Reaching into the Community: Immigrant Latino Adults from Mexico and Central America

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BACKGROUND

This project was designed to learn how adults born in Mexico and Central America (MCA) think about trait transmission. The findings are guiding the development of culturally appropriate informal learning opportunities about genetics and genomics. The overall aims of the broader project are to increase MCA Latinos' engagement in STEM learning, increase their perception that they can learn science, and increase knowledge about genetics and genomics.

METHODS

The interview guide was designed to elicit knowledge about trait transmission, genetics, genes, DNA, epigenetics, and environmental exposures.

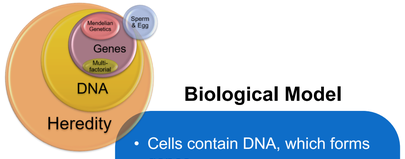
Gender	N=60
Male	30
Female	30
Age	
19-39	31
40-49	21
50<	8
Country of Origin	
Mexico	39
Central America	21
Education	
Elementary or less	27
Some or all middle school	15
Some or all high school	18

RESULTS

Heredity

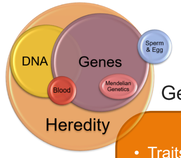
MCA Latinos are aware that children inherit traits from parents and grandparents. Many aware that some traits can skip generations. Five different models for mode of trait transmission were identified. A few participants do not fit into any model due to lack of knowledge.

Models of Trait Transmission



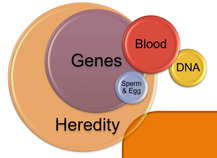
Biological Model

- Cells contain DNA, which forms genes
- Genes contain instructions for everything a cell does
- Egg and sperm contain mix of DNA ; ½ from each parent
- Mendelian genetics explains some traits; many traits are multifactorial



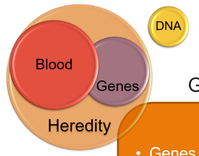
Model 1
Genes, DNA and Blood

- Traits passed through genes
- DNA is related to genes; relationship is often unclear
- Many have some familiarity with Mendelian genetics
- May not know how genes are transmitted
- Blood sometimes mentioned



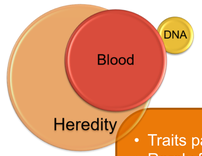
Model 2
Genes

- Traits passed through genes
- Concept of gene often vague
- DNA not associated with genes
- May or may not refer to blood in context of trait transmission



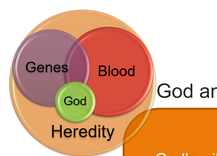
Model 3
Genes and Blood

- Genes and blood involved in trait transmission
- Concept of gene often vague
- May be aware of DNA in context of testing, not trait transmission
- "Stronger blood" may influence trait transmission



Model 4
Blood

- Traits passed through blood
- Rarely familiar with "genes"; may perceive genes are in blood; genes not related to trait transmission
- May be aware of DNA in context of testing, not trait transmission
- "Stronger blood" may influence trait transmission



Model 5
God and/or Genes/Blood

- God's will influences traits
- May or may not be familiar with "genes"
- Not familiar with DNA in context of trait transmission
- For some, "stronger blood" addressed in context of traits

Genes

A few participants correctly identify the concept of gene. Most familiar with term genes, connect heredity to genes in some way. Most understand that offspring are a mix of parents' genes, but unaware of mechanism. Some referred to strong(er) genes to explain dominance of physical traits across generation. A few are unfamiliar with term gene all together.

"Genes are basically inside the DNA. ...DNA is a combination of all the genes that one person has.... [W]hen the child is born, the DNA mixes, from the mother and father, and that's where [the whole family's] genes are." P4

"She had a stronger eye gene than mine, so her eyes turned out blue in the boys' case. In terms of face shape, for example, my genes were stronger than hers. So since it's different genes, each one is different." P26

DNA

Only some correctly associate DNA and genes with trait transmission. A few equate DNA with blood and genes. The majority do not associate DNA with heredity. Associate it with blood or testing. A few participants are unfamiliar with term.

"Your DNA is going to tell you whether your hair is blonde or your eyes will be blue." P52

"[DNA Is] the type of blood... If you want to know about a dead person and can't be identified, they can do a DNA test and you'll know who they are. Or to identify your child.." P21

Blood

Nearly all incorporate blood into mental model. Blood in context of trait transmission may be metaphorical or literal. Nearly half (from all models) refer to "strong blood" to explain dominance of physical traits across generation.

"I assume that you inherit the blood from your parents as well..." P33

"Whoever they look like the most, then it's more, then that means your blood was stronger." P6

RESULTS (continued)

Divine Intervention

Some refer to God or God's will to explain individuals' traits. Several note that one can inherit genes for up to 4 or 5 generations (some with biblical reference)

"We come from a creator—And he placed the genes in humans." P8

"…God himself makes you resemble [a] person." P39

"Physical characteristics can obviously be transmitted from generation to generation and they're not all going to be the same. I think it's until the fourth generation." P15

DISCUSSION

MCA Latinos are aware that children inherit traits from parents and previous generations. Knowledge about how trait transmission occurs varies substantially.

Knowledge we gained about Latinos' explanatory models during the formative evaluations is being used by the research team to develop linguistically and culturally appropriate learning materials that will be used during informal learning opportunities led by lay educators. We will evaluate the effectiveness of the program at increasing interest, engagement, and knowledge about STEM learning among MCA adults with limited formal education.

IMPLICATIONS FOR DEVELOPING INFORMAL LEARNING PROGRAMS

Assume that MCA adults with limited formal education may lack basic scientific knowledge, including familiarity with basic terms relevant to human biology and trait transmission.

- Be aware that knowledge about key terms may not be accurate.
- Assume that all visual images and terms need careful explanations.
- Avoid visual (red color) or verbal reference to blood whenever possible due to variation in connotations it may evoke.
- When it is necessary to discuss or visualize blood, be explicit about assumptions to avoid miscommunication.
- Understand that knowledge gaps may be filled with cultural explanations or religious interpretations.

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