theory to predict that people prefer to act and make sense of their experiences in identity-congruent ways and that culture shapes meaning-making (Oyserman, 2007, 2015b; Yan & Oyserman, 2018). We contrast an American ability-before-competence norm with Chinese and Indian competence-and-ability norms. The former implies that people who experience difficulty lack ability. In American culture, people believe that not everyone can have high intelligence (Rattan et al., 2012). We document for the first time that the association between difficulty and impossibility is more pervasive and hence more likely to come to mind than the association between difficulty and importance for Americans and that this may not be the case in other cultural contexts. While people should be sensitive to whether in a particular context difficulty implies low odds, a culture-based bias to assume that it always does may reduce chances for becoming competent.

We show that people's understanding of what difficulty implies is culture-based, not a product of people's individual beliefs about what difficulty implies when working on their own tasks and goals or their individual beliefs about whether intelligence is fixed. We also show that this culture-based understanding is already present by middle school and is not moderated by social class. In this way, our results both suggest limiting conditions as to when social class moderates culture (see also Stephens et al., 2007) and complement prior studies suggesting that individual differences in culture-based world views may not always predict task performance (see Kitayama et al., 2009).

Our results also contribute to the discourse on motivation and meta-cognition. American theories of motivation focus on high expectancies and the value of success in the context

of expectancy-value theories (Wigfield & Eccles, 2000). These ideas are also reflected in theories about self-efficacy (Bandura, 1997) and self-determination (Deci & Ryan, 2004) and in people's implicit theories about intelligence and ability as fixed, not changeable (Molden & Dweck, 2006). To the extent that American culture associates difficulty with impossibility rather than importance, American institutions may be more likely than institutions in other cultures to be structured in ways that imply innate, fixed, or "natural" talents at the expense of developing abilities (Scherr et al., 2017). Because American culture values natural talent, people are encouraged to focus on the domains in which things come easily for them (Li et al., 2021). This results in a conflation of talent and ability among Americans that may not be present in other cultures.

Indeed, while the belief that intelligence cannot be changed is incompatible with belief that ability can change by the stint of effort for Americans, people in other cultures seem to hold both ideas in mind as separate, not opposite beliefs (e.g., China: Chan, 2012; India: Kevin & Risla, 2020; Japan: Potsangbam & Barman, 2019). That is, some things about people are not changeable, other things are. For example, by becoming competent, people can become more able, but that does not mean that some people are more able than others. Perhaps, for this reason, endorsing the theory of intelligence as fixed is related to worse standardized test scores (Program for International Student Assessment [PISA]) for American students but not students from other cultures (Gouëdard, 2021).

Our results also contribute to the discourse on metacognitive processes in learning. We find that Americans, more than others, interpret difficulty as meaning impossibility rather than importance. If American teachers incorporate this culture-based belief into their classrooms, they may prefer suboptimal learning strategies, ones that support experiences of ease rather than capitalizing on chances for learning through difficulty, failures, and confusion (Bjork et al., 2013; D'Mello et al., 2014; Dunning et al., 2003; Karpicke et al., 2009; Kirk-Johnson et al., 2019; Koriat & Bjork, 2005; Yan et al., 2016b). By using these suboptimal strategies, teachers may reinforce American students' culture-based association of difficulty with impossibility and further undermine chances to learn (Oyserman & Dawson, 2021). Educational institutions set up in this way imply that not everyone has the capacity to learn and create negative cycles in which upward comparisons are depleting (Kemmelmeier & Oyserman, 2001a) and people fail to learn from others (Kemmelmeier & Oyserman, 2001b).

Strengths, Limitations, and Future Directions

Our studies are novel in that they document that Americans associate difficulty with impossibility more than importance and that this response is culture-bound—specific to the United States and not found in India and China. We use secondary analyses of large-scale data, linguistic analysis, analyses of over-learned implicit associations in adults and children, and adults' understanding of the full set of definitions of difficulty in both English and Chinese. We directly compare results for Americans and people from India and China. By using multiple methods, we can rule out alternative explanations that our American effects might be due to the limits of any one of these techniques. We show that effects are culture-based and culture-bound rather than due to individual differences in how people interpret difficulty working on tasks and goals in their own lives. We analyzed the probability that a randomly drawn participant from the United States associates difficulty with impossibility more than a randomly selected participant from India (69%) or China (64%). We interpret these high probabilities as implying that our results are substantially due to differences in cultural fluency. That the probability is not 100% also means that other effects remain to be discovered.

We infer that our results matter because culture-based understanding of what difficulty implies likely shapes institutions (e.g., educational systems) and practices (e.g., parenting, teaching, and coaching) and shapes that standard against which people make sense of themselves (e.g., shifting standards, Biernat, 2012). At the same time, our studies do not allow us to understand the source of individual variation and do not test downstream consequences for institutions and practices. We consider two kinds of limitations, those based on our methods and samples and those based on how culture-based and individual-difference-based understanding of difficulty can each uniquely contribute to outcomes.

First, regarding methods and samples, we use a variety of different methods and distinct samples. At the same time, our studies are correlational and do not include a full range of cultures or developmental phases. Hence, we cannot know when the cultural differences we show emerge and cannot say whether American participants exposed to other cultural frames would show less bias or to how many cultures our results generalize beyond the United States, China, and India (e.g., regarding multiculturality, Morris et al., 2015). Future studies comparing respondents before middle school, across countries, and comparing participants who spent time in diverse educational settings might shed light on this issue. Our results suggest that American culture sets up a negative association between ability and difficulty whereas other cultures do not. An implication is that interventions to increase the association of difficulty with importance and reduce the association of difficulty with impossibility are promising paths to the extent that they change local school cultures (Oyserman, 2015b; Oyserman et al., 2006). Future research examining the effect of such interventions on school-level norms and teacher beliefs is needed to begin to address these gaps. Moreover, our current results document that people in our different culture-based samples are likely to differ in their understanding of difficulty, but that some within-culture variability exists. Our current methods do not allow us to pinpoint

the source of that variation, we know that it is not due to how people interpret difficulties with their own task and goals, their socioeconomic context, or their beliefs about intelligence. Future studies are needed to understand whether our effects are driven by as yet unmeasured subculture effects.

A second limitation in our current studies is that although we show culture-based variation, with Americans uniquely associating difficulty with impossibility—low odds, lack of ability—our current studies do not take the next step to document the domains in which this culture-based variation matters. We speculate that these culture-based differences affect cultural practices. For example, consider American educational practices such as ability-tracking and parenting practices such as seeking to invest in those areas in which children show promise. Future studies are needed to test our assumption that these practices are associated with culture-based understanding of difficulty and that separately from that, particular teachers and particular parents may interpret their own difficulties in teaching and parenting as due to the importance or the impossibility of the task at hand. We interpret our results as implying culture-based differences in the extent to which achievement is essentialized as a natural talent or ability rather than seen as the result of sustained effort (attained competence). This culture-based belief is distinct from people's beliefs about what difficulty implies when experienced while working on their own tasks or goals.

Our results matter because theories about motivation are rooted in assumptions about the appropriate inferences to make from experiences of difficulty. In American culture-based theories, investing effort is understood as the less-valued substitute for ability because American culture sets up an undermining implicit dichotomy between succeeding easily due to ability and succeeding due to powering through difficulty with effort. To preserve themselves from the negative connotations of succeeding by the stint of their effort rather than through the gift of ability, Americans may too quickly withdraw effort in the face of difficulty. In contrast, people from other cultures are less ready to see difficulty as being about impossibility rather than importance.

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Supplemental Material

Supplemental material is available online with this article.

Note

1. The preregistered exploratory analytic method was a chi-square test of independence, but a one-way analysis of variance (ANOVA) is more appropriate. We used Welch's one-way ANOVA test which does not require an assumption of homogeneity of variance, given that the Levene's test was significant, $F(2, 1146) = 7.45$, $p < .001$.

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