

Emotion regulation through the ages*

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This paper reviews how emotion-regulation has been an archetypal, even a defining theme in the history of Western views about healthy mental functioning. The ancient Greeks bequeathed a constricted view of emotions, however, as ‘wild horses’ that need to be tamed by reason, which led to an equally constricted view of the development of emotion-regulation. In recent years, significant advances have enabled us to move beyond this classical outlook: most importantly, in our understanding of the types of experiences that enhance the development of emotion-regulation; the factors that can impede these experiences; and the reasons why emotion-regulation is so important for a child’s long-term well-being.

1. Introduction

I read: “...philosophers are no nearer to the meaning of ‘Reality’ than Plato got, ...”. What a strange situation. How extraordinary that Plato could have got even as far as he did! Or that we could not get any further! Was it because Plato was so *extremely* clever?
Wittgenstein, Culture and Value

With this remark, Wittgenstein embarked on his stunning exploration of how, ever since Plato, language has kept leading Western thinkers down the same paths and into

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the same cul-de-sacs. One issue he did not consider, however, is the extent to which Plato actually shaped that language, influencing the very questions that we ask and the way we try to answer them. If Wittgenstein is right, then some of the great questions that Western thinkers have struggled with for over two millennia are unanswerable because of some logical problem implicit in the question itself. But sometimes the reason for this obduracy lies in hidden assumptions that are built into the framework. And sometimes, as in the case of emotion-regulation, it is a combination of the two.

In *The First Idea* Stanley Greenspan and I explored the profound influence that a culture has on the kinds of mental traits that parents seek to inculcate in their children (Greenspan & Shanker 2004). Of all these traits, one of the most important – for parents and scientists alike – is that of emotion-regulation, which, according to modern theorists, involves the child's ability to "monitor, evaluate and modify" her emotional responses (Gross & Thompson 2007; Thompson 1994). Over the past decade, significant advances have been made in our understanding of the mechanisms involved and the connections between emotion-regulation and a child's psychological (Kochanska et al. 2000), social (Eisenberg & Spinrad 2004), prosocial (Kochanska et al. 1997), and educational development (Blair 2002). What remains unclear, however, is how these connections are forged, what sorts of biological and/or social factors can impede their formation, and how such obstacles can be mitigated and a child's emotion-regulation enhanced.

The reason why emotion-regulation has become such a leading issue in recent years may in part be due to rapid societal changes and demands that have resulted in a growing number of children with problems regulating their emotions, or children who display largely flat or negative affect. One worry here is that urbanization brings with it all sorts of physical and psychological stresses that test a child who might have coped better in a more rustic setting.¹ There is growing concern, for example, over the amount of visual, auditory, and social stimuli in cities (see Field 2007); the lack of green spaces and nature-based experiences (Kahn & Kellert 2002); the decline of

Finally, my debt to Stanley Greenspan goes beyond anything that could be justly recorded in a footnote. Those familiar with his work will immediately recognize that the developmental theory presented in this paper was developed by Stanley Greenspan over the course of thirty years.

1. We can get some idea of these trends from the latest Government of Canada Report (2006) on 'The Well Being of Canada's Young Children'. In 2002/3 16.7% of Canada's children 2–5 years of age displayed signs associated with emotional problems. This is up from 13.8% in the year 1998/1999. In 2002/3, 12.7% of children 2–5 years living in rural areas were reported to have emotional problems, versus 17.2% of children in urban centres. In 2002/3, 7.7% of male children living in urban centres were reported to display signs of hyperactivity and inattention versus 5.15 of rural males.

exercise as it becomes problematic for children to walk to school (Franco et al. 2007; Cotman et al. 2007); the decline of organized sports (Ratey 2008); changing family and social patterns (Mustard et al. 2007); changing leisure pursuits (Healy 1999), and especially, the exposure to violent or troubling emotional themes in the media (Levin 1998); changing eating and sleeping habits (Olfman 2005), and so on.

Furthermore, children have to adjust to the rigors of spending a large part of their day in a formal education setting at an increasingly younger age (Kirp 2007). In order to be able to deal with this challenge, a child has to maintain a calm state and settle herself when she becomes anxious or frustrated. She needs to learn how to control her emotional outbursts, attend to and become interested in what her teacher is saying, and if she is to mix comfortably with other children and take an active role in social interactions, she needs to understand what they are thinking and feeling and adjust her emotions to those of others (Loveland 2005).

What data there is suggests that a large and possibly growing number of children are having trouble meeting these challenges (Rimm-Kaufman et al. 2001). The apparent rise in behavioral problems over the past ten years (Baker & Milligan 2006) and the fact that behavior management programs for young children now abound attests to what is, at least, a widespread perception that there is a serious problem (Twenge 2008). What is unclear is the extent to which the problem may be due to environmental factors that are affecting the pre/postnatal development of prefrontal regulating systems (Kishiyama & Boyce 2009), and/or is due to society's placing ever greater demands on younger and younger children (Levin & Kilbourne 2009). What is clear, however, is that we need to develop a better understanding of the complex interplay between biological and social factors that may lead to a child becoming poorly regulated or even dysregulated.

Apart from the very real practical reasons why emotion-regulation has become such a large concern, there is also a substantial philosophical issue at stake. For emotion-regulation represents the *axis* of mind-body interaction: not the sort of gateway that Descartes claimed to have located in the pineal gland, but rather, the point at which we can identify how the social experiences that shape the growth of the child's mind thereby influence the development of the brain, and how neural structures and processes influence a child's receptivity to these very experiences.

In other words, the natural next question that arises from our exploration in *The First Idea* of the influence that a culture has on the development of a child's mind is whether the same can be asked of a child's brain. From the time of Plato onwards, Western thinkers have debated whether the mind shapes the brain or the brain shapes the mind (Kagan 1994). There is now consensus amongst developmental scientists that the answer to this archetypal question must be: *Both*. But the devil lies in the details: in our understanding of how the nurturing experiences that influence the development of self-regulation influence the organization of those parts of the brain that support

the child's ability to be remain calmly focused and alert, and how neurobiological processes and the organization of neural systems influence the kinds of experiences that a child can process or seeks out (Lewis et al. in press; Tucker 2007).

From a developmental pathways point-of-view (Shanker 2008; Mundy & Burnette 2005), the key point here is that, while these neural factors may *constrain* a child's capacity to regulate her emotions in such-and-such conditions (Lewis 2004), these conditions are constantly changing, not least of which as a consequence of the child's style of regulating her emotions. But then, the more scientists have studied this issue the more they have come to realize that emotion-regulation is not simply a matter of learning how to control one's negative affects; emotions also play a *regulating* role (Lewis et al. in press). Positive emotions are essential, not only for activating and energizing actions (Izard 1993), but also for motivating and sustaining the attention necessary for learning to occur (Tucker 2001).

Indeed, it is ultimately the child's motivation, interest, curiosity, and her feeling of security and self-worth that enable her to *thrive*: to experience what the Ancient Greeks referred to as *eudaimonia*, and what we simply refer to today as *well-being*. When the child exerts the effort required to master some new challenge, or to deal with a growing range of factors (both internal and external) that can interfere with emotion-regulation, her brain is forced to develop the networks needed to support this behavior. There is not some internal mechanism that dictates the extent to which a child can experience such drives. To be sure, a child's desire to confront and conquer these challenges is strongly influenced by biological factors; but it is fueled and supported by the types of interactions that she experiences with her caregivers and teachers (Bruner 1966).

Emotion-regulation affords – and indeed, has afforded from the very moment that Western thinkers started thinking about the mind-body problem – a critical area in which to explore this issue. At birth a child displays a number of automatic or 'reactive' self-regulating behaviors, such as gaze-aversion or withdrawal (Eisenberg 2002). Over the next few years she begins to develop more voluntary self-regulating behaviors, such as seeking out a comforting sight when stressed, or learning how to reappraise a discomfiting emotion (Rothbart 1989). There is such a complicated nexus between these two aspects of emotion-regulation that it may, for all intents and purposes, be impossible to disentangle them.

For example, is the reason why a child is having problems controlling her anxiety because she hasn't learnt how to redirect her attention, or is it because she is so excessively over-reactive to novel stimuli that this overloads her voluntary self-regulating abilities (Kagan 1998)? The same point applies to caregiving experiences. Extensive research suggests that there is a close connection between a caregiver's parenting style and the child's attentional control (Calkins & Johnson 1998). But is a caregiver overly directive because the child is overly reactive? Is maternal sensitivity to some extent

a function of a child's temperament? Or a reflection of how the parent self-regulates around the stresses involved in parenting?

What is clear is that emotion-regulation does not simply kick in when the brain reaches a certain level of maturation, although the growth of the prefrontal cortex is clearly a critical factor in the development of emotion-regulation (Diamond 2002; Stuss & Alexander 2000). Rather, emotion-regulation represents a paradigm example of why developmental scientists now think in terms of a nature/nurture *synthesis* (Lewis 2005; Gottlieb 1997). For no matter how robust a child's biological endowment, the presence of specific types of caregiver-infant interactions is decisive in the ongoing development of emotion-regulation: an idea that is not nearly quite as modern as it sounds.

As we shall see, the roots of our preoccupation with emotion-regulation are surprisingly ancient. Indeed, the very manner in which developmental neuroscientists look at emotion-regulation is surprisingly ancient: the questions asked, the processes emphasized, even the tasks used to study the relevant neural systems, have their roots in a Western outlook that traces back to Plato's reading of Homer. There is, perhaps, no more significant example of the profound influence that Plato has had on the kinds of mental traits that parents seek to inculcate in their children than that of emotion-regulation; and, perhaps, no more pressing area where we need to go beyond his way of thinking if we are to succeed in enhancing the healthy mental functioning of our children.

2. The wrath of Achilles

Just as the culture that we inhabit is one that prizes the cognitive skills celebrated by the Ancient Greeks, so too developmental scientists remain preoccupied with the same question that preoccupied the ancient Greeks: namely, how does a child acquire the capacity to regulate her appetites and emotions? From the time of Plato onwards Western thinkers have been obsessed with the question of which kinds of caregiving practices can best support the development of this capacity. That is certainly not to suggest that the West has succeeded in developing a 'more regulated child' than other cultures: i.e. a return to the sort of absurdity seen in Charles White's thesis that the Ancient Greeks marked the apex of human evolution (see White 1799). Yet one can't help but wonder how much the incredible march of science and technology over the past 2,000 years owes to a poem: the greatest of all the ancient epics.

Whether or not Homer intended the *Iliad* to be read as a meditation on the importance of emotion-regulation, it came to symbolize and nourish an obsession with precisely that theme. Achilles was regularly used by Western thinkers to illustrate the damage wrought by uncontrolled emotions on one's well-being. In some ways the

Iliad came to be read like a medieval mystery play rather than a heroic epic. Unlike the contemporary cinematic depiction of the *Iliad*, which has much more in common with ancient mythology, Achilles served for Western philosophers as a foil to Socrates, who had *learned* to master his emotions.

The *perepeteia* of the *Iliad* occurs in Book IX, when Achilles, who has been deeply affronted by the insult to his honour that he has suffered at the hands of Agamemnon, the leader of the Greek armies, rejects the overtures of the peace commission led by Odysseus. We have been led all along to expect that Achilles will accept Agamemnon's "gifts of friendship" (9.113).² But when the critical moment arrives Achilles is unable to accept the offering, which various authorities assure us is extremely generous. Achilles seems to be as surprised as everyone else by his own intransigence (9.636–9; 9.645). He presents Agamemnon with terms that couldn't possibly be met (9.385–387), derailing a story that, up until this point, had been proceeding along standard heroic lines (as Phoinix reminds us at 9.523–6).

There have been many attempts to explain just why Achilles refuses to accept Agamemnon's lavish attempt to atone for his "moment of madness" (which includes marriage to one of his own daughters). Whatever the reason, it is clear that Achilles' decision brings a larger psychological issue to the fore; for unlike Socrates' refusal in the *Apology* to abandon the role of philosophy as he conceives it – which must, as Socrates fully recognizes, lead to his own destruction – Achilles' action (or rather, lack thereof) results in the whole-scale slaughter of his comrades (as Odysseus reminds us at 9.300–303) and not just himself.

Whereas for the ancient Greeks it was Agamemnon who was to be faulted, for Western thinkers it became Achilles who should be censured, and not without some basis in the text. For Achilles makes it clear that he held his comrades just as responsible as Agamemnon for the insult to his honour: i.e. for failing to side with him in his quarrel with Agamemnon (9.316–317). Nestor reminds us at the start of Book IX that "Out of all brotherhood, outlawed, homeless shall be that man/who longs for all the horror of fighting among his own people" (9.63–4). He is clearly alluding to Agamemnon, but for later commentators, the question being raised here is whether Achilles himself was any less guilty of this cardinal sin against his community (Sorabji 2000). The important point, however, was simply that the connection between individual and social well-being had become inextricably bound together.

Most significant is the fact that Achilles has completely lost his capacity to regulate his emotions, a victim of his own "uncontrollable fury" (*ménos*). We are repeatedly

2. At 1.213–214 Athena tells Achilles that "Some day three times over such shining gifts shall be given you by reason of this outrage." This is indeed what happens and, at the start of the poem, Achilles seems to be indicating that he will indeed accept this restitution when it comes.

told how he has been thrown into this dysregulated state by the combined forces of his overpowering spirit or life force (*thūmós*); Agamemnon's transgression; the failure of his society to honour its own heroic code; and the uncharted psychological waters in which he finds himself. In book XI Homer presents us with a powerful image of the paralyzed state into which Achilles has been thrown, standing on the stern of his beached ship and watching the battle unfold in the distance (11.599). From this inability to act flows a series of disasters, leading, ultimately, to the deaths of Patroclus and Hector, the "devastation" and "thousandfold pains" suffered by the Achaeans, and Achilles' own death (which is foreshadowed in the *Iliad*).

One has to be careful, of course, about allowing modern sensibilities to intrude on one's interpretation of how ancient Greeks might have construed Achilles' behavior. Yet it is noteworthy that numerous characters within the poem – including such reliable sources as Patroclus (16.29–30), Ajax (9.629–30) and even Achilles himself (16.203–206) – comment on how Achilles' spirit (*thumos*) is out of control, culminating in Apollo's warning in the final book that "*Achilles' mind is unbalanced, nor is his thought kept in check in his breast; his thoughts are wild, like a lion who gives in to his great force and overmanly heart and goes against the flocks of mortals, to seize his feast; so Achilles has lost pity, and there is no abashment in him*" (24.39–45).³ Moreover, just before Apollo utters these lines, the narrator describes how, unable to overcome his grief over Patroclus' death, Achilles, unlike the rest of the army, is unable to sleep, weeps uncontrollably, and lies "sometimes along his side, sometimes on his back, and now again prone on his face; then he would stand upright, and pace turning in distraction along the beach of the sea".

The great question that the *Iliad* raises is: what brought Achilles to this state? Of all the many different answers that Homer himself explored, one of the most important occurs towards the end of the meeting with the peace commission in Book 9. Homer inserts a long speech by Phoinix, which, on the surface is somewhat puzzling insofar as it seems to disrupt the flow of the scene. But there is a telling line at 9.485: after learning how Peleus had entrusted him to raise his son, Phoinix remarks: "I made you all that you are now". Suddenly we are given an insight into just what sort of upbringing Achilles has had.

One is reminded of the beginning of *Don Quixote*, where we learn that Alonso Quijano has spent far too much time reading old chronicles on chivalry. What Phoinix's speech reveals is how Achilles has been raised on similar heroic stories, told to him over and over and thereby molding his character, but without the necessary experiences that would enable him to remain in control of his emotions in the face of great stress. This would explain the deep poignancy of Achilles' response to this long speech,

3. This is Michael Clarke's translation (Clarke 2004).

in which he rejects the heroic code that Phoenix sought to instill in him (9.607–608). But what he cannot reject is the character that Phoenix stamped onto a temperament that was vulnerable to just the collapse that we witness. Or at least, this was the theme that Plato was to explore throughout his writings.

3. The new Achilles

One of the most intriguing of all the allusions to Homer in Plato occurs in what is commonly regarded as amongst the earliest of the dialogues. Socrates tells his jurors in the *Apology* that his determination to continue as a philosopher, should they decide to spare his life, should be compared to Achilles' decision to return to battle, even though it portends his early death (*Apol* 28cd). Socrates' point is that the kind of heroism it takes to be a philosopher is comparable to the heroism displayed by Achilles.⁴ It seems likely that it was the historical Socrates who originally made this comparison, but it is a studied decision on Plato's part to return to this theme over and over.

No doubt this sort of allusion to Achilles was common at the time, but in Plato's hands it is latent with psychological meaning. In the *Laches* Plato has Socrates define courage as applying, not just to a warrior's behavior on the battlefield, but as including "those who are brave in dangers at sea, and the ones who show courage in illness and poverty and affairs of state" (*Laches* 191d). Plato is attempting to show that the concept of courage operates at a relatively polarized level in Homer, and shift it into a grey-area concept where the individual applies it to his own behavior as an internal standard. That is, he sets out to show that Homer's definition of *courage* is one-dimensional: viz., the individual must behave in such-and-such a way in battle in order to demonstrate courage. The idea that *courage* can be applied to the behavior of someone who is ill or frightened is a question that could not arise in Homer. But what Plato is doing is not so much an attack on the Homeric ethos as an attempt to raise it to a more advanced level of psychological functioning: one that applies to all human beings and not just a demi-god.

Throughout the *Iliad* Achilles is compared to a rampaging lion. At the end of the *Laches* Plato raises the question whether a lion does, in fact, demonstrate courage, and thence, whether Achilles' behavior, which licensed this simile, can be described as courageous. Laches asks Nicias whether he is saying that wild beasts are not, in fact, brave, and Nicias answers: "rashness and courage are not the same thing"; the cases which

4. Plato returns to this theme in the *Crito* (44), the *Hippias Major* (292) and *Hippias Minor* (363), it runs all through the *Republic*: indeed, allusions to Achilles occur in the great majority of Plato's writings (see Hobbs 2000).

“the man in the street calls courageous, I call rash” (*Laches* 197c). Nicias makes the point that wild animals or small children who do not fear something because they don’t know that it should be feared cannot be called courageous; he would not call someone who “for lack of understanding, does not fear what should be feared” courageous but rather “rash and mad” (*Laches* 197b).

Plato’s intention here was not to convince his contemporaries that Achilles was not, in fact, brave, but rather to highlight the importance of the shift introduced by Homer from the pre-Homeric homage paid to the hero who goes berserk in battle to the Homeric exploration of emotional control, such as Achilles demonstrating when he reconciles with Priam. The calmly regulated person is the one who experiences pride, shame, anger, happiness, and so on, and not just his fear in battle, and controls these emotions. The kind of emotion-regulation that Plato is talking about, therefore, is that which is learned, which requires some effort on the part of the individual.

The very fact that the comparison of Socrates to Achilles is such a recurrent theme in the dialogues (sometimes quite subtle) tells us that more is involved here than a mere figure of speech. But how can we compare this towering figure of philosophical enlightenment to the great hero of the *Iliad* who, as we just saw, collapses and ultimately goes berserk before he finally recovers his equilibrium? It is always possible that Plato intended this to be read ironically, but it seems far more likely that Plato intended this comparison to be read literally: i.e. that Socrates should be seen as the ‘new Achilles’ of the rationalist age. This is a Socrates of heroic dimensions who at the same time serves as an Everyman: a model of what each of us can and should strive to attain.

According to this reading, the reason why there should be a section on the *Iliad* in a paper such as this on emotion-regulation is because of Plato. In Plato’s words – to a significant extent because of Plato’s words! – Homer should be seen as the “educator of Greece” (*Resp* 606e).⁵ The very fact that Plato and following him, Aristotle, were so interested in the *Iliad* is often cited as important evidence of Homer’s stature in ancient Greece, and was to a considerable extent the source of that stature.

Plato’s (and Aristotle’s) reading of Achilles is filtered through the lens of tragedy; for like both Sophocles and Euripedes, they were concerned – as indeed were several of the great Hellenic philosophers who followed in their footsteps – with the consequences of the “wrath of Achilles,” not simply for his society, but more fundamentally, for Achilles’ own well-being. Indeed, the point of Plato’s comparison of Socrates to Achilles is very much a product of the tragedians’ twinned preoccupation with the

5. Note that in 380BC, Isokrates recounts how it was thought that, by listening to the *Iliad* and the *Odyssey*, one would come to “desire to perform the same deeds” (*Panagyrikos* 159).

issues of madness and temperance.⁶ But unlike the tragedians, Plato saw Achilles' emotional turmoil, not as the result of an external agent (i.e. a vengeful god), or a conflict with his society, but rather *the consequence of the manner in which his character was formed*.

In Plato's hands, the *Iliad* becomes a psychological meditation on the development of emotion-regulation: on how to tailor one's interactions with a child in order to maximize that child's potential to regulate his or her emotions. For some idea of just how influential this interpretation of the *Iliad* was on Western thought, one need only read *Emile* and Rousseau's advice to the reader early on to "Read Plato's *Republic*. It is not at all a political work, as think those who judge books only by their titles. It is the most beautiful educational treatise ever written" (Rousseau 1782).

What Rousseau is referring to here is the Enlightenment "dream of perfectability": the question of how to maximize a child's ability to master his or her emotions and appetites. As far as Rousseau was concerned, Plato's key message was that Achilles' eventual collapse was fixed by the manner in which he was raised. If we go back to the speech by Phoinix discussed in the preceding section, in which he alludes to the manner in which he raised Achilles to be a hero, we can see Plato telling us that what Phoinix accomplished was precisely the Achilles who cannot control his emotions in the face of great trauma.

That is not to say that, according to Plato, any child who had been raised in a like manner would have turned out to be an Achilles. Plato distinguishes, for example, between the effects of too much flute music on a child with a weak *thumos* and one who has a very "spirited nature" (Rep. 411b). The former "will become weak and dis-solute," 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 (1989), saw in biological terms.

Achilles operates as an example of someone born with an overweening *thumos* and raised on a regimen that no doubt included too much lyre-playing. He illustrates how those who "devote themselves exclusively to physical training turn out to be more savage than they should," where "the source of the savageness is the spirited part of one's nature" (Rep 410d). Herein lies the source of the distinction that Plato makes in the *Republic* between courage and savagery: *Thumos*, "if rightly nurtured, becomes courageous, but if it's overstrained, it's likely to become hard and harsh" (Rep. 410d).

6. Throughout the tragedies the chorus is constantly reminding us of the importance of harmony and balance, moderation and temperance. Typically, the antonym for madness in the great tragedies is *sôphrosunê*, moderation or temperance (Simon 1978:92).

Achilles is the paradigm example of the thumoeidic person who has not been “rightly nurtured,” insofar as he descends into a dysregulated state. Indeed, it is for exactly this reason that Plato returns so often to the example of Achilles to illustrate his argument about the importance of appropriate nurturing for developing the capacity to regulate one’s emotions.

But then, what is the key characteristic of an individual-differences approach to *appropriate nurturing*? Once again, Achilles provides Plato with the perfect vehicle for his answer. At the height of his frenzy, when his primal emotions have been unleashed, Achilles descends to the level of a beast and, in this maddened state, commits what Apollo describes as “evil” and “shameful deeds” (21.19).⁷ What restores him to normalcy at the end of the poem is not a blood-letting, or soothing potions, or a sacrifice to the gods, but the fact that, by identifying Priam with his own father – what we might describe today as an act of *cognitive reappraisal!* – Achilles is able to regain control over his emotions. This idea becomes the key, not simply to the ancient Greek view of emotion-regulation, but a theme that has dominated western thinking about the subject right up to the present.

4. The problem of Akrasia

Plato’s view of unbridled emotion as the source of “mental disease” and reason as the means to “mental health” was the hallmark of the rationalist revolution that occurred in the 5th century BCE. This pivotal event in the formation of western consciousness was marked by the celebration of logic, and, intimately connected with this, the emergence of science. As far as the history of Western thinking about the mind is concerned, its most important feature was this bifurcation between reason and emotion: quite literally, in Plato’s model, as belonging to different parts of the *psuchē* (see, e.g. *Rep* 604). It is an idea that is not that far removed from modern views of emotions as originating in subcortical systems and the executive functions regulating these impulses that are supported by prefrontal cortical systems (see Ledoux 1996).

For Plato, emotions are very much a part of the mind, with their own predetermined set of desires. This makes it difficult to say whether Plato viewed the bifurcation between reason and emotion as a conflict between rational and irrational (or arational) forces. But for the Stoic philosophers who followed in his footsteps it is clear

7. Achilles is the paradigm example of someone who can do “whatever he wishes, except what will free him from vice and injustice and make him acquire justice and virtue”; he thus illustrates the force of the point: “how can it be worth living when his *psuchē* – the very thing by which he lives – is ruined and in turmoil?” (*Rep* 445b)

that the bifurcation between reason and emotion does not involve a conflict between the rational and irrational; for they regarded emotions themselves as *cognitive* phenomena: judgments about the value of responding in such-and-such a way to an event. Indeed, it is precisely because of this cognitive basis that emotions were thought to be amenable to “philosophical therapy.” Thus for the ancients there was no problem of explaining how our emotional responses are elicited by our appraisals of the significance of an event, for them, emotions just *are* ‘cognitive appraisals’.

To be sure, the Stoics talk about ‘first movements’, which encompass what we would describe as autonomic and automatic reactions. But for the Stoics these ‘first movements’ are not in any way primitive emotions, or even part of emotions; rather, they are simply physical reactions triggered by an event that may or may not elicit an emotion. An emotion must, by definition, involve the value judgment that there is benefit or harm at hand and that it is appropriate to react in such-and-such a way to this event (see Sorabji 2000). For example, I may get goose bumps from a breeze but that does not elicit a feeling of fear, whereas goose bumps produced by the sight of a charging lion are likely accompanied by such an emotion. The ‘first movements’ themselves are similar in both cases; the difference between my two responses lies in my having no emotional response to the first event and an emotional response to the second.

Why, then, do certain events trigger an emotion? For the Stoics, the answer was that we are *taught* to respond in these ways. That is, society teaches us to fear the prospect of death or to feel love for another human being (Nussbaum 1994). Hence emotions are social constructions, and given what the ancients saw as the depravity of society, it is no surprise that emotions should be the source of so much human misery. Far from holding the key to our happiness, they are the basic obstacle we must overcome. And *given* their fundamental belief that happiness is what we all strive for, or will strive for if we are rational, it follows that we must learn to contain, and if possible, curtail this damaging element of our psyche.

As we shall see below, such an argument may not be all that far removed from current thinking about appraisal, although it represents a striking contrast with those modern theorists who see emotions as playing an important positive as well as negative role in cognition (Diamond & Aspinwall 2003). That is, while we might agree with the ancients as far as the negative consequences of catastrophic emotions are concerned, there is considerable interest today in the constructive role that emotions play in, e.g. motivating or focusing attention. But the Stoics had no such interest in exploring a positive side of emotions; for them, emotions were a negative phenomenon that, at a minimum, had to be controlled if not actually extirpated by learning how to view reality for what it is, shorn of social conditioning.

What came to be seen as the problem of *akrasia* – the question of why people behave in ways that are contrary to their own self-interest – dominated philosophical

thinking throughout the classical age. Indeed, even though the *Iliad* remained unknown during the Dark and Middle Ages, its view of the consequences for mental health if emotions are not held in check infused Christian thinking (Sorabji 2000). Over and over one encounters the basic theme that when emotion is not ruled by reason the result is mental pain and possibly madness. It is not surprising that a warrior culture should have placed so much importance on holding one's emotions in check – especially, one's fear of death. But, through his depictions of all the major characters (e.g. Agamemnon's greed and pusillanimity, Paris' vanity) Homer transformed this elemental theme into a meditation on the need to control all one's passions: be it anger, love, grief, or lust (whether for plunder or *kléos*).

5. The prevention of mental illness

The question of whether or not Achilles was free to choose his own destiny is not one that could be asked until the first century BCE (see Sorabji 2000 Chapter 21) – at least, not in terms that we would recognize as similar to what we understand by *free will*. It is not at all clear, then, how Plato would respond to the question of whether or not Achilles was responsible for his own breakdown and subsequent actions. But it is certainly a question that is – or should be – uppermost in our own minds when we think about the reasons why young children have trouble regulating their behavior.

We saw in the preceding section how Plato placed great emphasis on the significance of the kinds of childhood experiences that Achilles had undergone as the source of his overweening thumoeidic spirit; perhaps that might be taken to mean that Achilles was more a victim of his temperament rather than its author. Even in Homer, and certainly in Plato, there is a moral overtone to this argument. We frequently encounter the suggestion that when one allows oneself to be ruled by one's emotions and appetites one descends to the level of the beasts: a theme that is already present in the *Iliad*, with some of the censure that was to become so prominent in later writings. But ancient thinking seems primarily to have been that the reason why one should gain control over – or even, according to the Stoics, *eradicate* – one's emotions was in order to enjoy tranquility. If the fear of death causes much mental anguish then one must learn to be passive to its inevitability: e.g. to condition oneself, as Epictetus counseled, to the eventual loss of one's loved ones. Hence the widespread appeal of the story that, when told of his son's untimely death Anaxagoras replied: "I knew that I had begotten a mortal."

Does that mean that, just as the glutton was seen as responsible for his own dissolute condition, the mentally ill were also seen as somehow responsible for their "disease," and for that reason *deserved* to be treated harshly? Plato's remark that a family should seek to contain a mentally ill person "by whatever means they can improvise" would seem to sanction the barbaric practices that followed, such as binding the insane in

chains or forcing them to live amongst the household's animals. Yet Plato's primary reason for wishing to sequester the mad was in order to preserve social harmony. Far from seeing madness as the result of demonic forces, or as a sign of intrinsic guilt, he identified madness as "a disease of the *psuchē*" (Tim 86b). In fact, he distinguished between "several kinds of madness, brought on by several causes. [Some] are the result of illness, but there are some people with an unfortunate natural irritability, made worse by poor discipline (Laws xi.934.d).

Plato was the first to talk about the causes of mental illness, and how madness might be prevented. The upshot of his argument is that, regardless of whether an individual's madness is the result of illness or the wrong sorts of childhood experiences, Hippocratic medicine would be limited in its capacity to cure the adult's mental affliction, insofar as both types of psychopathology are ultimately due to "one or another corrupt condition of his body and an uneducated upbringing" (Tim 86e). But even "rational discourse" will have a limited impact on the truly mad. Hence the reason why there is so much emphasis in Plato's writings on the early years of life and the need to discover which kinds of experience will best cater to the temperament of a child and create the discipline needed to enjoy both mental and physical health.

It is an argument with a remarkably modern ring to it. But, apart from Posidonus, it was not an idea that was seriously pursued by ancient thinkers. Rather, their attention became increasingly fixed on the idea that the failure to control one's emotions was a sign of character weakness. To be sure, they continued to accept that a great many cases of mental illness were the result of physical disease; yet even these latter cases were traced back to the failure to inculcate the sorts of habits and attitudes that promote humoral balance. Thus Galen, who was to exercise more influence in the history of Western medicine than any other figure, stressed above all else the role of a proper regimen in the pursuit of physical and mental health. And given that we alone are responsible for what we eat and drink, or our work and exercise ethic, it follows that we alone are responsible for engaging in those sorts of actions that exacerbate humoral imbalances, resulting in physical and mental disease (Temkin 1991).

By the time we get to the early Christian thinkers, who, as Sorabji has shown (2000), were profoundly influenced by Stoic doctrine, we get an extremely close connection drawn between disease, whether physical or mental, and sin. This was seen as the direct result of Original Sin; for prior to the Fall Adam and Eve enjoyed perfect humoral balance, with reason in full control of their emotions, and thus, immunity from disease. By succumbing to the Devil's temptation, their reason weakened and their affects strengthened. Henceforward it became a constant struggle for humans to control their emotions, all of which have a corrupting influence on the body (i.e. on the humors). Mental illness was seen as clear proof of sin: i.e. of the failure to control one's emotions. Indeed, mental illness was regarded as perhaps the worst of all diseases, insofar as it represents the utter collapse of reason.

To this day there remains a tendency to stigmatize a child who has trouble regulating his emotions. If not the child himself who is seen as responsible for his externalizing or internalizing problems, then we lay the blame on some external cause: his genes perhaps, or his parents, or his peers, or the media. Unfortunately, the likelihood is that the child who is having self-regulating problems will be exposed to experiences that only serve to exacerbate those problems. The challenge that we face, if we are to overcome this archaic attitude, is only partly a matter of better understanding the developmental pathways involved in emotion-regulation; on a conceptual level, we also need to consider the limitations in the original Greek view of emotions.

6. The positive role of emotions

There could be no more telling indication of the persisting influence of Stoic thought on modern sensibilities than the fact that we so often still speak of “emotion-*regulation*” full-stop, as if basic emotions constitute elemental forces – Plato’s “wild horses” – that need to be reined in, without considering the regulating role of emotions (Lewis et al. in press). According to contemporary ‘affect program’ theorists (Ekman 1992), basic emotions are triggered by a selective range of stimuli, setting off a wave of physiological, behavioral and experiential responses that the child cannot regulate himself due to his under-developed Executive Functions. If, for example, a baby starts to become angry, the emotion will, if the child is left alone, keep escalating until sheer exhaustion forces the system to shut down.⁸ The caregiver must thus exercise this regulating function until such time as the relevant prefrontal systems can support this function on their own (Fox & Calkins 2003).

On one line of thinking, then, it has taken us 2000 years to bring these ancient Greek insights to fruition; but on another line of thinking, it has taken us this long to overcome the moralism associated with emotion-regulation. It has also taken us this long to get to the point where we can recognize a deep tension running throughout Western thought between the idea that emotions are something that need to be regulated and the idea that through appropriate caregiving practices we can enhance the regulating role of emotions. The problem was that these caregiving practices were viewed as a means of controlling a disruptive element in the psyche rather than as

8. In fact, this is a strategy some parents use for hyper-active children who cannot calm down for bed: i.e. they just let them keep running until utter exhaustion kicks in, or they might let the child cry itself to sleep. See (Calkins & Hill 2007) on the long-term consequences of these strategies.

recruiting this very element of the psyche in the development of the capacities that enable one to enjoy a meaningful life.

We now possess abundant evidence showing how important it is for mental health that a child learns how to control her negative emotions (Bradley 2000). But the study of emotion-regulation is not just concerned with the control of fear, anxiety, anger, and frustration; equally important are goal selection, interest, motivation, curiosity, cognitive flexibility, effective decision-making, calmness, and contentment. In other words, positive emotions can play an energizing and even a regulating role, while negative emotions (anger, fear, anxiety, sadness) need to be controlled. Furthermore, there is a dynamic interplay between negative and positive emotion-regulation in different contexts: e.g. a transition between them, or a positive reframing of potentially embarrassing, frustrating or frightening circumstances (Diamond & Aspinwall 2003).

Developmental neuroscientists have gone still further and have looked at the crucial role of emotion in the consolidation of synaptic connections (Tucker et al. 2000) and in the integration of various parts of the brain involved in spontaneous cognitive activities of all kinds (Lewis 2004). Tucker and Lewis have proposed the metaphor of vertical integration along a “neuroaxis” as a way of understanding the sorts of top-down and bottom-up coordination involved in emotion-regulation (Tucker 2007; Lewis 2005). 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 idea here is that the oldest levels are the most structured at birth. These are the automatic perceptual and behavioral programs that flow up the neuroaxis: i.e. stimulus-response systems formed in our prehistory. At the upper end are the highly plastic structures that are shaped by the child’s experiences (Tucker 2001; Lewis 2005; Lewis & Todd 2007).

The more there is ‘synchrony’ between these different levels of the neuroaxis the more stable and flexible is the brain’s response to a stimulus. Equally important is the number of systems involved, their amplitude, and their processing efficiency. That is, some forms of regulation are more constricting than others, in terms of being in an optimal state for learning to occur (see Shanker 2010). This is especially true in the case of autism, where reactive self-regulating mechanisms strongly inhibit the child’s capacity to engage in those early social experiences that are essential for the development of effortful self-control (see Shanker et al. in preparation). But the same point also applies to voluntary forms of self-regulation.

For example, if it requires a great deal of effort to remain calm, the child might have little remaining capacity to attend to what her caregiver is saying. Or if a child deals with her feelings of distress or anxiety by withdrawal, she might be cutting herself off from experiences that are necessary for the development of the ‘social’ brain network (Shanker et al. in preparation). Similarly, a child who regulates herself by, e.g.

self-stimming or perseverating might be able to maintain a feeling of relative calm, but such actions will significantly inhibit the child's capacity to attend to other aspects of her environment (Casenhiser in preparation; Casenhiser et al. in preparation).

It might be tempting to view the *neuroaxis* as exemplifying the view that emotion and reason reside at opposite poles. That is, emotions would occupy the lower levels of the neuroaxis, the source of automatic responses to stimuli, and the uppermost level would be the home of Executive Functions, where reason serves to tame the impulses surging up from below. But Lewis has repeatedly stressed that "in every part of the brain, from the cerebral cortex to the brain stem, it is usually impossible to assign either cognitive or emotional functions to any particular structure" (Lewis & Todd 2007). That is, all brain processes have cognitive aspects such as appraisal (i.e. interpretation of the world) or self-monitoring (i.e. appraisal of the self) and emotional response aspects (i.e. an urge to act in keeping with those interpretations; Lewis 2005).

What this argument amounts to is the claim that brain systems cannot be parsed into psychological categories: i.e. it is impossible to assign strictly cognitive or emotional functions to any particular structure, and even if one chose to do so, many structures become synchronized in all neural functions, so trying to distinguish between them is a bit like trying to separate the woodwinds from the strings in a melody. What we see are "whole brain" processes in which a stimulus ends up exciting everything in the brain, some systems more so than others, and cognition and emotion are both involved in every response.⁹

In one sense this conclusion has been known for some time: it goes back to a point that Anthony Kenny made famous in his classic paper on 'The Homunculus Fallacy' that, for strictly logical reasons, concepts that apply to a *person* cannot be applied to parts of that person (e.g. brain systems; see Kenny 1971). But there is a deeper issue at stake: one that relates to the Greek bifurcationist view of the mind. For the Greek model of emotion-regulation is grounded in their picture of emotions and reason as

9. For example, sensory input makes its way to the amygdala very quickly, and also to the frontal cortex, which has inhibitory (regulatory) connections back to the amygdala and the rest of the limbic system (and probably also back to the sensory cortex aiding it in its perceptual tasks). Young children have stronger reactions to stimulation (e.g. they are more easily frightened by loud noises, etc) either because the amygdala overreacts or because it is under-inhibited by the PFC. The PFC also regulates thalamic (n. reticularis) input to the cortex, so as it matures, the PFC becomes capable of reducing the effects of input: sort of shutting off the stimulation at the faucet. We call this habituation, or sensory gating, and this isn't as possible in those with damaged frontal lobes. Activation in the amygdala energizes the cortex by activating the stress responses, increasing cortical activation and increasing the likelihood that the PFC will typically shut down the stimulation cycle somewhat.

residing in different parts of the psyche; and it is precisely this picture that we need to transcend if we are to understand how self-regulation involves ‘whole mind’ as much as ‘whole brain’ processes.

7. The critical role of affect signals in self-regulation

As touched on above, Marc Lewis, more than any other contemporary emotion theorist, has drawn attention to the fact that it is impossible to parse neural systems into separate cognitive and emotion functions (Lewis 2005). Lewis’s point is that systems up and down the ‘neuroaxis’ are so tightly bound together, or involved in multiple functions, that it is impossible to assign strictly cognitive or emotion functions to any particular structure. But as Lewis has explained in his recent writings, this discovery should not be in the least surprising, given how tightly interwoven cognitive and emotional elements are at the psychological level (Lewis et al. in press).

It was precisely in order to explain how this interweaving comes about that we introduced the notion of *emotional transformations* in *The First Idea*: i.e. the idea that in the first two years of life emotional, cognitive, communicative and social processes become increasingly bound together as the result of infant-caregiver emotional interactions (Shanker & Greenspan 2007). To be sure, as Kagan showed early on in his career, some infants can be extremely sensitive to novel stimuli (Kagan 1989); but even here the caregiver’s responses can play a critical role in the child’s development of effortful control (Greenspan & Shanker 2004).

The crux of Lewis’ neuroaxis hypothesis is that the more time there is between stimulus and response, the more opportunity to select the most beneficial action. But, of course, the big question is: how do a child’s experiences help to stretch out the time between stimulus and response? The answer to this question, we argued, lies in these emotional interactions that the child experiences with her caregivers. What is involved here is not simply learning such things as strategies for reducing one’s fear or anxiety, but the very meanings that a child comes to associate with a stimulus, which serve to stretch out the time between stimulus and response.

The critical role of the caregiver’s subtle affect signals in this process is a point that is easily overlooked. Consider, for example, the famous example from LeDoux of a child who sees what looks like a snake on the path: the thalamus, which first receives the signal, interprets it as a snake and stimulates the amygdala to produce a fear response. On LeDoux’ reading, the visual cortex, with its more refined perceptual discrimination, also receives the signal from the thalamus and, if it determines that the object is a stick and not a snake, sends a message to the amygdala that quells the fear or stress response (LeDoux 1996).

Neuroscientists have added considerably to the complexity of this story. Instead of a linear stimulus-response-reappraisal sequence, they argue for a complex interaction

between the limbic system and the outer layers of the cortex, in which limbic resonance guides focused perception and reappraisal (Lewis et al. in press; Tucker 2001). But what is the nature of the experience that leads to this complex dynamic process?

It could, of course, simply be trial-and-error: e.g. through repeated exposures to snakes and sticks, the brain learns how to distinguish between the two. But note how phrasing the argument in this manner runs the risk of succumbing to the mereological fallacy (Bennet & Hacker 2003). For it is the child who learns to distinguish between snakes and sticks, not a part of the child's brain. And the reason why this classic philosophical argument is so relevant here isn't simply because it clarifies the logical grammar of *reappraisal* as a person-concept: it is because it draws attention to the importance of viewing reappraisal as a higher-order, developmental outcome, comparable to the sort of self-modifying algorithms used in pattern-recognition systems.

That is, if it is the *child* who learns to distinguish between snakes and sticks, then this raises the obvious question of *how*. Perhaps there are some children who carefully scrutinize the various objects in their environment and thereby learn to differentiate; but far more often it is how the caregiver responds to a stimulus, or to her infant's response to a stimulus, that leads to the sort of reappraisal described by LeDoux. For example, an anxious or startled response from the caregiver will often result in a similar behavior in the infant, as will utter indifference on the part of the caregiver. Indeed, depending on how the caregiver responds, the infant might become terrified by the sight of sticks (i.e. mom suffers from a form of hylophobia); fascinated by the sight of sticks (is it suitable for termite-fishing); excited by the sight of sticks (kindling for the cooking fire); aware of a stick's communicative significance (signifying "turn left here"; Savage-Rumbaugh et al. 1986), and so on. It is through a caregiver's actions and reactions that an infant is typically led to appraise or reappraise as the case might be.

What brought this particular example to mind was the fascinating new book by Lynne Isbell documenting how our visual system evolved in an ecology that our primate ancestors shared with snakes (Isbell 2009). What she shows in convincing detail is that there do appear to be human perceptual biases in the detection of evolutionarily relevant threat stimuli (cf. LoBue & DeLoache 2008). The fascinating studies by Cook and Minkea showed that monkeys quickly learn to be afraid of snakes if they see another monkey react fearfully to the sight of a snake, yet display no such response to the digitally-altered video of monkeys responding fearfully to the sight of flowers (Cook & Mineka 1989). Yet as Clara Moskowitz has remarked, "babies and very young children do not usually fear snakes" (LiveScience March 5, 2008).

In other words, the fact that we have these perceptual biases does not entail that we are born with an innate fear of snakes, any more than we are born with an innate fear of beach balls because we duck if one comes at our head. Rather, a child's cognitive/emotional perceptual acts and appraisals are, as Lewis has argued, inextricably bound together precisely because they are molded by a caregiver's (or another agent's)

responses. It is through her caregiver's affect cues that the child learns to *look* at the stick. Indeed, *looking*, on this argument, might *always* involve this sort of cognitive/emotional nexus (see Lewis et al. in press).

Such an argument is very much based on the sort of classic studies done by Sorce, Emde, Campos, & Klinnert (1985) showing that by 12 months babies use visual information from their caregiver's face to make sense of new or confusing situations. Indeed, Phillippe Rochat showed that as early as 9 months an infant will hesitate crossing the deep side of a visual cliff if their mother expresses fear (Rochat 2001), and that at 10 months infants begin to attend carefully to a caregiver's reactions to a novel stimulus (like Striano & Rochat's [2000] toy barking dog). But the argument is also more than just a bit reminiscent of the Stoic argument about 'first movements' that we looked at above, as indeed is the argument about emotional transformations that we shall examine in the next section.

8. The emotional transformation of stimulus-response connections

The basic principle of the concept of emotional transformations that we described in *The First Idea* is that infants initially experience a limited number of global states, for example, stillness, excitement, distress (Fox & Calkins 2003). A caregiver's calming interactions enable the infant to experience soothing pleasure and interest in the caregiver's sounds and sights, and to form the sensory-affect-motor connections involved in, e.g. turning to look at the caregiver. In this way, certain emotional proclivities, such as pleasurable interest in soothing sounds, begin to differentiate from these global states. They also differentiate nonpositive states: puzzlement, hesitation, irritation, etc.¹⁰

As the child's nervous system develops, in part because of nurturing interactions, and the capacity to discriminate differences and organize patterns develops further, the infant begins to further differentiate and elaborate these global states. She does this through continuing interactive experiences with her caregivers. For example, as caregivers respond to their infants' interests with different types of smiles and joyful sounds, we often observe the infant expressing a range of pleasurable smiles and a deepening sense of joy and security.

Through continuing human interactions of this type, infants associate more and more specific subjective qualities with selective physical sensations. For example, the sound of the voice registers as a sensation, but it is also either pleasurable or aversive.

10. I am grateful to Marc Lewis for pointing this out; as he remarked in a personal communication, these nonpositive states also contribute significantly to elaborating the world.

Mother's touch is a tactile sensation that also may be soothing or overstimulating. Every experience that a child undergoes involves this form of association. Both aspects of a child's perceptions, the physical and the emotional, are bound together. Thus, a hug feels tight and *secure* or tight and *frightening*; a surface feels cold and *aversive* or cold and *pleasant*, a mobile looks colorful and *interesting* or colorful and *frightening*.

These emotional associations can have an almost infinite degree of subtle variation so that each child's sense of pleasure or security is unique and highly textured. A child's ability to choose between different goals is very much a function of these emotional associations. By the time an infant has begun to choose between goals she has gone through a series of progressively more complex emotional transformations, in which the affect patterns described above come to give rise to and then orchestrate a large range of cognitive, communicative and social processes.

As just noted, in the first stage the child begins to forge sensory-affect-motor connections (0–3 months). Pleasurable, affective experiences, along with growing motor control, enable a baby to begin to respond with actions, such as reaching towards a pleasurable touch and turning away from an unpleasant one. In this manner motor responses quickly move beyond reflexes and become part of a sensory-affect-motor pattern. That is, affect serves as a mediator between sensation and motor response, connecting the two together. This basic unit of sensory-affect-motor response becomes more and more established through infant-caregiver interactions.

In order to form these connections, a baby must experience positive emotions. For example, because she finds the stimulus pleasurable the baby turns towards the sound of her mother's voice or turns to look for her smiling face. If the experience is unpleasant, primitive neural systems trigger an automatic response to avoid the experience, thereby inhibiting the formation of the stimulus-affect-motor connections that will underpin the child's subsequent development of effortful control.

To forge the sensory-affect-motor connections, individual differences must be attended to. Infants vary considerably in how they attend to sounds, sights, touches, smells, and movements. Some are very sensitive and require more soothing, while others are under-reactive and require more energetic wooing. Some quickly turn towards the source of a sound while others take more time to develop this skill. Similarly, some infants begin to recognize visual or auditory patterns fairly quickly and others more slowly. Thus caregivers have to tailor their interactions to their baby's individual preferences and abilities. The better that caregivers can adjust their behaviors to the child's biological profile the better the dyad displays 'goodness-of-fit' in their interactions (Thomas & Chess 1984). Should a caregiver fail to recognize the child's negative reactions or respond appropriately to a child's overtures, the child may become subdued and withdrawn or adopt reactive defensive behaviors such as gaze aversion or arching his back and straining to turn away (Beebe & Jaffe 2008; Downing 2008; Spitz 1965; Tronick 1989).

By no means, then, is a child's ability to engage in shared gaze or to recognize social and communicative patterns simply a maturational phenomenon. Rather, the caregiver must engage in a variety of subtle affective behaviors, both soothing and arousing, that are finely tuned to the child's individual sensory proclivities, in order to promote the development of these capacities (Greenspan 1997). A baby must be enticed by the emotional rhythm of the caregiver's voice, big smiles and gleaming eyes, to look or listen to interesting sounds and sights if she is to progress beyond the very simple stimulus-response sequences that she displays at birth and begin to engage in shared gaze.

In the second stage of affective transformation, the child develops a more intimate relationship with her caregiver (2–5 months). With warm nurturing the baby becomes progressively more invested in and interested in her caregivers, whom she can now distinguish from other adults. Positive and often joyful emotions enable her to coordinate gaze, listening, and movement in synchronous and purposeful interactions. Through these affective interactions she begins to discern patterns in her caregivers' voices and affect signals. She begins to discriminate their emotional interests, such as joy, indifference, and annoyance, and to recognize the emotional significance of facial expressions or vocalizations.

In the third stage of affective transformation, the child begins to master the ability to engage in purposeful two-way interactions (4–10 months). For this to happen, caregivers need to read and respond to the baby's emotional signals and challenge the baby to read and respond to theirs. Through these interactions, the baby begins to engage in back-and-forth emotional signaling. The 6-month-old smiles eagerly at her mother, gets a warm smile back, and then smiles again, even more expansively. Different motor gestures – facial expressions, vocalizations, arm movements – become part of this signaling, which now harnesses a broad range of emotions (pleasure, curiosity, assertiveness, fear, etc.), sensations (touch, taste, sights, sounds, odours), purposeful movements, and emerging social patterns.

By 8 months, many of these exchanges usually occur in a row. The infant is now using purposeful affective signaling to orchestrate the different components of her central nervous system in an integrated manner. She is beginning to use her purposeful activity in affective interactions to form higher-level cognitive, communicative and social skills: for example, searching in the caregiver's hand for her rattle, reciprocally exchanging a variety of sounds, and initiating facial expressions and gestures to achieve closeness, such as reaching out to be picked up.

Through these increasingly complex interactions, the child acquires implicit knowledge of the social and communicative patterns that will serve as a framework for her growing understanding of her world: what is felt, said, and done, and what is unacceptable, not said or not done. Through the endless smiles, head nods, friendly gestures, animated movements, etc. that she encounters in her countless interactions

with her caregivers, the child is learning to read and respond to the social and emotional cues of others as well as to communicate her own. These meaningful patterns involving the back-and-forth reading and responding to each other's emotional signals enable the toddler to begin forming for herself the social patterns, cultural norms, rules (including obligations) that characterize her family, community and culture.

In the fourth stage of affective transformation, which we call shared social problem-solving, the infant learns to sustain a continuous flow of back-and-forth affective communication in order to collaborate with a caregiver in solving affective, meaningful problems (9–18 months). For example, the 14-month-old infant takes the caregiver by the hand and, with a series of emotional gestures and vocalizations, gets the caregiver to go over to the toy area, points at and vocalizes about the desired toy up on the shelf, and manages to get the caregiver to pick her up to reach for the desired object. In these complex interactions, the infant is further developing the capacities outlined above – to read and respond to a broad range of emotional and social signals as a basis for forming patterns that include a growing sense of self and expectations from others as well as social and cultural norms.

9. Developmental pathways

As was noted above, infants and children differ in their basic responses to sensations. Certain types of touch, sound, or smell, for example, may be soothing to one infant and overstimulating to another (i.e. an infant may be hyper- or hyporeactive to a given sensation). The same sound can be stimulating and pleasant for one child and piercing and shrill for another. These physical differences can be experienced with a near-infinite range of subjective affective coloring, depending on early caregiver-infant interactions. For example, how a caregiver soothes or overreacts to her infant's hypersensitivity to touch will influence her subjective experience of that sensation. Or they might vary for the individual child according to her arousal state, which itself can be highly variable.

As an infant constructs a subjective emotional world, “experience” and physiologic expression continuously influence one another. Subtle reading and responding to an infant's emotional cues as part of a reciprocal interaction keeps refining her physiologic and emotional experience and expression. Growing central nervous system organization serves to organize and facilitate the expression of ever more complex and refined interactive emotional experiences.

To be sure, basic properties of the child's neurobiology constrain the sorts of demands or challenges we might impose on a child; but it is the nature of the demands or challenges that we impose through our emotional interactions which dictate how that child's neurobiology is going to develop. It also goes without saying that an initial

biological deficit can have a powerful effect on the kinds of social experiences that a child is receptive to or seeks out, which may further reduce the input to certain neural systems whose development hinges on these social experiences. But that does not mean that it is impossible for the child to engage in the sorts of experiences that will provide these neural systems with the needed input.

For example, recent research has demonstrated that a shortage of dopamine – a neurohormone that supports the ability to wait for a reward – might be a critical factor in the development of attentional problems (Sagvolden et al. 2005). Sagvolden's model raises the question of whether, if a child is born with a short version of the genes involved in the production of dopamine, there is a heightened risk that in stressful conditions these might be turned off prematurely, with the result that the child has a shortage of dopamine and thus experiences delay as aversive (see Rueda et al. 2007). Such a child would then be prone to engage in behaviors that favour immediate reward.

If no effort is made to lengthen the time-frame in which a reward must be delivered in order for it to be associated with a behavior, or to help the child deal with distractions, or to help the child develop the capacity to self-organize and see a task through to completion, or even to choose between equally attractive goals, the child's craving for instant gratification could well result in a lack of input to the parts of the brain regulating inhibitory control. This outcome might be especially true in the case of a highly anxious caregiver who perhaps herself suffers from a shortage of dopamine and thus responds to her child's 'delay aversion' by constantly catering to the child's need for rapid gratification, thereby exacerbating the under-development of the parts of the brain that not only help regulate the time-window in which a behavior can be associated with a reward, but which enable the child to recognize and remember patterns.

Similarly, a sensory hyper-reactivity to visual stimuli might lead a child to avoid those face-to-face interactions with her caregiver that are crucial if the fusiform gyrus is to receive the inputs that it needs to become fully functioning in the recognition of facial expressions of emotion. Not surprisingly, when imaging studies were conducted on adult subjects with autism, it was discovered that there was a striking lack of activity in the fusiform gyrus. This led researchers to question whether autism was somehow the result of a genetic malfunction in the fusiform gyrus itself or some 'lower' system feeding into it (Baron-Cohen 1995). But a discovery by Morton Gernsbacher and her colleagues at the University of Minnesota revealed a more complex developmental picture (Gernsbacher et al. 2003).

Adults with autism were shown photographs of actors displaying happiness, anger or fear, half of the photographs with the agent's eyes looking straight ahead and half with their eyes averted. There was indeed a significant diminishment in the activation of their right fusiform gyrus, along with a significant increase in the

activation of centres involved in conflict monitoring and the detection of threat, when these subjects viewed the eyes-straight-ahead photographs. But there was no comparable effect when the subjects viewed the photographs in which the actors' eyes were averted. Thus, the Gernsbacher study suggests that subjects with autism avert their gaze in order to reduce the stress that is created in direct social encounters. That is, the explanation for this behaviour would indeed appear to lie in sensory over-reactivity to social/visual stimuli, not in a specific malfunction of a 'dedicated' face-processing system.

The upshot of this way of thinking, then, is that an initial neurological deficit constrains the child's dyadic interactions, which results in reduced social input and thence decreased activation of specialized systems for functions like face processing, reading emotions, social orienting, and social motivation, which in turn constrains the child's capacity to engage in these very social interactions and has other measurable effects on brain development. A neurobiological deficit at birth or in the early years that obstructs these interactive experiences can thus result in a reduction of the input on which the development of these systems depends. If these neural systems are deprived of the input needed for their development, this can further impinge on the child's willingness or ability to engage in the necessary social experiences, resulting in a further constriction in the network of capacities necessary for healthy development (Segalowitz & Shmidt 2007).

The developmental pathways model, as so stated, sounds like the most modern of theories, grounded as it is in contemporary theories of physiological reactivity and the integration of neural systems; and yet, as we have tried to show in this paper, the pathway on which Western thinkers have looked at the interaction between biology and emotion-regulation has been surprisingly constant. Far from construing this as a philosophical constraint, however, we see this as a tradition that has opened our minds to the possibilities of enhancing children's healthy mental development.

10. A plea for philosophy

The title of this paper alludes to two different lenses for looking at emotion-regulation: one historical and the other developmental. On the one hand, emotion-regulation has operated as an archetypal, even a defining theme in the history of Western views about healthy mental functioning. On the other hand, it is a psychological lens for studying the development of this core capacity throughout the lifespan. Interestingly, the ancient Greeks were already aware of this ambiguity.

Being the great poet that he was, Homer provides us with all sorts of clues right from the outset of *The Iliad* that foreshadow Achilles' eventual collapse. Yet much of the drama of the poem derives from the fact that all of his peers are utterly

dumbfounded by his breakdown. It is a tension that we are all too familiar with at Milton and Ethel Harris Initiative in York University (see www.mehri.ca), given our interest in the early detection of autism. We know that, for many children with autism, things appear to be going well in the beginning but then the disorder suddenly emerges, often but not necessarily because of some precipitating event. Yet when we view early videos of cases of regressive autism it seems that we can, in fact, discern some subtle sign of the disorder (see Bayrami 2010).

The Achilles who has not been tested emotionally is really still an adolescent. It is only when he is subjected to stresses unlike anything he has hitherto experienced that his emotions become uncontrollable. When we look at the normative development of emotion-regulation we see an interesting parallel. When problems in emotion-regulation appear suddenly, out of blue as it were, it is typically at a major transition-point. It seems likely that what has happened is that the child was able to deal with the range of challenges or demands that she was exposed to until then but the sudden shift stretches her beyond her capacity to stay regulated.

For example, the Rimm-Kaufmann study, cited above, suggests that for many children the transition from a home or nurturing daycare environment to a classroom is quite difficult. This is not the first and certainly not the last of such critical transition-points the child will have to deal with. There is another one, from example, in the move from grade 6 to 7, or when they enter puberty or go to college. In other words, we need to take a longitudinal perspective on the ongoing development of emotion-regulation: a point that has been reinforced by developmental neuroscientists who have identified periods of extreme brain lability that occur at the same time as some of these 'transition-points'.

Jay Giedd's work has been especially influential in this respect (Giedd et al. 2004). Giedd has shown that, while a child enters kindergarten with 95% of her adult brain, her grey matter continues to thicken over the years of elementary schooling and there is a sharp growth spurt in the PFC just before puberty. At puberty there begins another critical phase of synaptic pruning, which appears to be pivotal for the individual's subsequent self-regulatory abilities over the course of their lifetime. The experiences that the adolescent engages in at this time turn out to be critical for the wiring of the self-regulation network (Giedd 2002).¹¹ In a particularly memorable image, the adolescent brain has been likened to a race car without a skilled driver at the wheel (Steinberg 2005). It is clearly highly significant that adolescence marks the peak age of onset for many psychiatric disorders (see Paus, Keshavan & Giedd 2008).

In order for the child's emotion-regulation to continue to grow and strengthen over the school years, she must continue to undergo the types of experiences that

11. Giedd, J. Inside the teenage brain. *Frontline*, Jan 31, 2002

nurture these core capacities. It is highly important that by the time she enters school the child has developed a number of strategies for dealing with sensations or situations that render her anxious or frustrated. It is equally important that we consider sorts of experiences that will promote the development of her positive emotions, such as sports, music, art, drama, clubs. But at the top of this list – at least as far as concerns the young adult – Plato would have us consider the role of philosophy.

Plato's view of philosophy as a "medical art for the soul" – what Cicero was to call the *medicina mentis* – inspired a philosophical tradition that runs all the way from Arcesilaus, who took over as Head of the Academy in the third century B.C., to the present article. Just as Achilles serves an example of what happens to the thumoeidic individual when they are raised in the wrong way, so the stories about Socrates are supposed to represent an example of how *thumos* can be "relaxed" by "soothing stories" and made "gentle by means of harmony and rhythm" (Rep. 441e).

Plato's core idea was that philosophical reflection can enhance an individual's control over his or her emotions. A great deal of thought went into the stories that are told in the dialogues, which ebb and flow in much the way that conversations do, which balance off characters and ideas against one another, which endeavour to soothe the *psuchē* and to excite certain desires or appetites, such as for justice, or indeed, for health. Thus, the dialogues do not operate as instruction manuals for how to achieve *mental health* but rather, are meant to guide the reader to this result. Like a dramatic poet, the language that Plato uses and the structure of the story are critical factors in this healing process.

Whatever one might feel about the importance that Plato assigned to the written word,¹² what is of utmost importance is his emphasis on the need to understand the nature of *mental health* before one can consider the experiences that promote

12. Plato's view of the power of the written word dates back to the ancient Greek shamans, according to whom the incantation of words, the manner in which they are expressed, have a special power to operate on the human mind. These are the *epōdai*, the magic charms that, as Laín Entralgo showed in his classic *The Therapy of the Word in Classical Antiquity*, are crucial to Plato's view of philosophy (see also Nussbaum 1994: 49ff). This is the point that lies behind Socrates' argument in the *Laches* that medicine needs "to proceed beyond Hippocrates" (*pros tō Hippocratei*) if it is to treat disease effectively, whether it be mental or physical. The context for this argument is as follows: Socrates tells the young Charmides, who has asked for his help in treating a headache, that he learned a cure from a Thracian physician that involves administering a plant and uttering an *epōdē*. Socrates emphasizes that the important lesson here is that "one should not attempt to cure the body apart from the *psuchē*. And this ... is the very reason why most diseases are beyond the Greek doctors, that they do not pay attention to the whole as they ought to do, since if the whole is not in good condition, it is impossible that the part should be. Because... the soul is the source both of bodily health and bodily disease for the whole man, and these flow from the *psuchē*" (Char 156de). And these *epōdai* "consist of

it. And what is fascinating is the extent to which Western thought has remained so heavily dominated by Plato's outlook: like Moliere's physician, we still look at emotion-regulation through Plato's lens, even if we are not fully aware of the fact.

To appreciate the significance of this point, just consider how the *Iliad* is ultimately a story about a monumental culture shift, one that deeply informs everything that we now take for granted when we study emotion-regulation. As his listeners would have fully realized, Homer was depicting the transition from an ancient ethos, in which warriors who would go berserk in battle were prized, to the dawning of a new culture that valued the importance of staying in control of one's emotions. Plato went to great lengths to make this theme explicit. He employs the figure of Achilles to shift our focus from a preoccupation with extrinsic rewards (e.g. the trappings of public status) to a meditation on the psychic well-being of the individual.

Over and over Plato compares *mental* with physical health so as to question what would constitute 'mental health' and how one would attain such a state (Gorgias 504). He argues that, just as someone who eats and exercises properly will experience what is termed "health," so someone who tempers their appetites and desires and is unafraid of death will flourish. This is very much the underlying theme in the long discussion on the nature of justice in the *Republic*. Plato argues that "just and unjust actions are no different for the *psuchē* than healthy and unhealthy things are for the body. ... Virtue (*aretē*) seems, then, to be a kind of health, fine condition, and well-being of the *psuchē*, while vice is disease, shameful condition, and weakness" (Rep 444d).

Plato's most explicit statement on mental health occurs in the *Timaeus*, which, for historical reasons, is amongst the most important of all Plato's writings on the subject; for the *Timaeus* was the only one of his texts widely available in Latin in late antiquity and the Middle Ages. The *Timaeus* presents a comprehensive review of the Hippocratic theory of disease, which culminates in the critical claim that:

diseases of the *psuchē* that result from a bodily condition come about in the following way. It must be granted, surely, that mindlessness is the disease of the *psuchē*, and of mindlessness there are two kinds. One is madness, and the other is ignorance. ... The diseases that pose the gravest dangers for the *psuchē* are excessive pleasures and pains. When a man enjoys himself too much or, in the opposite case, when he suffers great pain, and he exerts himself to seize the one and avoid the other in opportune ways, he lacks the ability to see or hear anything right. He goes raving mad and is at that moment least capable of rational thought". (Tim 86bc)

What Plato is arguing here is that the humoral theory of physical disease does not suffice to explain mental disease; for the problems that need to be explained for the latter

beautiful words. It is a result of such words that *sōphrosunē* arises in the *psuchē*, and when the *psuchē* acquires and possess *sōphrosunē*, it is easy to provide health" (157a).

are *why* someone has trouble regulating his emotions, why he overindulges his appetites or fails to attend to his proper needs. And the latter dimension of human behavior cannot, he insisted, be reduced to biological causes.

There is an important argument in the *Phaedo* in which Socrates belittles Anaxagoras for failing to recognize the difference between reasons and causes.¹³ Socrates' criticism of Anaxagoras represents the first attack on materialism in Western thought. Just as a man's actions cannot be explained by examining the operations of his bones and sinews, so a man's mental illness cannot be explained by measuring the levels of the four humours. That is, you cannot explain why Achilles behaves in the manner that he does by arguing that he has too much choler in his blood; for the question that concerns us is precisely why he has this overabundance of choler; and that, according to Plato, is not simply a matter of biology – i.e. not simply something he was born with – but rather, is a question that can only be explained by studying the development of his *psuchē*. Moreover, mental health occurs, not because there is a balance between the body's four humours, but rather, because reason is in control of the different components of the mind,¹⁴ tempering and overseeing the individual's bodily and thumoeidic desires and thereby resulting in humoral balance.¹⁵

13. The term is Wittgenstein's but it was Plato who saw the problem first. Anaxagoras, Socrates scornfully insists, "would mention other such [physical] causes for my talking to you: sounds and air and hearing, and a thousand other such things, but he would neglect to mention the true causes, that, after the Athenians decided it was better to condemn me, for this reason it seemed best to me to sit here and more right to remain and to endure whatever penalty they ordered. . . . To call those things causes is too absurd. If someone said that without bones and sinews and all such things, I should not be able to do what I decided, he would be right, but surely to say that they are the cause of what I do, and not that I have chosen the best course, even though I act with my mind, is to speak very lazily and carelessly. Imagine not being able to distinguish the real cause from that without which the cause would not be able to act as a cause." (*Phaedo* 99)

14. There has been much debate over whether Plato was being literal when he argued that the *psuchē* is composed of three elements (*Rep.* 580d): reason, thumos, and the appetites (corresponding to the three classes in his ideal state: the Rules, Auxiliaries, and the Producers). The point that concerns us here is Plato's emphasis on the need for harmony imposed from above between the different elements of the mind ("justice") if the individual is to enjoy a state of mental health. Essentially what he is saying is that we have different kinds of drives and desires, 'higher' and 'lower'. The 'lower' are innate; they are what we share with animals, what governs the actions of an infant. If these lower desires are given free reign this will lead to a life of vice; but the 'higher' desires – those that separate us from animals – can lead to a life of virtue and justice – i.e. mental health.

15. "To produce mental health" the components of the *psuchē* have to be "in a relation of control and being controlled" (*Rep.* 444d).

Achilles struck Plato as the perfect illustration of his point; for at the height of his frenzy when his primal emotions have been unleashed he descends to the level of a beast, totally out of control.¹⁶ Yet what restores him to normalcy at the end of the poem is not a herculean act of rational self-control, but a point that is easily overlooked: it is a strong positive emotion, the compassion that Achilles feels for Priam. How different the history of studying emotion-regulation might have been if the importance of this point were grasped: i.e. if it were recognized that emotions are not simply an aspect of the mind that need to be controlled, or worse still, suppressed: that cultivating a child's positive and prosocial emotions is as important an aspect of emotion-regulation as learning how to control her negative ones. That is, that *emotions are not simply the object, but also the vehicle for strengthening the mind*.

The more we think about the importance of emotion-regulation for a child's long-term benefit, both physical and mental, the more we need to take this lesson to heart. Without a compensating emphasis on the importance of the affective interactions that nurture a child's curiosity and interest, her security and self-esteem, desires and attitudes, empathy and moral integrity, her overall happiness, we run the risk of reducing emotion-regulation to behavior management. In *The Modern Art of Taming Wild Horses* (1858), one of the classics on the importance of treating animals with kindness, John Solomon Rarey revealed how the secret to the extraordinary feats of the great Arab horsemen was that they never resorted to punishment or cruelty but rather, lovingly schooled their horses in a remarkably broad range of nonverbal signals, thereby enhancing the communication between horse and master immeasurably. It is a point every bit as relevant to Plato's constricting view of emotions as 'wild horses' that need to be controlled by a cold faculty of reason.

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16. Achilles is the paradigm example of someone who can do "whatever he wishes, except what will free him from vice and injustice and make him acquire justice and virtue"; he thus illustrates the force of the point: "how can it be worth living when his psychē – the very thing by which he lives – is ruined and in turmoil?" (Rep 445b)

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