LING 001
Introduction to Linguistics

Lecture #2

Language as an Instinct

01/22/2020

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Enrollment

- The **course is full**!
- Make sure you are enrolled in both **the lecture** and a **recitation** section - double check!
- If you can’t enroll:
  - **Join the waitlist** via the course website.
  - **Keep checking** in case a place opens up.
- Friday recitation is in high demand: email me to **volunteer to switch** from Friday to Thursday

Resources

- Course website for resources
- Canvas for announcements and grade-related things
- Perusall for reading (bonus points available!)
  - Earn engagement points by commenting on the reading and to each other (2 is a little, 8 is a lot)
  - TAs will wait to respond to questions to allow you time to engage with each other.
  - You **have to engage with most readings to be eligible for bonus points**.

Recitation

- Starts this week!
- You can see the schedule on the course website
- If you are on the waitlist, attend the recitation section you want to join so we can get a sense of numbers.

How to do well this week

- Do the reading (~1 hour) and attempt the practice problems (~1 hours this week, normally ~2)
  - Try to do the problems without solutions first
    - To facilitate, I'll post the solutions after recitation
- Go to recitation and ask questions about the practice problems.

“Miracle” of acquisition

- Given how fast and based on how little evidence children become competent speakers of their native language, it’s unlikely that language acquisition starts from scratch
- This happens without explicit instruction!

Language acquisition is fast

Jan 2019
13 months

June 2019
18 months

Dec 2019
25 months

But the task is really hard

- Figure out **the basic elements** of language
  - what are the sounds, words, categories.
- And how those basic units are permitted to combine
  - **Rules**

And they only get a small sample

- Children only get a **small and finite sample** of the sentences possible in their language
- From that sample, they have to figure out the **underlying grammar** that will allow the to produce an infinite number of novel utterances
- Induction problem - many lines are consistent with a set of data; many grammars are consistent with a sample of input
  - How do we all arrive at the same one?

Constrain the learner

- One extreme: born with domain-general learning constraints (e.g. humans can only learn certain kinds of patterns or only like attending to certain kinds of things)
- The other extreme: born with a substantial amount abstract knowledge about language (e.g. verb and noun category)

Language as an instinct

- **The biological side:** knowledge prior to experience
  - somehow this is part of our biological make up
- What is an **instinct**?
  - In simple terms: a biologically determined behavior.

(Non-)Instinctive Behaviors

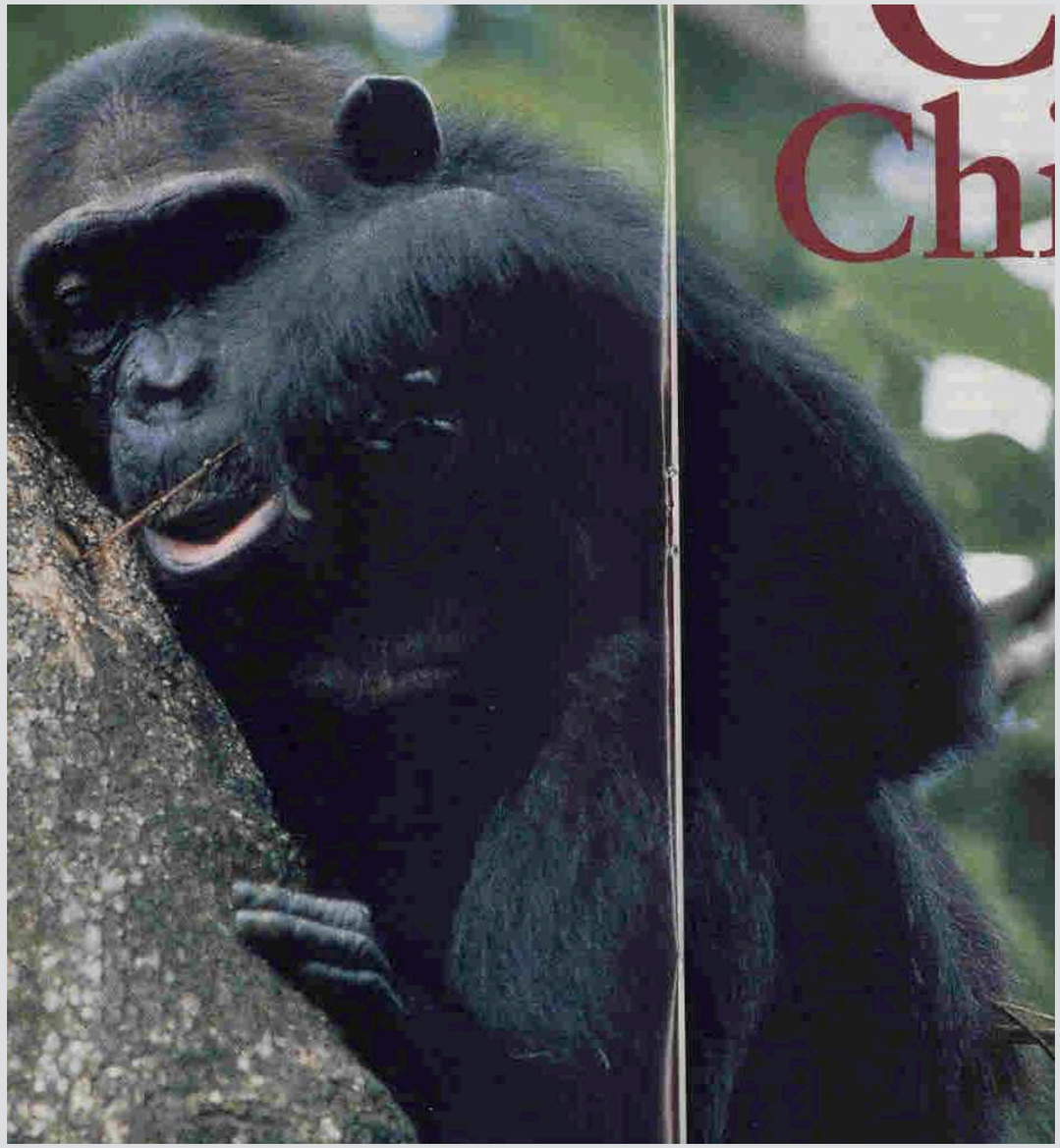
- **Instinctive**
  - Honeybee language
  - Suckling, chewing, swallowing
  - Mating
  - Walking
- **Non-instinctive** (learned, cultural)
  - Reading and writing
  - Cooking
  - Romance
  - Ways of eating ants (chimps)

Chimp ‘Ant-dipping

- **Different chimp bands** have different traditions:

- **Gombe chimps**: pick ants off of stick

- **Bossou chimps**: eat ants off stick



Mixed Behaviors

Instinct + learning / culture:

- Basic program present in biology,
  but experience also needed:
  - Hunting by cats (vs. grooming).
  - Herding by border collies.
  - **Human language**.

    "An **instinctive tendency** to acquire an art"
    (Darwin via Pinker).

Feline Hunting Behavior

- Hunting & Chasing Instinct
- But **killing** and **eating** prey is learned
- **Mothers** will gradually teach kittens
- Various skills that require practice are involved

Lenneberg's Criteria

Neurologist Eric Lenneberg proposed a set of criteria for biologically determined behavior

Main Points:

- Follows its own schedule
- Happens to everybody
- No prodding needed

Up next: how do these apply to language?

The Schedule of BDB

- More **specific** points (Lenneberg):
  - May **emerge** before needed
  - **Develops** in steps or milestones
  - **Must develop** during critical period or it won’t develop at all

Schedule of Language

- Language **emerges** before needed
  - **5-year olds** are essentially on par with adults (main exception: vocabulary size)
  - Their needs are still very different

- Language **develops** in steps / milestones
  - Any child development guide will refer to linguistic milestones (along with others)
  - **Examples**: first word, first two-word utterance, etc.

Critical Period

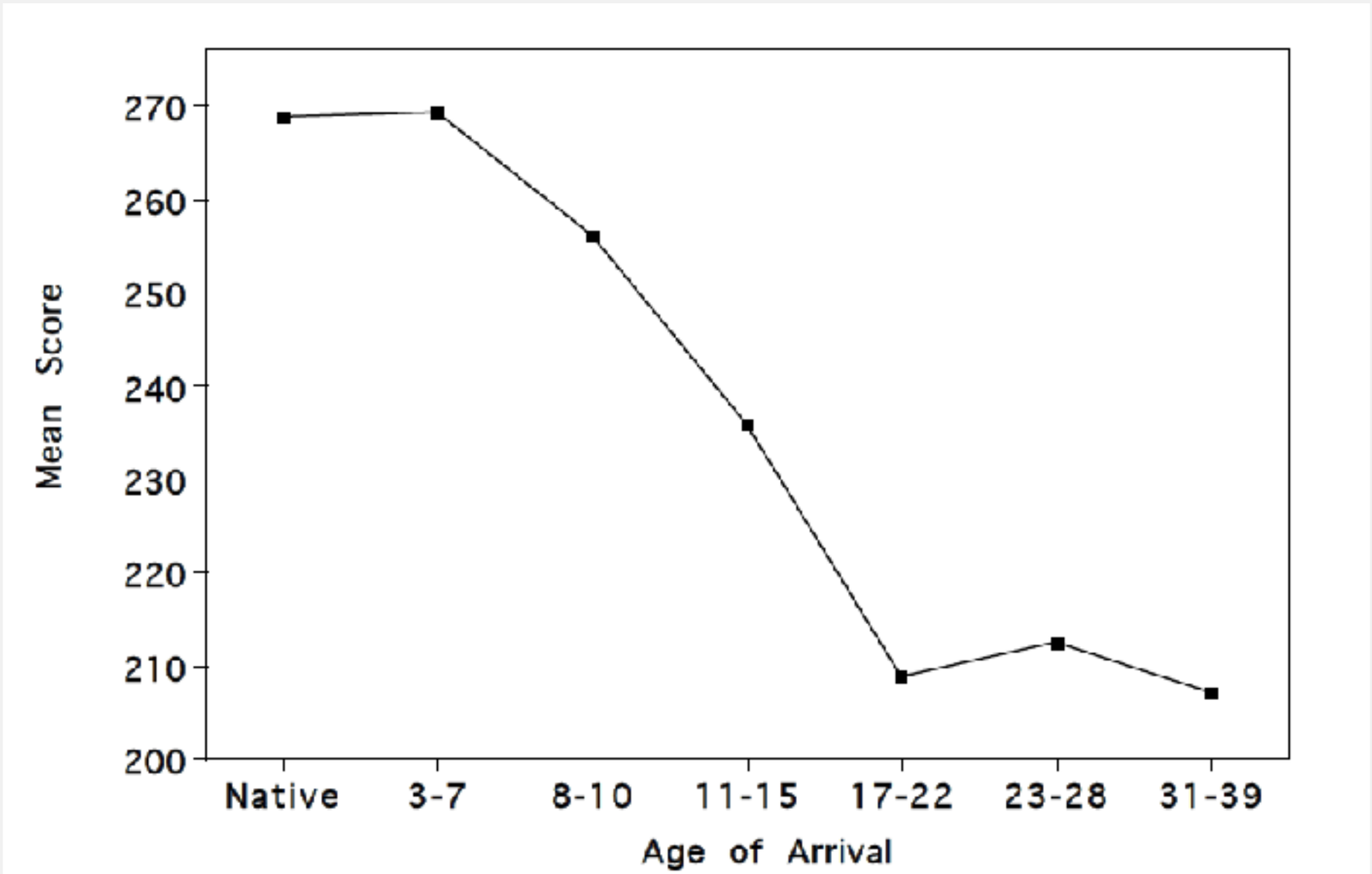
- **Instinctive behavior** emerges during specific developmental time window
- If external triggers are needed, they have to occur then
- **Example**:
  - **Border collies** ‘imprint’ at 4-16 weeks.
  - **Can’t be raised with sheep** if you want them to herd sheep

    (they’ll think they are a sheep themselves and won’t act aggressively towards them)

A Critical Period for Language?

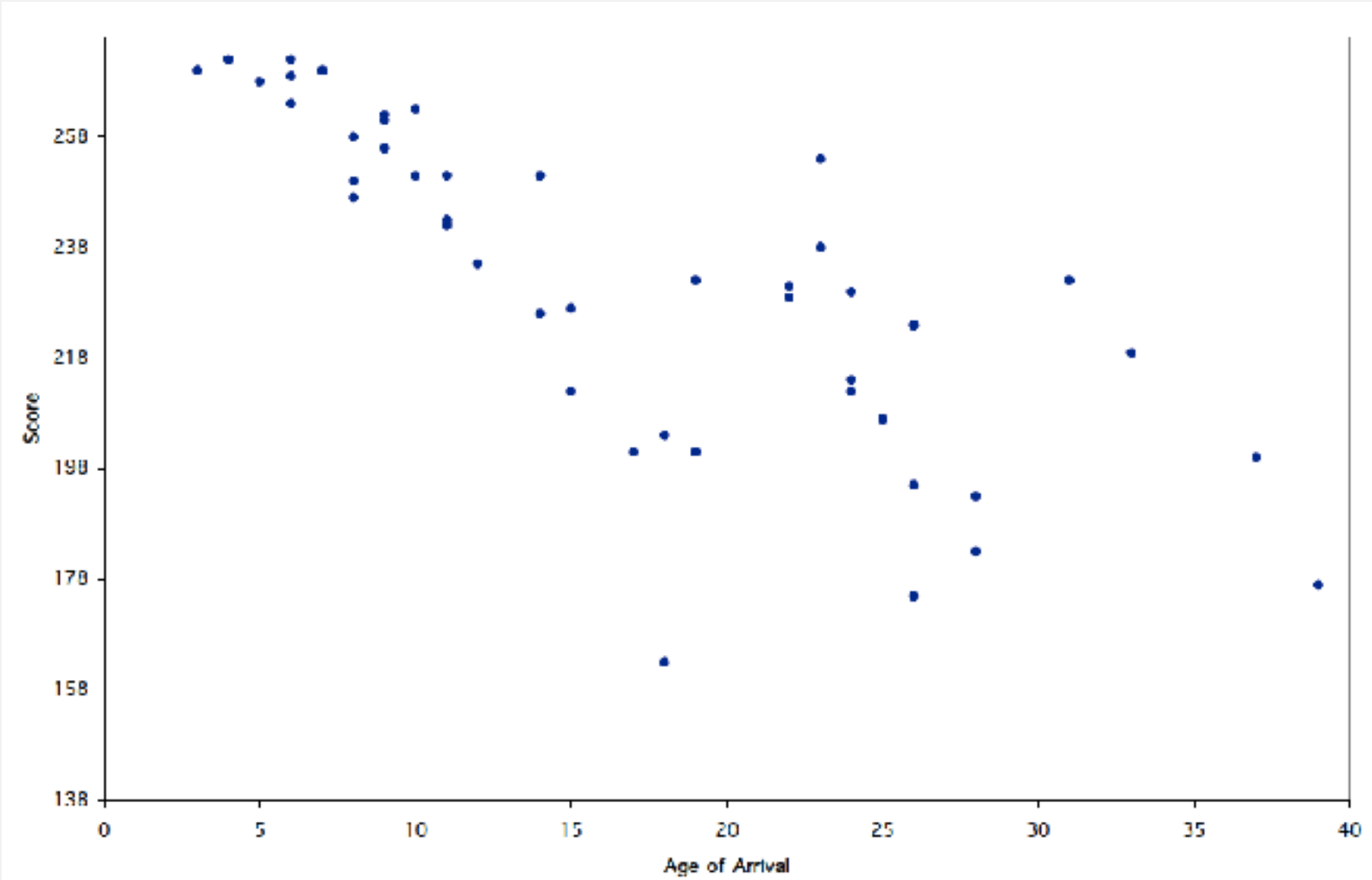
- **Critical Period Hypothesis**:
  Native language has to be acquired before puberty
- **Evidence**:
  - Acquisition complete before puberty
    (apart from vocabulary)
  - Second language learning more successful earlier
  - Brain damage effects vary greatly based on timing
  - ‘Wild’ children that grow up without linguistic input

Second language learning



(Johnson & Newport, 1989)

Second language learning



(Johnson & Newport, 1989)

Brain Damage: Hemispherectomy

- Rare Procedure to deal with seizure disorders localized to one half of brain
- Interesting test case: language-related brain areas are mainly in left hemisphere

	Side removed	Language intact	Language lost
Pre-teen	left	**49**	3
	right	38	5
Adult	left	**0**	6
	right	25	**0**

“Wild” Children

- Typical **background**:
  - Raised by wild animals or psychotic parents.
  - No exposure to language during critical period.
  - Little or no language when discovered.

- **Many historical cases**:
  Romolus & Remus, Victor, Kaspar Hauser

- Modern case: **Genie**

Genie’s story in a Nutshell

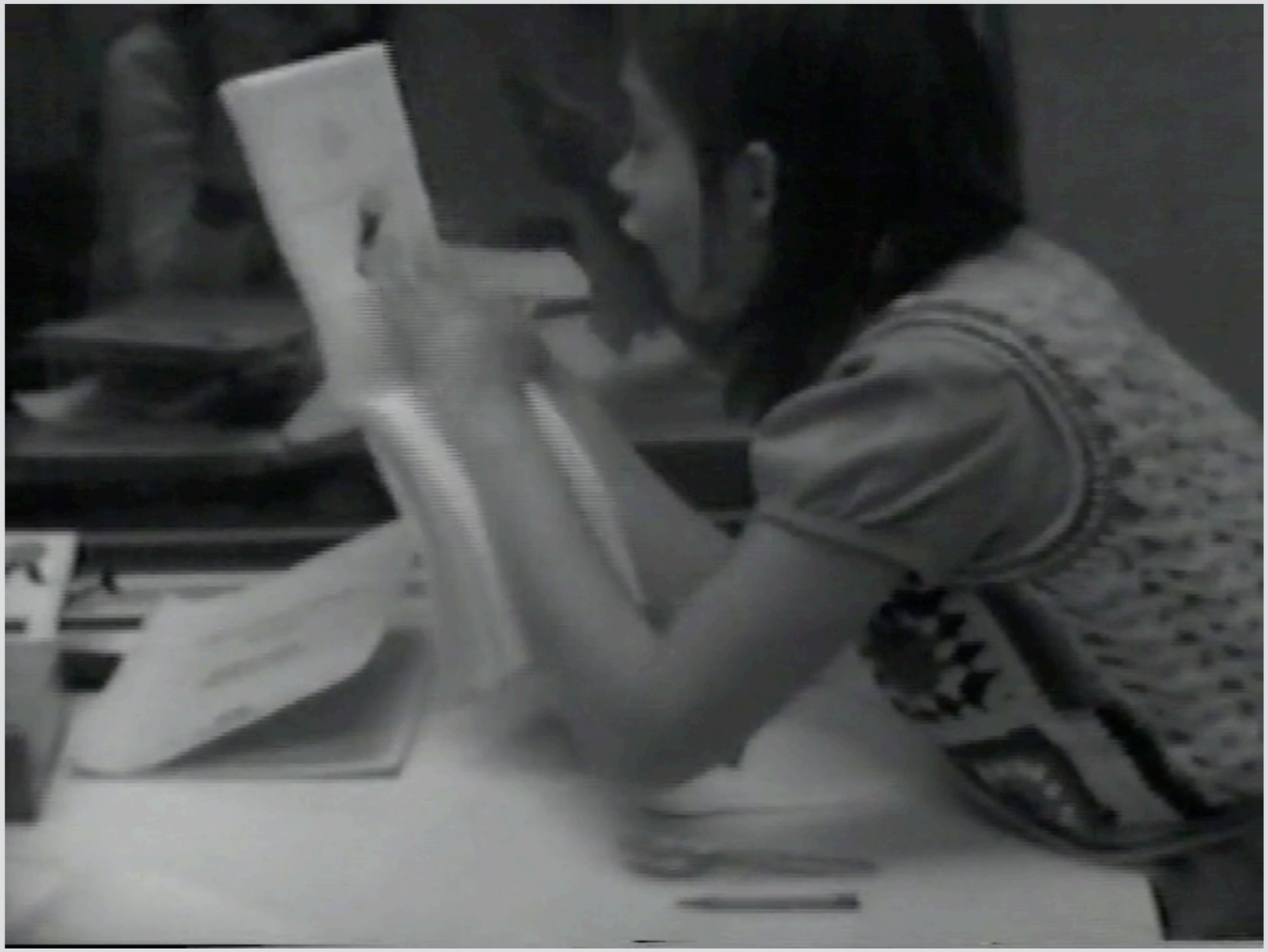
Genie was...

- **Discovered** in LA in 1970 at 13.5 years old.
- **Confined in closet** tied to potty-chair since infancy.
- Punished for making sounds.
- Received **little linguistic stimulation**.

- Exciting **scientific question**:
  - Is there a critical period?
  - Could Genie still learn a language?

Genie - Early Successes

- Strong **vocabulary** development
- Quite **communicative**
- **Able** to recount past events
- **Real hope** that she might overcome her linguistic challenges



Genie - Later Struggles

- Effective at **communicating**, …
- but never acquired any **real syntax**:
- **Mike paint.**
- **Applesauce buy store.**
- **Neal come happy.**
  Neal not come sad.
- **Genie have Momma have baby grow up**

Conclusion?

- **Support** for Critical Period Hypothesis!
- It was simply **too late** for her to really acquire a language
- **Another case**:

  Chelsea (deaf, but not diagnosed until very late)

A luckier wolf child: Isabelle

- Story similar to Genie's, but discovered at 6.5
- 1.5 years later:

Why does the paste come out
if one upsets the jar?

What did Miss Mason say
when you told her I cleaned the classroom?

Do you go to Miss Mason's school
at the university?

Wolf Children & Critical Period

- Generally seen as **supporting** Critical Period Hypothesis
- **But** obvious problems:
  - highly traumatized individuals with other deficiencies
  - Very few cases
- **Keep in mind**: not the only case in favor!

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- Happens to everybody
- Doesn't need prodding

Language Happens to Everybody

- No conscious decision is involved
  - **All human communities** have language
  - Fairly **minimal exposure** suffices
- Language emerges in spite of deficits

➡ **Independent** of general intelligence

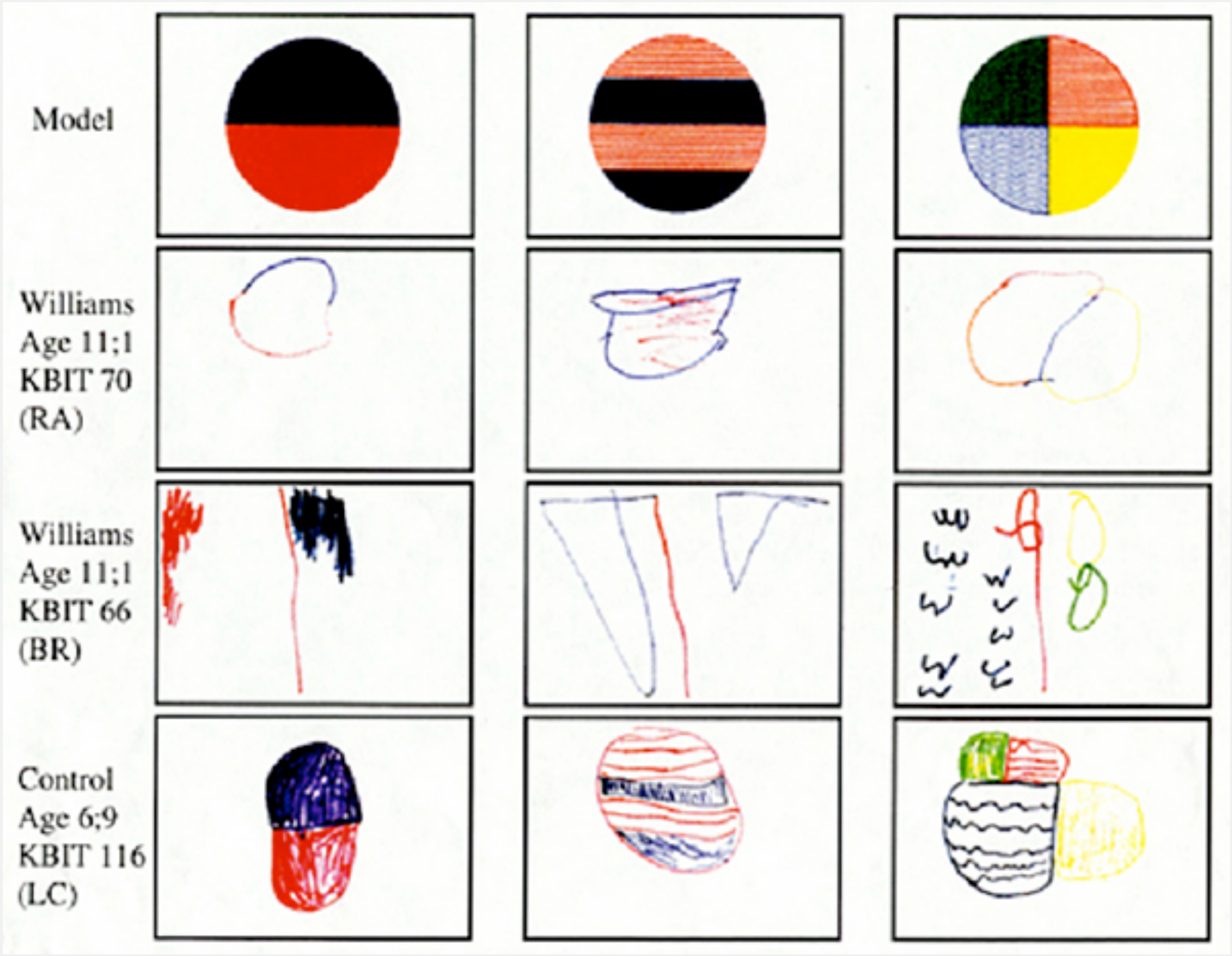
– **Williams Syndrome**:
Low intelligence, high linguistic capacity

– **Specific Language Impairment** (**SLI**):
Normal intelligence, specific linguistic issues

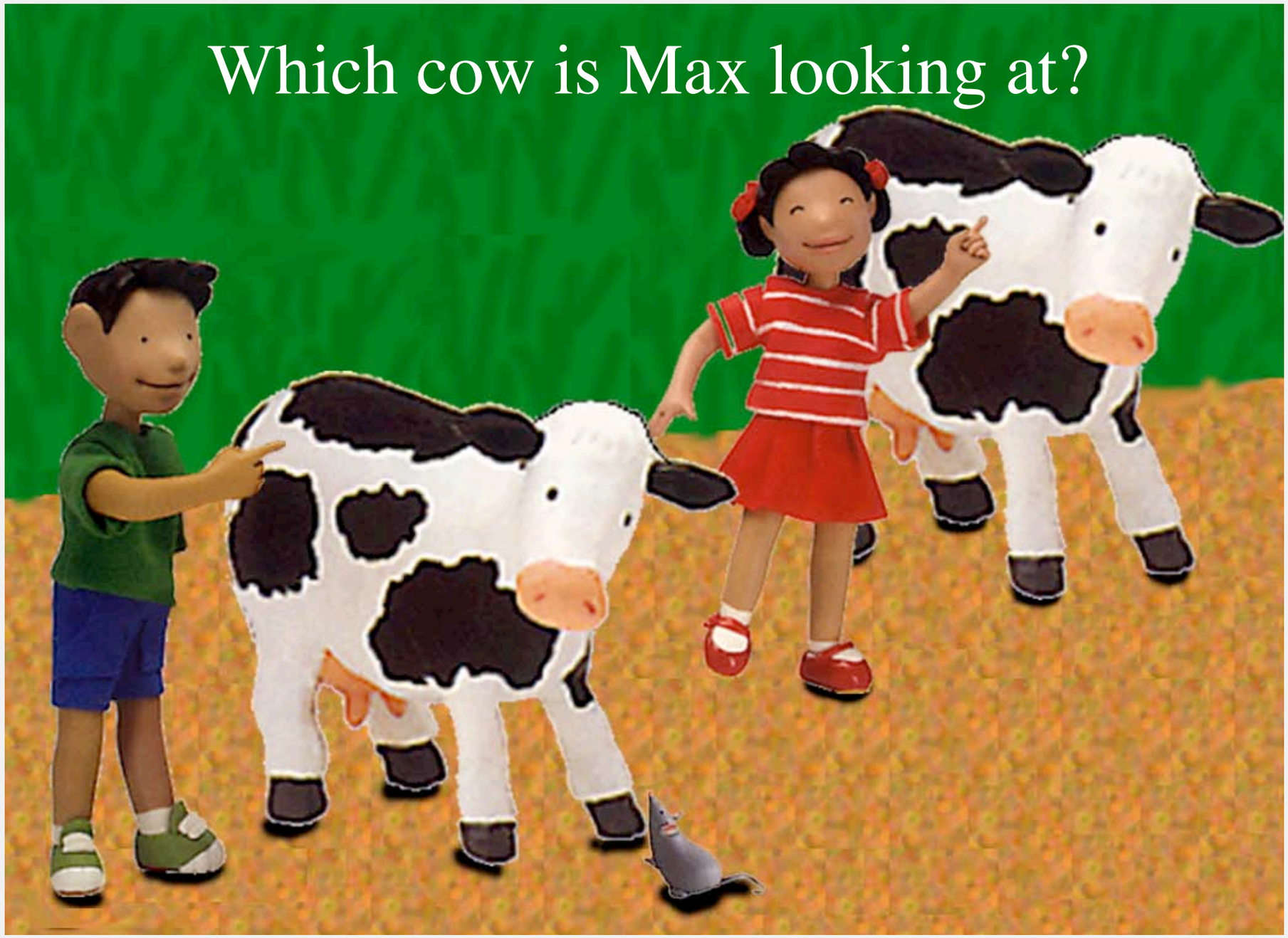
Williams Syndrome

- Spontaneous **deletion** of small segment of 7th chromosome.
- **Symptoms**:
  - average IQ = 55
  - poor coordination
  - hoarse voice
  - “Pixie” or “elfin” face, heart and aorta problems, hyperacute hearing.
  - Very (excessively) friendly, “affinity” for music.
- Despite cognitive problems, **remarkable linguistic abilities**

Williams Syndrome



Williams Syndrome



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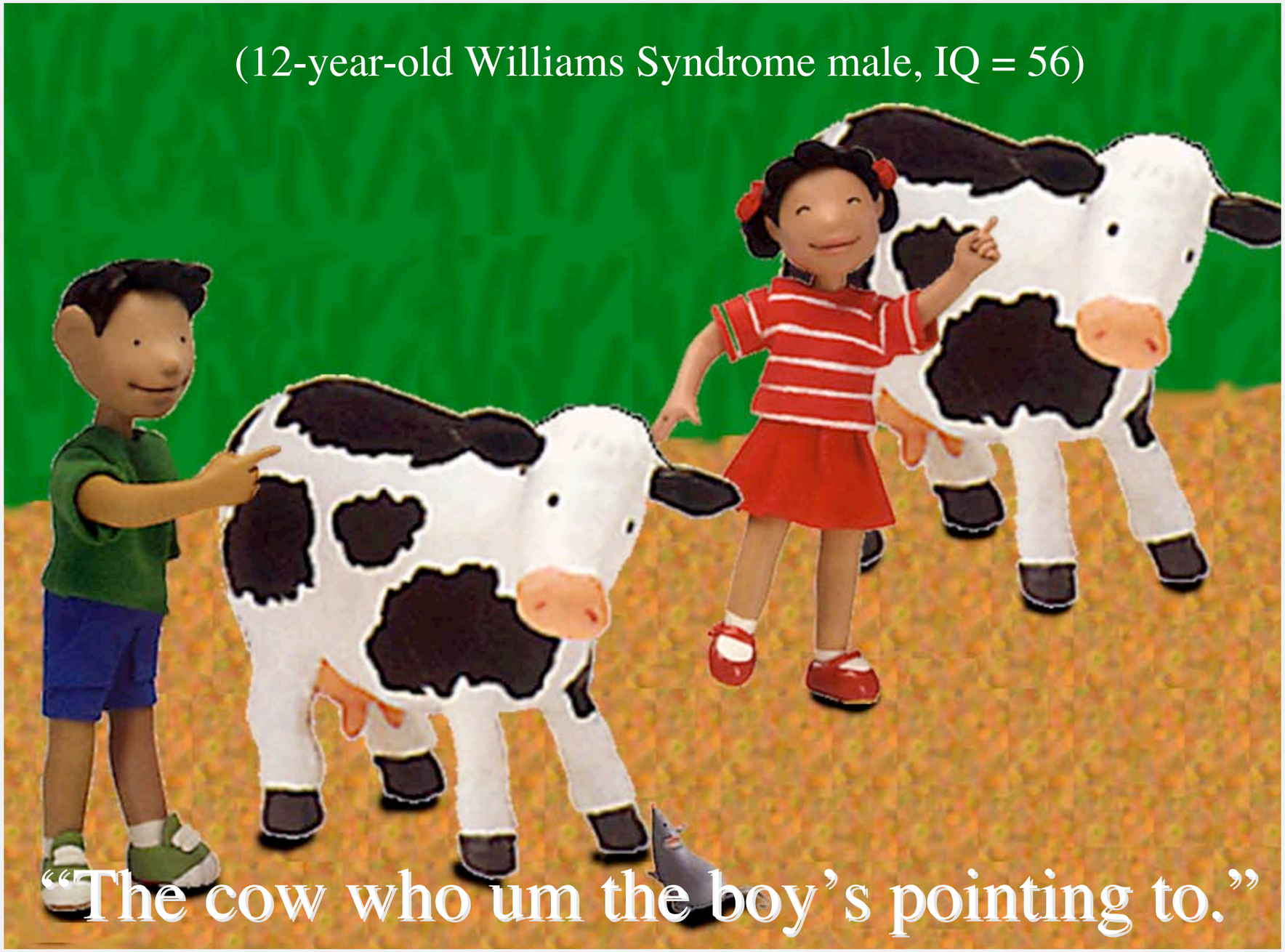

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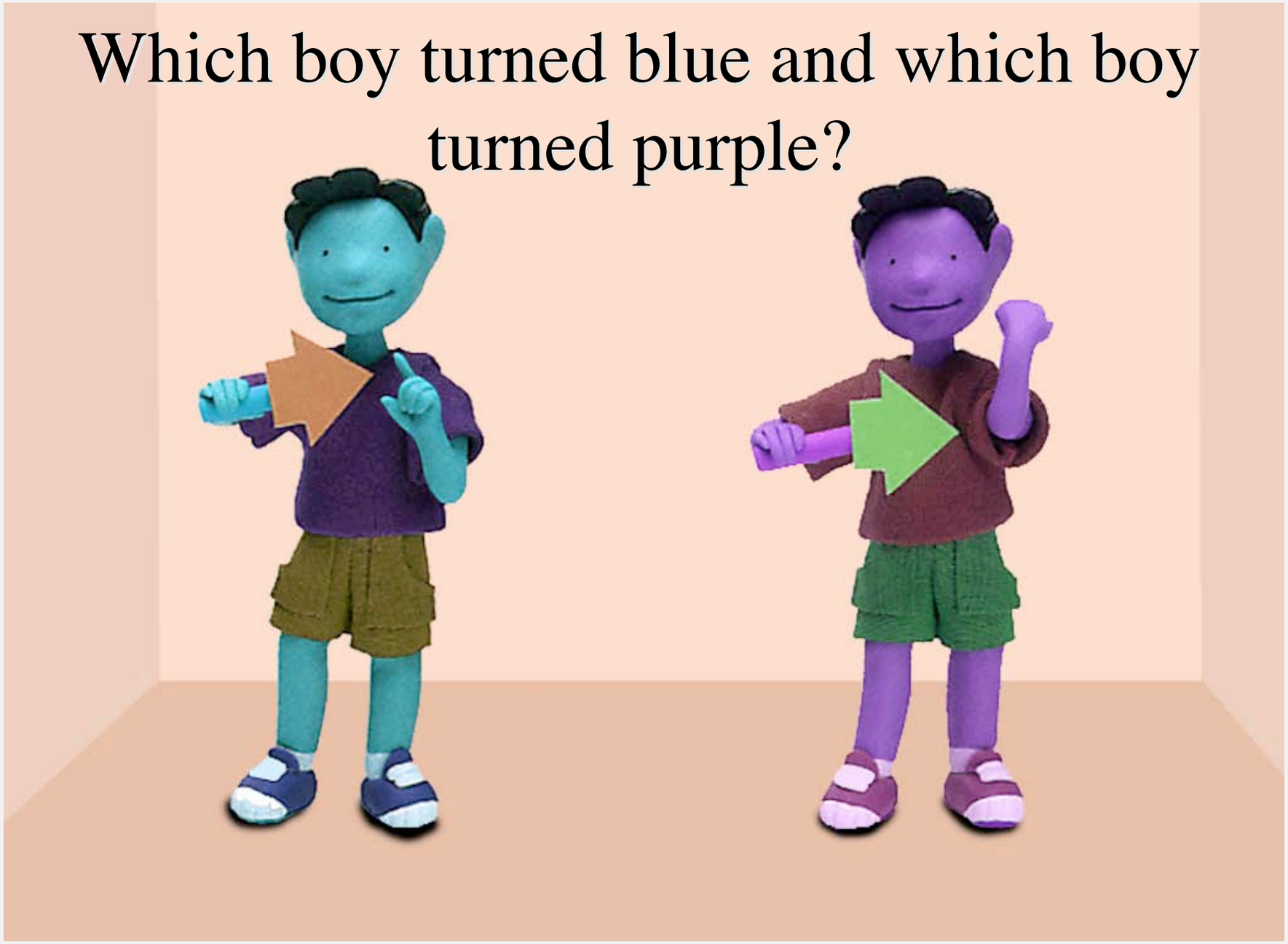


Williams Syndrome

(16-year-old Williams Syndrome male, IQ = 40)

"The boy that's pointing to his arm
turned purple,
and the boy that turned blue
is pointing to his finger"

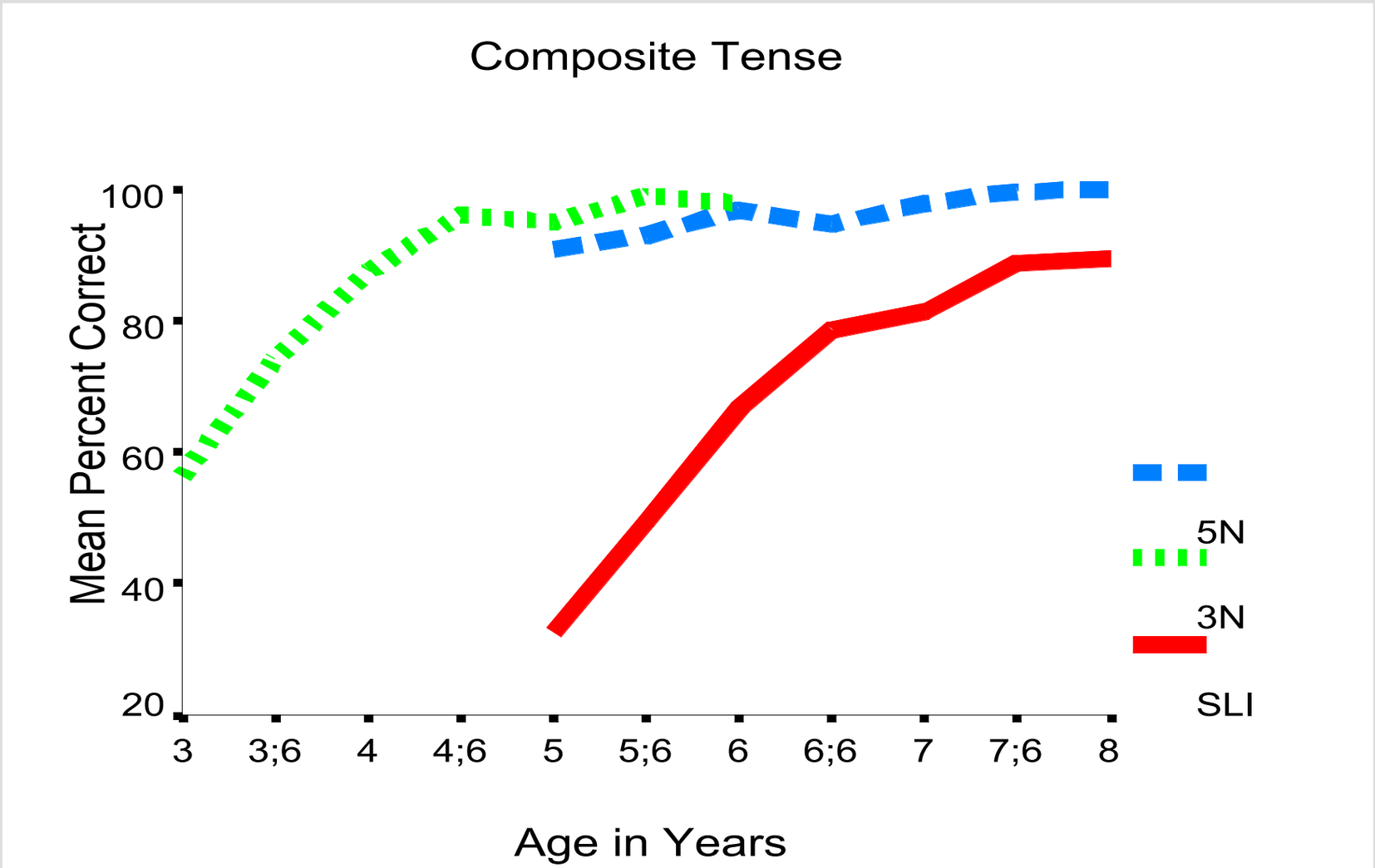
SLI

Specific Language Impairment

- Apparently affecting 8-9% of the population
  - some **genetic** influence:
    22% chance if **direct descendant**, but 7% otherwise
- Language emerges later
- E.g. use of tense
  - “He walked to the store”
  - “John drinks coffee”

SLI: Tense development

- typically developing children use tense consistently by age 4
- Children with SLI lag up to age 8



Linguistic Savants

- **Christopher**: A language savant studied by Neil Smith and Ianthi Tsimpli
- **Brain damaged** but with remarkable gift for language
- **Unable** to pass the false belief task (traditionally used for diagnosis of autistic children)
- **Unable** to learn **logically possible** artificial languages that violate principles of Universal Grammar

Christopher: Illustration

Summing up

- Evidence for **Language as an Instinct**:
  - **Develops** on its own schedule
    - Brain damage
    - Wolf children
- **Happens to Everybody**
    - No conscious decision
    - Emerges in spite of deficits
- **Next time:** No Prodding needed

  Reading:
  Chapter 8 on Language Acquisition

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