

When learners surpass their models



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Welcome to
Simon's world

Meet Simon

- 7 years old
- Profoundly deaf
- Limited ability in spoken English
- Attends local public school

Simon's environment: Meet the parents

- Both profoundly deaf
- Mother learned ASL at 15, father at 16.
- Both had nonsigning, hearing parents.
- Attended oral schools where sign language was prohibited.
- Neither has native fluency in English.
- ASL is now their primary language

Simon's environment:

The school

- In class for deaf and hard-of-hearing students.
- Mainstreamed for art and PE classes.
- Classmates and schoolmates do not appear to know ASL.
- Teacher uses “Total Communication”:
spoken English plus signed English plus signs for English morphology

Simon's environment: conclusion

- Parents are only source of input for ASL.

Why is this an interesting case?

- Parents are not native signers of ASL, yet they are the only source of input for Simon.
- We can expect a lot of “noise” in the input. How will Simon deal with this?

Some basic facts about ASL

- ASL ≠ English
- ASL closer to French Sign Language than to British Sign Language.
- Not all ASL signers are deaf, and not all deaf people know ASL (even in U.S.).
- Sign languages are “real languages”
 - Structure
 - Acquisition
 - Brain areas

This study focuses on verbs

- In many languages, verbs carry information about subject (and/or object)
 - John goes^s to the library.
 - Juan y María vanⁿ a la biblioteca.
- Each piece of the verb is a “morpheme”:
 - go + (e)s
 - va + n
- The verb’s structure is its “morphology”.

Verb morphology

- In some languages, verbs are morphologically very complex, containing much information about the subject or other elements.
- In others, verbs are morphologically very simple, sometimes having no morpheme other than the verb itself.

ASL verbs are morphologically complex

Seven Morpheme Categories of ASL Verbs of Motion

Root = Path along which object moves

Orientation = Orientation or direction in which the object moves

Manner = Manner in which the object moves

Location = Locative relationship of moving object to secondary object

Position = Position of the secondary object with respect to the central object path

Central Object Handshape = Class (category or size and shape) of the moving object

Secondary Object Handshape = Class (category or size and shape) of the secondary object



Two types of morpheme in ASL verbs of motion

- Motion/location:
 - Root (straight line, circle, etc.)
 - Orientation (backwards, uphill, etc.)
 - Manner (bouncing, rolling, etc.)
 - Location (spatial relation of central object relative to secondary object)
 - Position (spatial relation of secondary object relative to path)

Two types of morpheme in ASL verbs of motion

- Handshape
 - Central object (human, vehicle, cylindrical, etc.)
 - Secondary object (human, vehicle, cylindrical, etc.)

Examples

- To describe a car driving down the road:

root central object

CAR LINEAR+VEHICLE

- To describe a doll jumping into a hoop:

DOLL

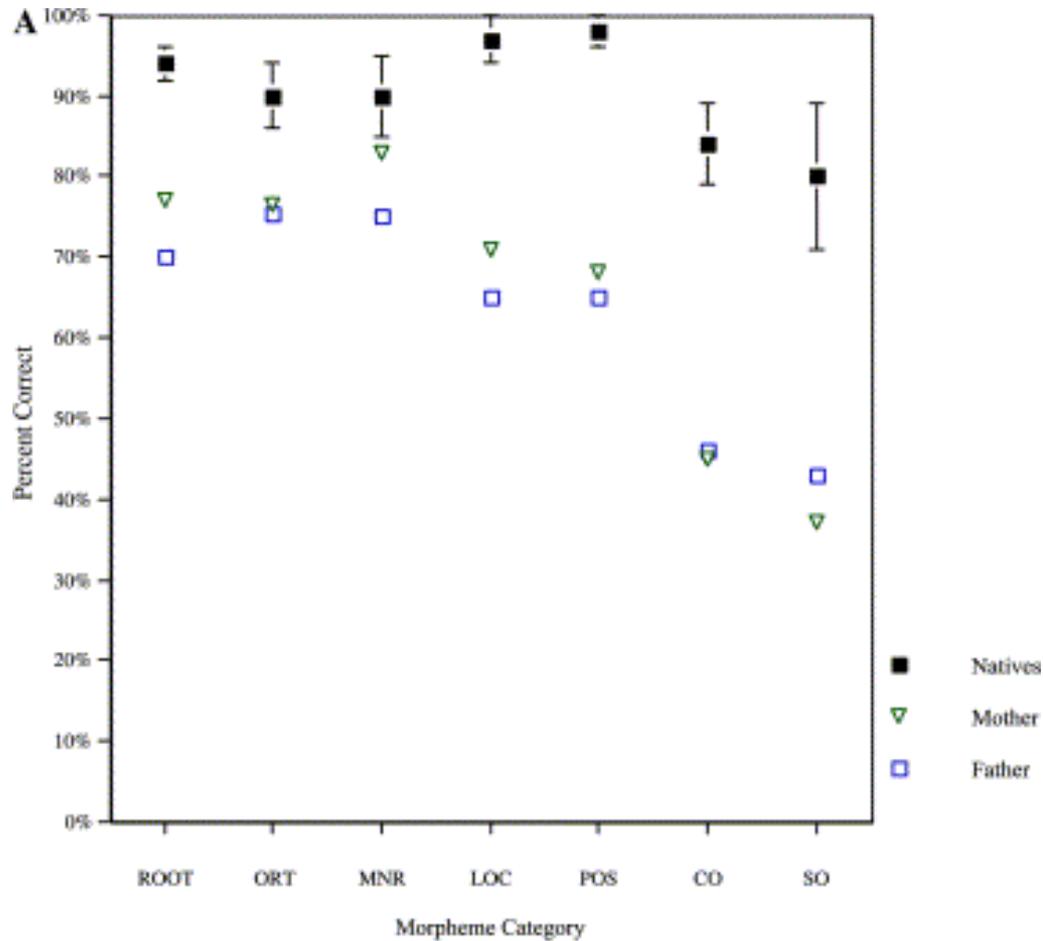
Root Central object Secondary object Location Position

JUMP+HUMAN + ROUND + INTO + END

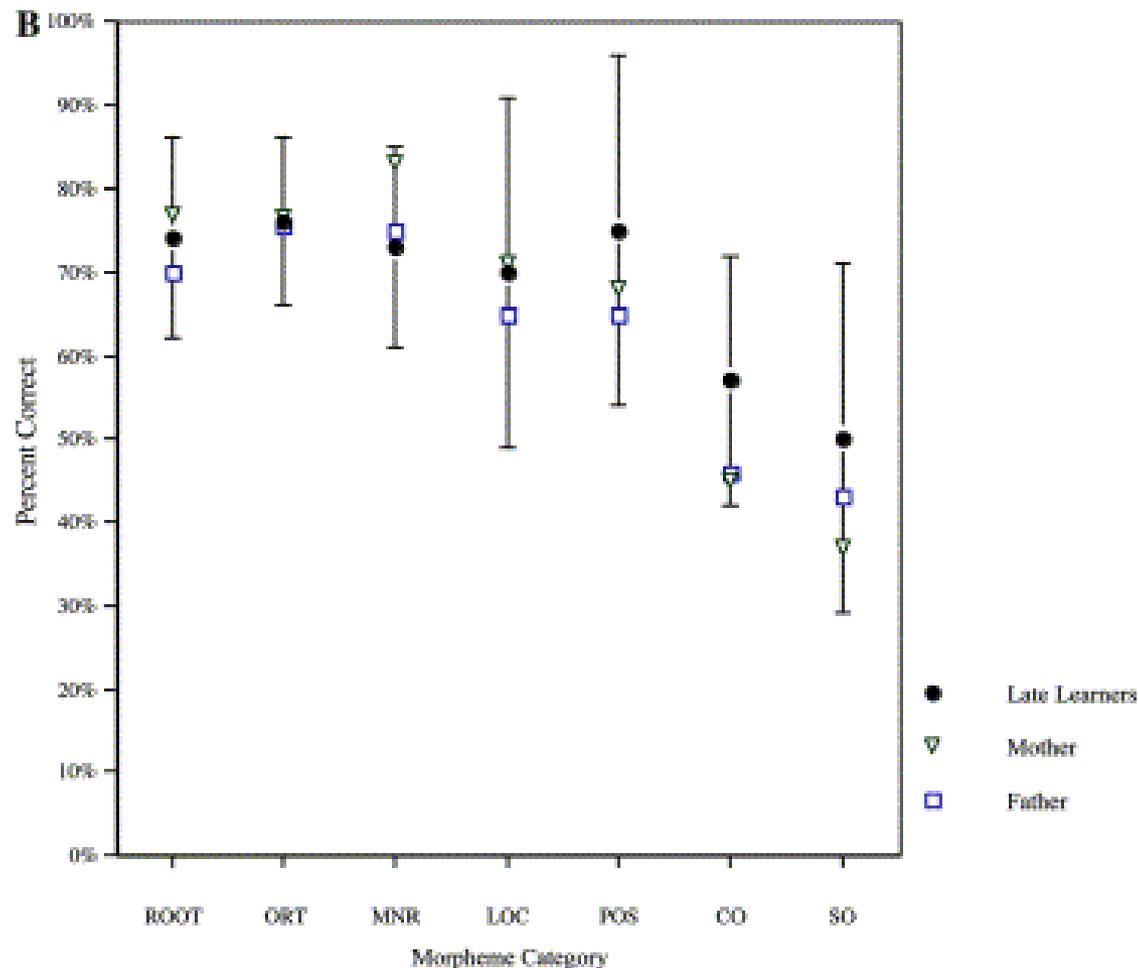
Simon's input (parents)

- Motion/location morphemes: 70% correct
- Handshape morphemes: 45% correct

Parents compared to native ASL signers



Parents compared to adult late learners of ASL



What are parents' errors like?

- Incorrect morpheme
 - Substitutes LINEAR root for TURN root
- Omitted morpheme
 - Required morpheme not present
- Split verb
 - Morphemes produced sequentially instead of simultaneously

Split verb errors especially confusing

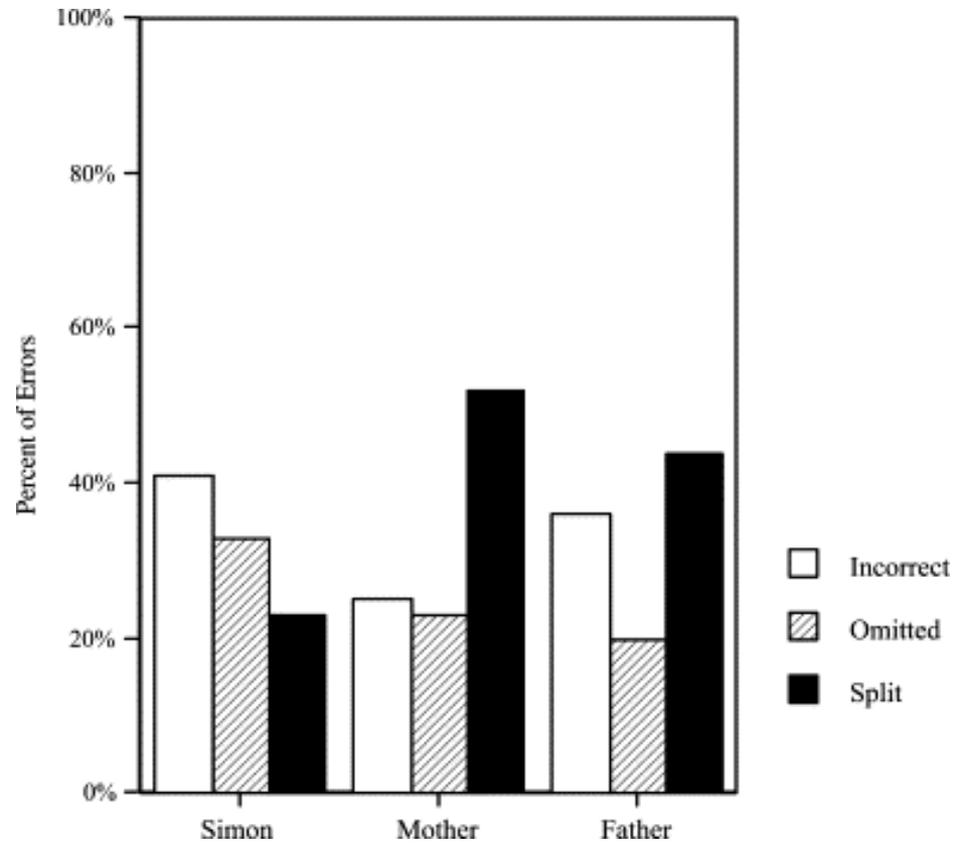
A car moving uphill should be:

CAR VEHICLE+LINEAR+UPHILL
(simultaneous)

Error:

CAR MOVE STRAIGHT UPHILL
(sequential)

Proportion of error types



Simon's input: summary

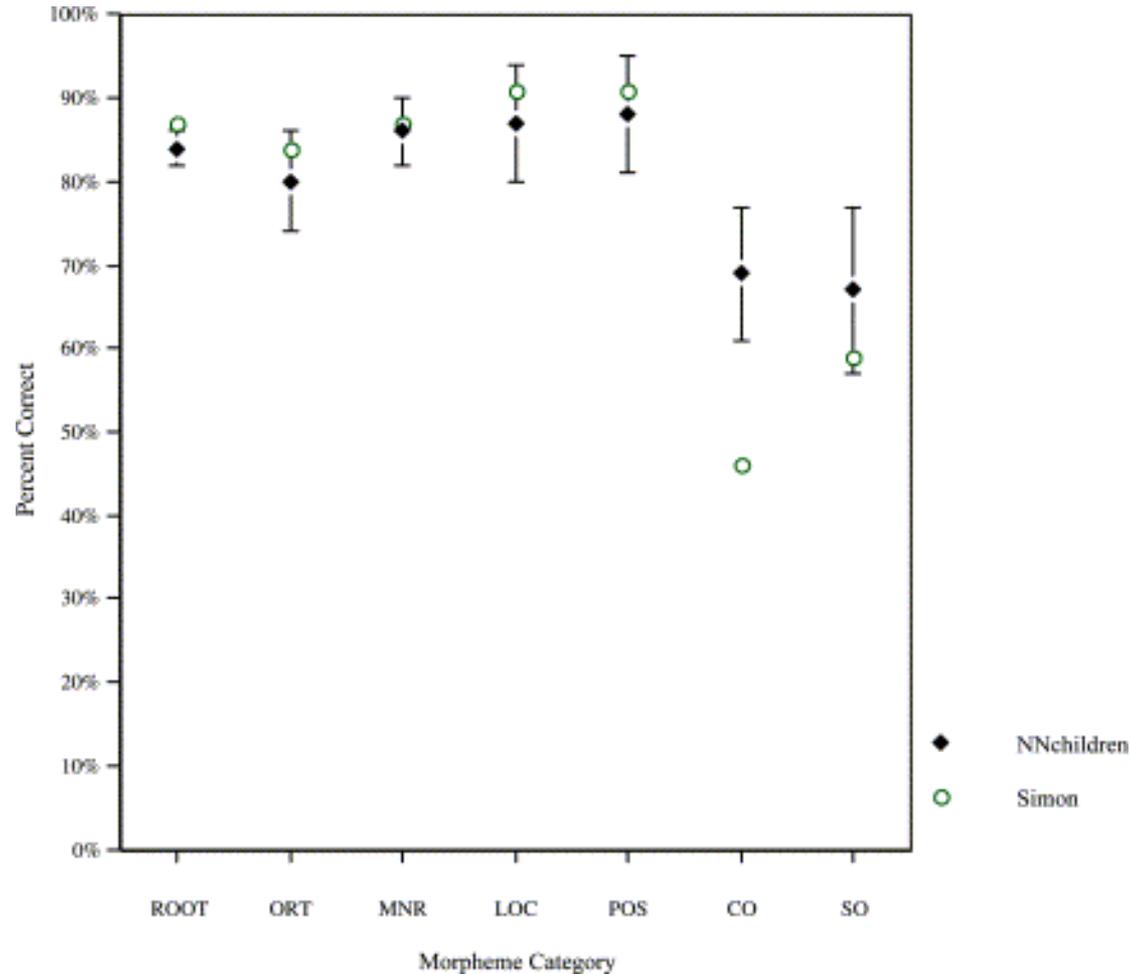
- Motion/location morphemes:
 - 65-83% correct
- Handshape morphemes:
 - 37-46% correct
- Input is thus inconsistent and “noisy”

.....so what will he do with this input?

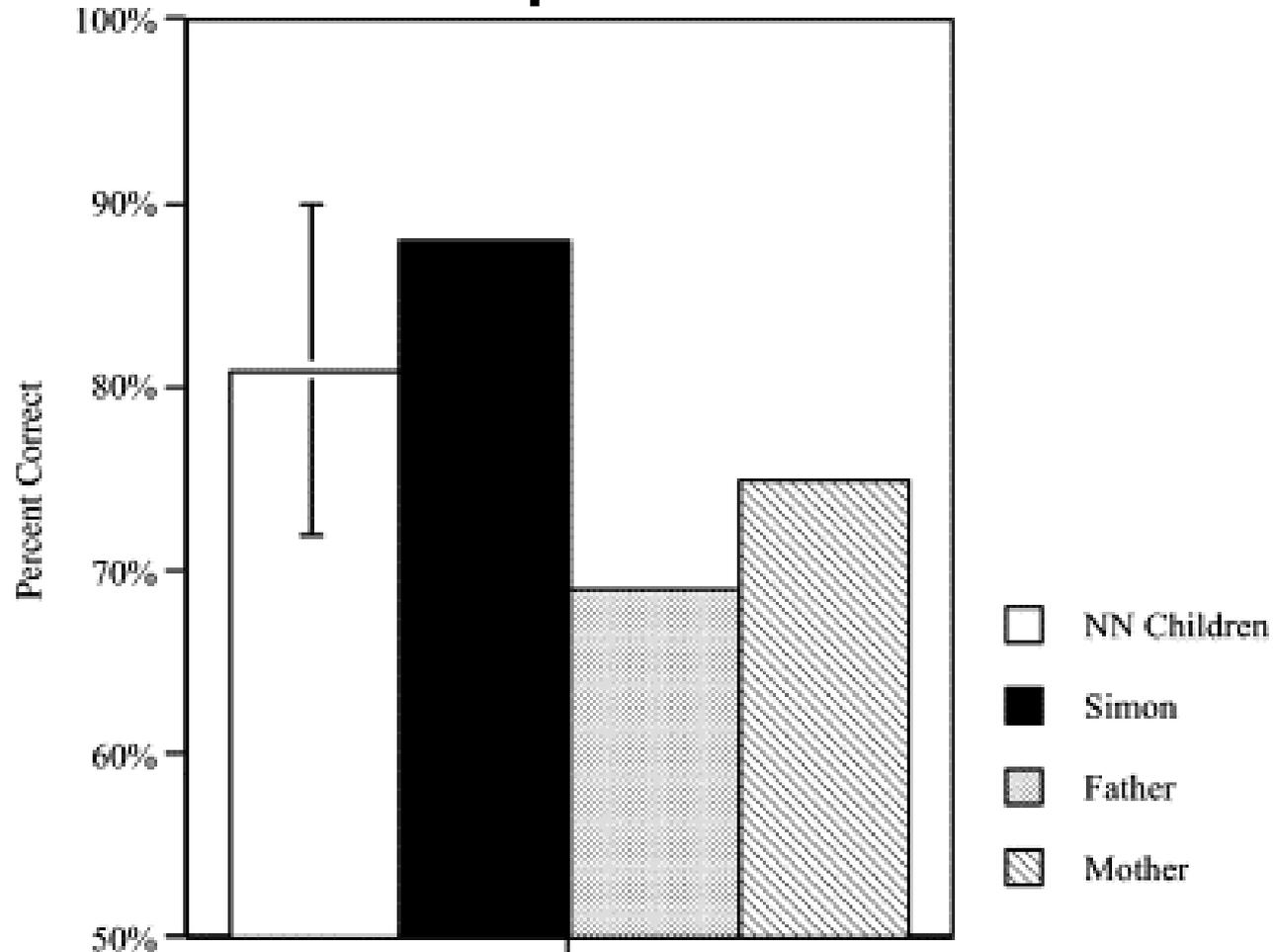
Simon's output: motion/location morphemes

- 84-91% correct
- Compare to parents:
65-83%

Simon compared to native children



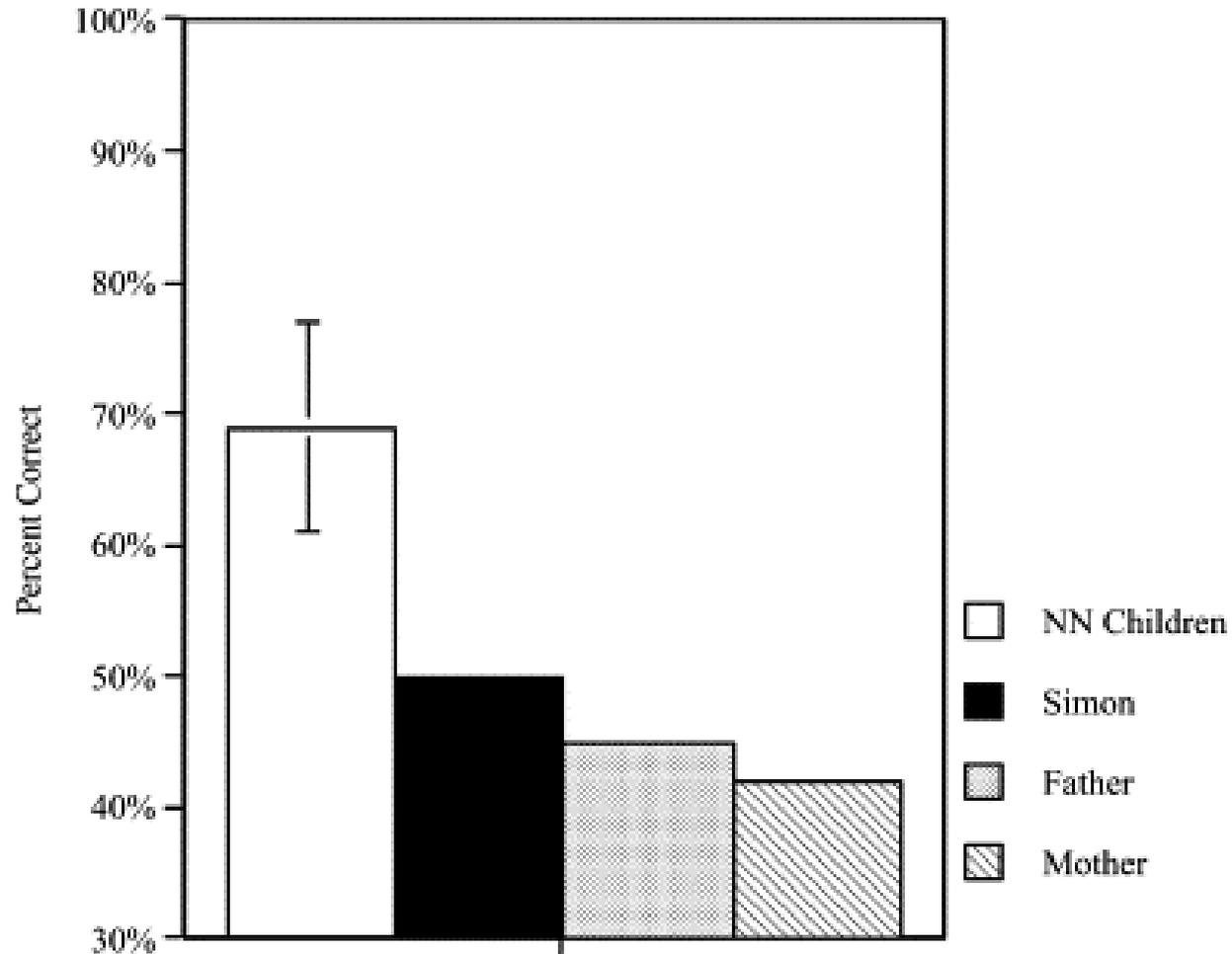
Simon compared to native children and parents: motion/location morphemes



Simon's output: handshape morphemes

- 46-59% correct
- Compare to parents:
37-46% correct

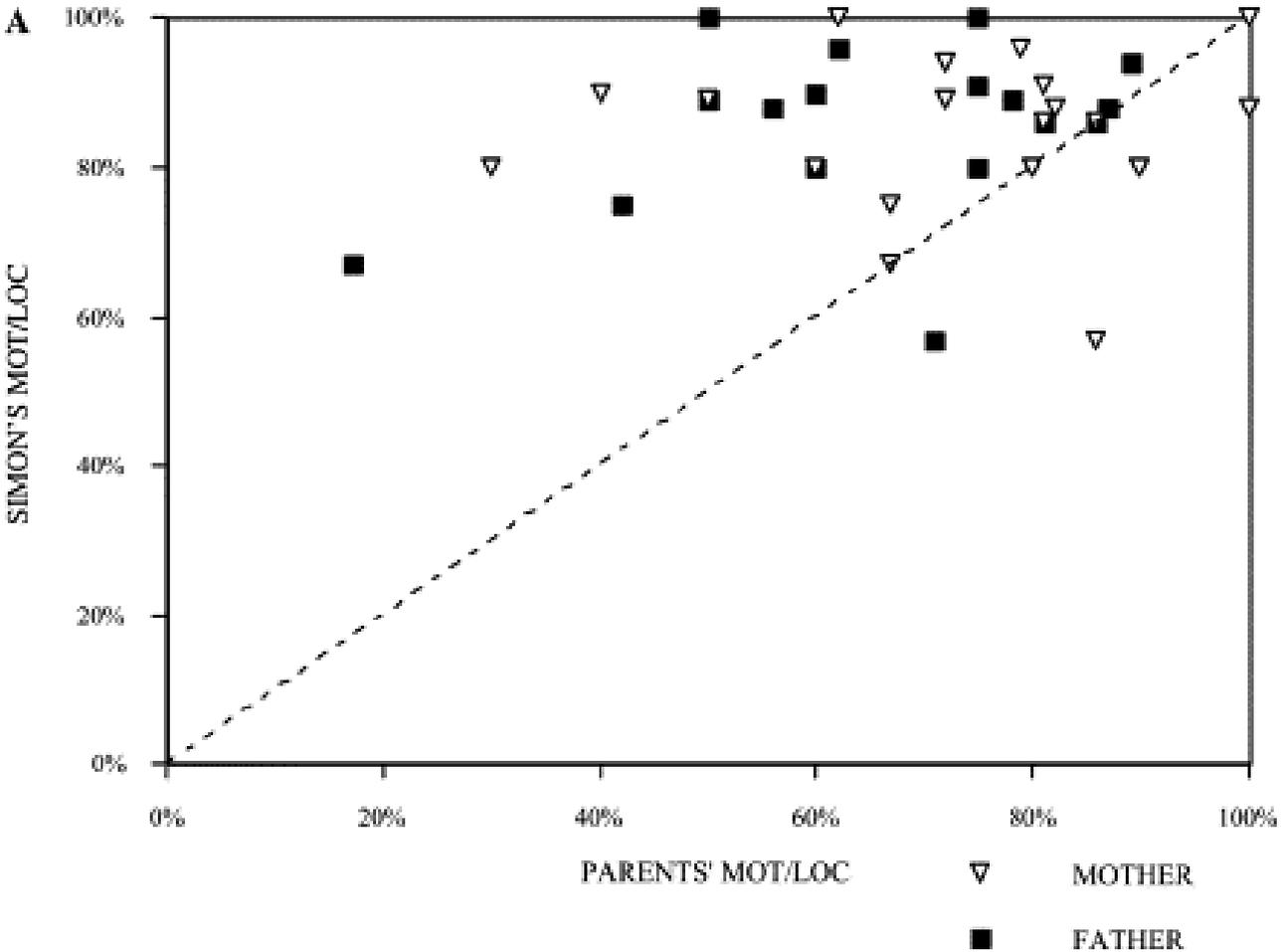
Simon compared to native children and parents: handshape morphemes



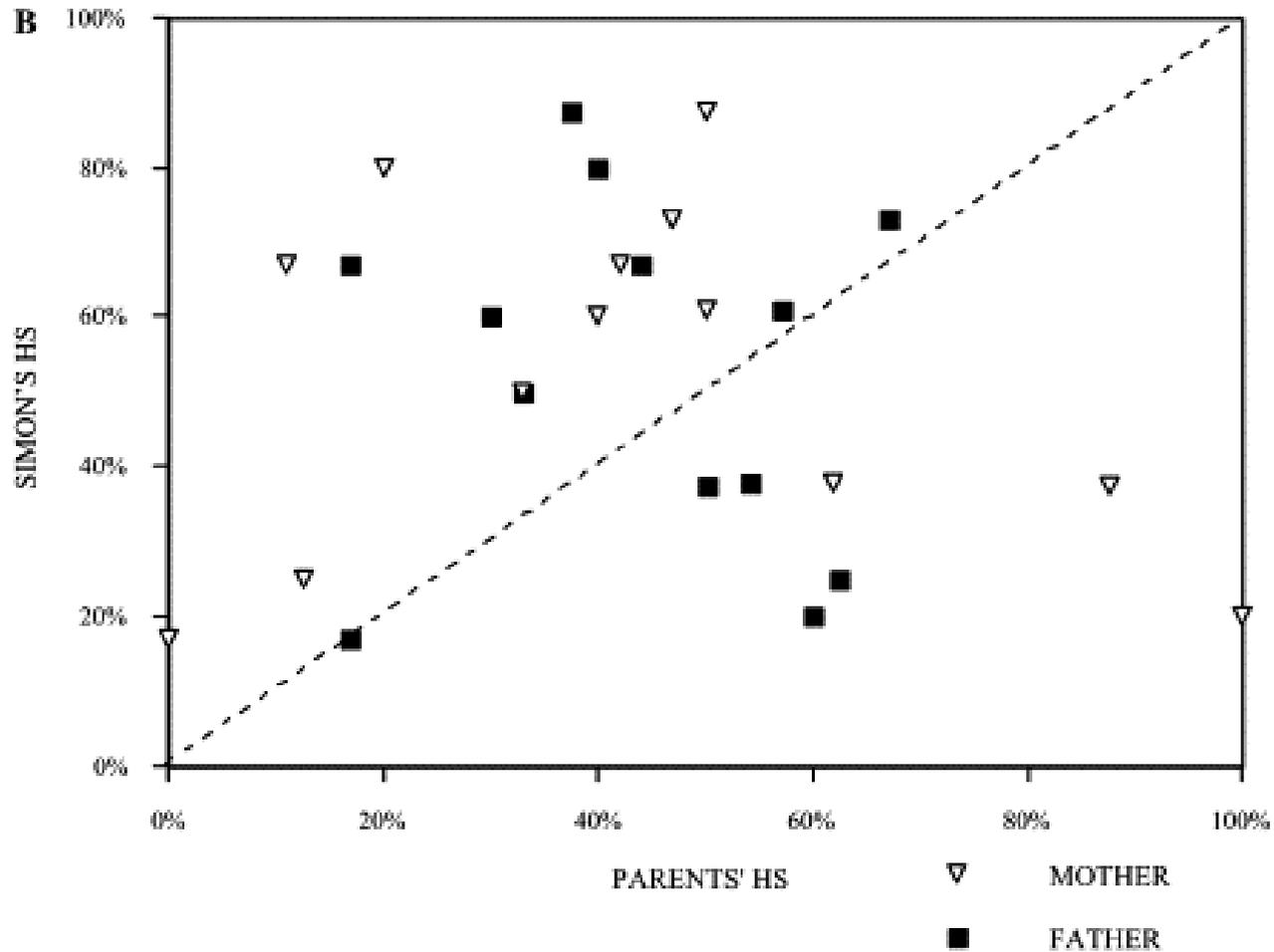
Motion/location morphemes vs. handshape morphemes

- Simon does lots of “frequency boosting” with motion/location morphemes.
- Not so much with handshape morphemes.

Motion/location morphemes



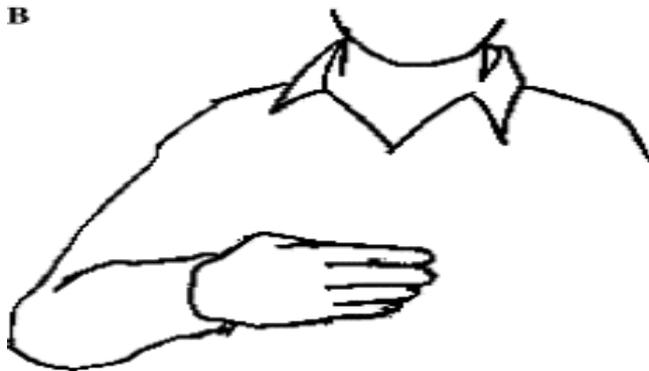
Handshape morphemes



Why this difference?

- Parents' overall accuracy with handshape morphemes is less. Perhaps this is too much inconsistency.
- Parents most frequent form for handshape morphemes is sometimes not ASL.

Example of parents' non-ASL handshapes



- Standard ASL form for VEHICLE
- Parents' most frequent form for VEHICLE

More reasons for Simon's poor performance with handshape morphemes

- Parents had some highly frequent forms without clear meaning



Some other possible reasons

- Motion/location morphemes often iconic, handshape morphemes often not.
 - But iconicity doesn't seem to play a big role.
- Handshape morphemes take longer to acquire: Simon could be delayed.

So....

- Simon's worse performance on handshape morphemes seems understandable, given:
 - Nature of his input
 - Nature of these morphemes

Summary

- Simon receives inconsistent, “noisy” input.
- But Simon regularizes this input (as evidenced by “frequency boosting”).
- And creates a qualitatively different system than what his parents have.

This is powerful evidence against:

- The idea that children learn language through imitation.
- The idea that children match the probabilities in the input