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How Empathic Deficits Explain the Psychopathic Mind Thomas B. Lewis, M.D.

If you are at all interested in learning about the neuroscience of empathy, the best way I have found is this: read every paper you can find authored by Jean Decety, currently at the University of Chicago. He is not only the investigator doing the most interesting work on the scientific study of empathy, but he is also a very good science writer, an extreme rarity in researchers. I have found that just about any paper that bears his name proves to be extraordinarily informative and insightful. I highly recommend them in general, and I will recommend several specific ones below.

One of the early papers to get people excited about the neuroscience of empathy was “Empathy: Its ultimate and proximate bases” by Preston and de Waal, (*Behav Brain Sci* 2002 Feb; 25(1):1-20; discussion 20-71.) This is quite a lengthy but fascinating paper, and it is followed by 50 pages of commentary from other investigators and groups. In the commentary section, the comments by Jaak Panksepp are particularly worthwhile.

Overview: What is Psychopathy?

The best resource for this is likely to be Robert Hare’s book, *Without Conscience: The Disturbing World of the Psychopaths Among Us*, available on Amazon.com

In brief, psychopathy is a disorder manifested by arrogant deceitfulness, a significantly impoverished affective range, impulsive and irresponsible behavior, and sometimes repeated criminal offenses. Psychopathy is one of the strongest predictors of recidivism. Only about 15% of criminal offenders are psychopaths. Many criminals, 50% or more, meet criteria for DSM IV disorder, “Antisocial Personality Disorder.” Thus, ASPD and psychopathy are not synonymous; the group of psychopaths are a subset of those with antisocial behaviors.

Evolution of the brain

Reference: *The Triune Brain in Evolution*. Paul MacLean, 1990. Maclean, a comparative neuroanatomist at NIMH, describes a tripartite model of brain evolution: the reptilian brain, with important reflexive survival machinery; the limbic or mammalian brain, which enabled the mammalian way of life, with social and emotional communication, caring, nurturance, and

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empathy; and the neocortical brain, which is responsible for the advanced cognitive abilities found in later primates, like us.

Later theorists have pointed out that some of the advanced machinery in the neocortical brain has allowed human beings to go from sociality to *ultra*-sociality. Most mammals are social; they live in small groups (sometimes as small as one family) and interact cooperatively in tasks like hunting, defense, and so forth. Human beings are not just social; we are *ultra*-social, and we are among the most cooperative organisms on the planet, living, like termites and ants do, in giant colonies of thousands to millions of cooperating members. Large-scale cooperation turns out to be a remarkably powerful and useful tool, and we have used it to do things that no single person or family could do alone: build cathedrals, cure polio, go to the moon. Massive cooperation/*ultra*-sociality are enabled by some of the limbic/mammalian structures, which give us “good feelings” when we help each other out or work toward a common goal. Certain neocortical areas also facilitate *ultra*-sociality, as explored below.

One way to think about psychopathy is this: psychopaths are human beings who are *not* *ultra*-social; they are *non-cooperators* who live inside a vast system of mutual cooperation. They don't get “good feelings” from helping people out or working toward a common goal. At best, they are free-riders, unwilling to contribute and coasting on what they can scrounge or scavenge from the goods that the *ultra*-social group produces. At worst, they are *intra*-species predators, lying in wait at the watering hole of our *ultra*-sociality.

The 3-Part Model of Empathy

“The functional architecture of human empathy.” Decety & Jackson. *Behav Cogn Neurosci Rev.* 2004 Jun;3(2):71-100. In this paper, Decety and Jackson describe empathy as “a complex form of psychological inference in which observation, memory, knowledge, and reasoning are combined to yield insights into the thoughts and feelings of others. As such, empathy involves not only some minimal recognition and understanding of another's emotional state but also the affective experience of the other person's actual or inferred emotional state. Empathy accounts for the naturally occurring subjective experience of similarity between the feelings expressed by self and others, without losing sight of whose feelings belong to whom.” They point out that there is an evolutionary spectrum of empathy, from agitation at another's distress all the way to full

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comprehension of another's situation. "We believe that self-other awareness and self-regulation of emotions are vital components of human empathy. These components may well steer us toward a clear distinction between humans and other mammals when referring to empathy. In addition, humans, unlike other primates, can put their emotions into words, allowing them not only to express emotion but to report on current, as well as past, emotions." Decety and Jackson go on to outline three primary components of empathy: "(a) an affective response (feeling what other feels); (b) a cognitive capacity to take the perspective of the other person (knowing what other feels); and (c) some regulatory mechanisms that keep track of the origins of self and other-feelings."

Empathy Mechanism #1: Modeling/Mirroring

One of the revolutionary findings of the last decade, now described in many places, is the existence of *mirror neurons*: neurons that fire when you *reach* for a cup or when you see someone else reach for a cup. This finding ultimately led to the discovery that every waking moment of our lives, our brains are creating complex models, inside our own heads, of what *other people out there* are doing, feeling, and sensing. When we access this internal simulation or model, we are able to know what it's like to be the person *out there* that we are looking at. One aspect of empathy is that empathy involves *internal mirroring* or *modeling the emotional state of another person*. Here is a good early paper on this topic: "Neural correlates of feeling sympathy." *Neuropsychologia* 2003;41(2):127-38. Decety & Chaminade.

And, thus, the **1st Law of Empathy**: *Empathy begins with covert modeling of other people's behavior*. A corollary of this Law is that persons already in the grip of acute emotion are empathically impaired, to some degree: because they are already running a strong emotional program, they cannot easily drop that program and model someone else's emotion at the same time.

Empathy Mechanism #2: Self-Projection of the Point of View

Empathy is not just the ability to sense what other people feel. It also involves the ability to understand, in a more cognitive and effortful way, that they have a different point of view.

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You may notice that it is very hard to talk about this function of the brain without making use of metaphors that describe what the world *looks* like from an alternate position in physical space: we say that people have a *point of view*, an *out-look*, a *view-point*, a *world-view*. We say that we need to understand *where they are coming from*. The reason that we so often resort to these metaphors is because the brain literally computes what the world looks like from other points in space, and we use that faculty to understand or grasp why people are doing what they're doing.

This function is carried out by the posterior superior temporal sulcus, or PSTS, sometimes also called just the STS. Unlike modeling, this function is not automatic; instead, you must engage this faculty as an exercise of will.

And thus, the **2nd Law of Empathy**: *Empathy proceeds through the imaginative projection of the mind's eye.*

Here are a couple of references on this topic: "A region of right posterior superior temporal sulcus responds to observed intentional actions." Saxe R et al. *Neuropsychologia*. 2004;42(11):1435-46. Also "The Neural Substrate of Human Empathy: Effects of Perspective-taking and Cognitive Appraisal." Lamm/Batson/Decety, *Journal of Cognitive Neuroscience* 19:1, pp. 42-58 2007.

Empathy Mechanism #3: Balance

The brain has only one set of hardware on which to run emotional programs. When you are having a feeling, your brain is using that piece of hardware. If you are running a model or a simulation of what someone *else* feels, your brain is using that same piece of hardware. So running the "Self" program competes for the resources necessary to run the "Other" program. It's like the early DOS operating system, where you could only run one program at a time. So your brain has to "toggle" back and forth between the Self program and the Other program -- stop one, run the other one, stop that one, run the first one, and so forth. This faculty requires a well-functioning inhibitory system -- perhaps the most crucial piece of the ability to balance Self and Other is the ability to *inhibit* one program and then the other.

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Of course, in most people most of the time, the system defaults to making the Self program a priority over the Other program. In other words, the hard part about balancing Self and Other, for most of us, is inhibiting Self long enough to run a decent simulation of Other. Decety calls the Self program the “pre-potent self perspective,” to emphasize that the Self program comes pre-loaded with intrinsic potency. This “pre-potent self perspective” must be actively suppressed in order for a model or simulation of Other to be run. This suppressing function is carried out by an inhibitory center in the medial prefrontal cortex.

And thus, the **3rd Law of Empathy**: *Empathy finishes with a fine-tuning of the balance between Self and Other.*

So what happens when these empathy mechanisms don't work properly?

Reference: *Biopsychosoc Med.* 2007 Nov 16;1:22 “The empathic brain and its dysfunction in psychiatric populations: implications for intervention across different clinical conditions.” Decety & Moriguchi.

Empathy Deficit: Balance

What are people like who cannot perform the balancing of Self and Other very well? Usually, they default to the Self program, and then they are literally Self-ish, or narcissists.

Because narcissism results from an imbalance between the strength of the emotional Self program and the strength of the inhibitory system, we might postulate a typology of narcissism. A person could become Self-ish by having either too **strong** a signal from the emotional Self, so that it cannot easily be inhibited, or he could become Self-ish by having too weak an ability to inhibit a normal-sized Self program.

The first case we might call **Hot** Narcissists: people whose emotional self is just a little too strong to be easily contained, and even a normal braking or inhibitory system cannot contain it. People like this would be swept up in the current of their emotional passions. Patients in the bipolar spectrum, for instance, are commonly afflicted with this sort of narcissism. Artists and other creative types are famously Self-ish and narcissistic, and it's likely to be this same kind of narcissism: their emotions are unusually strong, and not easily inhibited.

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What about the people who have an emotional Self of regular, ordinary strength, but have a deficient inhibitory system? We might call these people **Cold** Narcissists: they do not appear inspired or passionate or particularly emotional, but instead they simply fail to inhibit Self-ish urges that ordinary people inhibit without much difficulty. Usually these urges relate to basic motivations for money, sex, status, food, power, and so forth. One occasionally meets people who appear to care for nothing but money, or sex, or status, or power, but they do not “care” in a passionate, expansive, artistic way; instead they “care” in a shriveled, miserly, acquisitive way. These are the **Cold** Narcissists.

Empathy Deficit: Projection of Point of View

The most clearly identifiable people who cannot project their point of view in space to imagine the perspective of others are those who have an autistic spectrum disorder (ASD). We do not yet know what the *fundamental* neural abnormality is in ASD: many abnormalities have been identified, and it isn't clear which abnormality or which set of abnormalities are primary. ASD people definitely have significant trouble projecting their point of view to imagine other perspectives, and some evidence exists to suggest that structural abnormalities of the STS may exist in ASD. When a person has a mild version of ASD, with a mild deficit in projecting point of view, he might have trouble understand *faux pas*, the comprehension of which requires adopting another person's point of view. In cases of severe deficit, the person may appear not to comprehend that another point of view is even *possible*.

For an excellent overview of ASD, I recommend Simon Baron-Cohen's book, *The Essential Difference*.

Empathy Deficit: Modeling

The people who have deficient abilities to internally model the emotions of other people are psychopaths. The discussion of people who have defects in modeling, therefore, becomes a discussion of:

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The Psychopathic Brain

A number of studies in recent years have delineated the CNS abnormalities to be found in psychopaths.

First, and probably foremost, is the growing evidence of a drastically inactive and unreactive limbic system. Several studies have demonstrated that in response to emotionally provocative stimuli, ordinary people respond with a vivid activation of their limbic system: the amygdala “lights up”; the surrounding brain tissue in the temporal pole is activated, and the orbitofrontal cortex, the part of the neocortex that receives input from the limbic system, is activated. In the psychopath, these areas remain dormant and “dark” during emotionally provocative interventions. The difference is stark and startling.

Not only are these regions functionally abnormal, i.e., under-active when studied using functional brain imaging, but they may also be *structurally* abnormal. Several recent studies have demonstrated grey matter volume reductions in the anterior temporal cortex, the orbitofrontal cortex, and the insula. Because these are the areas that allow people to feel emotions, as well as the areas that allow people to model emotions, this grey matter paucity could underly the deficiency of emotional experience so evident in psychopaths. Interesting, psychopathic empathic deficits may not be confined to the empathy mechanism of modeling: grey matter volume reductions have also been found in the frontopolar area (possibly underlying the sort of inhibitory deficit that leads to **Cold** narcissism), as well as the STS (possibly linking psychopathy with the sort of deficit seen in ASD, the inability to imagine or conceptualize the perspective of others).

The insula, so critical to the perception of one’s own feelings and to the ability to infer the feelings of others, also appears dysfunctional in psychopathy. In functional imaging studies, the insula lights up when normal people observe feelings in others, but in psychopaths, the insula does not. Some data has also found volume loss in the insula in teens with Conduct Disorder, a precursor condition to adult psychopathy.

So we know that psychopaths have a deficient affective experience of life, and we can see from the structural and functional brain imaging studies why this might be so: their limbic structures are relatively inactive, non-reactive, and atrophic. Why should this so profoundly

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affect their behavior within the ultra-social group? Why should this make psychopaths (to normal eyes) so appallingly *amoral*?

A quiet revolution has occurred in neuroscience over the past decade. Not so very long ago, everyone took it for granted that morality is an advanced *cognitive* function of the neocortex, but the evidence now strongly suggests that morality is primarily a *limbic* function that is directed and re-shaped by interactions between the limbic system and the neocortex. People are moral, in other words, not primarily because of what or how they *think*, or their ability to reason, but primarily because of what and how they *feel*. If we take hold of an imaginary “Volume” knob on the limbic system and turn it down, we not only give the owner of that limbic system a deficient affective experience of life, but we also remove most or all of his moral sensitivity: his displeasure at hearing about an immoral act, the inner feeling of self-condemnation that comes from contemplating the performance of an immoral act, the enjoyment to be had from cooperating with others, and so forth. All gone.

When you read in the literature about the deficient affective experience of the psychopath, a good deal is made of their relative fearless-ness. Most writers on the subject assume that morality, like the old Freudian superego, is a construct that is built by the fear of external punishment and then internalized, in a Pavlovian fashion. So if we removed a child’s fear of punishment, in this model, we would remove his ability to be “moralized” by this process. This entire conceptualization of morality is certainly incorrect; morality is not instilled through the fear of punishment. Instead, the moral emotions are a complex and multifaceted set of functions that develop as a normal part of brain development, like the ability to acquire a language or the ability to walk. Psychopaths *are* certainly fearless, but their fearlessness did not *cause* their amorality by preventing fear-conditioning. Rather, psychopathic fearlessness is a *marker* that tells us that something is drastically wrong with the ability of that limbic system to represent emotion. A limbic system that cannot represent fear is likely to be unable to represent a whole collection of other critical emotional functions: guilt, remorse, compassion, sympathy, respect, reverence, sadness, loyalty, and so on.

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Aggression

Aggression is often subdivided into two forms of aggression: reactive or impulsive aggression, and premeditated instrumental aggression. After examining these two forms of aggression, I will suggest the existence of a third kind of aggression, intrinsic aggression.

Impulsive: Here, a person loses control and commits an aggressive act. Perhaps someone insults him, and he takes a swing at the guy. Perhaps the sight of his ex-wife in the arms of another man makes him wildly angry, and he impulsively stabs both of them to death. The aggressive acts are not planned; they are committed quickly and in the “heat of passion.” Some provocative event precedes the act; guilt and remorse often follow. Not surprisingly, persons exhibiting repeated failure of impulse control in connection with aggressive acts sometimes evidence lesions of the inhibitory pre-frontal areas. Note that impulsive criminals can still be dangerous recidivists. No one is arguing that impulsive aggression is not a problem. However, acts of impulsive aggression are often (even usually) committed by non-psychopaths.

Instrumental: Here, a person calmly plans to use violence or aggression to get something that he wants. Planning and pre-meditation precede the act; guilt and remorse do not follow. Violence is seen as an instrument to carry out the crime, like any other instrument, like a hammer or a crowbar. A person capable of instrumental aggression might use a crowbar to break open a money box to get at the contents; he might also use a crowbar to break open somebody’s skull in order to render the victim incapable of protest when he takes their wallet. The goals that are sought through the use of instrumental aggression tend to be: money, sex, power, status, drugs, material possessions.

Intrinsic: Here, a person seeks to use aggression and violence because, fundamentally, that is what he wants. Aggression is not used as a means to an end; instead, aggression *is* the end. The goal *is* the aggression; the violence *is* the thing sought and desired, and the aggressor will not be satisfied until violence is done. The fundamental reason for this may be discomfiting to some, but it is unavoidable.

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Aggression, violence, and killing are enjoyable for human beings. They are rewarding in the same way that sex, food, money, drugs, and gambling are rewarding -- on a primal level, in terms of evolutionary origin and brain structure. Human beings are omnivores. As a species, we gather, plant, harvest, and eat plants and plant products. We also hunt, kill, and consume animals. In other words, we are predators, as are many social mammals, like lions and wolves. Our evolutionary success depended on the ability of our ancestors to hunt, and wound, and kill. In the long process wherein evolution shapes the brain, activities that advance survival and reproductive fitness are associated with ancient and powerfully motivating reward circuitry, in the ventral tegmental area and the nucleus accumbens. Activities that advance fitness very strongly are, in turn, very rewarding. If you think about it for a minute, this *must* be true. If you are a predator, evolution cannot have you sitting around on the plains, looking at interesting cloud formations. That will not get your genes into the next generation. You must survive and reproduce, and to survive, you must eat, and to eat, you must hunt and kill. As evolution shapes your brain, it must make hunting and killing very interesting to you. You must be fascinated, and at times nearly obsessed, with these activities, and when you achieve your goal, there must be a substantial reward payoff. In neuroanatomical terms, evolution must wire the brain so that hunting, and wounding, and killing elicit substantial dopamine release in the reward circuit, so that you will be motivated to do it again and again. Dopamine flowing in this circuit is synonymous with our words "interesting," "fascinating," "rewarding," and "pleasurable."

If you have ever seen a dog or a cat hunt and kill an animal, you have probably witnessed the intense, primal satisfaction that seems to accompany that act. One might call it a sort of savage joy. I suspect that this potent, primal satisfaction comes from our neuroevolutionary heritage as predators, in which hunting and killing are fundamentally rewarding because they are fundamental to survival.

Human beings, particularly young men, like to hunt and kill things. You may have noticed that while no practical necessity exists for most people to become personally involved in the killing of their own food, that activity -- hunting, killing, and eating one's prey -- is an enormously popular recreational activity. Although civilization has "relieved" people of the burden of killing, lots of us do it for fun. Many people don't like to think of themselves, or their fellow human beings, as creatures who *like* to kill, but because we have brains that have an evolutionary

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heritage, that truth is unavoidable. If we had brains that were wired in such a way that human beings did *not* like to kill, it's likely that none of us would be here now. Our species' career as a predator would have fizzled out long ago.

The fact that predators like to kill other animals presents some obvious problems for a social way of life: how will evolution gather these predators into a cohesive social group, in which they (mostly) refrain from killing each other? How can these incompatible urges be reconciled? In our case, evolution added on an additional layer of functions that serve to make killing within one's own group painful. Killing has an intrinsic reward, so evolution opposes it with an intrinsic punishment: *don't harm people within your social group or you will suffer a pain inside your mind*. How does another person's pain *out there* become a pain for me, *in here*, inside my brain? We've already seen how that happens: through the functions of empathy, most prominently through the modeling mechanism of empathy. If modeling functions correctly, my brain will run a simulation of *your* pain inside *my* brain, and when I see you feel pain, I, too, will feel pain. My empathically delivered experience of pain may not be as bad as the pain you feel, but it can be very unpleasant nonetheless. We might call this mechanism *the empathic barrier*. My brain is programmed at very old levels to *enjoy* killing, but programmed at a more recent level to be *pained* at the suffering of those within my social group. An empathic barrier has been inserted between *your* pain and my ability to enjoy it, and this barrier prevent me from enacting harm, for the most part. If I have a normal limbic system inside my brain, I will not try to harm you; instead, I may well try to prevent you from being harmed. Empathy makes your pain mine, and it also makes your happiness mine.

What if we remove the empathic barrier? There are several ways to do this. First, we might disable the modeling function of the brain. In that case, psychopathy results: no empathic barrier is interposed between harming people and enjoying that harm. Psychopaths are then able to use aggression *instrumentally*, at no immediate cost to themselves: if I want your money, and I don't mind your suffering in the least, why *not* hit you over the head and take what I want? Psychopaths can also *enjoy* harming people in a way that limbically normal people, with their empathic barrier intact and sturdy, cannot. Psychopaths thus also practice *intrinsic* aggression: they hunt and harm and kill people because they like it, even when there is no strict logistical

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necessity to do so, much as an ordinary hunter may kill a deer or a duck, even when he could obtain the meat much more easily at a grocery store.

Psychopathy is not the only way to neutralize the empathic barrier. If we make aggression and violence “unreal” by removing them from the real world and putting it in a world of make-believe, then, for many people, the empathic barrier thins out considerably. No real “harm” is being done to anyone, so what is there for the empathic faculty to object to? And you don’t have to look very far into the world of make believe -- stories, movies, TV, videogames, and so forth -- before noticing that violence and aggression, often of the gory variety, are recurrent themes. (I am not leveling a criticism here, merely an observation.) As the storytelling medium becomes very un-real, as in cartoons, remarkably sadistic levels of violence become permissible for the average person to enjoy. The next time you see the Roadrunner drop an anvil on the head of Wile E. Coyote, you might pause to reflect (in a non-judgmental way) that the undeniable fun to be had from this cartoon comes from the ability of the make-believe violence to tickle the ivories of your reward system without triggering the empathic alarm of the limbic system.

Some people will think that I mean that “normal” people or “good” people should not enjoy cartoons because they are violent. That is not what I’m saying. In our brains reside multiple motivations dating from multiple ages in the history of our brain’s evolution, and there is no reason to suppose that this multiplicity of motives should move in concert. Often, they conflict. In each one of us, the base motives and the brutal ones co-exist with the sublime and the elevating. In the psychopathic person, we can catch a glimpse of what each one of us might become if our own limbic volume were turned down to zero: morally anesthetized, Self-ish, motivated to pursue the most primitive of rewards, including violence, and deaf to nearly everything that makes a fully human life worthwhile: friendship, loyalty, compassion, caring, love.