

# Reducing the Effort in Effortful Control\*

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In the fourth Book of *The Republic*, Socrates tells the following story:

*I once heard something that I believe, that Leontius, the son of Aglaion, was coming up from the Piraeus under the north wall from outside and observed corpses lying beside the public executioner. At the same time he had an appetite to look and again felt disquiet and turned himself away. For a while he fought and covered his face. But overcome by appetite (ὕπὸ τῆς ἐπιθυμίας), he stretched his eyes, ran towards the corpses and said, 'See for yourselves, you wretches, replenish yourselves with the beautiful sight' (Rep 439).*

Leontius, like all educated men, knew that he shouldn't look, yet his impulse was overpowering. For Plato, there was nothing shocking about the fact that he should have had such a perverse urge; we all have such urges. Nor is it surprising that he should have been unable to control himself; we all get overpowered in this way. Such urges and internal conflicts are, Plato felt, a core feature of human nature.

Plato believed that we are at constant war with our impulses: that there is what he describes as a 'civil war' between two different parts of our mind: our faculty of reason, and our appetitive self. For the faculty of reason to acquire control over the appetites, it is imperative that it should be *educated*, so that we learn which are the 'right' sorts of desires and which are self-destructive. Yet Leontius was clearly aware that he shouldn't look. So the reason why Socrates tells this story is to make the point that reason alone is not enough to vanquish the appetites: that it is up to a

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third faculty in the mind, that of *thumos*, or ‘spiritedness’, to see that reason triumphs.

*Thumos*, Plato argued, must be trained from an early point in a child’s life to “obey reason and be its ally” and to “fight” against the appetitive self “with courage” (442). If an individual’s *thumos* is too spirited he will become, like Achilles in the *Iliad*, a “wild beast” who cannot control his thoughts and actions (Shanker 2012); but if it is not spirited enough the individual will, like Leontius, be unable to overcome his appetites. By no means is Plato faulting the appetites themselves; this is a fact of life, the urges and temptations that boil up from our animal nature. Hence there is no point in railing against this elemental part of our constitution, and in so doing Leontius reinforces the overall picture of character weakness.

If the faculty of *thumos* is not strong enough to carry out reason’s dictates the result will be “injustice, licentiousness, cowardice, ignorance, and, in a word, the whole of vice” (444). It was, in fact, Plato who first insisted that if we lose the battle against our emotions and appetites the result will be *mental* and not just physical illness; for “to produce health is to establish a natural relation of control and being controlled, one by another” (Rep 444)

It is imperative, then, that reason should be cultivated and *thumos* should be strengthened. How this is done in respect to *thumos* must be tailored to the needs of the individual child. Plato distinguishes, for example, between the effects of too much flute music on a child with a weak *thumos* and its effect on one who has been born with a highly “spirited nature” (Rep. 411b). The former “will become weak and dissolute,” the latter “quick-tempered, prone to anger and filled with discontent, rather than spirited.” Overlooking what must strike us today as Plato’s rather curious hostility to the flute, the important point here is Plato’s insistence that a child’s caregiving experiences should be tailored to suit the child’s temperament: something that Plato, long before Mary Rothbart sharpened our focus (2012), saw in biological terms.

The story of Leontius has resonated with Western thinkers down through the ages.<sup>1</sup> Indeed, the concept of *thumos* not only influenced but was likely the source of our concept of *willpower* (Sorabji 2000). To be sure, *thumos* had none of the moral connotations that are so strongly tied to the early Christian view of the will; yet the image of the internal strength needed to vanquish the appetites has never wavered. Indeed, Plato’s emphasis on the *mental effort* that an individual must make to inhibit his impulses, and the importance of cultivating a child’s desire and ability to make such a mental effort, has served as one of the fundamental mainstays in western views of childrearing.

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<sup>1</sup>To learn more about this fascinating history, see the essay on ‘The Will’ that Hans Oberdieck wrote for Harry Parkinson’s *Encyclopedia of Philosophy* (1988).

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## *The Early Christian View*

The story of Leontius represents the climax of a philosophical inquiry, beginning at *Republic IV* 431 into the nature of self-control and how it is acquired. Socrates concludes that self-control is a function of two factors: education – viz, acquiring a set of ‘rational’ desires – and the development of *thumos*, so that the individual possesses the internal “strength” to act on these desires and “master” the “irrational appetitive part” of the soul that craves “certain indulgences and pleasures” (439).

From Plato onwards it has been treated as a given that self-control is needed to prevent our appetites from interfering with our rational desires.<sup>2</sup> This theme was picked up at Galatians 5:17, when St. Paul warns: “The desires of the flesh are against the Spirit, and the desires of the Spirit are against the flesh, for these are opposed to each other, to keep you from doing the things you want to do.”

But early Christian thinkers introduced an important modification to this classical argument. They believed that, prior to the Fall, Adam and Eve enjoyed perfect humoral balance, with reason in full control of their desires and emotions, and thus, immunity from disease. By succumbing to the Devil’s temptation two critical things happened: first, our reason weakened, and second, our appetites strengthened (Midelfort 1999). Hence the need for self-control and the difficulty involved in exercising it were the direct consequence of the Fall.

Plato’s writing on self-control were largely concerned with the fear of death, but for the Early Christian thinkers death is only to be feared if one has not struggled to control one’s passions during one’s life. In direct opposition to classical thought, Saints Gregory and Cassian highlighted the need to control anger, and in addition, avarice, envy, gluttony, lust, pride and sloth to the list. These, of course, constituted the Seven Deadly Sins, a term which reinforces the most important aspect of the shift from classical to Early Christian thought: namely, that lack of self-control was not simply a matter of individual weakness, but the consequence of Original Sin.

Whether early Christian thinkers intended the story of the Fall to be read literally or allegorically, their message was that it is a constant struggle for humans to control their impulses, which were thought to have a corrupting influence on the humors and thus to lead to an overheating of the brain and illness, both physical and mental (Arikha 2007). Physical afflictions like deafness or blindness, and mental afflictions like madness or imbecility were regarded as the consequence of failing to control

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<sup>2</sup> Not to mention behaviors that are harmful to others, a theme that was highlight by the ancient Greeks. For example, Medea confesses (in the play of the same name by Euripedes): “I am overcome by evil, and I realize what evil I am about to do, but my passion controls my plans.”

one's impulses, and the individual was accordingly treated for his ignorance and lack of willpower.<sup>3</sup>

The resulting view of childrearing was that, for their own physical and mental wellbeing, impressionable young minds have to be *taught* to distinguish between True Desires (those that would lead to the fulfillment of God's Will) and false desires (those planted in us by Satan); and *disciplined*, so that the child acquires the internal strength to act on these True desires. Herein lay the upshot of the doctrine of Original Sin: namely, that even – or perhaps, especially – young children are the repositories of sin (Shanker 2008).

Accordingly, the twin goals of the medieval Quadrivium were to cultivate reason and strengthen the will so that the child would have the desire and would make the necessary effort to control his sinful nature. This view is captured by the famous carving at the western portal of Chartres Cathedral, which depicts Grammar as an older woman with a stern look on her face, sitting with a watchful eye over two young pupils. In her left hand she holds an open book and in her right, a flagellum with which she is about to beat one of the children who is misbehaving (Shanker 2008).

In other words, a child must have both knowledge and discipline drilled into him, even beaten into him if necessary. Following ancient Roman custom, medieval educators believed that a child could best develop self-control by being drilled in the rules of grammar and subjected to corporal punishment for any waywardness.

This view of the Will as a faculty needing to be strengthened dates back to Plato's metaphor of appetites and emotions as "wild horses" that need to be restrained: the stronger the animal, the stronger needs to be the hand wielding these reins. And one 'strengthens' this faculty in a child with 'mental exercises': a 'gymnasium for the mind' (see Criboire 2002). The latter idea owes much to the ancient view of Memory as a kind of 'muscle' that could be 'strengthened' through appropriate exercises (Yates 1966; Carruthers 1990)<sup>4</sup>. According to this metaphor, the ability to recall long fragments of poetry was comparable to the ability to lift a heavy weight: one might be born with a natural aptitude, but regardless of this biological inheritance one would nonetheless have to train just as assiduously to become an epic poet as to become an Olympic champion.

Willpower was thought to develop in much the same way that memory, indeed, that any muscle develops. For example, one raises a warrior by giving a young boy a sword and instructing him to hold it out at arm's length. If repeated over and over then, by the time he is a young man, he will be able to hold the sword at arm's length with ease. So too a child must be trained to resist his impulses. And here is the

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<sup>3</sup> Recall that it was Plato who recommended that the State establish *sophronesterion*: correctional institutes where the insane would have their madness drilled out of them by 'instruction' (Laws X).

<sup>4</sup> Yates 1966, *The Art of Memory*; Carruthers 1990, *The Book of Memory*

critical point: some children will require much more training than others, perhaps because their 'muscle' is just naturally weak, or perhaps because their impulses are unnaturally strong. For these children, the hand wielding the flagellum must not flag.

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### ***The Act of Inhibition***

The accepted standard definition of self-control today, or 'effortful control' as it is now commonly referred to in the scientific literature, is that it consists in "the ability to inhibit a dominant response to perform a subdominant response" (Rothbart, 1989). The reason for this behavioristic language is because of the desire to define effortful-control in such a way that it is about inhibiting impulses *simpliciter*: as much a matter of attentional control as emotion-regulation and behavioral control, all subsumed under the rubric of *effortful control*.

For the moment we need only note that, where for the Ancient Greeks self-control was essentially about mastering the appetitive and emotional self, for moderns it is as much about controlling the sorts of attentional faculties required to perform a Stroop task (saying the *name* of the colour we're looking at rather than reading the colour-word that is written) as it is about resisting the impulse to grab a toy from another child or telling someone we haven't seen for some time how shocked we are to see how much weight they've gained (Diamond, 2000). Indeed, for modern theorists, these different aspects of effortful control are closely intertwined; thus, for example, it has been shown that an early deficit in focused attention predicts later problems in behavioral control (Kochanska, Murray, & Harlan, 2000).

In language that could have been written by Plato, modern theorists define effortful control as: "the ability to willfully or voluntarily inhibit, activate, or change (modulate) attention and behavior. Measures of effortful control often include indices of attentional regulation (e.g., the ability to voluntarily focus or shift attention as needed, called 'attentional control') and/or behavioral regulation" (Eisenberg, Smith, Sadovsky, & Spinrad, 2004). The problem with this definition, however, remains the same as has historically plagued this issue: viz., the more we probe the various terms presented here the more the definition leaves us, either with a different set of problematic terms, or else starts to look tautologous. For what exactly is it to *inhibit* a dominant response if not to make an effort to control it? To add the idea that we do so *willfully* or *voluntarily* is as old as Origen and as puzzling as it was for the Church Fathers.

The core idea here remains the basic premise that effortful control involves *trying* to suppress a dominant response. But how exactly does one do this? And if a child is impulsive, does that mean that he didn't try hard enough? Or that the impulses he

was attempting to inhibit were simply too powerful for his meager resources, for whatever reason? And does this entail, as the recent longitudinal studies on the long-term impact of poor delay of gratification at age four seem to indicate, that such a child is faced with a future of both mental and physical compromise?

Over forty years ago, Mischel developed his famous ‘marshmallow test’, in which a child is told that he can have one marshmallow right away or several if he waits until the experimenter comes back in fifteen minutes. It turns out that only around 30% of 4 year-olds can wait. But what is really striking about this test is that it turns out that the children who can wait score an average of 210 points better on their college entrance exams. And it’s not just academic achievement that’s at stake here: poor performance on delay of gratification tasks predicts things like anti-social behavior, internalizing problems, educational attainment, and susceptibility to drugs (Mischel, Shoda & Rodriguez 1989).

The challenge here is to understand why a delay of gratification test can make such powerful predictions; for clearly the test is tapping into something important vis-à-vis a child’s subsequent trajectory. Is it because their ‘self-control muscle’ tires more quickly? As Roy Baumeister has shown in a number of elegant experiments, tasks requiring sustained concentration, or emotional or behavioral control, have a significant impact on a child’s performance on a subsequent effortful control task, and much more so in some children than others (Baumeister & Tierney 2011). Is this because of some congenital neural deficiency?

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### ***The Shift from Mind to Brain***

For Plato, the mind (*psuche*) was the staging ground for the ‘civil war’ described above between reason and the appetites. Although Plato’s view of the tripartite mind quickly faded, his idea of the mental effort required to win this internal conflict remained a constant theme over the next two millennia. But over the past decade a fundamental shift has occurred as scientists begin to study the neural processes that are thought to underpin ‘effortful control’.

It is tempting, on the classical outlook, to see the shift that is going on today as simply involving the locus of the ‘internal conflict’. That is, whereas for Plato it was the mind, for the modern developmental scientist it is the brain, with the neuroaxis serving as the staging ground for an internal conflict between the subcortex (brain stem and limbic system), which is the source of impulses and powerful negative emotions, and the prefrontal cortex, whose job it is to tame these powerful urges (e.g., by reappraisal, self-distraction, goal switching).

Roughly speaking, the *neuroaxis* is conceptualized as proceeding from the lowest or most primitive level of the brain (the brain stem) to the most advanced (i.e., phylogenetically newest) structures in the cerebral cortex. The oldest levels are the most structured at birth, while those at the upper end are the highly plastic structures that are fundamentally shaped by the child's experiences (Tucker 2001; Lewis 2005; Lewis & Todd 2007).

According to recent research, the 'basic emotions' are triggered by a selective range of stimuli and set off a wave of physiological, behavioral and experiential responses. These basic emotions (e.g., love, anger, fear, curiosity) flow up the neuroaxis: i.e., they are highly structured 'affect programs' (Ekman 1992) that were formed in our prehistory. Not only is there a downward flow of control but also, an upward flow (e.g., from brain stem and hypothalamus) of synaptic activation and neurochemical stimulation. In so-called vertical integration, stimuli trigger upward flow (primitive physiological and emotional responses), which in turn are controlled by top-down processes. The bottom-up processes may enhance as well as direct top-down until the latter reduce emotional activation. This coordination may be marked by phase synchrony between 'higher' and 'lower' systems (Tucker 2000; Lewis 2005).

The crux of the neuroaxis hypothesis in regards to self-control is that the more time there is between stimulus and response, the more opportunity to select the most beneficial action: i.e., the better the child's ability to stop and reflect, to choose between different goals, or to monitor and correct goal progress. But for some children there is next to no pause between stimulus and response: no time whatsoever to choose between goals, and hence, no opportunity to exercise self-control.

Such children are going to have to make a much greater effort to inhibit their impulses. The cause of their problem might be a limbic system that is particularly 'arousable' or 'reactive'; or the problem might lie in a medial prefrontal cortex that is somewhat limited for genetic reasons, or has been weakened by smoking or alcohol during pregnancy, and possibly even by maternal stress (????); or perhaps the child's problem is a shortage of those neurohormones that help a child negotiate between short-term desires and long-term rewards (Sagvolden ????). But whether it is because the impulses are stronger or the dampening systems are weaker, these children are thought to have much more difficulty with inhibition.

As can be seen from the foregoing discussion, as modern as this argument might sound, the basic picture operating here dates back to Plato. Take, for example, Libet's famous experiments, which were widely thought at the time to show that in voluntary actions an electrical signal (the 'readiness potential') precedes the action by around 200 milliseconds<sup>5</sup>. To be precise, Libet claimed that these experiments

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<sup>5</sup> There has been considerable debate about both the methodology and the interpretation of Libet's experiments; for probing analyses of the conceptual problems involved in this reading of Libet's experiments, see Coulter ???; Hacker & Bennett ???

show that we have a very small window of time in which to consciously suppress an unconscious impulse (Libet ???). As Ramachandran pointed out, what Libet was really suggesting is that the theory of “free will” should be recast as a “theory of free won’t” (Ramachandran *New Scientist* 1998). And that, of course, is very much the point that Socrates was making with the story of Leontius (see Rep iv. 440).

To be sure, the modern theorist has recourse to the tools afforded by developmental neuroscience to study what is happening in a child’s brain when he is engaged in things like a frustrating go/no-go task. For example, we can measure the amplitude of frontal N2, the ERP that occurs around 200-400 ms after a stimulus and the error-related negative. N2 and ERN are still widely interpreted as reflecting the effort involved in inhibiting a response (Jodo & Kayama, 1992) (Falkenstein, Hoormann, & Hohnsbein, 1999).<sup>6</sup> But then, the brain, or part of the brain, does not make an effort: it simply processes information.

As we shall see below, this glimpse of what is happening in the brain when a child is struggling with a frustrating or an emotionally challenging task provides an important insight into why some children find it so difficult to stay calmly focused and alert. What these studies *cannot* explain, however, is the source of the child’s effort, any more than could Plato’s *thumoeidic psyche* or St. Augustine’s *plena voluntas*; for the question of in what part of the mind or the brain the effort in effortful control resides is metaphysical, not empirical, and one key to understanding the significance of contemporary neuroscientific findings is to understand the significance of this fundamental philosophical distinction.

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### ***The Metaphysical Problem of Self-Control***

Throughout his writings, beginning with the *Tractatus* and right up to his *Last Writings on the Philosophy of Psychology*, Wittgenstein was fascinated by the problem of the will. His basic idea, encapsulated in a brief remark in *Philosophical Investigations*, was that:

*I can’t will willing; that is, it makes no sense to speak of willing willing. ‘Willing’ is not the name of an action; and so not the name of any voluntary action either. And my use of a wrong expression came from our wanting to think of willing as an immediate non-causal bringing-about (PI §613).*

What Wittgenstein is warning against here is the assumption that when we do something willfully it must be because we first experience a mental act, a *volition*, that causes us to behave (or not to behave) in such-and-such a way. This assumption then sets us off on the search to discover the workings of this mysterious ‘volitional’ part of the mind. And if, like Leontius, we fail to ‘inhibit a dominant response to perform a subdominant response’ it must be because our ‘volition’ simply wasn’t up

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<sup>6</sup> But see (Nieuwenhuis, Yeung, van den Wildenberg, & Ridderinkhof, 2003), who argue that the data are also consistent with the interpretation that N2 is simply an indicator of the detection of response conflict.



to the task. And the key to escaping from this metaphysical trap is to recognize that “willing” is not the name of a mental action or experience.

As always when reading Wittgenstein, one might be left more puzzled by his enigmatic remarks than the problem we are supposed to be dealing with. But his *Nachlass* clarifies the thinking behind this argument. In *Remarks on the Philosophy of Psychology* Wittgenstein asks: “How is ‘will’ actually used” (I §51). The reason why this question is so important is because: “In philosophy one is unaware of having invented a quite new use of the word... It is interesting that one constructs certain uses of words specially for philosophy, wanting to claim a more elaborated use than they have” (Ibid.). As he made clear in *Culture and Value* (p. 15), it was the ancient Greeks who inspired the problematic uses of “will,” “effort,” “self-control” that continue to frustrate our efforts to understand effortful-control; for they treated self-control as the name of a mental act that, depending on the amount of mental effort exerted, succeeds or fails to inhibit an impulse.

To be sure, there are all sorts of ordinary, non-problematic uses of volitional terms: “Want,” for example, “is sometimes used with the meaning ‘try’: ‘I wanted to get up, but was too weak’” (Wittgenstein, 1980) I §51). The *metaphysical* problem only arises when one assumes that: “Wherever a voluntary movement is made, there is volition. Thus if I walk, speak, eat, etc., etc., then I am supposed to will to do so. And here it can’t mean trying” (Ibid.). But that is absurd; for there are only special circumstances in which we speak of *trying* to do something: “when I walk, that doesn’t mean that I try to walk and it succeeds” (Ibid.). We only speak of *trying to walk* when there is some reason to indicate that walking would be difficult; if, for example, it is very windy, or I am recovering from an illness. And we only speak of *trying to inhibit an impulse* when there is something about the situation that licenses this description.

That does not mean that there is not such a thing as mental effort; but here too one has to consider: “How do I learn [that] the words ‘I exert myself’, ‘This is hard’; ‘Ugghh’ when lifting a weight is the natural expression. We can all imitate a man lifting a weight. If a child grunted when it turned over pages and not when it lifted a weight, this would be confusing” ((Wittgenstein & Geach, 1988) 36). That is, what are the circumstances in which we learn how to use expressions like “mental effort”? To be sure, we draw on the language of “physical effort” when talking about the mental effort involved in working (*sic!*) on a problem. We speak of *wrestling with the problem*, of being left *exhausted after our mental exertions*. But then, these are classic examples of “metaphors that we live by” (Lakoff & Johnson 2003) -- metaphors that shape the way we think about and indeed experience ‘mental effort’.

Moreover, we certainly understand what it means to say: “[enter not into temptation: the spirit indeed is willing, but the flesh is weak](#) (Matthew 26:41). But the point of Wittgenstein’s philosophical critique is not that there is no effort involved in willpower; rather, it is that, as Peter Hacker explains:

*[Willpower is not a] mental correlate of muscle power, and strength of will is not a matter of having causally efficacious volitions. It is rather determination, persistence, and tenacity in pursuit of one's goals. But it is a philosophical fiction to suppose that our voluntary actions are always preceded by acts of will, or that the power of the will is exhibited in ordinary action as the power of the muscles is exhibited in ordinary movement (Hacker, 2000): 583).*

To say that willpower is not a correlate of muscle power is not to deny that it makes sense to speak of the strength of one's willpower; but this is to describe how a *person* responds to a challenge or a temptation, not the amplitude of a neural waveform when they are so doing. For it is the person who makes this effort, not his brain; brains don't make any effort to process stimuli, they just process it. And the source of that individual's strength is located, not in his prefrontal cortex, but rather, in his motivation or his beliefs or his upbringing.

Moreover, one would only use this term, according to Grice's maxims, if there were some particular feature of the action to which one wanted to draw attention; for, to paraphrase Wittgenstein, it doesn't (ordinarily!) require willpower to say 'good morning' to a neighbour. And to say that 'S just didn't have enough willpower to stay on his diet over Xmas' isn't to say that some mechanism in his mind or brain wasn't strong enough to control another part of his mind or brain (e.g., his desire, or his limbic system), but that S gorged himself on shortbread knowing full well that he'd pay for this act of indulgence in the New Year.

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### ***The Story of Leontius seen through a Wittgensteinian Lens***

When Leontius claims that he couldn't control himself because he was "overcome by desire" (*ὕπὸ τῆς ἐπιθυμίας*) he was not *describing* but rather was *expressing* his mental conflict. That is, the first-person statement "I couldn't control myself because I was overcome by desire" is not an empirical description which, by definition, must be capable of being either true or false but rather, is an *avowal*: i.e., a unique kind of non-contingently true first-person utterance in which a speaker gives a reason for his action.<sup>7</sup> Leontius does not possess privileged access that enables him to observe and relate the inner workings of his mind; rather, his statement operates as a criterion for our saying that 'The reason why Leontius looked was because he was overcome by his macabre desire to see the corpses' (see {Hacker 2000} chapter 2).

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<sup>7</sup> The fact that Leontius gives this as his reason does not, of course, entail that this actually does explain his behavior. As Plato so brilliantly explored in his analysis of Achilles, such an explanation might look at the kind of upbringing that Leontius experienced and why this failed to help him develop the self-control that he clearly desired in this situation (Shanker 2012).

Were one to treat this avowal as an empirical proposition, then what else could Leontius have been describing when he said “I couldn’t control myself” other than, e.g., the fact that his ‘faculty of thumos’ (or ‘willpower’) wasn’t strong enough to execute the dictates of his reason? The obvious concrete analogy is that someone could have forcibly prevented Leontius from looking at the corpses, and if Leontius were a big strapping fellow it would have taken a great deal of effort to hold him back. This physical struggle might be taken as analogous to the internal struggle being waged between the different parts of Leontius’ mind (or brain). So Socrates reasons metaphysically that what a story like that of Leontius must be telling us is that the part of his mind that performed this regulatory function simply wasn’t up to the task: wasn’t strong enough to inhibit the impulse. But what Wittgenstein shows us is that words like ‘strength of will’ describe how an *individual* deals with temptation: not to something that was happening inside his mind when he acted.

In fact, it seems clear that Leontius is struggling with two opposing desires: one to satisfy his morbid curiosity and the other to satisfy his desire to maintain proper decorum and dignity. What happens is that Leontius *chooses* one desire over the other, and in this case it is a shameful, or at the very least what he himself regards as the improper desire that he chooses to satisfy. But rather than publicly announce “I chose to do something of which I am ashamed” Leontius attempts to shift the blame to the *desire itself*, to his appetitive self, a force so powerful that it could not be contained.

The critical point here is not the insight that psychological defense mechanisms are reflected in the creation of metaphors (though this is interesting), but that the concept of self-control is internally tied to an individual’s capacity to inhibit an impulse (Strawson 1974). If we judge that Leontius was indeed weak it is not because of something that may or may not have been going on in his mind (or his brain), but because we feel that he *could* have acted otherwise but failed to make a strong enough effort to do so. But perhaps there were mitigating factors?

It was Hume who recognized the significance of this point and questioned whether there might be hidden dimensions to this story that Plato’s audience would have recognized but that are lost on us (Hume, ‘On Tragedy’; Paton, 1973). Would the fact that Plato so carefully specified which Leontius he was talking about have served to indicate the reason why Leontius experienced this emotionally-charged reaction?<sup>8</sup> Or perhaps Leontius was ill, or had been on a long journey, which left him exhausted? Would he have still have chosen to look at the corpses if he had been healthy and well rested when he came upon the site of the execution?

It is a particularly apt question when we attempt to unravel the significance of something like a delay of gratification test performed on a four-year old child. The

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<sup>8</sup> Were they, Hume asked, members of the ‘Thirty Tyrants’ that were overthrown in 403 BCE, some of whom were relatives of Plato, and was the point of the story that Leontius was deeply conflicted about their execution: torn, e.g., between personal ties and his feelings about democracy?

upshot of Wittgenstein's argument is that we need to *look at the child* before we talk about him as 'trying' or 'failing' to 'inhibit an impulse', let alone describing a child as 'weak'. For example, we would never get angry at a child with autism for having a tantrum: never tell his parents that their child needed a dose of "tough love." But why is the four-year old who snatches up the marshmallow any different? That is not to say that the task is without significance; the challenge is rather to clarify where that significance lies.

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### ***The Importance of Self-Regulation***

Every stress that a child must deal with demands energy. The stressors in question might be physiological, emotional, cognitive, social, or prosocial (Shanker 2012). The cost to the child's autonomic nervous system will vary according to the stressor, and, of course, the child's physical or emotional state. Two children might have to expend very different amounts of energy to deal with the same situation. Suppose, for example, that we are dealing with a child who finds sitting in a classroom very stressful, for different reasons. Perhaps he finds the visual and auditory stimuli distracting and he has to work hard to filter this out in order to pay attention to his teacher; or he finds the hard seat uncomfortable and it is taxing for him to sit still for too long. In cases such as these, the child is not only expending a great deal of energy attending to his teacher, but considerable amounts of energy trying to inhibit the distraction or to counteract the forces of gravity (Porges 2011).

Of all the costs on a child's energy reserves, one of the greatest is anxiety. Anxiety sets off a vicious cycle in which the intensity of an impulse is heightened, demanding yet further energy to inhibit that impulse. What the research on N2 is showing us is that some children become so much more anxious than others on a frustrating or emotionally challenging task. There are any number of reasons why this might be the case. It might relate to the child's biological constitution (Shanker et al. submitted); parenting practices (Stieben et al. in preparation); or the medium of the task itself (Shanker 2012).

It is no surprise, given the tight interconnection between arousal and attention, that the more anxious a child the more constrained his attention span, and the more likely that the child will tend towards either a hypo-aroused state in which he shuts down to try to restore energy, or a hyper-aroused state in which his impulsivity is heightened. In either case what is needed is not a greater effort, either to "pay attention" or to "control his impulses"; rather, what is needed, especially with a young child, is a reduction in the stressors that are leaving him in such a vulnerable state.

This is precisely the reason, we believe, why delay of gratification tasks performed on a four-year-old can have such long-term physical and mental health implications

(Moffitt et al. 2011). For what these tasks are showing us is that some four-year-olds are experiencing far too many stressors (McCain, Mustard & Shanker 2007). If the sources of these stressors are not addressed and the consequent load on the child's autonomic nervous system reduced, then we see the sorts of downstream psychological and behavioral consequences that have been noted in the 'ego depletion' literature (Shanker 2012).

The problem is not that some children are *weaker*, therefore, but that some children have to work much harder than others to perform the same tasks, and it is this expenditure that so seriously depletes their capacity to meet subsequent challenges. This, we suspect, is a key reason why so many children find the marshmallow task difficult. And this is the reason why the task has the predictive significance that it does in regards to the child's long-term physical and mental well-being.

A child who daydreams excessively or is inordinately hyperactive is certainly not culpable in any way, and it would be deeply unfortunate to treat the child as if he were, however unconscious this might be. Rather than trying to *strengthen* their ability to remain focused and alert (e.g., through punishment and reward), we need to understand and thereby mitigate the drains on their nervous system that has resulted in their chronically depleted physiological state.

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### ***The MEHRIT Study***

For the past seven years we have been studying the effectiveness of a parent-mediated intervention for your children with autism (MEHRIT) based on Greenspan and Wieder's DIR (Individual Differences/Relational model) (Greenspan & Wieder 2008). Our basic assumption was that the reason why children with autism typically have so much trouble in social interactions is not because they are lacking a fundamental social need (viz., the 'belongingness drive'; Baumeister & Leary 1995); nor because they are congenitally incapable of interacting socially (e.g., because they are born with a defective 'theory of mind mechanism' (Baron-Cohen 1995)). Rather, the reason why these children have so much trouble with social interactions is because of the amount of stress involved.

The source of their stress might be a sensory system that is overloaded by various aspects of the interaction: e.g., the myriad and rapidly changing signals involved, the noise, visual stimulation, even the odours. The child with autism's typical responses – eg., gaze aversion, self-stimming, perseveration – represent defensive behaviours that the child adopts to deal with an encounter that he finds overwhelming. The problem is that the child's mode of self-regulating blocks the development of social skills, and indeed, of the social brain network, thereby exacerbating the stresses involved in social interaction (Shanker et al. ???).

Our goal was to understand and thereby reduce the stresses the child experiences so as to enhance his desire and ability to engage in social interactions. What we found was that MEHRIT has a dramatic impact on the pleasure that the child experiences in social interactions; his desire to initiate social interactions; his ability to remain engaged in social interactions; and his development of the communicative skills that are needed to be so engaged (Casenhiser et al. 2011). But the larger lesson that we took away from this study is that we needed to write a paper on 'reducing the effort in effortful control'; for what we came to recognize is that far too many children are dealing with far too much stress in their lives, because of biological, social, psychological, and/or environmental reasons.

Quite simply, these children have to work much harder to stay calmly focused and alert, and an allostatic load condition is going to have ever great downstream effects (e.g., on language development, social development, mood, impulsivity) as the negative effects of poor self-regulation lead them to fall further and further behind their peers, or have greater and greater social, psychological or health problems, thereby exacerbating the drain on their already over-stretched system.

The first and most critical step to helping these children is to reframe their behavior, and to accomplish this we must leave behind the classical view of self-control. As we have seen, the classical view assumes that self-control is simply a matter of exerting the effort required to inhibit an impulse, and thus, that a child who is not exerting a sufficient effort in this regard is somehow being weak or headstrong and should be treated accordingly. But for most children punitive 'corrective' actions actually exacerbate their problems with self-control (O'Keefe 2005). This is because such actions can add to the excessive stress load that they are already dealing with.

Rather than becoming angry or irritated by a child's lack of self-control we should always assume that a child *would* exercise self-control *if* he could. To be sure, this is an enormously bold statement. It is not just a matter of questioning the effectiveness of some of our disciplinary practices. Rather, it involves a fundamental and far-reaching shift in the manner in which we look at children.

Instead of assuming that a child is being willfully oppositional or inattentive, our assumption should always be that children do not like disappointing the important adults, and for that matter, peers in their lives: that they themselves may not understand why they lashed out or were confrontational or even why they are constantly getting in trouble. And if that is the case, we need to look past their behavior in order to get to the heart of what is really troubling them.

The implications of the view of effortful control that we have sketched in this paper are clear: it is not just antiquated, but counter-productive to blame a young child for whatever problems he might be experiencing in emotional, behavioral, or attentional control. If we want to prepare that child for the world of social learning that awaits him, then it is imperative that we understand the sources of his difficulties. But there is a deeper point here.

The title of this paper questions the persisting influence of ancient Greek attitudes in our modern views of effortful control; but in no way do we seek to question the importance of effortful control. And neither, although we speak of reducing the effort in effortful control, is our intention to question the importance of effort. But to the extent that perseverance is fueled by success, effort begets effort.

What we have tried to do at MEHRI is change the trajectory for the children that we work with: to open them up to a world of social learning, in all its many forms, that is only made possible by the pleasure they experience with their caregivers and the effort they make to seek out these experiences. But the more effort they have to expend trying to stay calmly focused in an environment that they find overwhelming, the less they will be able to acquire the self-regulating skills touched on in this paper.