The Nature of Science
Patterns in Heredity

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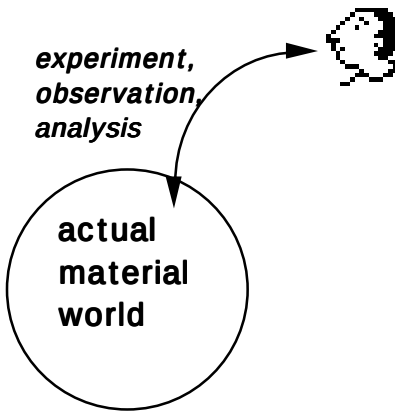
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observation,
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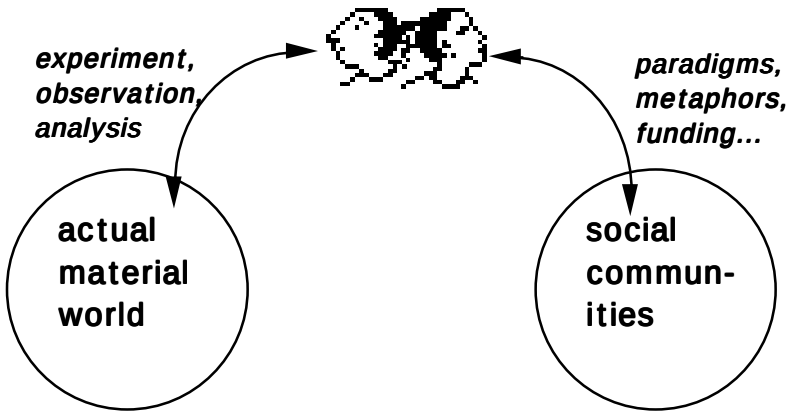
experiment,
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You be the scientist!

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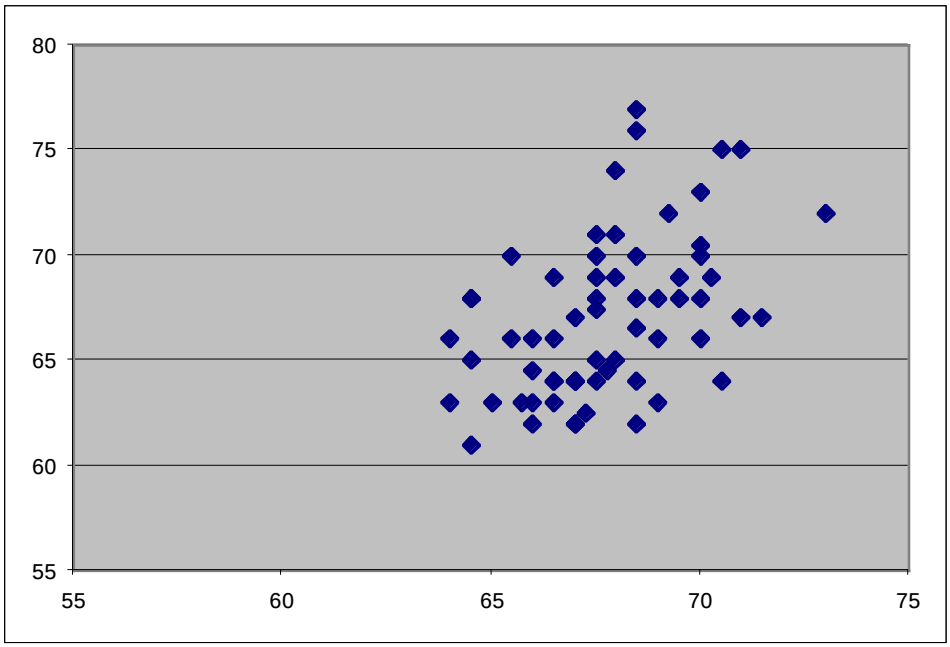


You be the scientist

Choose one of the four plots on the handout.

What patterns can you detect?

Ask for help from your neighbor or from me.

Discuss your ideas with your neighbor.

You be the scientist, part II

Ideas or questions about the causes behind the patterns?

You be the scientist, part III

Questions/ Reservations?

Questions or reservations about the process?

adoption, step-parents
reliability of data
outliers
bringing in extra information
pattern in the mother-father pairs
why graph average of parents' heights
data not collected
what could one do with any of the patterns?
what if the data were for IQ?

Chain of steps in scientific inquiry

Phenomenon deemed interesting
-> questions asked
-> categories demarcated
-> observations made
-> data collected
-> patterns perceived
-> predictions made
and/or hypotheses
about causes
-> social actions
supported.

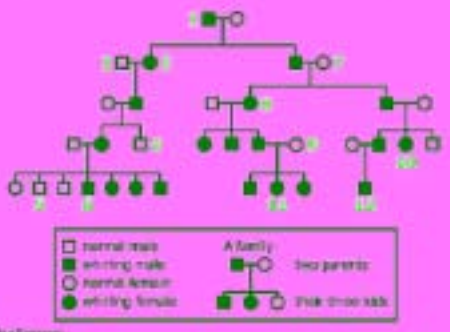
Other kinds of patterns in heredity?

Genetic Science Learning Center

Find the Gene for Whirling Disorder!

While individuals afflicted with Whirling Disorder hear old folk rig tones tunes, even remade as muzak, they let loose and dance uncontrollably.

As a geneticist studying Whirling Disorder, you have identified a large family in which some individuals have the disorder, and others don't. For this family, you've drawn up a pedigree, which is a diagram that shows how family members are related and which individuals have Whirling Disorder.



Here's your challenge:

Below, you'll find genetic jigsaw puzzles for 12 members of your Whirling Disorder family. Each puzzle has a number that corresponds to an individual in the pedigree above.

Your job is to find the puzzle piece that is responsible for whirling disorder.

Puzzles too small? Try the enlarged versions.

Need a hint?

1. The correct puzzle piece must be present in every individual affected with the disorder.
2. The correct puzzle piece must be absent from every unaffected individual.

Are all genetic disorders this simple?

No! In fact, most genetic disorders are more complex than the Whirling Disorder.

Many disorders are multigenic, meaning that two or more genes are responsible for the disorder. Disorders caused by mutations in only one gene are not common.

Also, **environmental factors** such as diet and exposure to mutagens can greatly influence the severity of a disorder.

What can this tell us about ME!?

Pellagra sufferer

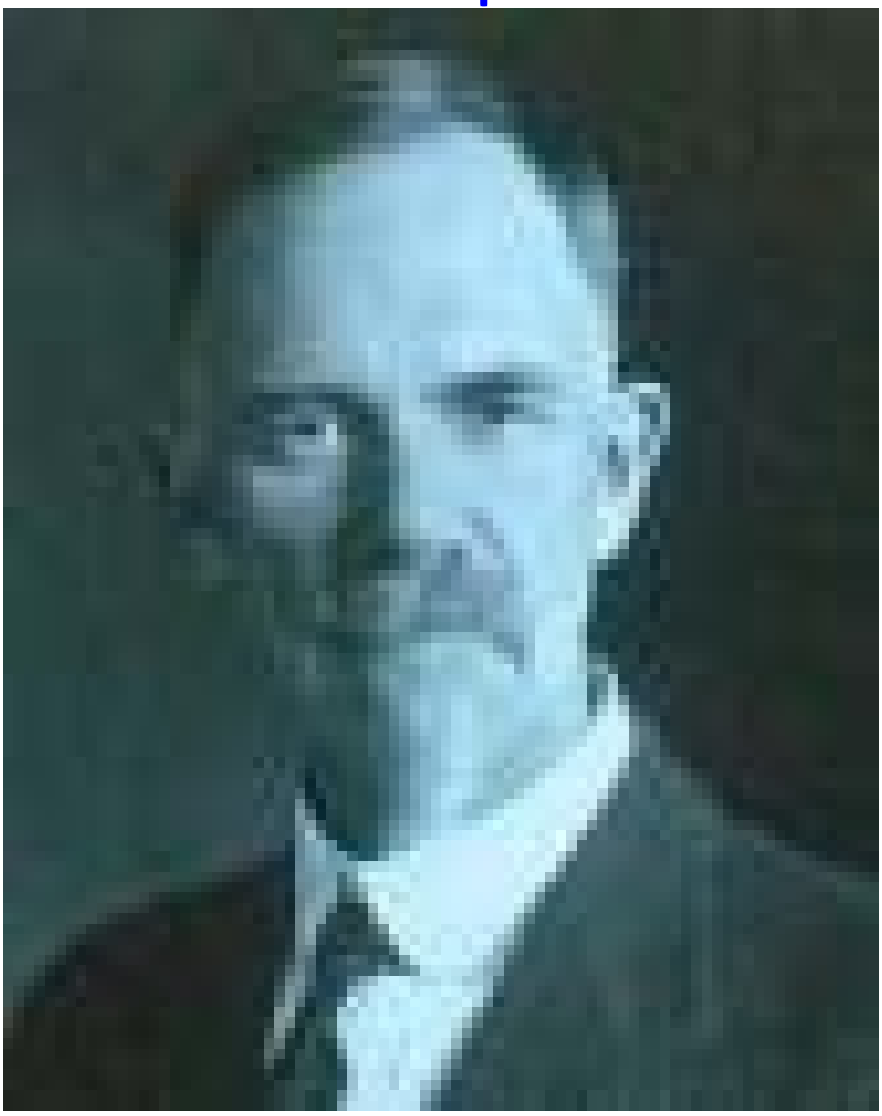
Year	Total Deaths	White Deaths	Nonwhite Deaths	Other Events
1900	2			Pellagra relatively unknown
1914	847			Goldberger discovers pellagra is a vitamin deficiency disease
1915				Mississippi Prison Study

	1058			
1916	1807			'
1917	2843			Pe
1918	3126			
1919	2568			
1920	2122			
1921	2348			
1922	2514			
1923	2245	1143	1102	U t a
1924	2206	1086	1120	
1925	3049	1384	1665	
1926	3501	1724	1777	
1927	5091	2351	2740	
1928	6523	2689	3834	
1929	6623	2781	3842	
1930	6106	2722	3384	
1934	3602	1914	1688	F

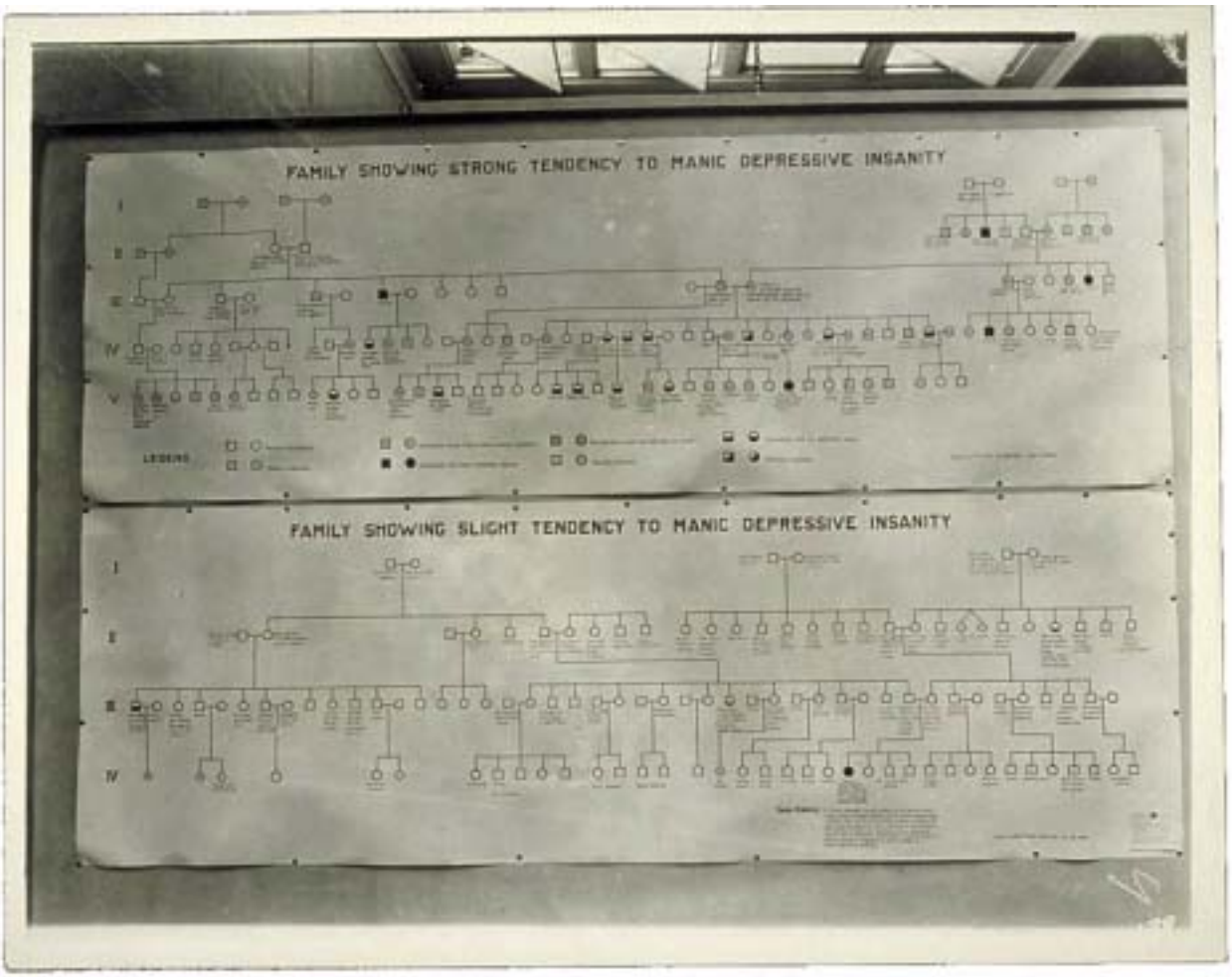
1935	**3543**	**1963**	**1580**	**T p**
1936	**3740**	**2129**	**1611**	
1937	**3258**	1804	**1454**	
1938	**3205**	1**707**	**1498**	
1939	**2419**	**1404**	**1015**	
1940	**2123**	**1270**	**853**	
1941	**1836**	**1137**	**699**	
1968	**15**	**12**	**3**	

Goldberger

Davenport



Good or Bad Scientist?



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Look at:

- ways people justify decisions at points in the chain
- influences on those decisions
- sources of ideas for alternative decisions

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