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Notes on

Bruce E Wexler, *Brain and Culture: Neurobiology, Ideology and Social Change* (MIT, 2006)

## OVERVIEW

At the heart of his wonderful, important, and fascinating book, Bruce Wexler makes a series of interconnected points: our sociality and our brain structure / function have co-evolved, such that humans have evolved for a long period (though young adulthood) of intense *socially mediated neuroplasticity* (16; 142). In fact, the most socially sensitive plastic parts of the human brain are precisely the ones whose proportions relative to other brain structures distinguish humans compared to other primates (e.g., frontal and parietal lobes, involved in decision making, impulse control, etc) (31; 105).

However, this *neuroplasticity is relatively reduced in adulthood*. In a formula, children need sensorimotor and social stimulation (these are linked and mutually reinforcing in that different cultures have different characteristic sensorimotor patterns) to form neuropsychological structures, while adults look to shape their world and / or at least to select input that reinforces previously generated structures, since they operate on a consonance = pleasure / dissonance = pain principle. (Nuance: this principle is active in children as well; it's just that adults [*\*some\** adults, those in favored social positions!] can act on the world according to this principle, while children's action in this regard is largely limited to adapting to what is the case and / or asking for help from adults.) This difference in neuroplasticity sheds light on generational conflict, bereavement and immigrant experience, and social conflict.

## CHAPTER 1: BRAIN BASICS

Wexler emphasizes that higher-level cognitive function (thinking, and feeling as well as sensorimotor perception / action) is an *emergent process* that occurs as the result of the integration of firing patterns in multiple brain structures and cannot be located in individual neurons. Although he tends to adopt a brain-centric terminology in this chapter (e.g., p 21: "processes such as thinking, remembering, and feeling arise from the integrated action of many neurons"), his fundamentally emergentist viewpoint in the whole book is in line with *the enactive school*, which locates sensorimotor functions as those of an organism in its environment, that is, as emergent from a differentiated system in which brain, body, and world are linked in interactive loops. Indeed, the whole thrust of Wexler's position serves to "minimize the boundary between the brain and its sensory environment, and establish a view of human beings as

inextricably linked to their worlds by nearly incessant multimodal processing of sensory information" (9).

This view of humans as embedded in their (largely social) environments has profound philosophical implications; we must defeat any lingering tendencies to conceive of humans as individuated substances endowed with properties; *we are individuated, but as singular patterns of social interaction*. Character is not a set of properties of a substance but the tendency to action as part of a pattern of social interaction. This helps us cut through the character vs situation debate in social psychology, for instance.

To reinforce his *neuroplasticity* perspective, Wexler cites the work of Luria with wounded veterans, where some function can be restored despite the destruction of what is the statistically normal locus of that function in a particular brain structure (25-27). It may be that we have underestimated the neuroplasticity potentials of adult brains by not pushing hard enough in rehabilitation (the thesis of Norman Doidge, *The Brain That Changes Itself*); there is also research into pharmacological aids to adult neuroplasticity (27). It's important to emphasize that Wexler has a basically anti-Evolutionary Psychology viewpoint: instead of a suite of modules, it's neuroplasticity that is an adaptation, which was selected for, which yielded fitness advantages to our ancestors.

Wexler also devotes some time to *emotion and the limbic system*, citing inborn modules for basic emotions (this is about as far as I go in re Evolutionary Psychology) and emotional contagion (34-35), two topics at the heart of *Political Affect*. I particularly like Wexler's phrase "emotion is an interindividual process that alters the moment-to-moment functional organization and activation patterns of the brain in the individuals who are interacting" (36).

I would just add that those neural changes have to be thought in relation to the modifications to the *emergent functional unit of the couple or group in which the component individuals are interacting*. Also, this emergent neuro-corporeal-social emotional process need not only be equilibrium-seeking; too often any mention of group processes is seen as equilibrium-seeking (negative feedback) as in "functionalist" sociology. Rather, we're all familiar with interpersonal emotions that spin out of control in positive feedback loops (a mob rage, of course, but on the positive side of the ledger, falling in love can't really be seen as equilibrium-seeking, even if a stable loving couple results, for that "stability" can [sometimes? Rarely? Let's hold out hope in any case!] be a mutually reinforcing dynamic process of empowerment that never settles down to anything we can describe as an "equilibrium.")

## CHAPTER 2: SENSORY DEPRIVATION AND ENRICHMENT EFFECTS ON BRAIN STRUCTURE AND FUNCTION

Wexler begins by emphasizing the constant interchange of organism and environment, both in terms of material exchange / metabolism and in terms of sensation. At 39, he presents a rather

linear description of biochemical changes along the sensory pathway; in contrast, the enactive school emphasizes *sensation as the modulation of ongoing processes* rather than a linear process. Again, this latter modulation viewpoint of the enactive school is certainly in line with Wexler's main perspective, that sensory / socially mediated neuroplasticity forms neuropsychological structures that shape later incoming sensory / social input. So it's always a matter of "laying down a path in walking" as Varela's slogan would have it: input produces structure that shapes future input, but during high plasticity periods such structures are always being modified as well. During these highly plastic periods, it's a matter of modulation of a process, of formation and reformation, rather than putting content into boxes.

He also gives us an interesting take on *memory* as encoding of experience / shaping of neural pathways (or at least probability of triggering a particular neural firing pattern) such that the origins of the encoding / shaping is forgotten. One of the things I like best about the book is the way Wexler takes psychotherapy and psychoanalysis seriously, as he does at 40.

The concluding line of one paragraph is noteworthy for the *process vs substance debate on human ontology*: "Thus, as we develop into unique individuals as a result of both our unique cumulative interactions with the environment and our unique hereditary characteristics, our uniqueness seems a property of us" (40). But that "seeming" to possess "properties" is an illusion, or better, the result of a bad ontology: we're not substances with properties, but singular patterns of interaction, singular ways of integrating and differentiating a multidimensional differential social field. This doesn't deny individuality, but sees it as an ongoing, self-modulating, process of individuation (this language comes from an unjustly neglected French philosopher, Gilbert Simondon, who influenced Deleuze very much).

Wexler notes studies implying that visual perception is not passive capture of or unidirectional processing of visual information qua patterns of light hitting the retina, but is the *active achievement of the organism in navigating its world* (61-65). Here the work of Alva Noë is crucial. Crudely put, there is a lot of internal brain traffic that incoming sensory data modulates; this internal brain traffic is linked with changes in body position in the environment. In this way, perception is an achievement, a process of relating potential changes in sensation to potential changes in bodily movement; this capacity of linking differential changes in sensation and bodily movement occurs in the "body schema," which is a set of capabilities rather than an embedded picture.

All this research Wexler summarizes depends on the notion of a *critical developmental window* (e.g., 54). This is really important when we think of time in a biologically appropriate way. Time in physics is the same everywhere and always, but biological time has to include the distinction between ordinary and critical periods. The months in a critical window in which sensorimotor / social stimulation is needed for brain development cannot be thought of in the same way as the years of adult functioning that follow the close of the window. The Greek word here for critical period is *kairos*; our everyday sense of time easily accommodates this notion with our talk of "windows of opportunity," or "turning points," or any of a number of other such phases.

Wexler also ventures into the *minefield of IQ tests*. I'm pretty sympathetic to the standard set of critiques here (e.g., Gould in *Mismeasure of Man*): 1) the tests really only measure success at a

certain type of test-taking; 2) the tests are culturally skewed, so that the real correlation is with socio-cultural advantage rather than "intelligence"; 3) that in any case there is no such thing as general intelligence that can accurately be measured with a single value, but a large number of human capacities that vary independently ["emotional intelligence" need not correlate with the ability to solve word problems which need not correlate with a "dance intelligence" that lets one move meaningfully and artistically, and so on]; 4) that the origin and history of the tests are intimately related to ugly racist practices. But I'm not a psychologist and I don't pretend to know much about the debates other than these major points.

In any event, the general thrust of Wexler's remarks are that *cultural environment affects brain structure and function*, and that such a bio-neuro-cultural outlook outflanks the racism IQ tests are still used to buttress. Key points here are the rise in IQ tests across the 20<sup>th</sup> century and the drop in the discrepancy between rural and urban scores as rural life has become more integrated into the urbanized mainstream culture.

The political importance of the *sensory deprivation* studies can be seen in terms of the "enhanced interrogation" techniques of the Cheney / CIA / consultant wing of the national security team (against the "informed interrogation" method of the FBI [Ali Soufan] and Armed Forces ["Mathew Alexander"] wing. The disorientation and oversensitization caused by sensory deprivation and its "softer" corollary, social isolation, make subsequent sensory overload ["music torture," hot / cold extremes, "stress positions" etc.] all the more unbearable.

We should note that there are two traditional models for interrogational torture as information extraction: 1) excruciatingly intense pain causing an animal survival reaction (the model for torture used as the basis for the infamous "pain consistent with organ failure or death" memos) and 2) prolonged less intense techniques (i.e., "enhanced interrogation") aiming at disorientation and learned helplessness. Waterboarding is basically part of the first model aiming at triggering a survival instinct, though it uses an evolutionarily inherited panic module rather than sheer pain per se. See Jean Maria Arrigo, "A Utilitarian Argument Against Torture Interrogation of Terrorists," *Science and Engineering Ethics* (2004) 10, 543-572.

### CHAPTER 3: THE SOCIAL ENVIRONMENT

This chapter is in many ways the heart of Wexler's book. He begins with a crucial distinction between a crudely reductionist / mechanist outlook, often mislabeled as "materialist," and one that includes *the irreducibility of corporeal / affective / social relations*. IOW, instead of infants being "fundamentally" nourished by milk in some biochemical sense, and corporeal / affective / social relations being a secondary, additional, bonus on top of the allegedly fundamental biochemical, research shows that milk alone won't foster development (89); you can even go so far as to say that milk is only "a means of ensuring contact between the mother and the infant because this contact is essential for development" (86). Of course, milk in some biochemically

reductive abstraction is a necessary condition for development, but corporeal affective social relations are just as necessary, just as fundamental. There is no hierarchy with the biochemical as fundamental and the corporeal / affective / social as secondary.

Indeed, *oxytocin is essentially a social hormone*: it's spatially separated by membranes into individual organisms, but its production is only triggered by the kinds of social relations that it serves to reinforce. You simply can't understand mammals w/o understanding the social nature of our bodies, right down to the hormonal and neuronal level.

And down to *the genetic level too* (92). Three points: 1) "down to" shows the lingering effects of a hierarchical imaginary, with the smallest being at the bottom [cf. the etymology of "fundamental"]; 2) DNA qua strings of nucleotides just sits there; the action is in networks regulating gene expression, composed of patterns of enzyme / regulatory gene interactions [NB: "patterns of interaction" is for me ontologically basic at many different levels, which are themselves linked in upward and downward "emergence"]. These networks control the complex mechanisms of transcription, editing, splicing, and translation that mediate the nucleotide strings of the chromosome and the mature tRNA transcript at the ribosome involved in protein synthesis; 3) methyl groups are a prime example of epigenetic inheritance as theorized by Jablonka and Lamb, *Evolution in Four Dimensions*.

The reason biochemical reductionism is mislabeled as "materialist" is that the corporeal / affective / social are just as materialist, in the sense of shaping the neuropsychology of development, AND in the sense of being fundamental to our being, as the biochemical. Most mammals, including humans, are bio-neuro-social creatures; that's our ontology, and that is best thought as an interactive process rather than as the "relation" of an independent mechanical substance and its environment. If we're not very careful with our terms, even "relation" overstates the independence of the components, as Wexler remind us (39). Once again, we're individuated by the singularity of our pattern of interaction, not by a set of properties constituting an essence that distinguishes us from others.

Wexler's treatment of human studies stresses *the mother-infant dyad*. He's careful, and we have to be careful too, to avoid any "fusion" images, which distorts individuation by seeing it as separation from a prior fusion, with all the anxiety about engulfment that entails. The dyad is a patterned interactive process, with the caregiver providing *a scaffold, a supplement*, which provides structure just beyond what the infant is capable of at any one moment, but which the infant can internalize. In this way, self-regulation shifts from the parent-regulated dyad to the developing infant. But the infant has some capacity for self-identification (Stern's "core self"), some crude and vague but active body schema or else it couldn't imitate (cf Meltzoff and Moore as read by Gallagher, *How the Body Shapes the Mind*).

The important thing to keep in mind is that *what is internalized is a pattern of interaction*, not the properties of an independent substance. I can't repeat this often enough: we are patterns of interaction. That's our being. We're not independent substances which "relate" to other substances. If you want to put it like this, the "relations" are primary, and the relata are only nodes of multiple relations. It's relations all the way down, if you will. Which is just a spatialized image of a process ontology. We ARE the patterns of the processes of forming and reforming of

relations. This radical bio-neuro-sociality makes the prominence of video games so fascinating (106). We're embarking on a huge bio-neuro-social experiment with these things; Susan Hurley's work on the violence angle here is just one, albeit very important, angle.

*Turn-taking* as part of our social being is a great topic (111). There's great stuff by a researcher at University of Edinburgh here, Colin Trevarthen.

Turn-taking is also in the ballpark of "*entrainment*," which has fascinated me for a long time, since I read William McNeill, *Keeping Together in Time: Dance and Drill in Human History*. Also some fascinating research on human musicality by Cambridge researchers Ian Cross and John Bispham; according to the Cambridge school, we are the only mammals capable of changing rhythms in communicating with others; IOW, we are the only ones capable of true musical dialogue. The Cambridge group emphasizes the sociality, the community bonding, forces of group musical participation. Dancing and singing together in a group is the historically basic form of human music; listening to professionals while seated in aesthetic appreciation is an oddity.

Wexler has a very interesting argument for *the social being of language*: "language is not a property of the human brain but rather of human society and culture" (121). The argument goes like this: granted that co-evolution of language and sociality has produced specialized brain structures which provide a default setting for necessary components of language acquisition and use. But if these specialized default structures are destroyed during the early period of high neuroplasticity, other brain regions can take over and subserve language function (albeit with "subtle" deviations [119]). But of course these alternate brain regions can only take over language function *if the child develops in a linguistic environment*. So, if you have a normal brain but no linguistic environment, you don't develop language, but if you have an abnormal [but not totally destroyed, of course] brain and you do have a linguistic environment, you do develop language. So language has a social (or at least bio-neural-social) foundation.

We have to be careful to avoid overly localizing language use: the evolutionarily specialized default brain structures are not where language capacities are "located"; what we can say is that they are necessary to the "normal" functioning of language, but they always work in coordination with many other brain areas (see the basic principle of Luria formulated by Wexler at 25: "each cortical region contributes to multiple different behaviors and multiple cortical regions contribute to each individual behavior").

I really appreciate Wexler's open-mindedness toward *psychoanalysis*. There's way too much tribalism in American academy and one of the shibboleths of "hard" psychology / neuroscience is to sneer at psychoanalysis. Anyway, Wexler distinguishes an individualist and "drive" oriented theory from an interactional one. What's important is that the target of internalization is "interpersonal or even multiperson processes that had not previously existed in any particular individual. That is, the qualities of the developing individual arise from interactive combinations of processes based on several individuals" (125-126). As I've said several times already, I'm 100% in agreement with this notion of *individuation as the process of singularizing a pattern of interactional processes*.

Individuation is the creation of a pattern by which one navigates, by differentiation and integration, a *multidimensional differential social field*. Wexler puts it like this: human development is a matter of "the early shaping of the infant and child's psyche by the human-influenced environment, with the unique mixing of qualities from different adults and the internalization of historically influenced interpersonal processes" (128). The crux of Wexler's book is this *generational interchange*, providing for repetition and difference in cultural change via the plastic development of infants and the conservatism of adults.

Wexler also has some interesting things to say about *play*. The non-instrumentality of play is really only "puzzling" if you have assumed some vulgar crypto-capitalist ultra-Darwinism replete with individualist selection via intragroup competition for scarce resources. ("Applying Malthus to nature" was indeed part of Darwin, but only part: he recognized group selection and cooperation; the true inheritor of Darwin was Kropotkin!) Now you can explain away play as training for hunting / fighting (i.e., play is just the trigger for genetically programmed survival oriented behavior [or psychological mechanism tending to produce that behavior]), but you can explain anything away on a set of adaptationist principles if you're clever enough at producing just-so stories. But again, like IQ test, Evolutionary Psychology debates are a minefield, and I'm going to take the "better part of valor" route here and leave it at that.

#### CHAPTER 4 SELF-PRESERVATION AND THE DIFFICULTY OF ADULT CHANGE

Chapter 4 is the turning point of the book. We first discussed socially mediated neuroplasticity in infancy, childhood, and adolescence so that individuation is a process of singularizing a pattern of social interaction. We now turn to discuss *adult processes that seek to conserve mature patterns* (the "consonance of internal and external worlds") by selective attention to, or active shaping of, the world. The first adult process alters the perception of the existing world, that is, it works on the present from the perspective of the past. The second changes the world to "increase the likelihood that subsequent events will be consistent with pre-existing internal structures" (143), that is, it works on the present to make the future conform to the past. Wexler puts the transition from childhood to adulthood as a change in the relation of learning and power of action: "we learn the most when we are unable to act. By the time we are able to act on the world, our ability to learn has dramatically decreased" (143).

I completely agree with this bio-neuro-cultural standpoint; I would just say that a little more emphasis on *population variability* would help, in two ways.

First, the neuropsychological conservatism Wexler notes in adulthood varies within a population, so that *some adults remain in search of novel experiences*. Now as Wexler notes, sometimes this novelty is just variation on familiar themes (17). But can we design a culture such that what people are used to is the search for novelty? I admit that you can't just value novelty for its own sake. You do have to have familiarity and repetition, if only as repose from novelty searching. And, some novel experiences shouldn't be experimented with!

So we do need some *normative standard*: we should search for *novel ways of empowering people to search for novel means of empowering others*. IOW, our challenge is to make empowerment a radiating, horizontal social process. It's not like we're going to run out of such challenges in this quest; there's more than enough injustice to fight; we can let the ones who reach utopia worry about being bored! IOW, some adults seek to "conserve" their inner neuropsychological structure by selecting friends who fight with them against unjust social structures and for positive social change. That is, they "conserve," in Wexler's sense, the fight against "conservatism" in the political sense. So what would be pleasant for them is not the conservation of an (unjust) social structure, but the change of that social structure, to which end they seek to conserve the fight against that structure.

Second, attention to population variability is needed to attend to *disempowerment right here at home*. It's not just immigrants who face disempowering dissonance between internal structures and external world. Right here at home there are many people who grew up here but who never quite feel at home, if you see what I'm getting at. To use a little jargon, there are many people faced with "subject positions" that are devalued by the larger culture ("internal exile" or alienation of the culturally disadvantaged; this is a big theme in race / class / gender-oriented cultural studies). Even though it's a great advance to talk about socially-mediated neuroplasticity and the attendant notion of human ontology as the establishment of patterns of social interaction, we have to talk about populations of subjects, many of whom suffer disempowering subjectification practices.

The key here is to propose a level of analysis that would not be merely idiosyncratic, but that produces traits that would be reliably repeated (to use the distinction Paul Griffiths uses in discussing Developmental Systems Theory in biology) and that would be open to political analysis. This is of course the major problem of feminism, race theory, queer theory, and other such analyses: where to locate the analysis so that you avoid the Scylla of personal anecdote and the Charybdis of ignoring difference altogether. Can we isolate *structured subjectification practices that reliably reproduce* what we can call a feminized / masculinized / racialized ... subject?

## CHAPTER 5 THE MEETING OF CULTURES

There's a lot to talk about in this rich chapter, so it feels a little like cheating just to begin with a weak point, but the description of the crowd reaction to the Pygmy exhibition in 1900 can't simply be treated as fascination with difference without reference to reinforcement of racial superiority (197). Now Wexler is fully aware of racism as a defense mechanism, along with the pseudoscientific "evolutionary ladder" business that makes up part of its 19<sup>th</sup> and 20<sup>th</sup> century manifestations (203-4), it's just that this could have been made more explicit as part of the analysis of the Pygmy exhibit. But as I said, that's only a minor quibble with a complex and important chapter.

An important point is raised at 195 regarding *differential amygdala activation* in cross-racial situations. Here we see a prime example of *socially mediated neuroplasticity*. There's been a lot of work done of racial perception and its affective dimension, and we can't do more than gesture in that direction. The key takeaway point is that these *affective structures are deeper than "beliefs"* (if we see these as intentional states with propositional content to use the philosophical jargon) and that you can't just talk somebody out of such a corporeal patterning. If they are amenable at all to change, it will have to come at the level of neuroplasticity, at least in forming cortical over-ride mechanisms that can control the negative affect modulation of amygdala activation.

Another point of interest comes from the *selective attention* aspect of defense mechanisms looking to ensure internal-external "consonance." That is, some aspects of a social situation glaringly obvious to some will literally be invisible to others. There has to be a social pedagogy that enables a *retraining of social perception* so that people can see "exploitation," or "racism," or "sexism." It's not that some people see these things and just don't care; it's that they can't see them at all; they only see "free contracts" or "free association of people with those they are comfortable with" or "traditional family values."

Probably the most important philosophical point of Chapter 5 is the "Methodological Note" at 211-213, which tackles the problem of *identifying causes in multifactorial systems*. There's a huge discourse on nomothetic vs idiographic approaches to social science behind this, as well as plenty of knotty details about ANOVA issues and so on. Not to mention long and bitter debates between Marxist and other materialist approaches and various "idealist" approaches. As well as the debate about whether the assumption of rational self-interest on the part of historical / political actors is sufficient to account for systemic behavior, or whether "irrational" ideological (especially religious) factors are needed as well (230).

We're not going to be able to do more than gesture to those debates here, but we can note that the key to all these debates is to have the correct notion of *emergence*. Wexler has a "bottom-up" emergence position when he upholds the need to take account of neurobiologically mandated consonance when discussing cultural violence (230). (I've noted before that I'd prefer he use his term "affective structure" (153) rather than "belief system" as he does at 230, but his intent is clear; it's all about a deeply embedded socially mediated neural structure.) At 231 he broaches the topic of emergence, which is the key concept here, though I think it could be made more clear that you have to see the *cross-cutting temporality* that links social structures as top-down causality in relation to neurobiological consonance as bottom-up.

Indeed, the major point of the book is that you can't just think this synchronically (because then you're caught in sterile structure vs agency or individual vs society debates). Instead you have to see socially mediated neuroplasticity as *differential*: formation of internal structures in childhood via adaptation to novel social situations versus "conservative" filtering / active manipulation of social structures to fit already formed neural structures in adulthood.

## EPILOGUE

Again, there are many complex issues here. Let's just end these notes by seconding Wexler's call for hope and struggle to produce a sociopolitical system that rewards productive cultural hybridization. We are bio-neural-cultural creatures; what kind of society can we produce that takes advantage of our potential for mutually empowering novelty rather than exploits our capacity for self-preserving fear? Because that's about as basic as affective politics can get: collective productive optimism versus atomizing alienating fear.