PSYC, October 18 -
Academic Skills / Intelligence
(On exam)

- in Ontario, educators use a balanced approach; will use phonics, but will also try to enrich mechanical view of reading with an enriched environment (read books to children, talk about structure of narratives, talk about vocabulary) so that children see the richness of the reading process
  - a balanced approach presumably does this
  - phonological awareness: metalinguistic skills that children can develop; allows them to break down words into corresponding speech sounds -- the letter represent a speech sound

Phonological awareness - the ability to discriminate phonic sounds
- ex: little children can break the word 'cat' into units of sounds
- the inconsistency of the scipt of the English language might make the task very difficult
- Spanish speaking children learn very rapidly; what you see is what you say
- at the other end of the spectrum was English -- English the most difficult for children to learn to read (esp. English vowels; what you see not necessarily what you say)

Learning disabilities:
- most common: reading disabilities

Math and academic skills:
- at 6 months of age, babies can distinguish up to 3 things (thanks to evolution); they can't count but they have a sensitivity to quantities that allows them to discriminate between very low quantities
- once you learn how to decode words fluently, can decode texts and read sentences

Discovering new strategies:
- ex: microgenetic approach: children taken from grade 1 and 2, solve math problems for 2 weeks
- both when we face conflict and success we learn new strategies
- disabilities in mathematics are often underdiagnosed
- practice is necessary in order for generalization to occur

Spelling:
- children have an idea that you represents speech sounds by doing something (ex: squiggly lines, using numbers)
- this invented spelling is an introduction to an alphabetic principle -- the more practice you have at represening speech sounds into corresponding letters, that practice facilitates the entry into reading
- phonological awareness helps, too, but is best when paired w/letter training
(end of Ch 7)

Chapter 8: Intelligence
- we all have a notion of what intelligence is
- can be measured with psychometrics (what an IQ test measures)

Psychometric Theories
- interested in measuring what is intelligence
Spearman: - more than 100 years ago, Spearman looked at performances on tests; saw that those who did well were doing well across a variety of tests
- came up with the theory of general intelligence (the 'G' factor); coined the notion of a general intelligence (an overarching ability that would make individuals be able to solve mental problems very well)

Thurstone:
- argued that 'G' can be broken down into component skills that can each be measured; move from general factor to component analysis; argued that there was no such thing as general intelligence

Cattell:
- argued that there is such a thing as fluid intelligence (problem-solving) and crystallized intelligence (what you have learned so far)

- if we are to divise an intelligence test, it should measure the ability to problem-solve, adapt, as well as what you have learned and retained so far given your age

For psychometric theories, we remain in the world of mental operations.

Physical skills - some individuals have an ability to create and be artistic; others will be more so in terms of their interpersonal knowledge. How to develop a theory to open up intelligence to other dimensions?

Gardner and Sternberg
- Howard Gardner interested in developmental pathways; when we look at any domain of intelligence and the time periods in which children make the greatest gains, vary. He argues that we have multiple constructs w/in intelligence. Those constructs have different pathways. When you look at the brain activation, those different dimensions activate different regions of the brain.
- Multiple intelligence: **not all of us have similar strengths in those different dimensions.**
- with the notion of multiple intelligences came the notion that our individual differences can be in different intelligences
- Gardner also became very popular w/educators -- they picked it up; he argues that if there is such a thing as multiple intelligences then, as a teacher, you want to find out how the children in your class room are learning and teach them according to their strength

- want to optimize learning w/multiple intelligences
- Gardner believes in active engagement; being an active learner, asking questions

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Alina Pringle 7:48 PM (1 hour ago)

to me

- Gardner: because of school, we have a superficial knowledge of so much material; so many priorities to care about
- says that it's important for children to learn the basics of science, like hypotheses, etc. In school, assessment is mystified; don't know what will be tested on, etc.
- says in school, you should be the most active agent. Should learn deeply, exhibit their knowledge publically; teacher should be able to get help that the student needs; need assessment schemes which convince everyone that this kind of assessment works
- thinks there should be a political commitment expressing interest in reform

The key feature that allows the teachers to see individual differences in children is a small ratio of teachers to children. Otherwise, it's difficult to nurture knowledge of children.

Robert Sternberg:
- different idea of 'intelligence'
- his notion of intelligence has 3 constructs:
1) analytic ability -- the ability to analyze and solve problems
2) creativity - the capacity to adapt to new situations in order to solve problems
3) practical ability - those individuals that you know are street-wise; to know what the odds of are a solution working in a work environment

- in all these constructs of intelligence, if the dimensions are pure, will divise a test of tasks measuring all the dimensions. You want to divise tasks that measures the 3 above. If each is pure, they should be independent of each other. Then look at correlation; is good performance on one task associated with good on another? Correlation should be close to 0 according to Sternberg's. If there is a G factor then the **correlations between the tasks should be quite high (evidence of Spearman's hypothesis.)** In reality, the correlation is the middle -- .3 to .4.

Intervention studies - done to see if you are catering to practical intelligence
- intelligence testing closely linked to academic performance

Sternberg: Ted Talk
- speaks about his own experience as a child and going thru education; was not picked as one who would succeed
- when IQ tests were first introduced, they made sense: most of the students taking the tests were homogenous: white, male, upper-class
- but then the population of students taking the test became much greater
- the tests were introduced to create a meritocracy rather than based on parents' reputation
- but tests found to be a reflection of socioeconomic status; replacement turned out to be the same
- and the skills needed to survive today different than the early 1900s when IQ tests were first introduced
- in today's world, need to be creative, flexible, adaptive, need analytical skills, persuasive skills, wisdom and ethically-based skills
- if you need this broader range of skills today, then why do we still use 100 year old tests?
- one reason: inertia -- people get used to them; don't want to change
- we can double standardized tests, cut ethnic group differences, and separate creative/practical from memory, etc using tests that cater to everyone's strengths.

Alfred Binet:
- divised a series of tasks for children to perform
- measured and assessed when the children were able to do this task
- coined the notion of a 'mental age' -- can be different than chronological age. For ex: children who are advanced in math might have an older mental age.
- his test became very populah
- Thermon took his took to the states, adapted it to an American popualtion, and coined the term 'intelligence quotient' (IQ). Thermon argued that one should do an equation - take mental age, divide by chronological age, multiply by 100.
- allow you to have a number that gives you an idea of IQ and compared to people of the same age
- **the underlying assumption is that intelligence is a characteristic that is normally distributed in the population**
- if plotted on a scatter plot, should have the shape of a bell shape if it is normally distributed **(**most individuals in the middle)
- from the normal distribution, can calculate the mean performance -- representative number for the entire distribution
- from that, can calculate variability (how spread out the scores are)
- from the variability, can calculate the SD (standard deviation)
- most of us are within two SDs of the mean

Is performance on IQ tests stable over time? What does it predict?
- stability:when young children's intelligence is measured, then it is predictive of later performance on IQ tests, but not before 18-24 months.
- correlation improves after 18-24 months (at 6 there is a .7 correlation; shows there is variability, but very good at predicting)
- IQ tests can vary from 10-20 pts during high school
- **intelligence is predictive of academic achievement, higher SES, occupational status,**

Self-regulation:
- if children able to regulate their own behaviour, they can take away more from their environments

Intelligence and its Heredity:
- tested by assessing identical twins
- **if inherited, IQ correlation should be high - higher even than fraternal twins**

Ethnicity:
- ex: Asians scoring highest, then Europeans, Hispanics after, African last
- no evidence of ethnically-linked 'smart' genes; what accounts for IQ differences are cultural differences
- environment: self-discipline in Asia is very strict; then map onto that value of education; SESatus
- within groups, the individual differences are just as wide between all

Are intelligence tests biased?
- who develops them? who do they cater to? why are they developed?
- we already knows that SES (closely linked w/linguistic skills) affect IQ tests

Stereotype Threats:
- either you have adopted the expectation that you will do less well -- self-fulfilling prophecy because of anxiety
- images of a group that are carried on by society (ex: women and math)
- **stereotype threats are very distracting;** can affect how you perform
- this is a souce of this underperformance
- underperformance = groups whose intellectual abilities are negatively stereotypes tend to perform worse than other kids -- same preparation but group whose abilities are seen as poor
- which groups are affected by the stereotype threat? there is not a single identity that doesn't have a negative stereotype

Culture-Fair Tests: there is a movement to develop them; they typically eliminate language component from tests
- ex of culture-fair test: The Ravens
- can be supplementing another test
- called 'nonverbal intelligence test', often linked w/fluidity component of intelligence

Special Children, Special Needs
- 'gifted' children; can be intellectual gifts, but 'talent' also (ex: musicians)
- while there are gifted intellectuals, we will typically cater for them; special classes for them (dependent on the school boards)
- individuals who are talented will do better if their parents nurture them
- to be admitted to a gifted program, have to be at least 1 SD above the mean (IQ of 115 or more)

Mental Retardation:
- argument is that children who have MR in the mild range can have IQs lower than 70 (95% of all with MR are mild)
- might not be identified until they reach school where they do not progress as well as other kids academically
- those with severe mental retardation are very rare; taught adaptive skills and if to nod or shake head
- those with mild mental retardation might live alone or in groups

Learning Disabilities:
- should 'intelligence' even be used when talking about learning disabilities?
- parents more responsive to learning disabilities than mild retardation
- with learning disabilities, it is a matter of debate as to whether IQ should be used to assess learning disabilities
- traditional thought: if you have a learning disability, then you can still be gifted / but not with mental retardation

Reading disabilities - most frequently diagnosed in school
- first 3 years of school spent learning to read
- if not picking up reading, after grade 3 we use reading to learn

- if not picking up reading, entire academic performance jeopardized
- but the school system will not intervene until grade 3 (have to fall behind sufficiently before school board intervenes -- usually a 2-yr lag)
- math disabilities: some individuals have difficulty w/number concepts -- this is underdiagnosed
- might be linked to the notion of skill; teachers might not be as attuned to math
- some disabilities linguistically based (auditory processing deficits)