The Brain and Literary Questions - Session 1

Check room, TUR 2341. [I am working getting a new, larger room.]

1. Purpose of course. How new knowledge about brain affects our thinking about literature.
   Seminar not about lit but what we say about lit.
   Limitations on "theory."
   Some things are just plain wrong.
   "Life and works" criticism -- early form.
   More creative uses of brain knowl with metaphor.
   Work entrances us vs. willing susp: Czikzentmihalyi's "Flow."

2. Introduce self
   1. Radio programs when kid.
   2. Odd humanist. MIT. Science doesn't scare me.
   3. I am psychoanalytic. Problem of validity. Link in Why This Book? to essay on same.
   4. Study neurology. No easy answers in lit-and-psych. There is slapdash work.

3. Hand out class list form. I need info from all of you and I need to talk to those not-yet-registered.
   Then take time out & straighten out enrollment.

4. Go thru class memo. Explain about dividing reading by eight.

5. Introduce students? What do you hope for from this seminar? Is everybody OK with online, web site, etc.? Hand out student cards.


   Csness, the ultimate mystery.
   Dualism - Monism. Dual-aspect monism.

2. Medicals: neurologist; psychiatrist; neurosurgeon; neuropathologist. Experimenters:
   computational neuroscientist; developmental neurobiologist; neuroanatomist; neurochemist;
   neuroethologist; neuropharmacologist; neurophysiologist; physiological psychologist; psychophysicist.
   Handy prefix: neuro- Neurotheologist. Neurocritics? Neurotheorists?

3. Two approaches to cognitive science. 2 groups digging into the Alp from different sides, both seeking to get at MIND in the middle. 2 quite different methods:
   1. Left side: use of
      1. special populations. E.g. Viet vets, left-handed, stroke victims.
      2. experimental situations; non-ecological
      3. "clinico-anatomical method": look for a lesion site in brain that goes with cognitive deficiency
4. Two things about left (neuro-) side. How tremendously much we know. What a vast, complex field this is.

Every cubic millimeter contains over two miles of connecting neuronal wire. Somewhere: pinhead contains 6 million neurons. Brain as a whole: 100 billion neurons, 100 trillion synaptic connections. Brain has 1027 possible states? Men have about two billion more neurons than women.

Said to be most complicated object in universe. When you read the popularizers, the books about the brain that make the best-seller lists, you often don't get a clue as to how involved and various this field is.

That's the other thing I've learned: how much we don't know; how much there is yet to be figured out.

5. Right side of Alp. Logic first established by Freud,

a. but precisely by Chomsky when he began talking about universal grammar.
   Chomsky Syn. Struct, first on list of influential books.
   Huge effect: ling, psych, AI, philos--not in Eng depts.
   Basic arg: If this is universal among all human beings, then it must be innate or otherwise "in" the brain. If evrybody learns to walk . . . If evrybody learns language . . . If subject-verb is something everybody does, then you can infer something about the brain from that.
   The importance of the UG argument. Problem when applied to behaviors, traits.

b. Earlier, Freud started as neurologist, then on to neurotic symptoms, moved outward to dreams, jokes, character -- normal stuff, hence a general theory of mind. Problem of scientific value of Freud - don't get into yet. In effect, moved from left side of Alp to right side.

c. Darwin and basic emotions. Ekman: all cultures use same facial expressions for basic eight or how many?: disgust, anger, anticipation, joy, acceptance, fear, surprise, sadness; other lists: love, hate, shame, envy, guilt, anxiety.

d. Laughter. All cultures laugh. 2000: Book by Rob't Provine: most laughs not to wit.

e. Individuality, personality ----------> style in literature. "Life and works."

f. Social groupings; culture. Fish's "interpretive communities."

6. Evolutionary explanations--if evrybody does it, it must be innate, must have been inherited, must have evolved. Leads to Evolutionary Psychology. Argument is that evolutionary timetable is such that homo sap's hard-wired brain contains only traits useful for survival in hominid hunter-gatherer environment. Evolution is very slow. No known changes since homo sapiens sapiens, 100K BP. (Cp. dinosaurs.) Hominids 5M BP. (How does lit help hunter-gatherer? Mental exercise? Moral exercise? Tooby & Cosmides: scope syntax)
a. Darwinian evolution. Variation - replication - selection. Very slow, but anything we attribute to genetic endowment ought to have a Darwinian explanation. What's it good for? Why was it selected for and not against? Some things irrelevant: appendix, little toe. Argument from design?

b. Baldwinian evolution. How a social change can affect the genome, but not Lamarck. Variation - replication - selection. Lactose intolerance. In hunter-gatherer environment, genes promoting will be selected for. In pastoralist env., genes promoting will be selected against. Cp. the orang-utans.


7. Brain imaging used by both sides. Normals on the right/humanist side (fMRI); lesioned on the left/neuro- side. Imaging is important achievement, but also important to recognize limitations. Newspapers overstate.

8. One very striking difference in approach on right/left side of Alp. Right side of Alp shows considerable interest in children's patterns of development. On left side, I can remember very few papers, a lot on dyslexia. Often, in general presentations of brain science, no mention of children at all. Foetal development of brain yes, but not children. By contrast, the language people on the right are very interested in children's acquisition of language and children's psychological development. Both are assumed, in this tradition, to have foundations in the brain.

7. Obviously, one should combine methods, but in this, as in so many interdisciplinary operations, neither side talks much to the other. Left side, in particular, has contempt for right side (clinical demands, intense focus of research, superiority of doctors, psychologists' emphasis on "science" (narrowly defined as experimental). Right side is bound to be less precise.

8. A lot of other topics we will get into. Why do we willingly suspend disbelief at sciLiterary characters--why do we think of them as real people? Personal styles of reading and writing and their relation to personality or identity. Schemata. How we perceive story, language. Applied in individual ways. "DEFT" = constructive theory of reading. metaphor / "cognitive linguistics."

4. We will be straddling back and forth between these two sides. I am assuming that the left side is new to you as it is to me. Most of our time there.

HOLD FOR WEEK #2?

# Three kinds of brain. See appropriate cartoon. Bring out IGOR. Check the diagram. Idea of 1970s. Not quite correct, but gives us a way of thinking about brain functions. Imagine what a lizard can do, what a dog/cat can do, an ape, a human. What can the "top" do that the lizard can't and v.v.

1. Reptilian. Within the big repertory of human actions, what can reptiles do? Blood pressure, heartbeat. Four Fs. Coordinate legs, tail, tongue, etc. Enormously successful species. Dinosaurs lasted for 100s M yrs. Note that invertebrates with very differently structured brains can also get quite sophisticated: cockroaches; octopuses. Pleasure-unpleasure at least.
2. Mammalian. Within the big repertory of human actions, what can mammals do? What is added to
the reptiles' repertoire? (Fur.) Milk and live birth. Leads to nurturing, mother-love, and play. Mother-
love leads to intraspecies social relations in general. Ma cat training kittens. Play fighting. Play, v.
important. Means you can inhibit. Sociality—not w reptiles. Emotions? Fear (reptiles? computers?).
Reptiles prolly feel fear, anger, disgust (amygdala), not love.

3. Neo-mammalian or primate. Vastly increased cerebral cx, particularly the association cxes. From
monkeys to apes, tool use. More complex social relations. More complex communication, planning.
Neo to other mammals: just more, diff'ce in degree, not kind. As you go from apes to humans,
language and long-range planning (=greater inhibitory abilities, less stimulus-bound) are really the
only new things for humans. Derived from cerebral cx. A difference in amount, rather than a
difference in kind from other mammals. But what a difference. (Next week, ask me about the fold
just below your nose.)

4. So far as literature is concerned, what levels of brain are important? Human level for language, but
mammalian for emotion, imitative response, empathy. This is an important conclusion for today's
session. Large cerebrum allows the cognitive functions that make reading, movie-going, understanding
lit/art possible, but the fun of it, the emotion of it, the play of it, uses the the limbic system,
mammalian. Connections betw the two crucial. PLAY.

# Six kinds of brain science, in order of size: molecular (neurochemistry; neuropharmacology);
genetic (evolutionary psych); cellular (neurochemistry; neurobiology); systems (neuroanatomy;
neurophysiology); behavioral (neurophysiology; neuropsychology); cognitive (neuropsychologists).

# Six modes of brain explanation.

transmitter does diff't things at diff't sites. Hormones in circulatory system. Enzymes. Brain generates
hormones; body talks back to brain. Fear when you read a ghost story.

2. Genetic. Very hot right now. BUT a gene requires an environment to express! A gene
expresses by making a protein! Genetic. X is the expression of a gene. The media: "gene for
language." Question of creativity. The expression of a gene is a protein which may provide the
environment for another gene. Key: What triggers a gene is environment--inner, local environment
(proteins). Genes work out geography of wiring of neurons. Genes in serotonin and violence. Not a
single gene for X, combination.

   Stages in gene expression. 1) presence or inheritance of the gene. 2) activation of the gene by
   the environment. 3) Gene produces protein. 4) Protein leads directly or indirectly to trait or
   behavior or functional system. 3. Cellular. How neurotransmitters work within cells,
   transmission of info, action potentials, cell nourishment (strokes). Neural regeneration (strong at
   UF).

3. Systemic or Structural. Different nuclei (clusters of neurons) or cortices (flat layers of neurons)
in brain. Tracts, bundles. NOT one-to-one function. Repeat: NOT one-to-one function. Lit in
hippocampus--no! 19C problem as neurology began: localizers vs. "holistic," or whole-brain. History
of neuroscience. "Associated with." Everything connected to everything. Today: complex,
interconnected systems between structures.
4. Functional. Look at particular brain functions, e.g., inhibiting motion, limb movement, hormonal control of e.g., heart rate, blood pressure.

5. Behavioral. Look at complex activities like reading, laughter, naming, finding your way around (London cabbies). Uses the previous levels of explanation or takes for granted. Block diagrams. Flow charts. Strong at UF: neuropsychology, particularly attention and aphasia. Luria. Heilman. We will be operating mostly at these last two levels.

# Essential terms (handout or online). Don't be intimidated!

# Pictures of the brain. Black-and-white as handout. Color online--too many for color print-outs.

# A short list of perhaps helpful books. Handout or online.

2. January 14. Introduction to the brain. We will be learning some basic brain structures, chemicals, and functional systems useful for thinking about literature. I will try to keep these technical things to the minimum needed.

Discussion:

* What are the basic brain structures and systems important for literature?
* What is the relation between brain and mind?
* What is the basis for reader-response theory?

Reading:

2. Solms and Turnbull, "Introduction to Basic Concepts" and "Mind and Brain," pp. 1-43, 45-78. 44+34 pp. Pp. 75-78 summarize the theoretical underpinnings of this course.
6. Learn the "essential terms" and familiarize yourselves with basic brain anatomy. I have put online a list of various parts of the brain that you should be able to locate on diagrams. The Kalat assignment includes such a list, but longer than I require. Use the list I have handed out to see what from Kalat's pictures and text you are being asked to remember.
9. Important: get ahead by reading part of Pinker, Language Instinct, chs. 4-7, pp. 83-230. Read chs. 4-5 or 75 pp. this week.