#### COGS 105

Final Content Week: Brains and Clinical, Part II



## **Class Logistics**

- Exam #3 (noncumulative) review guide posted and lecture slides posted by tomorrow. Plenty of time to study.
  - Exam date: May 13th, 11:30am-2:30pm
- Tuesday next week: Our very own Prof. Paul Maglio of UC Merced and IBM!
  - Will discuss cognitive science and industry.
  - Lumosity data science director sends his apologies; is sending some materials for us.
- No class Thursday next week: Last day, and Rick traveling; work on your projects!



#### **Final Paper Notes**

- Conventional structure: Introduction, Methods, Results, Conclusion that's fine.
- Philosophy final papers: Essay style narrative weaving from thesis to argument to conclusion (*with background review*).
- Neurosynth project may be Introduction, Analyses, Conclusion.
- Other points:
  - First-person / third-person: Take your pick, just be consistent.
  - APA style preferred but not required (just be consistent; give me all the information in a consistent way).

#### Last Time...



## Difficulties...

- It is, in some sense, **at least as difficult** to discern the underlying deficits, cognitive processes, and mental disorders that are relevant as it is to work with the brain.
  - Why? The vagueness and difficulty in defining and measuring these concepts.
  - Remember part I of this course: What are the constructs?



#### Historical Constructs...

- **Neuropsychology** is the field devoted to the relationship between psychological processes and the brain, and how we can discern when those processes break down.
- Historical methods: qualitative, non-objective, poor validation, unstandardized, etc.
- Modern methods: psychometrics and standardization, strict measurement protocols in **batteries of tests** 
  - E.g., "process approach": Utilizes standardized tests, but also qualitative methods for determining how patients are solving tests.

## Woodcock-Johnson



						_								
Se	lecti	ve Testing Table - Clus	ters			Inte A	bilit	tual y	С	Cognitive Categories				
W. Co	l III gnii	Tests of tive Abilities	/5	Go finell a	Bri Intell a. Sic	Vor Intellocality. Ex	Vois Ability Ability	This Ability - Sed	This Abie Er	Contring An. Sig	Co. Effering. Err	Contraction Star	Low the Ext	In Perminent
	1.	Verbal Comprehension	٠	•	•	٠	٠					٠	[	
	2.	Visual-Auditory Learning	٠	٠				٠	٠				٠	
ttery	3.	Spatial Relations	٠	٠				٠	٠					٠
	4.	Sound Blending	٠	٠				٠	٠					
l Ba	5.	Concept Formation	٠	٠	٠			٠	٠					
Standard	6.	Visual Matching	٠	٠	٠					٠	٠			
	7.	Numbers Reversed	٠	٠						٠	٠			
	8.	Incomplete Words												
	9.	Auditory Working Mem.												
	10.	Vis-Aud. Learn Delayed												
d Battery	11.	General Information		٠			٠					٠		
	12.	Retrieval Fluency		٠					٠				٠	
	13.	Picture Recognition		٠					٠					٠
	14.	Auditory Attention		٠					٠					
	15.	Analysis-Synthesis		٠					٠					
é	16	Decision Sneed		٠							٠			





1) Run test, find deficits

2) Observe subject, determine strategy







# Neurology

- Neuropsychology vs. **neurology**: Neurologists are explicitly concerned with the "tissue"; they are focused on the brain's anatomy, as their emphasis.
  - Remember, neuropsychologists tend to focus on batteries of tests and their relationship to brain
- **Neuropsychiatry**: Focus on brain structure and function as it pertains to mental disorders and (often) pharmaceutical drugs.
- Again these are **fuzzy categories**: all are concerned with brain areas and functions, but have different disciplinary histories and emphases.

DLPFC/VPFC involvement within the right hemisphere. VPFC is involved in retrieval cue specification, whereas DLPFC is involved in higher-level postretrieval monitoring operations (Fletcher et al. 1998, Petrides et al. 1995). This finding pro-



For the purposes of clinical neuropsychological assessment, the important principles follow on those described for long-term memory above. As in longterm memory, the frontal lobes' primary role in working memory is in control and manipulation of information held on-line, hence Baddeley's notion of the "central executive" (Baddeley 1986). Whereas the frontal lobes are certainly inmoleod in simple atorsecand maintenance, these exercising are primerily medi-

#### "Trail Making Test"

• DLPFC impairment causes difficulty in maintaining attention; VPFC patients not impaired.



Letter Sound Fluency – Teacher Score Sheet	Letter Sound	f Fluency - S	Student Copy		
eacher: I'm going to show you some letters. You can tell ne what gung the letters make. You may know the sound for some letters. For there latters, you may not know the sounds. If you den't know the sound a latter makes, don't worv, Okay' What's most important is read. (Refore to the practice portion of the GBM LSF shoet). This says Mu or turn now. What sound does it say?	b	С		h	а
tudent: /b/					
raminer: Very good. You told me what sound the letter makes. You're oing a really good (ab. Now it will be just your turn. Go as quickly and arefully as you can. Remember to tell me the <u>sounds</u> the letters make. amember just by your best. If you don't know the sounds it's okay. rigger the slopwatch.	g	I	d	i	w
Serve Sheel	n	b	t	f	k
Score Cristel Suders Nane Canadri Vitals Teoders Nane Cale of Teolog Schoo	а	р	m	j	v
Letter Sound Fluency Test Tactil does not any wything other 3 access, all on any wything other to sour letter. If names record states have place, Datas adopted state Through any states the source toots of any the yound one way the work of concerns). Criteria test attempts.	x	r	h	0	z
minum rfnshoðbetre innste: neuroltina. gið i win bit fika pim jvix hozyce qisu	У	С	e d	q s	u
	L				

Card Sorting Test (WCST, see below), letter-based fluency is the most popular frontal test; its face validity derives from its lack of specification by external cues. It is traditionally considered to reflect left frontal function (Milner 1964, Perret 1974), although other areas of damage have been shown to produce impairment on this task (see Stuss et al. 1998 for review).



#### Subjects

- 15 with AD and 13 with only minor memory issues (~70 years old).
- Used EEG: 21 electrodes
- Recorded electrical activity of brain
- Looked at how electrodes (nodes) synchronize (edges). (Two nodes are connected if their corresponding electrodes show synchrony.)





<text><text><image>

#### Importance of Basic Science

optional reading re: importance of basic methods, even in clinical domains

#### Renewing the scientistpractitioner model



The scientist-practitioner Clinical psychology trainers and lextbooks practicines model as key to the values, competencies and contributions of the profession. The origins of the model are usually reaced to the Boulder Conference on Graduate Education in Clinical Psychings Clinical Psychiology, 1947, framiny, 1950, sea das Benjamin & Baker, 2000, This conference developed a model of chocarism and training rather than a. Last year, at the Centenary Conference in Glasgow, DAVID SHAPIRO delivered the annual M.B. Shapiro Lecture in his father's honour.

When working as Research and The model was of a clinician working Development Director for an NHS Trust. scientifically. The applied scientist was to I noted members of other professions finding the scientist-practitioner label use validated methods of assessment or nent where these existed. Where the treatment where these existed, where they did not, the clinician was to apply scientific principles of observation, hypothesis generation and hypothesis testing to the individual patient. The model also us and elitist, and its advocates aloof precious and elitist, and its advocates ald from the day-to-day realities of multi-professional service delivery. Research evidence seems to confirm such doubts. For example, in studies of psychological treatments for mental health embraced research directed at improvin the efficiency of methods of assessment problems - a field of central concern to and modification, and at increasing clinical psychology that remains a focus of lively controversy (Wampold, 2001) - the more selective the national inclusion criteria understanding of the dysfunctions bringin patients into the clinic. Shapiro saw the more selective the patient inclusion crit the greater the apparent efficacy of the treatment (Westen & Morrison, 2001). psychologist as primarily a scientist, with the duty to ensure that public money was spend on procedures justified by the



