Difficulty

8247 words including abstract and footnotes

What is difficulty? Despite being invoked in numerous normative debates, the nature of difficulty remains poorly understood. Various accounts, tailored to different explanatory contexts, have recently been proposed in different philosophical discussions. I criticize these accounts. I then provide an alternative, empirically informed account of difficulty in terms of cognitive demand. This account captures empirical phenomena as well as folk intuitions regarding difficulty. I further argue that it generalises well, explaining many other facets of difficulty. I end by showcasing the broad applicability of this account by looking at a set of normative debates invoking difficulty. I show that understanding difficulty in terms of cognitive demand helps us make progress on pressing questions in the study of moral responsibility, achievement, the value of difficult action, and moral demandingness.

1. Introduction

A student ponders a challenging question on a physics exam; an employee, gazing at the morning sun through the window, struggles to find the will to get out of bed; a couple in a rocky relationship tries very hard to work out their differences. Difficulty is ubiquitous in many aspects of our lives, and philosophy is no exception.

To illustrate the normative relevance of difficulty, consider three examples of how difficulty is invoked in moral debates. Achievement is commonly understood as the competent performance of difficult tasks (Bradford, 2015; von Kriegstein, 2019; Kieval, 2024). A moral theory may prove overly demanding if its prescriptions are inappropriately difficult (Chappell, 2019; McElwee, 2022). When facing a very difficult task, moral responsibility for errors is reduced, but for failure at an easy task, it is not (Nelkin, 2016; Guerrero, 2017). The critical role difficulty plays in these and other debates, as well as the ubiquity of difficulty in everyday discourse, makes understanding the nature of difficulty a vital and pressing issue.

However, the nature of difficulty remains poorly understood. To take just one example, no current theory explains the (empirically) well-studied phenomenon of how difficulty decreases as we learn.

These problems may stem from the disconnected accounts of difficulty proposed by different philosophers. Conflicting explanations of difficulty, tailored to specific explanatory purposes and contexts, have taken root in various philosophical debates (e.g., Bradford, 2015; von Kriegstein, 2019; Chappell, 2019; McElwee, 2022; Massin, 2024; Kieval, 2024; Dunkle, 2024). I present an alternative: a comprehensive theory of difficulty that is intuitively plausible, empirically sound, and broadly applicable across different philosophical debates.

The remainder of this essay is laid out as follows. Part 2 illustrates the need for a new account of difficulty by identifying shortcomings in current accounts. Part 3 develops an alternative, broad-scoped account of difficulty. I argue that difficulty is proportional to ‘cognitive demand,’ a psychological notion that refers to the appropriate amount of one’s higher-order processing capacity required by a task. Part 4 introduces the empirical literature on learning and demonstrates that only my cognitive demand account explains how difficulty is reduced as we learn. Part 5 clarifies the relational and context-sensitive nature of difficulty, which is captured by my account. Part 6 argues that my account generalises to a wide variety of cases, including physical difficulty. Part 7 discusses how my account relates to the notion of effort. Part 8 briefly sketches four normative applications of the

cognitive demand account, showcasing the fruitfulness of the unified account of difficulty for a wide range of philosophical debates.

2. The Need for A New Account Of Difficulty

Currently, difficulty is typically explained in terms of reliability or effort.

Reliability accounts suggest that difficulty is a function of how reliably one can bring about a particular outcome (Westbrook & Braver, 2016; von Kriegstein, 2019)[1]. After all, many difficult things cannot be achieved reliably, such as hitting a home run. However, as others have noted (Bradford, 2015; Guerrero, 2017), many difficult things can be reliably achieved. Think of carrying heavy groceries or multiplying 1237 times 1923 with a pen and paper. These are more difficult than carrying light groceries or multiplying 12 times 13. But still a competent adult can reliably succeed at all four tasks. And some tasks we cannot bring about reliably do not seem difficult. Rolling a six in a dice game cannot be done reliably but seems to involve no difficulty – just a throw of a die. Low reliability is neither necessary nor sufficient for difficulty.

Effort views, on the other hand, explain difficulty by the effort-requiring features of a task – the more effort a task requires of the agent, the more difficult the task (Bradford 2015, Nelkin 2016, Chappell 2019). These are the currently dominant views, so I will discuss them in greater detail. They seem intuitively plausible, yet they struggle to explain what effort is.

Some effort views stay silent on what effort is. Bradford tentatively posits that effort may be explanatorily primitive (2015, p.39). This move may strike many as premature given the sizable philosophical and psychological literature on the topic. This work instead suggests that an analysis of effort should be attempted before resorting to primitivism, a possibility that Bradford indeed explicitly welcomes (ibid.).

An analysis of effort may rely on the feeling of effort to identify the difficulty of a task (Wolpe et al., 2023; Bermúdez, 2023). But the feeling of effort and the difficulty of the associated task can come apart.[2] For example, flow states are states of ‘effortless absorption in a task.’ Yet achieving success is difficult even when in a flow state (Csikszentmihalyi, 2002). In fact, the difficulty of a task is a good predictor of whether subjects can enter a flow state at all (Kozhenikov et al., 2019). Furthermore, Naccache (2006) presents a report of a patient with a brain lesion who does not experience any mental effort. Self-report, behavioural measures, and physiological tests confirm the lack of any feeling of mental effort. Yet, the patient still faces difficulty when undergoing mental tasks, and does not perform better than healthy patients. These cases show that the feeling of effort is not a necessary component of difficulty.

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[1] Kriegstein defends a hybrid view that incorporates both complexity and effort. I criticize effort views separately below.

[2] In these and the following examples, multiple indications of difficulty exist: task success is highly variable, subjects self-report experiencing the task as difficult, and physiological measures indicate emotional and/or physical excitation. A more precise measure of difficulty will be introduced in the next section.

Effort views can avoid these counterexamples by arguing that making efforts and the feeling of effort are distinct (Bermúdez & Massin, 2023; Shepherd, 2023): only the latter is dissociable from difficulty. This view avoids the counterexamples above, because one may still make an effort without it feeling effortful. This raises the question of what it is to make an effort, and philosophers have since been trying to identify the underlying mechanism.

Chappell (2019) appeals to a scientific explanation of effort to explain difficulty. He takes effort to be best explained in terms of willpower, which in turn is taken to be a depletable resource ("Ego Depletion," see Baumeister, 2018). Yet the empirical tides have turned significantly against this view. Multiple large-scale meta-studies failed to replicate the results undergirding Baumeister's account of willpower (Carter & McCullough, 2014; Vohs et al., 2021). These scientific developments render Chappell's view on effort empirically questionable. Chappell rightly takes a scientific analysis of effort to be required if one wants to explain difficulty in terms of effort. But it has since become apparent that the wrong analysis of effort has been chosen.[3]

As this brief critical review clarifies, no analysis of difficulty is without problems. Reliability views face counterexamples. Effort views seem intuitive and promising, but struggle to identify the nature of (making an) effort. Another issue may arise because philosophers rarely analyse the notion of difficulty on its own terms. Current accounts of difficulty are byproducts of other philosophical pursuits. For example, Bradford (2015) and von Kriegstein (2019) provide elaborate accounts of difficulty, but they are ultimately seeking to explain achievement. Nelkin (2016) addresses difficulty mainly to illuminate its role in moral responsibility, and Chappell (2019) and McElwee (2022) analyse difficulty to explain moral demandingness. Such tailor-made accounts excel at explaining the role difficulty plays in the respective debate. But they struggle to generalise to debates other than the ones they were designed for. In the next section, I will propose a general, empirically informed account of difficulty that addresses some of the limitations of previous accounts.

3. Difficulty As Cognitive Demand

I will now argue that the most plausible and broadly applicable account of difficulty explains the notion in terms of cognitive demand, a concept informed by cognitive science.

To understand cognitive demand, we must understand a central distinction between two importantly different kinds of psychological processes. On the one hand, we have automatic processes unfolding in a rapid and inflexible manner. Think of recognising a friend's face or perceiving a car moving towards you, both automatic processes that will unfold regardless of whether you want them to or not.

Not all processes are like this: some psychological processes are serial and flexible. These involve sequential processes of cognitive control, which allow us to select, monitor, sustain, and regulate voluntary thought and behaviour. Think of mentally rotating a shape in your mind, deliberately turning your gaze to a detail on a painting, or carefully picking up a shard of glass, all of which you choose,

[3] Chappell (2019, p.9) rightly notes that his claims about demandingness do not depend upon the truth of the Ego Depletion literature. I take my account to strengthen his arguments concerning demandingness, as I explain in section 8.

initiate, and execute. For decades, psychologists have built a robust and convergent body of evidence for this distinction between these two different kinds of psychological processes (Seminal works include Fitts, 1964; Shiffrin & Schneider, 1977; D'esposito et al., 1995; Monsell & Driver, 2000; Buckner et al., 2008; Kahneman, 2011; Diamond, 2013; Raichle, 2015. Buehler 2018 presents an accessible and philosophically rich review.). Automatic processes are fast but inflexible and simply happen to us. Processes involving cognitive control are slower but more flexible and deliberate. These latter processes, also known as executive processes, are the key to understanding difficulty.

Cognitive control has received relatively scant attention in philosophy. Far from what the name may suggest, it is not just aimed at regulating thoughts. Rather, it is domain-general. It is intimately linked to self-control, goal-directed flexible behaviour, attention, and action selection (Wu, 2011; Wu, 2016; Sripada, 2020; Buehler, 2021; Buehler, 2022). These functions are involved in both mental and bodily kinds of guidance and action.

Cognitive control has a maximal capacity (Halford et al., 1998). Working memory acts as a natural constraint on how many cognitive control processes can be deployed at any time. When the requirements of tasks exceed this maximal capacity, agents become unable to sustain the tasks (Kurzban et al., 2013). This capacity is also influenced by circumstantial factors, such as how distracting your environment is or what parallel tasks you perform (Musslick et al., 2019). Other factors may limit cognitive control capacity, and identifying such factors is an active research program in psychology. But the existence of total (i.e., absolute) and circumstantial (i.e., context-dependent) limitations are widely accepted, providing us with a distinction between two kinds of limitations to cognitive control (cf Engle, 2002; Musslick et al., 2019).

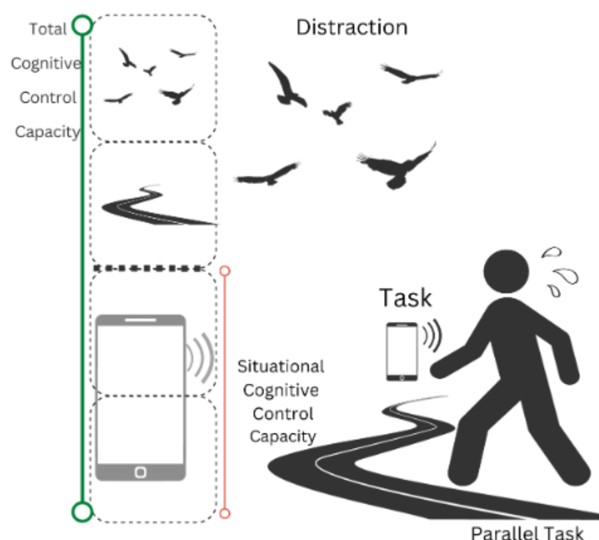

Figure 1: Capacity Limits

An agent's total cognitive control capacity is limited by factors such as their working memory. For simplicity sake, assume an agent can deploy four 'units' of cognitive control, represented by four slots on the left. A distracting stimulus, a bird, currently uses some of the agent's capacity. The agent is performing a parallel task, navigating the road. That's why the current situational cognitive control capacity available for the new task of answering a call is reduced to half of the agent's total cognitive control capacity.

There are differences in how much cognitive control capacity is required to succeed at a given task. Some tasks, such as complex maths, require a lot of capacity. Other tasks, such as simple maths, require less. At the same time, some agents require more or less of their cognitive control capacity for the same task. Spelling a word, for example, will require significantly more cognitive control capacity of a child than an adult. How much cognitive control capacity a task requires of an agent is

thus fixed by facts about the task, facts about the agent, and facts about their circumstance.

This relational character of cognitive control capacity requirements differs starkly from more narrow concepts such as complexity, which is fixed solely by facts about the task. I call the relational property that fixes how much cognitive control capacity is minimally required of an agent to succeed at a task in a given circumstance the '*cognitive demand*' of a task for an agent, given their circumstance.

Note that in the examples above, this cognitive demand goes hand in hand with a higher or lower difficulty. Reading is more difficult for a child than for an adult. Complex maths is more difficult than easy maths. This is no coincidence. In fact, I will spend the remainder of the essay arguing that the difficulty of a task for an agent is proportional to the cognitive demand of the task for an agent in a particular circumstance.

Cognitive Demand View of Difficulty

> The difficulty of a task for an agent is proportional to the relative amount of cognitive control capacity that this agent would have to allocate to appropriately succeed at the task, given their circumstances.

This account explains difficulty as the demands a task makes on the agent's capacity for cognitive control. Any agent has, in any given circumstance, a maximum cognitive control capacity to devote to a task. If a task's cognitive demand exceeds the agent's cognitive control capacity, the task is impossible for the agent. If a task does not pose any cognitive demand, it cannot be difficult. Suppose it poses a cognitive demand within the agent's capacity. In that case, it is difficult for the agent in proportion to how much of the agent's cognitive control capacity is minimally required to succeed.

4. Difficulty And Learning

Here is an obvious observation: as I learn to do a task, it becomes easier for me to do that task. Contrast this with a worrying observation: no current theory of difficulty explains why this is the case.

In trying to offer an explanation, we may say that the effort a task requires is reduced as we learn, but why is that so? We may claim that higher reliability is achieved, but why is that so? Such statements redescribe the phenomenon of learning rather than explaining why learning decreases difficulty. As it stands, no theory of difficulty explains how learning reduces difficulty. The cognitive demand view does, as a reduction of cognitive demand is at the core of contemporary theories of learning.

We have ample evidence that learning fundamentally consists in changes in the interplay of automatic and cognitive control processes (Fitts, 1964; Shiffrin & Schneider, 1977; Wiestler & Diedrichsen, 2013; Diedrichsen & Kornysheva, 2015). We learn by reducing the number of sequential processes using cognitive control that are required to solve a task. This is terrific news for the cognitive demand account. This reduction directly leads to a reduction in cognitive demand, thereby reducing difficulty, as the cognitive demand view would predict. Let us review the most influential parts of the empirical literature on learning in a bit more detail.

Learning by practice typically proceeds in stages (Fitts & Posner, 1967; Miyachi et al., 2002; Dayan & Cohen, 2011; Tenison & Anderson, 2016). When facing a new task that has not yet been learned, learning proceeds by executive rehearsal (i.e., repeatedly solving the task using cognitive control): the agent cannot yet rely on automatic routines to solve the task. To visualise this, imagine a child adding numbers by serially counting up with their fingers: slow, sequential, flexible behaviour that involves cognitive control processes. As the task is rehearsed over many iterations, parts of the task can be solved with automatic processing. The child may not yet automatically recall the result but may be able to remember that one hand has five fingers. They can then count from five upwards when adding 5 + 3. Notably, the task still requires some cognitive control capacity, as automatic (5!) and flexible, sequential processes (6, 7, 8!) both contribute to the task (Fitts, 1964; Shiffrin & Schneider, 1977; Hardwick et al., 2019). In the last stage, an agent performing a well-rehearsed task relies exclusively on automatic processing for a solution. For example, asking an adult to perform the calculation 5+3 requires no sequential calculation, as the result is automatically retrieved (Wiestler & Diedrichsen, 2013; Hodges & Lohse, 2022). The cognitive demand required to complete the calculation has been minimised. This stage model of learning generalises to a wide range of tasks in various domains, including cognitive, perceptual, and motor tasks.

Cognitive demand is also decreased by chunking together aspects of a task that would otherwise require sequential, flexible processing (Gobet et al., 2001). Memorising the number 1801412999 by individual digits is much harder than memorising number “chunks” such as 180 - 1412 - 999. When recalling the number, reporting each chunk instead of each digit requires only a third of the work. Such strategies underpin learning in both the mental and motor domain to reduce the cognitive demand of initiating individual steps of a task. So do other strategies that reduce cognitive demand, such as flexibly deploying attention more selectively (Chase & Simons, 1973; see also Du et al., 2022).

What unites all these different aspects of learning is that they are best characterised as the processes by which agents reduce the cognitive demand of tasks. This lends significant credence to the cognitive control view. Furthermore, it poses a significant challenge to any alternative to the cognitive demand view. Neither reliability nor effort necessarily increase with cognitive demand. This leaves these theories at odds with an empirically robust literature on learning.

5. Difficulty and Context

Our everyday usage of the word ‘difficulty’ seems context-sensitive. The cognitive demand account captures this. On this account, the difficulty of a task is a function of three things: the agent attempting it, the circumstances under which the attempt is made, and an assumed appropriate means of executing the attempt under those conditions. Let us walk through an example that illustrates each of these aspects.

Varying the agent changes the difficulty of the task. It is typically more difficult for children to solve maths homework than it is for their parents. Varying the circumstance changes difficulty. It is harder to solve maths homework while your phone rings, as the self-control you need to exert to ignore the phone also makes use of cognitive control capacity. Lastly, the choice of means plays a role. Imagine doing maths homework by translating the exercise into binary code, solving it in binary code, and then transferring it back into a decimal system. The extra steps

involved increase the cognitive demand of the task. In this way, we see how the agent, circumstances, and means jointly specify what we call ‘difficult’.

Sometimes, agent, circumstance or means are explicitly mentioned, but mostly they are not. A drunk person might say: “This is going to be a difficult drive home.” It is implicitly understood that it is difficult for them in their current circumstances. After all, the drive would be easy for a different agent, such as their sober friend, or in different circumstances where they had refrained from drinking, or using different means, such as calling a cab. By being relative to agent, circumstance and means, my account captures the context-sensitivity of ‘difficult’ in everyday discourse (cf. Stanley, 2000).

The cognitive demand account stipulates an *appropriate* means which settles the difficulty of a task. By appropriate means, I refer to the minimally cognitively demanding means available to the agent.

Appropriate means are important because most tasks allow for multiple ways in which they can be completed, often incurring different cognitive demand. Consider Savitha asking George to pick up a glass of water. Picking up a glass of water is an easy task for George, because it has a low cognitive demand. Yet George tries to do so using his feet. Picking up a glass with one’s feet requires the utmost focus and attention. When George inevitably fails, he complains that picking up a glass is too difficult for him. Savitha would regard this as nonsensical - picking up a glass is not difficult for George. George just did it in the wrong way!

Savitha and George are talking past each other, of course. Under the description of picking up a glass, the appropriate means is using your hands, which is easy. It promises success at minimal cognitive demand. Under the description of picking up a glass with one’s feet, the task is difficult. Note that we can see the notion of appropriateness at play here if we vary the case. If George informed Savitha that his arms were amputated, Savitha would realise that the appropriate (i.e. minimally demanding) way of picking up a glass is with his feet. Now, both could agree that picking up a glass is difficult for George.

Such differences between agents can also help explain why some tasks are considered ‘difficult’ for some, but impossible for other agents. On the cognitive demand view, there is a distinct point at which a task becomes impossible: namely, when performing it adequately would exceed the agent’s capacity for cognitive control. This capacity may differ between agents: what’s possible for you may be impossible for a child. Introducing a clear and empirically tractable, agent-relative threshold at which tasks stop being difficult and start becoming impossible is a unique virtue of the cognitive demand account.[4]

‘Difficult’, on my account, is relative and gradable. The level of difficulty is proportional to the minimal cognitive demand successfully performing the task would pose of the agent, in their circumstance, using an appropriate means. These features of my account explain the context-sensitivity of difficulty. They also fix which cognitive demand settles the difficulty of a task, given the multiple strategies available to agents, explain how this can give rise to productive disagreements about the difficulty of tasks, and illuminate the difference between difficulty and impossibility. Having clarified the account, I will now motivate why

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[4] I take this to indicate that ‘difficult’ is a relative gradable adjective with an upper-closed scale (cf. Kennedy, 2006). Yet nothing in my analysis hinges on this observation.

my account is a general account of difficulty, applicable to the different ‘kinds’ of difficulty we encounter in everyday life.

6. UNIFYING DIFFICULTY

Does the cognitive demand account of difficulty generalise to the many kinds of difficulty we encounter in everyday life? Here are some examples of difficult tasks: solving a maths problem, proving the incompleteness theorems, counting to five hundred, remembering to pick up groceries for a friend, learning to tango, or lifting a heavy weight. These seem importantly different. Nonetheless, the cognitive demand account can explain why these are typically considered difficult, because cognitive control is domain-general and involved in all of these tasks.

It may seem there is no apriori reason to believe that all difficulty can be explained by one single account. This has led some philosophers to embrace hybrid accounts of difficulty (Nelkin, 2016; von Kriegstein, 2019). Of course, it would be impossible to prove that the cognitive demand account can explain all kinds of difficulty. But I will now argue that it does indeed explain a wide range of cases. These cases, ranging from weightlifting to remembering to pick up a bottle of brandy, initially seem very disparate. Nonetheless, the cognitive demand account makes sense of them. Difficulty, on this picture, is much more unified than it might initially strike us.

Difficulty Tout-Court

On my account, all difficulty is relative to task, agent and circumstance. But are there not some tasks that are just difficult, tout-court? Think of climbing Mount Everest, or of proving the incompleteness theorems. These examples may strike us as difficult independent of who performs these actions, or what circumstances they are in (cf. Hirji, 2019; von Kriegstein, 2019; Isserow, 2022). Yet two observations indicate that all difficulty is relative.

The first observation is that what is considered ‘difficult’ tout-court changes over time. A medieval peasant, not having received literacy training, may felicitously say that reading the entire bible is ‘difficult’ tout-court. My great-grandfather may felicitously have said that helping a stranger on another continent is ‘difficult’ tout-court. It is easy to come up with many such examples of formerly nigh-insurmountable tasks that are trivially easy nowadays.

In both cases, whether the task is considered difficult tout-court changed over time. They illustrate once more the context-sensitivity of ‘difficult’. Judgements about difficulty tout-court are implicitly relativised to the “normal” agents or circumstances of their time. An average person in 1100 AD cannot read the bible unless they undergo long training, and an average person in the 19th century finds themselves in circumstances that do not allow easy access to faraway countries. In this regard, ‘difficult’ resembles words like ‘tall.’ We may think a six-foot adult male is tall, full stop, but in the NBA, they would not be. This holds even for more extreme examples: a ten-foot individual may be considered tall, but in a group of tallest mammals, they would be on the short side.

This leads us to the second observation, which holds that for every difficult task, we can imagine an agent for whom the task is easy. Gödel famously claimed that he could simply see the proof for the incompleteness theorems. If we take him by his word, the task would be easy for him. Scaling the Mount Everest seems ‘difficult’ tout-court, yet Superman could do so with ease. We may think of these as rare

exceptions, or complain that these examples require agents of superhuman ability. But that is unimportant: 'difficulty' tout-court is supposedly independent of agents. Even a single exception, fictional or not, reveals these statements are implicitly about difficulty for most, or all, existing human beings. That is enough to say they are agent-relative, and that we must reject agent-independent 'difficulty'.

Diachronic Difficulty

Another important kind of difficulty is diachronic, i.e. difficulty arising in temporally-extended tasks. Sometimes, a temporally-extended task seems to present unique difficulties: think of the difficulty of sustaining a very boring task, or the difficulty of remembering to go for groceries while going about your workday. Currently, how this difficulty comes about seems unexplained. But thinking about these cases in terms of cognitive demand helps us understand why they are difficult.

Performing a simple yet boring task for a long time is a relatively well-studied case of diachronic difficulty. Sustaining attention to a boring stimulus, such as a moving clock, quickly becomes difficult (Kurzban, 2013): a phenomenon called vigilance decrement. Recent work on vigilance indicates that the reason for vigilance decrement is motivational and spells out the effect in terms of cognitive control and metareasoning (Murray & Amaya, 2024). As time passes, the agent's boredom in performing the task makes them waver on the goal and experience the task as less rewarding: the feeling of mental effort typically intensifies as we perform a task with a low expected value over long periods of time. Overcoming this aversive feeling is cognitively demanding, unless external factors help. For example, reminding participants of their task reduces vigilance decrement (Ariga & Lleras, 2011). This becomes intuitive when you consider which part of the task is difficult. The first minute of sustained attention may come easily to you, but as half an hour passes, you may feel a nigh-unbearable urge to abandon the task and check your phone (Kurzban, 2016). Powering through this urge requires self-control, imposing a high cognitive demand on the agent (Sripada, 2020). Because of this high cognitive demand, the task becomes difficult, as my account would predict.

Another interesting case concerns prospective memory, i.e. the ability to reliably remember and execute a task in the future. For example, a physician engaging in a conversation with a patient is cognizant that she must later remember, at the right time, check for blood pressure. Depending on how cognitively demanding the conversation is, remembering to check the blood pressure may become difficult. The doctor would have an easier time maintaining his intention to check the blood pressure while absent-mindedly discussing the weather than having to explain the incompleteness theorems: this is because the latter poses a higher cognitive demand.

Prospective memory has been studied quite extensively by psychologists. Subjects are given an occurrent task to perform and a future task description to remember and execute at a chosen point, mimicking our example above. Indeed, results suggest that when the occurrent task and the maintenance of the memory of the future task jointly exceed an agent's cognitive control capacity, agents must decide between deprioritising the occurrent or the future task, leading to performance decrements in the deprioritised task. Importantly, such psychological models of prospective memory make sense of its challenging nature in terms of *cognitive demand*, as both the prospective memory task and the occurrent task take up a share of cognitive control capacity (Boag et. al., 2019; Strickland et. al., 2020*)*.

What about cases outside the lab? Here, too, cognitive demand can help. For example, consider the difference between a seasoned doctor and her junior colleague. The junior colleague has little experience and needs to consciously remember each step of the exam, lest he forget to check the blood pressure. Likely, he will fail more often than his senior colleague, who has performed this task many times, building a strong habit of checking blood pressure at a specific time of the exam. Because the senior colleague can rely on this habit, the cognitive demand of remembering the task is lower for her, making it less difficult for her.

Lastly, consider tasks that unfold over a long time. Randy is asked to pick up a bottle of brandy at the end of the week (Murray & Vargas, 2020). Randy forgets to buy it, and claims remembering it was too difficult. Here, too, the cognitive demand account can guide our judgement. If Randy habitually uses a shopping list, remembering the brandy would be easy: adding it to the list poses a low cognitive demand. Now contrast this with a case where Randy is on a meditation retreat, cut off from his digital shopping list. Remembering the brandy would require keeping the brandy at the forefront of his mind for days. This would pose an intense cognitive demand. In this case, it does strike me as unreasonably difficult for Randy to remember the brandy. The difference between both cases is whether Randy can 'offload' the cognitive demand of the task onto his shopping list or not. If he cannot, remembering the brandy would require a lot of self-control, imposing a high cognitive demand.[5]

Much more can be said about the peculiarities of diachronic difficulty. But as this section showed, current literature on persistence, prospective memory and vigilance indicates that cognitive demand plays a decisive role in explaining their difficulty.

Physical Difficulty

Cognitive Demand may strike the reader as a purely mental notion, unapplicable to cases of physical difficulty, such as performing an intricate dance, or lifting a heavy weight. This misunderstands the domain-generality of cognitive control, which is ubiquitous in physical performance. Physical cases are squarely in the domain of my account, or so I will argue. This is because our intuitions about the difficulty of these tasks depend on their cognitive demand, specifically the self-control, discipline and grit their successful performance requires, rather than the physical aspects of the performance.

To see this, consider the central role of motivation in physical difficulty. I may be able to run for 3 miles, at which point I abort my run because of its difficulty. Yet, imagine a gunman walks up to me, telling me I will be killed if I do not continue running for a mile. Nothing about my bodily conditions has changed, yet I focus and push through. The gunman returns, asking me to run another mile, lest he kill me and my loved ones. I continue running, overcoming the immense difficulty of doing so. If we repeat this wicked game, I will presumably break down at some point, my legs unable to hold me. But at the moment of my bodily breakdown, it seems inaccurate to say it has become difficult to run: it is rather impossible for me to run. At any point before running becomes impossible, overcoming the difficulty was a mental feat sensitive to motivational constraints, as the gunman's extortion revealed.

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[5] Cf. Murray & Vargas (2020) for a more thorough analysis of when agents' failure to generate action-appropriate attitudes in cases of diachronic omissions is culpable. Their analysis, like mine, centers on the reasonableness of (cognitive) demands upon agents.

Now let us consider the source of difficulty involved in extraordinary physical performances. We admire the ballet dancer or weightlifter for having mastered difficult feats. Yet mastery is acquired through gruesome years of practice, requiring considerable grit and self-control (cf. Morton & Paul, 2019): mastering the skill clearly imposed a high cognitive demand on the agent. Does our judgement about the difficulty of these tasks stem from this acquisition phase of skill or strength, or the physical force or resources involved in the feat? Isolating physical and mental aspects makes apparent that it is the acquisition and execution of the feat, not the physical aspects of performance, that is difficult.

Removing the grit and self-control involved in acquiring a skill intuitively removes the difficulty of physical tasks. Imagine a weightlifter who has gained their muscles purely through a magical pill: for them, lifting the weight is now easy (while still being difficult for an average agent), and we consequently are less impressed by their feats. This is despite the force and energy expenditure required being identical to that required of a 'clean' weightlifter. In a popular German fairytale, Kohlenmunk-Peter asks a mystic figure to imbue him with a supernatural ability to dance. There is no doubt that this would make it easy for him to dance, and the onlookers lose their admiration upon eventually learning the truth. Imagine a spasm at just the right time just happens to move your leg so that you score a beautiful goal: it was not difficult for you to score.

Here are still more examples. It is difficult for a child to lift a pumpkin, while it is easy for me, despite the force required and resources expended being equal: this is because the child has less muscles and must exert self-control to push through the lift. It is more difficult for a child to walk than for me: this is because the child must still sequentially will their limbs into the right position, whereas my gait has become automatic to me, inducing no cognitive demand.

I have argued that intuitive judgements about physical difficulty are driven by the cognitive demand of training and task execution. Yet for most philosophical purposes, whether my account of difficulty extends to physical difficulty is not a central concern. In philosophical applications we typically care about the mental rather than the physical aspects of difficulty. For example, when we worry that an ethical theory demands something too difficult from an agent, we typically think of a tough choice or a heroic display of self-sacrifice (Chappell, 2019; McElwee, 2022), not impressive displays of strength. Nonetheless, it is a point in favour of my account that it can make sense of our shifting intuitions regarding the difficulty of physical tasks by appealing to the cognitive demand involved.

Is difficulty a unified phenomenon? This section reviewed heterogenous cases of tout-court difficulty, diachronic difficulty and physical difficulty. They were explained using the cognitive demand account and required no hybridisation of difficulty. Future work may very well present cases that the cognitive demand account fails to account for, making difficulty correspondingly less unified. But for now, the cognitive demand account handles a broad range of cases, making a unified account of difficulty plausible.

7. Effort and Difficulty

Let us return to the question of what role effort plays in explaining difficulty. Is the cognitive demand view an effort view? It seems natural to explain the difficulty of a task in terms of the effort required to meet the difficulty of the task (Bradford, 2015; von Kriegstein, 2019; Chappell, 2019). This, naturally, raises the question of

what effort is (Massin, 2017; Bermúdez & Massin, 2023; Shepherd, 2023; Massin, 2024; Holton & Holton, forthcoming). If to make an effort would be to deploy cognitive control, the cognitive demand view would be an effort view.

Again, a look at the empirical literature is instructive. Current models of the feeling of mental effort take it to be the phenomenological upshot of a cost-benefit calculation that determines how we allocate cognitive control capacity (Shenhav et al., 2013; Kurzban et al., 2013; Chong et al., 2017; Shenhav et al., 2017; Shenhav et al., 2021). If cognitive control capacity is wasted on a high-cost or low-reward task, for example, having to focus intensely on listening to a boring story told in a monotone way, switching the target to another task seems beneficial to the individual. We invoked this mechanism in explaining the diachronic difficulty of temporally-extended, boring tasks. The aversive phenomenology of mental effort, which typically intensifies for tasks with low expected value, facilitates task-switching and requires self-control to overcome. The evolutionary function of the feeling of effort is widely taken to be the facilitation of task-switching. This is achieved by generating an aversive experience when continuing to exert cognitive control on low-reward tasks (Kurzban, 2016; Bermúdez, 2023; Holton & Holton, forthcoming). As the feeling of mental effort is so intimately tied to cognitive control and its deployment, it seems natural to suggest that the mental effort we make are just deployments of cognitive control

While I do not wish to develop and defend this proposal here fully, I want to briefly highlight four advantages of the suggestion that making a mental effort is simply deploying cognitive control.

First and foremost, it explains mental effort rather than having to posit effort as a primitive notion. Secondly, it explains how and why the feeling of effort and the effort itself correlate. In healthy cases, the current use of cognitive capacity is evaluated by the cost-benefit mechanism directly responsible for generating the feeling of mental effort that accompanies our actual mental efforts (Shenhav et al., 2013; Kurzban et al., 2013). In cases where this evaluation mechanism, rather than the capacity for cognitive control itself, breaks down, the feeling of effort is dissociated from the effort one makes. Indeed, this is exactly what we see in a lesion patient presented by Naccache (2006), who is perfectly able to make efforts at solving challenging tasks despite a complete absence of any feeling of effort. Thirdly, it explains why making an effort is an active, goal-directed phenomenon intimately tied to agency (Massin, 2017; Bermúdez & Massin, 2023). Cognitive control enables flexible, voluntary behaviour, which is central to agency (Buehler, 2018; 2022; Wu, 2022). Lastly, understanding effort as the deployment of cognitive control gives a harmonious account of the relationship between effort and difficulty. Effort concerns how we, in fact, deploy cognitive control capacity. In contrast, difficulty concerns how much cognitive control capacity one would have to deploy if one were to appropriately engage in the task, i.e., how much effort a task minimally requires. Hence, difficulty has a certain counterfactual aspect. Tasks that you never undertook (or even considered) can be more or less difficult for you, but tasks that you don’t undertake are not efforts.

For now, the suggestion that making a mental effort is deploying cognitive control remains speculative. I defend it at greater length elsewhere. If the speculation proves to be correct, the cognitive demand view of difficulty would explain difficulty in terms of effort required, making it an effort view. What would set it apart from current analyses of difficulty in terms of effort required would be that it rests on a novel notion of effort that is intuitively and empirically plausible and philosophically informative by tying effort firmly to the psychological process that

1 allows flexible, voluntary behaviour: cognitive control. If the speculation proves
2 incorrect or unconvincing, the cognitive demand view would not be an effort view.
3 This is no problem for the analysis of difficulty presented here, which is
4 informative regardless of whether it is classified alongside existing effort views
5 such as those presented by Bradford (2015) or Chappell (2019) or as an entirely
6 independent view.
7
8
9
8. The Wide-Ranging Normative Roles of Difficulty
10
11 The cognitive demand account of difficulty explains difficulty as the proportion of
12 an agent's cognitive control capacity required to succeed at a task. I have argued that
13 this account explains difficulty better than alternative accounts proposed in the
14 literature and gives a principled, empirically satisfying explanation of how learning
15 modulates difficulty. I have furthermore argued that it captures the context-
16 sensitivity of difficulty, and generalises well to different kinds of difficulty we
17 encounter in everyday life. But why do we need an account of difficulty at all?
18
19 Throughout the paper, I have lamented that current accounts of difficulty are too
20 narrow to cover the many normative debates invoking difficulty. A general proposal
21 like the cognitive demand account fares better. Applying a unified account of
22 difficulty makes normative projects that currently seem disconnected strike us as
23 more closely related than previously believed. Such connections are only made
24 visible by a unified, broad-scoped account. Its novel features, such as the appeal to a
25 capacity-limited mechanism and appropriateness conditions on cognitive demand,
26 enable genuine philosophical progress in many debates that invoke difficulty. I will
27 briefly sketch three ways in which the cognitive demand view can make such
28 progress. I leave a more complete treatment of these matters to another time, being
29 confident that these brief discussions suffice to show the wide-ranging normative
30 applications of the novel account of difficulty defended here.
31
32 ***Moral Responsibility***
33 Philosophers have noted that difficulty excuses mistakes in peculiar ways (Eriksson,
34 1996; Nelkin, 2016; Guerrero, 2017). Here's an example: if a task is very difficult,
35 and you make a mistake despite trying hard, you are not blameworthy. Yet difficulty
36 does not excuse simpliciter: if a task is very difficult and you make a lukewarm
37 attempt, you are not excused. For example, a medic who focuses entirely on the
38 difficult procedure, but fails to extract the bullet without damaging the patient's
39 organs, may be excused even if this causes the patient's death. We would not excuse
40 the same mistake at an identically difficult task if a lazy medic did not try very hard.
41 Why is that so? From the cognitive demand view, this result naturally follows
42 because of the capacity limitation of cognitive control.[6] A very difficult task has a
43 very high cognitive demand, requiring the agent's total cognitive control capacity.
44 Once an agent meets that demand, there is no further cognitive control capacity to
45 allocate to further increase the chance of success.
46
47 The mistake of the diligent medic is thus non-culpable: it would have been
48 impossible for her to do more than she did. The same is not true for the mistake of

1 [6] Intuitively, mistakes are non-culpable only when one made an all-out effort. Alternative
2 views such as resource views give the wrong results: they predict previous, resource-
3 depleting actions to excuse mistakes. But a long, depleting day at university does not
4 excuse you making a lukewarm effort at resuscitation. The high-stakes situation
5 intuitively requires an all-out effort on behalf of the agent, regardless of whether one
6 solved sudokus or took a nap earlier.

the negligent medic: they could and should have done otherwise by devoting more of their cognitive capacity to the task. In this way, the cognitive demand view of difficulty explains when and why agents bear moral responsibility for failure at difficult tasks.

Achievement

Another domain in which difficulty is often invoked is that of achievements. What are achievements, and why are they valuable? The orthodox account takes achievement to be the performance of effort-requiring (read: difficult) action brought about in a way one understands sufficiently well. The value of achievements is explained by efforts being a uniquely human capacity, the exercise of which is intrinsically valuable (Bradford, 2013; 2015; 2016). I believe this is incorrect: efforts are not a uniquely human capacity since animals such as chimpanzees, dogs and cats can undoubtedly make efforts.

Nor are efforts valuable intrinsically. In particular, inappropriate efforts are neither valuable nor are they achievements. Imagine trying to add 1 to 2714 by counting upwards from 1. This is clearly an inappropriate effort: less effortful ways to add these numbers are available. But since it is effortful and something one can competently do, it counts as both a difficult task and an achievement on Bradford's view. This allows agents to create intrinsic value by taking inappropriate, difficulty-inflating approaches to complete tasks, and leads to highly suspicious achievements. On the cognitive demand view of difficulty, making an inappropriate effort does not increase the task's difficulty, and so does not bring about an achievement. Since difficulty is relative to the appropriate, i.e. minimal cognitive control required of the agent by the task, choosing effort-inflating means to perform the task does not inflate its difficulty, value, or status as achievement– it only makes it more effortful.

If achievements are not intrinsically valuable, why do we care so much about them? I'd suggest looking at the various affective responses and ideas of ownership that can arise from difficult action. We often find ourselves highly valuing the product of our own difficult labour. The well-replicated Ikea effect, where people value things they have assembled themselves more than the ones they bought pre-made, (Norton et al., 2012; Sarstedt et al., 2017) is an instance of this "paradox of effort" (Inzlicht et al., 2018). Self-assembly poses a higher cognitive demand than just buying higher-quality premade products. The cognitive labour reflected in the goals we set, the skillful control we used, and the persistence we showed leads us to identify with the product we created. Not surprisingly, researchers do indeed find that the value participants ascribe arises from a sense of (intellectual) ownership of the product (Sarstedt et al., 2017). These products of our labour are valued because of what they reveal about ourselves – even if that is sometimes just that we can follow Ikea assembly instructions.

Moral Demandingness

Can a moral theory be too demanding? Demandingness objections claim that moral theories that ask agents to sacrifice too much of their own welfare should be revised or given up (Hooker, 2009; van Ackeren, 2018). Real-world cases of Moral Burnout, a condition prevalent among healthcare workers in understaffed hospitals (Sundin-Huard & Fahy, 1999) or young altruists committed to donating excessive amounts of money (MacFarquhar, 2017), illustrate the plausibility of moral demandingness objections. Moral Burnout is a chronic stress disorder that is characterised by an obsessive mental preoccupation with one's self-perceived moral shortcomings. Yet these real-world disorders do not align with the philosopher's exclusive focus on welfare and are largely ignored by the literature. Self-reports on moral burnout focus primarily on demands upon the patients' thoughts and agency, highlighting that

agents can simply not stop thinking about the high stakes of their every action. Worrying about whether it is ethical to buy a candied apple rather than donate the money will indeed make one's life miserable. But this misery is a downstream effect of the moral burnout that moral demandingness objections seek to prevent.

The cognitive demand view offers a better analysis. When doing good brings us to the limits of our capacities, moral theories become demanding. Since the capacity for cognitive control is one such limited capacity, moral demands crowd out our ability to pursue our own non-moral projects (cf. Wolf, 1982). On this view, some cases of demandingness are better explained by the difficulty of an action rather than the wellbeing cost of an action. Current analyses of demandingness as difficulty (Chappell, 2019; McElwee, 2022) can be strengthened by adopting the cognitive demand account, which ties difficulty to a capacity limitation. This allows them to explain cases like Moral Burnout. Such an updated view of demandingness as difficulty would hold that theories are morally demanding not only because they impinge on our welfare but because their cognitive demand restrict our ability to perform everyday actions. Taking seriously the self-report of agents who struggle with Moral Burnout requires broadening the scope of which capacities are subject to moral demands. A view of difficulty that emphasises cognitive demand and capacity limitations can thus enrich our understanding of demandingness.

9. Conclusion

Difficulty plays a prominent role in many philosophical debates yet is poorly understood. I proposed a new account of difficulty built on advances in our understanding of the capacity for cognitive control and learning, two phenomena closely tied to difficulty. This convergent body of research suggests that difficulty is proportional to the amount of cognitive control capacity a task requires of an agent in a given circumstance. I dubbed this the cognitive demand of a task. Recent work on difficulty and demandingness (Chappell, 2019; McElwee, 2022), difficulty and skill (Bermúdez & Felletti, 2021; Pacherie & Mylopoulos, 2021), the nature of effort as it relates to difficulty (Bradford, 2015; Massin, 2017; Shepherd, 2023; Bermúdez, 2023; Bermúdez & Massin, 2023) and difficulty and epistemic responsibility (Guerrero, 2017; Bradford, 2017; Munton, 2023) illustrate the need for an empirically plausible account of difficulty and present fruitful further avenues of research. Given the proliferation of appeals to difficulty in philosophical debates, it is time for philosophers to develop a more precise, unified picture of the nature of difficulty. To this end, I have proposed a novel, empirically plausible, and philosophically fruitful account of difficulty as cognitive demand.

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