The Edmonton Narrative Norms Instrument (ENNI) -- Update

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The ENNI is available on-line at:
http://www.rehabmed.ualberta.ca/spa/enni

Overview of the ENNI

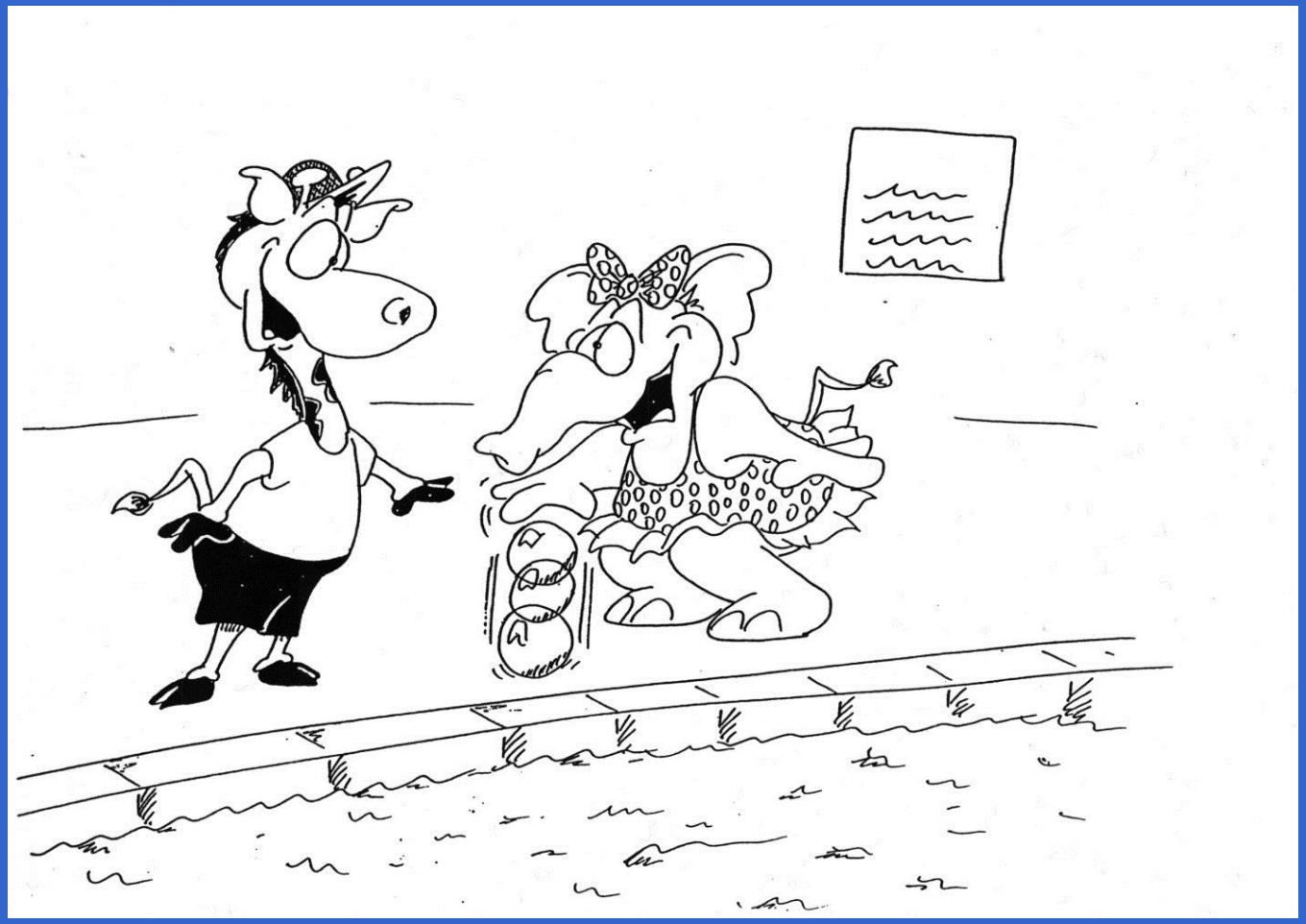
- The ENNI was designed as a measure of storytelling abilities with ‘local’ norms
- Story stimuli: pictures drawn to story scripts by a professional cartoonist
- Normative sample: 377 children aged 4-9
  - 50 children with typical development per age group
  - 10-17 children with specific language impairments per age group

Choice of task

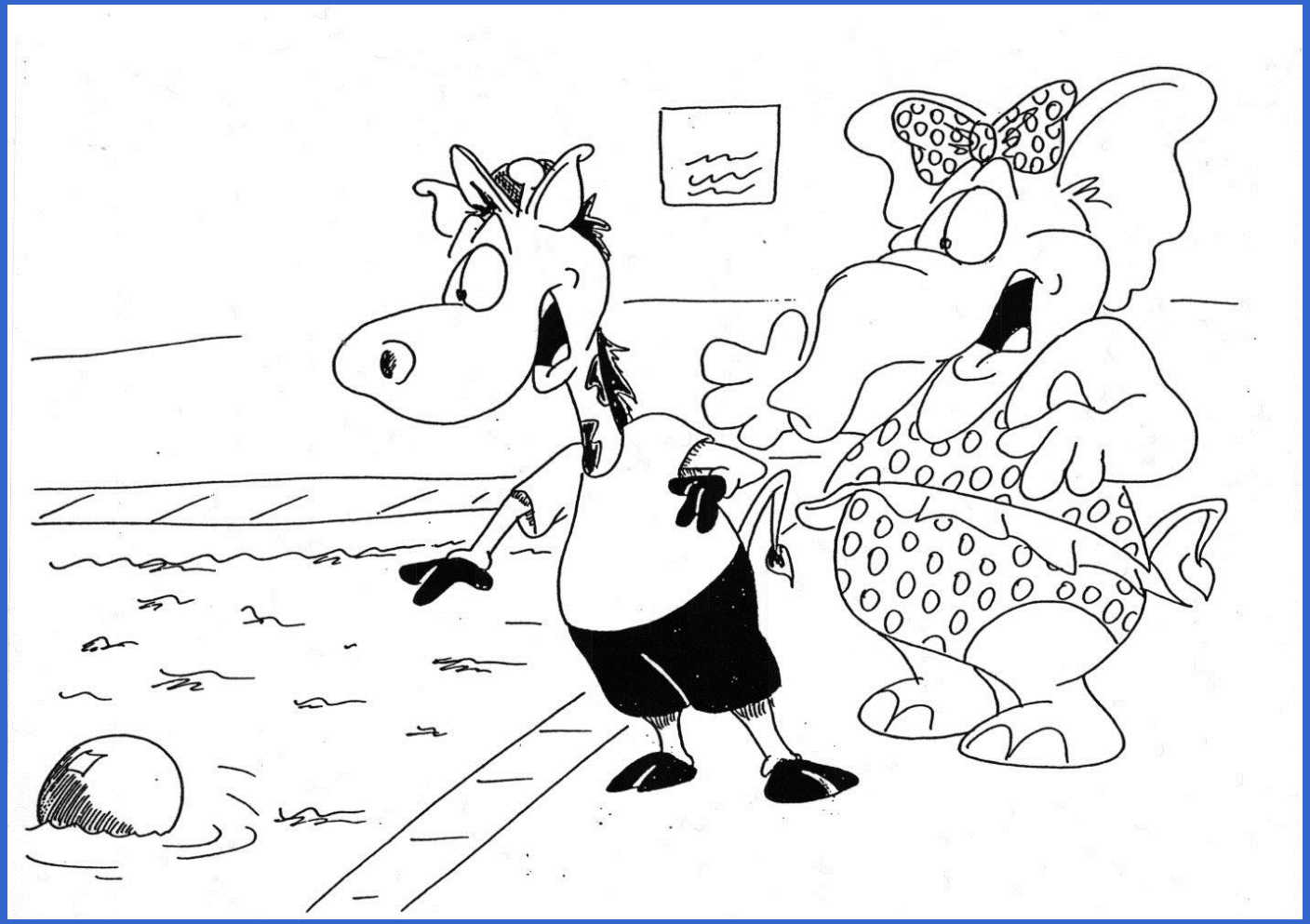
- In previous research, we found that children have more difficulty telling a good story from pictures when they did not hear the story first
- Telling stories from pictures seems to tap the child's storytelling abilities
- Retelling stories seems to tap auditory memory more than storytelling ability

Example: Simple story

SETTING



INITIATING EVENT



ATTEMPT

OUTCOME

REACTIONS

The ENNI can be used to assess…

- Edmonton children suspected of having language impairments without cognitive delay between the ages of 4-9
  - They are represented in the normative sample
- Other children suspected of having language impairment
  - But with caution; they are not represented in the norms

The ENNI website

http://www.rehabmed.ualberta.ca/spa/enni

The Edmonton Narrative Norms Instrument

The Pictures

The pictures for each story should be put into a book format. For the normative study, each picture was placed in a plastic page protector and then put into a binder.Comb binding of the pages is also acceptable. Each story must be in its own book or binder.

Training story

Giraffe/Elephant stories

- Story A1 - Ball
- Story A2 - Diving board

Psychometric update

Interscorer Reliability

- Naomi Beswick: study of interscorer reliability for the story grammar measure
- Asked 4 community SLPs to score SG
- Calculated intraclass correlations
- Results:
  - A1: 92% (range: 83%-97%)
  - A3: 96% (92%-98%)
- Thus: reliability is excellent

Discrimination between groups

- Tests should discriminate between children with and without language impairment
- Discriminant analysis can reveal whether a measure discriminates between groups
  - i.e., whether the groups are identified correctly
- Individual ENNI scores: moderate discrimination
  - SG: 70-84% accuracy
  - First Mention: 73-82% accuracy

Discrimination with all variables

- We calculated a discriminant analysis with all variables
  - SG simple and complex
  - FM
  - MLCU
  - Complexity Index
  - TNW and NDW
  - Word and Utterance errors

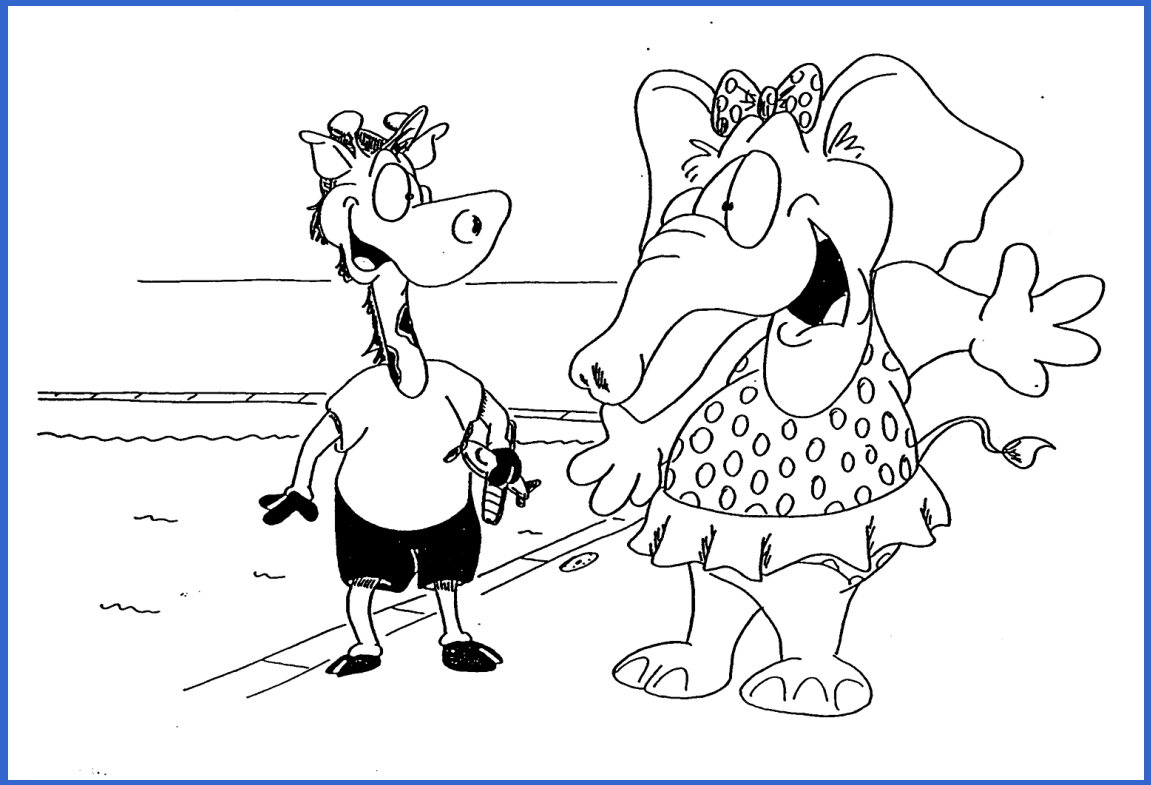
Results using all variables

Age Group	Specificity (TD as TD)	Sensitivity (SLI as SLI)	Overall classification
4	96.0%	83.3%	93.5%
5	94.0%	92.9%	93.8%
6	98.0%	81.8%	95.1%
7	94.0%	84.6%	92.1%
8	100%	94.1%	98.5%
9	98.0%	80.0%	95.0%

Results continued

- Two variables contributed less than the others: Word and Utterance errors
- Without these variables, discrimination was slightly lower, but still good
- Recommendation: Use several ENNI measures rather than just one or two

ENNI questions



Questions

Graesser (1985), Goldman (1985), Trabasso et al. (1988)

- Production and questioning tasks place different demands on child
- Questioning tasks
  - reduce processing demands
  - child doesn’t have to generate own strategy
  - reduces information needed to be held in working memory
- Questions are especially likely to help when child has not made inferences spontaneously

Theoretical models

- We used the Story Grammar model to create a set of questions
- The questions focused on SG units
- We also used Causal Network model
  - Focus on causal relations that link SG categories to produce a causal network representation

previous research on SG questions with children

Goldman (1985,1986) - Children 5 & 10

- Children understood more (i.e., answered more questions correctly) than indicated in recall task

- 10 year olds included more ‘understood’ information in retell than 5 yr olds

Types of questions used in previous studies

- **Factual/literal questions**
  (Merritt & Liles, 1987)

- **Inferential Questions**
  (Harris Wright & Newhoff, 2001; Merritt & Liles, 1987)

- **Integrative inferences**
  (Ellis Weismer, 1985; Crais & Chapman, 1987)

Another type of question: Importance Judgements

Stein & Glenn (1979) - children aged 6 & 10

- Correlation between information considered important and information included in recall task

van den Broek (1989) - adults; Bourg et al. (1997) - adults

- Causal Network model predicts that outcomes or resolutions will be considered most important

van den Broek (1989) children aged 5 & 10

- “importance” judgments reveal ability to distinguish central ideas in story

ENNI Questioning Task

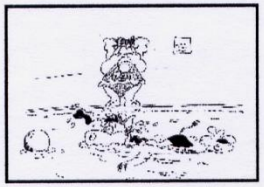
- Children in the ENNI sample also participated in the questioning task
- Children seen 1-2 weeks after completion of the retell part of the ENNI
- Order of stories – randomized (chosen by the child)
- Child previewed all the story pictures
- Returned to beginning of story and asked questions related to each story picture

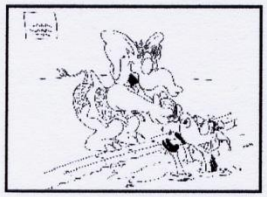
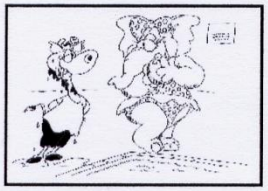
ENNI A1 Question Set

Hayward, D.V.

A1 Questions

General Instructions:
"I'm going to ask you some questions about this story that you just told me. Remember you don't have to tell me the story, just answer my questions."

Picture	Question	Story Grammar Categories	Question Type Designation
 1.	Q1. *Who is in this story?* Q2. *Where are the animals?*	Setting–Characters 1 & 2 Setting–Location	Literal Literal
 2.	Q3. *What happens first in the story?* Q4. *What was the giraffe thinking?*	Initiating Event Internal Response	Literal Inferential
 3.	Q5. *What did the giraffe do?*	Attempt	Literal

 4.	Q6. *What happened when he did that?*	Consequence	Literal
 5.	Q7. *How did the elephant feel?* (Q8 not asked if child does not respond or answers 'don't know.')	Reaction Character 2	Literal
	Q8. *Why did she feel that way?* (Not asked if child provides explanation in Q7.)	Explanation for Reaction	Inferential
	Q9. *How did the giraffe feel?* (Q10 not asked if child does not respond or answers 'don't know.')	Reaction Character 1	Literal
	Q10. *Why did he feel that way?* (Not asked if child provides explanation in Q9.)	Explanation for Reaction	Inferential
Close Storybook	Q11. *What was the problem in this story?*	Problem	Integrative Inference
	Q12. *How did that problem get fixed in the story?* (Not asked if child does not respond or answered don't know in Q11).	Resolution	Integrative Inference

Allow child to look at pictures if s/he would like OR if you can't figure out which part of the story s/he is referring - ask child to show you the picture.	Q13. *I'm interested in what you thought about the story.* *What do you think was the most important thing that happened in this story?* **Allowable Prompts** **[Moral]** If child gives moral of story. (e.g. you should never take a friend's toy) Say: "*Yes, that's what you learned from the story; can you also tell me something you think was important that happened in the story?*" **[Repeat Answer or Don't Know]** If child still gives moral or says I don't know. Say: *"Think about all the pictures that helped tell the story; what was the most important thing that happened?"* (you can let child look at the pictures if needed). **[Clarify]** If you are not sure which part of the story the child means.	Importance Judgement	Integrative Inference

Results
Simple and Complex Story

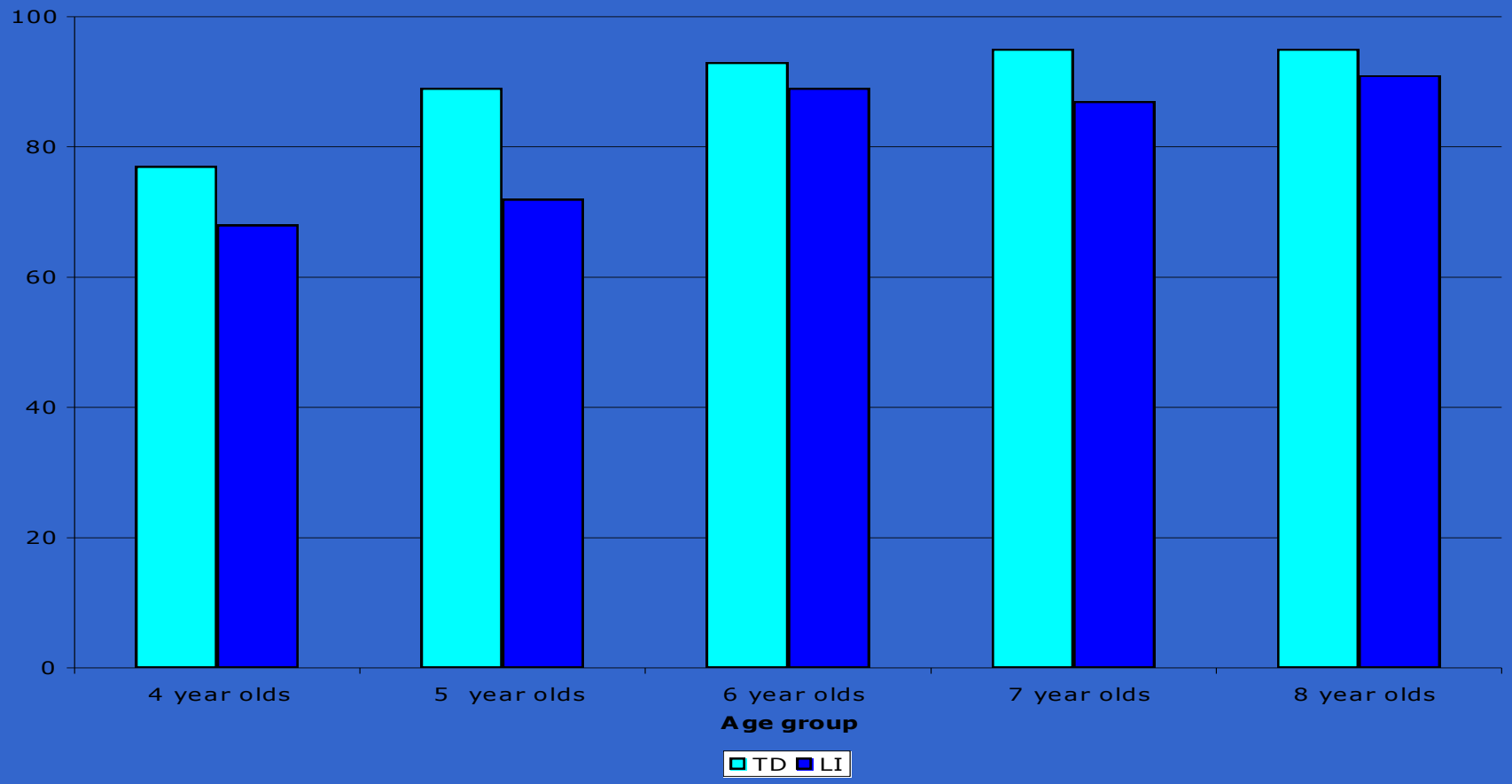
- **Literal / Inferential Questions**
- **Importance Questions**
- **Story Questions / Story Production**

- Data are presented for 4-8 year olds

Simple Story (ENNI A1)
Literal Questions

Age Effects: [4 < **5 - 8**]; [5 < **6 - 8**]; [6=7=8]

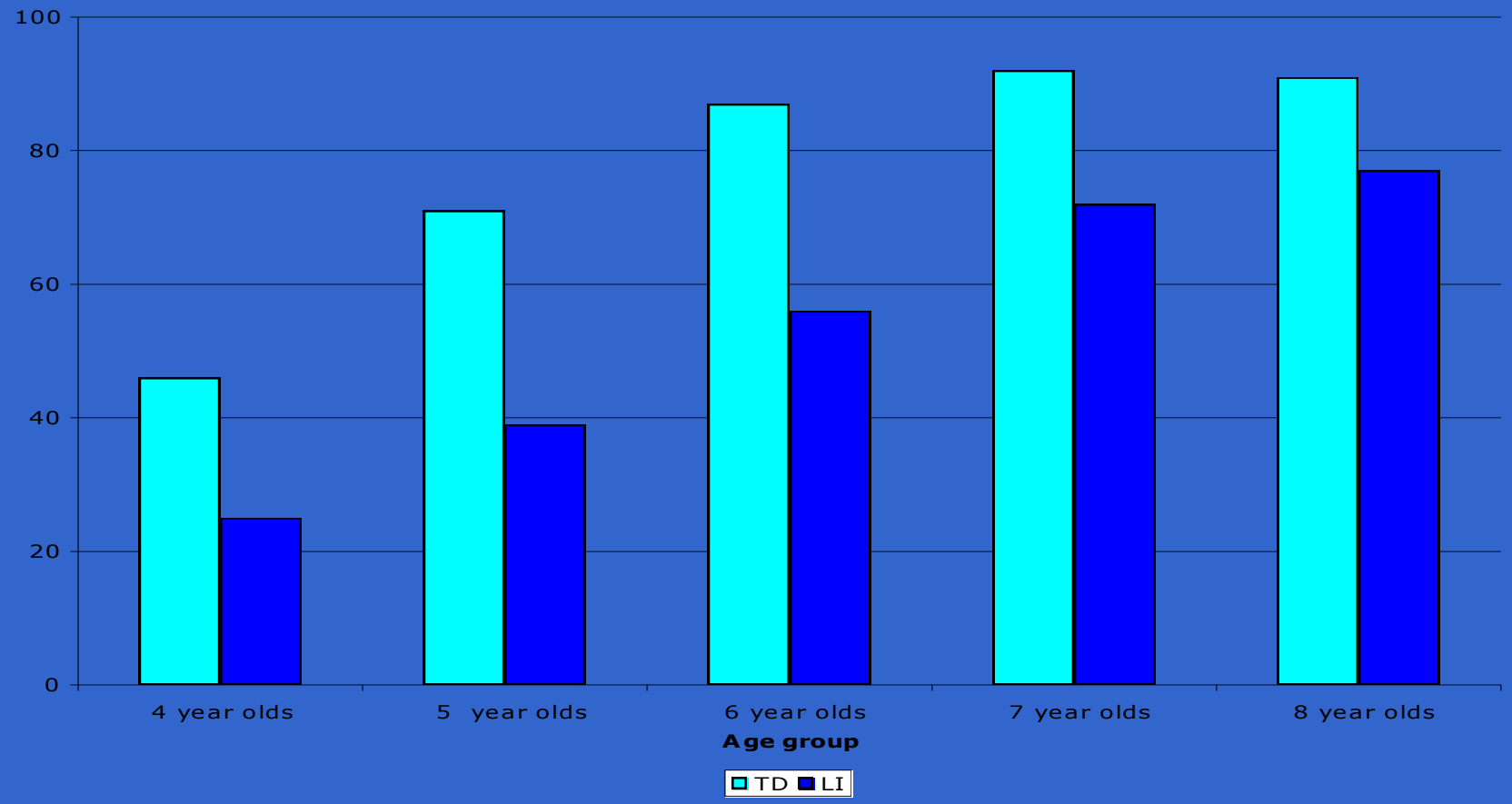
Language Status Effects: TD > LI



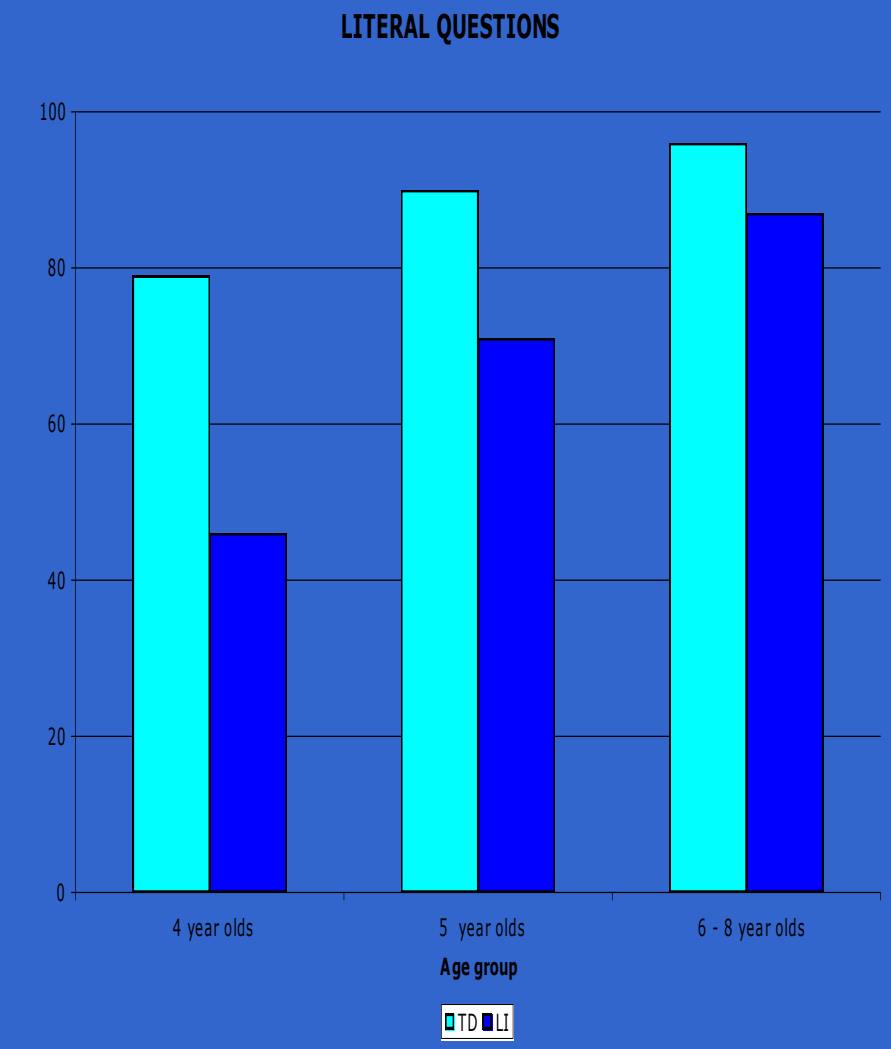
Simple Story (ENNI 1A)
Inferential Questions

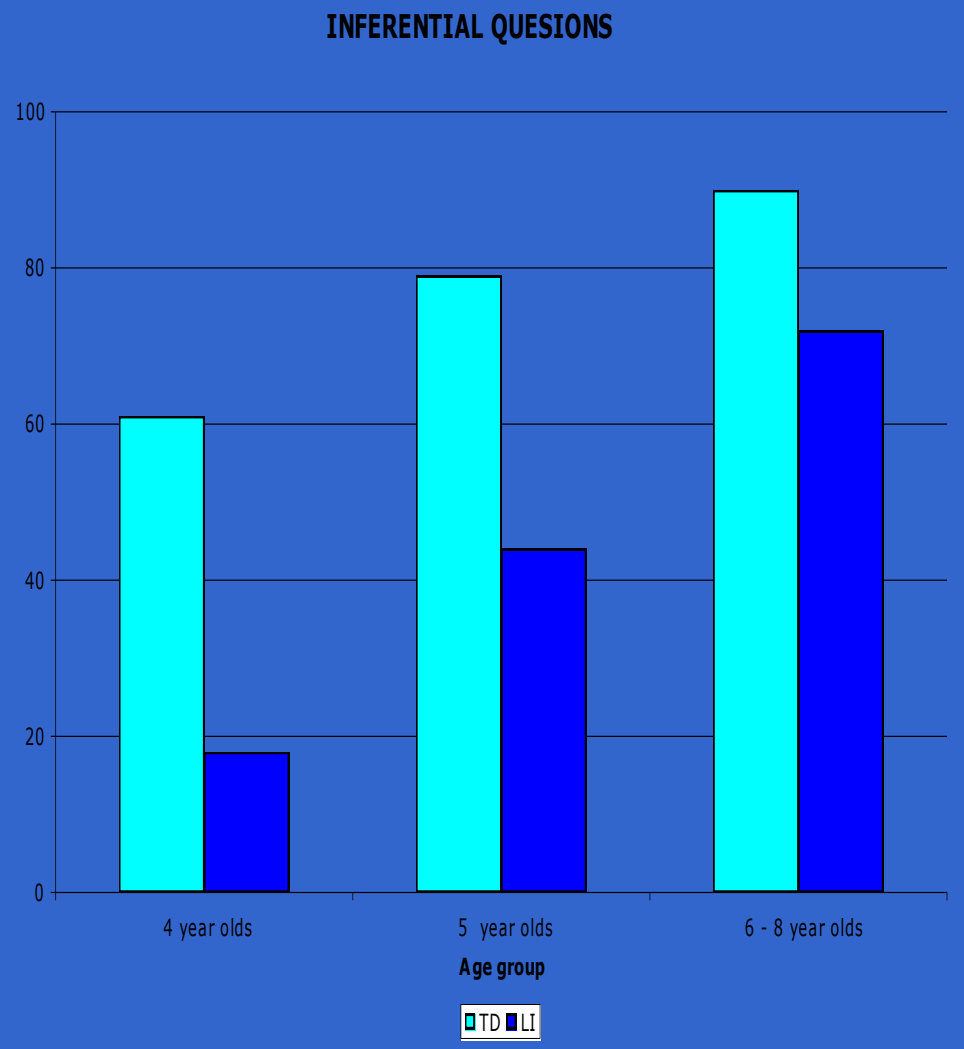
Age Effects: [4 < **5 - 8**]; [5 < **6 - 8**]; [6=7=8]

Language Status Effects: TD > LI

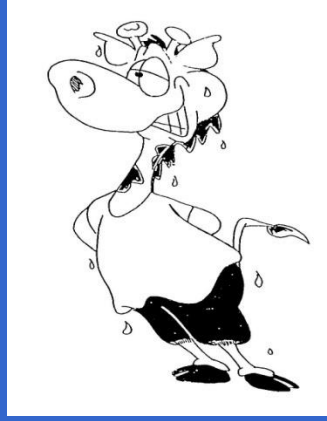


Complex Story (ENNI 3A)
Literal & Inferential Questions





Importance Questions



- Responses assigned a Story Grammar category

Examples from complex story (ENNI 3A)

✓When she threw it in there because if she didn't there wouldn't be no story [Consequence - Episode 1]

✓When the very ending came when all of the people were happy [Reaction Episode 3]

✓That the Dad tried to reach it [Attempt Episode 2]

✓That super girl came [Initiating Event – Episode 3]

Importance Questions

Additional codes

- Moral

  Never to run at the pool or never to play with toys at the pool

- No Story Grammar (NSG)
- Just nice story

  They can't colour on the deck

- Don’t Know (D/K)

  It's a hard part {child prompted to look at pictures} I think my head got lost in thought.

Importance questions: best answer?

What would be considered a good answer according to the Story Grammar Model?

A response that corresponds to one of the core SG units

- Initiating Event
- Attempt
- Consequence
- Causal Network: Consequence -- has most causal connections to rest of story

We didn’t score as right or wrong – looked for predominant responses at different ages

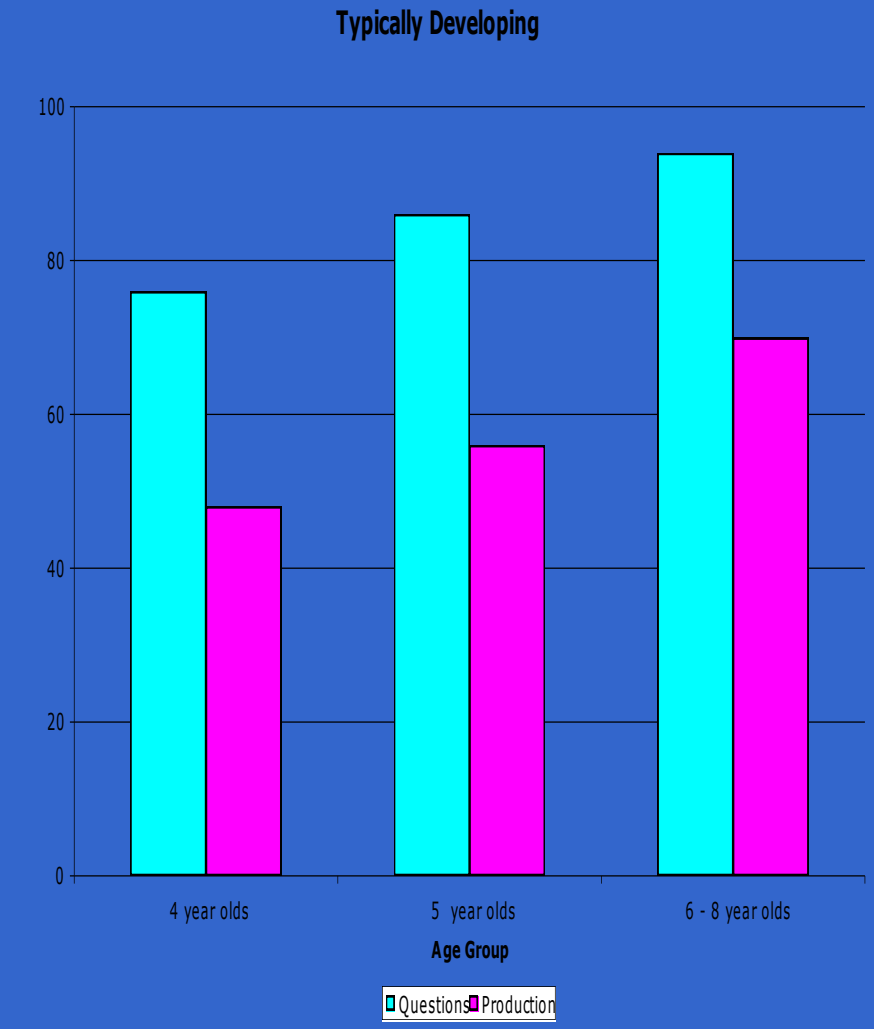
Simple Story—Most common responses to Importance question

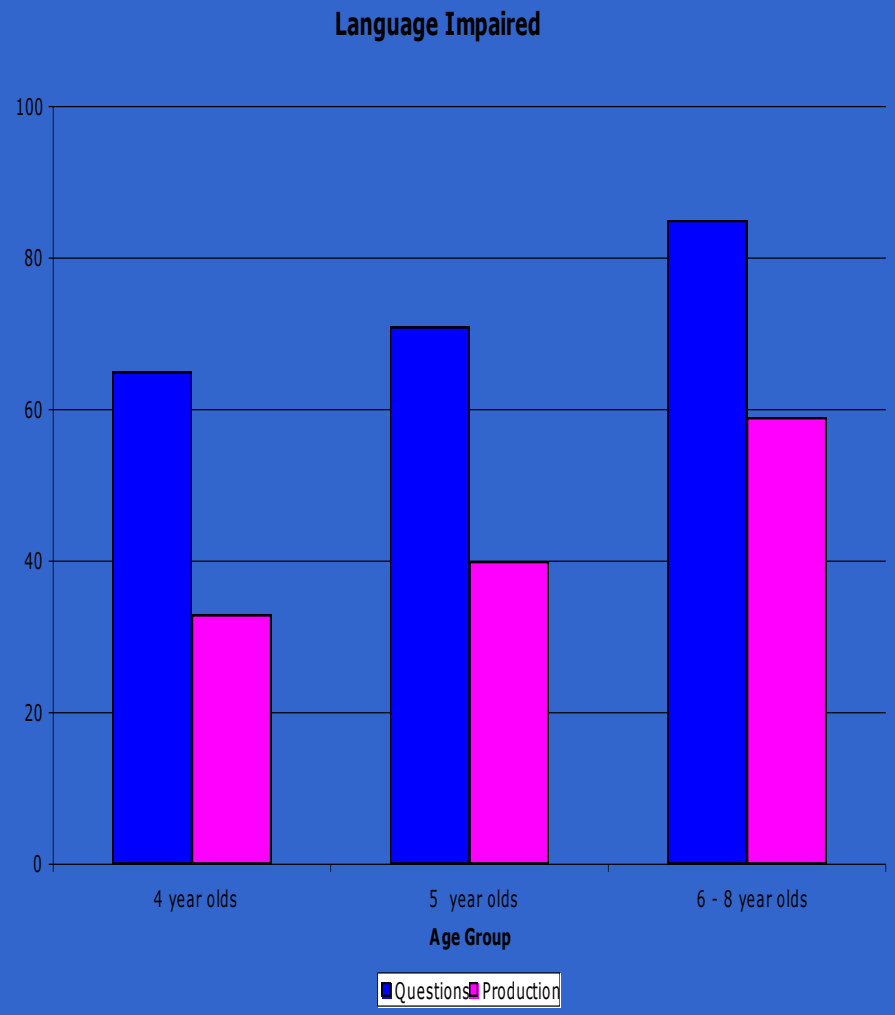
Age Group	Typical Development	Language Impairment
4 year olds	IE (24%)	Don't Know (40%)
5 year olds	CON (50%)	Don't Know (28%)
6 year olds	CON (49%)	IE/Att/Con/NSG (18%)
7 year olds	CON (39%)	Att/Con/React (23%)
8 year olds	CON (51%)	Don't Know (26%)

Complex Story Story—Most common responses to Importance question

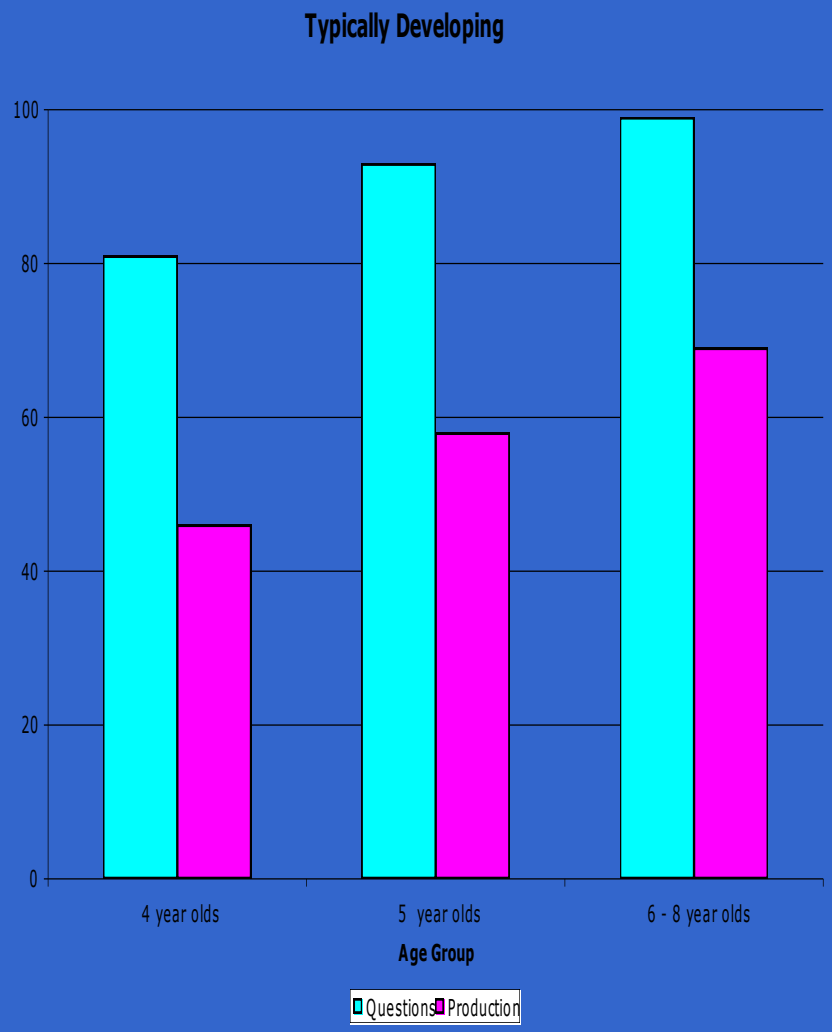
	TD	LI
4 year olds	CON 1 (30%)	Giraffe/NSG/DK (20%)
5 year olds	ATT 3 (28%)	CON 1 (21%)
6 year olds	ATT 3 (42%)	NSG (18%)
7 year olds	CON 3 (28%)	ATT 3 (23%)
8 year olds	CON 3 (36%)	Moral (29%)

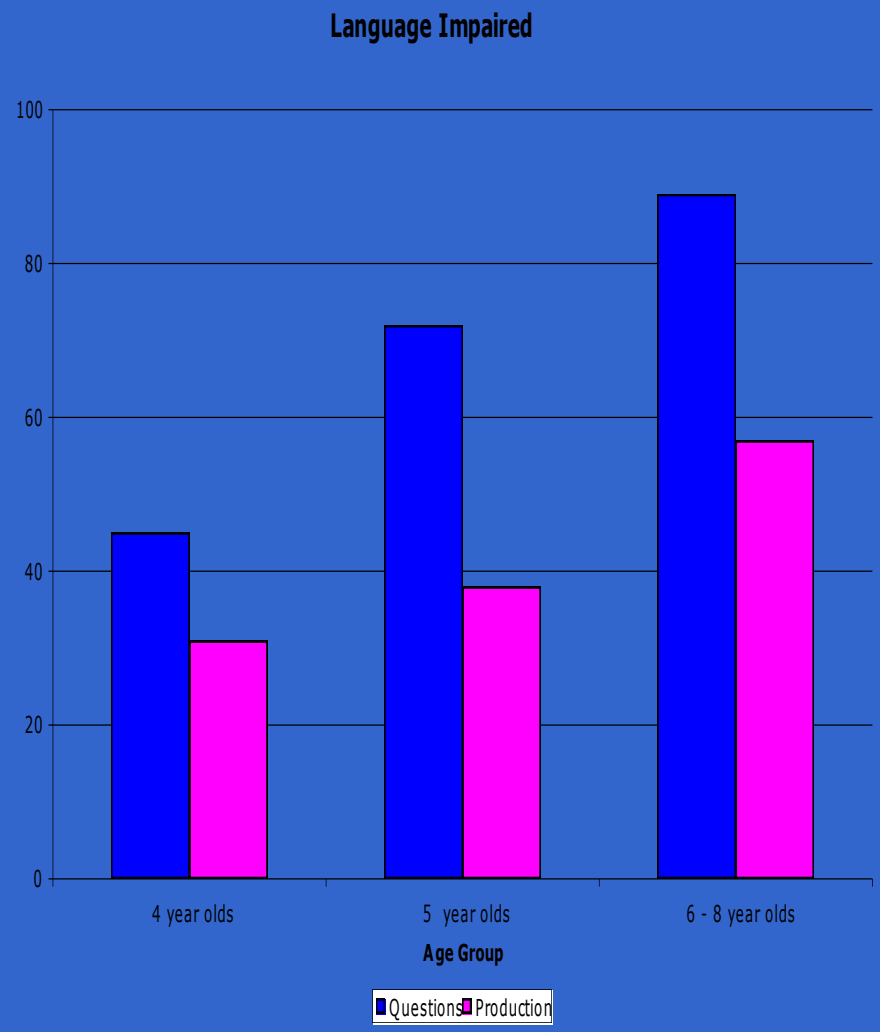
Simple Story (ENNI 1A) Questions and Production





Complex Story (ENNI 3A) Questions and Production





What is being assessed with the questions?

- Story comprehension?
- Basic questions not a pure measure of comprehension
- Scaffolding is a factor
- Children may not have provided information in production because:
  - They understood it but didn’t include it
  - It never occurred to them until they were asked
- What is really assessed: children’s ability to provide information with support

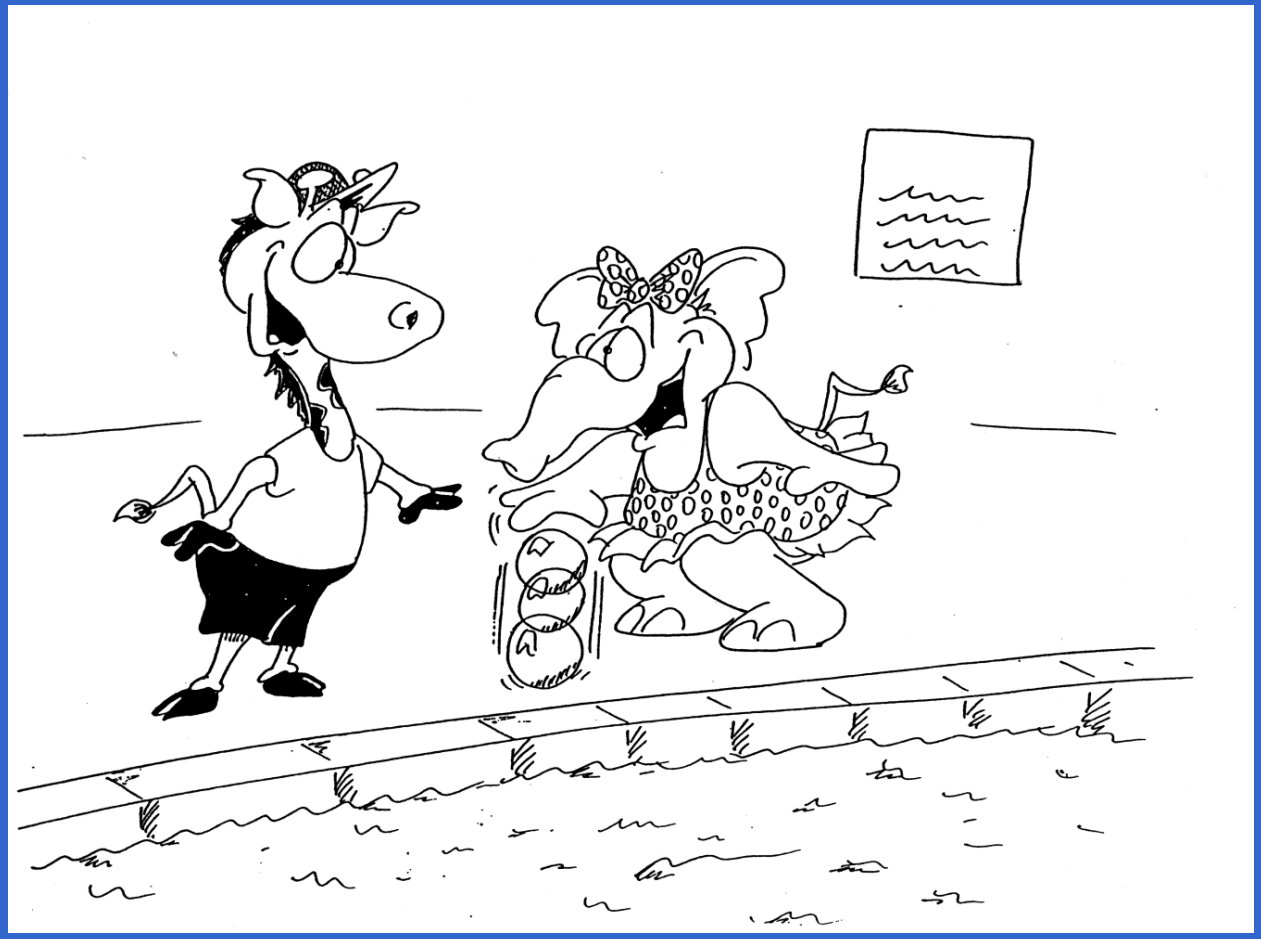
What is assessed with questions?

- The problem, solution, and importance questions may be better estimates of overall story knowledge
- They require children to reflect on the story and evaluate it
- Importance questions appear to differentiate children with and without language impairments

What do you gain from using the questions?

- Allows another perspective for assessing narrative abilities
- Questions can be applied to other stories
- Allow comparison of supported versus spontaneous narrative abilities
- Appropriate for use in dynamic assessment
- Appropriate for use in intervention

Animated version of A1



Effects of story stimuli

- Previous work: the way stories are presented to children affects the way they (re)tell the story
- E.g.: Telling the story for retell versus asking child to tell the story from pictures
- We wondered: does the static nature of pictures affect younger children's storytelling in the ENNI?

Possible effects

- Typically developing 4-year-old children's stories were sometimes very different from older children's
- They do not always seem to 'get' some aspects of the story
- For example, in the simple story:
  - Ball going in the water
  - Goal-related reason for Giraffe swimming
  - Who gave ball to whom

Example 1: ENNI A1

a elephant and a cow.

(that) that guy fell in the mud.

and this girl picked him up # elephant.

and he was very mad at her.

- C did not mention the ball at all
- Did not understand emotions
- Got points only for characters

Example 2: ENNI A1

the elephant and the giraffe looked at a sssstone.

but (they) they thought it was a balloon.

(Then they were) (and) (and) and they were swimming for it.

(And) (and then he got) and then the elephant got it.

and they're playing soccer with it.

The end.

- Ball (stone) is in the water – does not go in during the story

Example 3: ENNI A1

one's doing a ball bounce.
one threw the ball in the sand.
it got stuck.
one's digging in # to get the ball.
(one) the elephant's going to help the giraffe.
whee one's crying.

- This child gets the story but changes pool to sand (still got the points)

Example 4: ENNI A1

once upon a time a giraffe and a elephant met.
they saw # a balloon stuck (in) in their water (p) pool.
(they the the) the zebra tried to get it.
but he (cou) just couldn't get it.
then # <the> [/] the elephant got it.

- C thinks that elephant gave ball to giraffe

Example 5: ENNI A1(?)

now he's going to say aah no no no no no no no no.

I'm not going take those balls # home # to his [/regi/].

(EXA: what? C: [/regi/].)

that day that balls got stuck.

and he said oh oh.

and the lady called away and said ah I'm going to get that ball.

and they said uhoh the choochoo train's coming.

that way he swimmed to the ball.

and now (he said) # oh he cried and cried and cried.

um now he helped him to get that ball.

and then now he helped to get him up.

and he couldn't get up # now.

- No obvious reason for this one being unusual!

Animated version of A1

- Students from New Media program at the University of Alberta needed a project
- They animated the simple story from Set A of the ENNI
- They animated those units that are often misunderstood and/or omitted by young children

What was highlighted

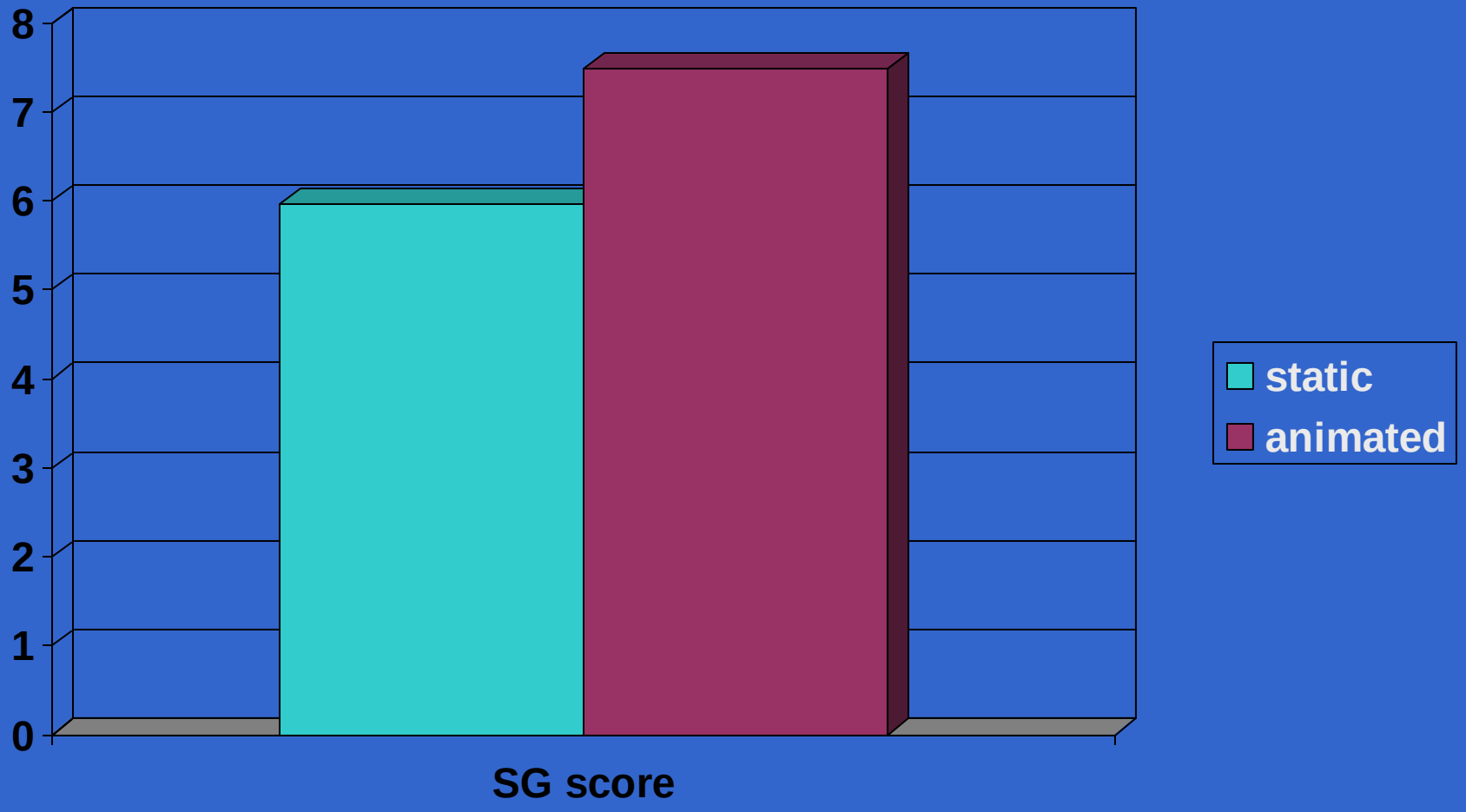
- Ball going into water
- Internal response (facial expression) of elephant
- Giraffe swimming towards ball
- Ball going from giraffe to elephant

Let’s view the animation

Trying out the animated version

- Nikki Dooley, Kara Kvile, Kelly Millar and Carla Monteleone conducted a study
- We gave the animation to 25 typically developing 4-year-old children
- We compared their stories to 25 4 year olds from the ENNI normative sample
- Results: children provided slightly but significantly more information with the animated version

Story Grammar scores – static versus animated versions



Story Grammar scores – static versus animated versions

Example 1: animated A1

An elephant.

And the ball went in the water.

An elephant and water.

An animal's swimming {1 sec pause} to get the ball.

(He he) the animal gave the elephant the ball.

And the end.

Example 2: animated A1

An elephant.
A giraffe.
The ball fell into the water.
(um) (The elephant gets) The elephant got splashed.
The giraffe is swimming.
The giraffe passed the ball to the elephant.
The giraffe's wet.

- C talks about close-up of elephant, but not with internal response

Example 3: animated A1

It fell down the bridge.

Splash!

They swam like this.

And then he got it.

And then he gived it to her.

And then he was wet.

Example 4: animated A1

First they are bouncing the ball.

And then it flies into the pool.

That) The longest one goes to get it.

And then what?

And then he gives it to (th) the girl.

Then she likes that.

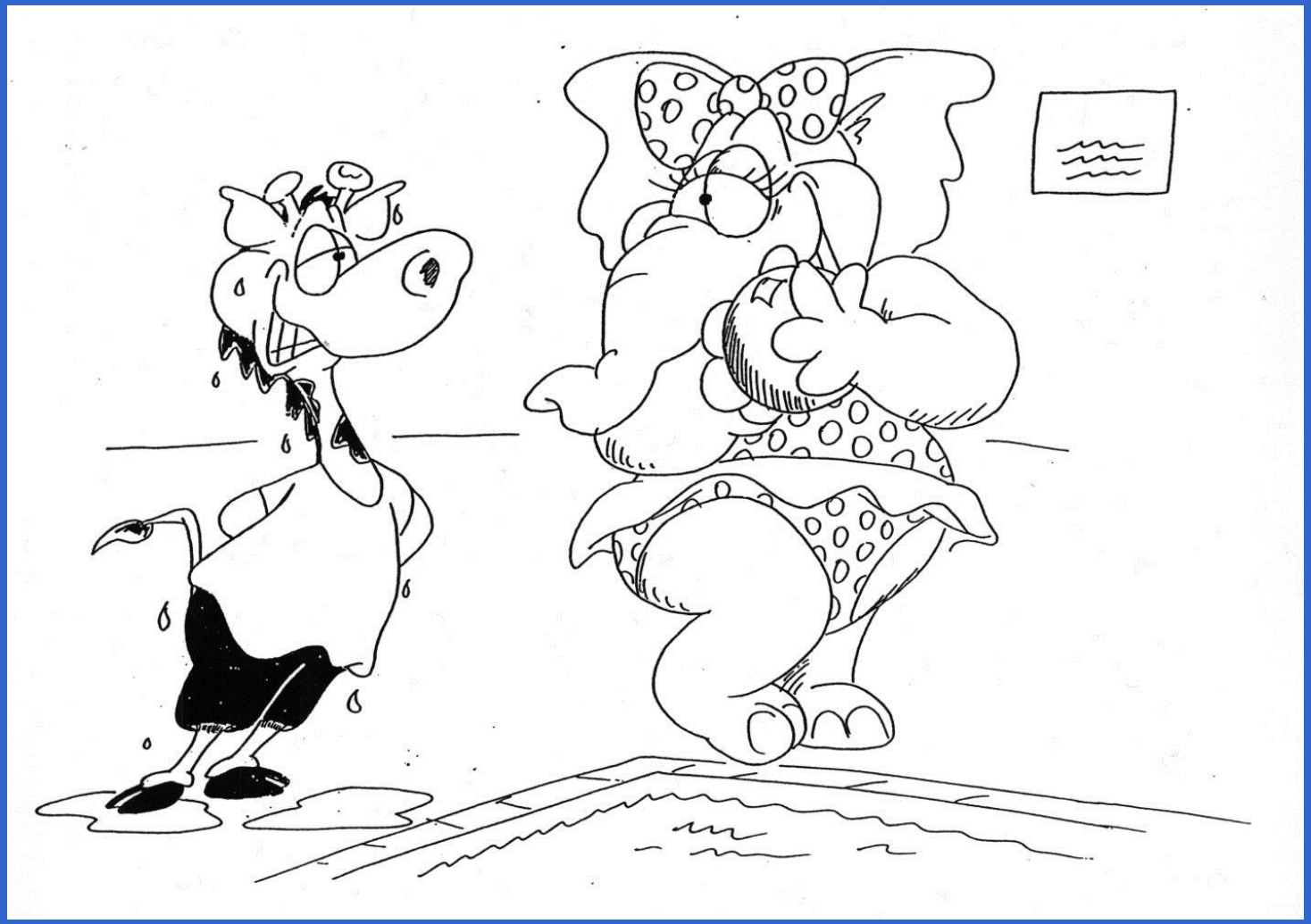
Example 4: animated A1 (some are still strange!)

what is the ball doing?
(E: can you tell us what's happening?)
it's drowning # down {laughs}.
water splashing up in her mouth and face.
oh bubbles bubbles bubbles # bubbles bubbles.
bounce.
the elephant's can squirt water.
he's drowning # the giraffe.
giraffe giraffe giraffe.
he giraffed.
he giraffes.

Animated versus static: what we learned

- Most 4-year-olds will get some SG units in their stories told from static pictures
- Children who view animated pictures tend to get 1-2 more SG units
- Animation may make the story easier to understand
- However, other factors are also involved in 4-year-olds' lower story performance

The ENNI in other languages



ENNI studies in other languages

- The ENNI was designed to be useful for collecting narrative data in any language
- Previous research: with a given stimuli, people from other cultures and languages will tell similar stories
- The ENNI has been used in several other languages for various purposes

French studies using the ENNI

Pilot study (A. Chambers and J. Mallette)

- Small sample of children aged 5 and 9
- Pictures were altered to change English words to French
- SG and First Mention scoring were adapted

Elin Thordardottir's studies

- Currently using ENNI in prevalence study in Quebec with preschool aged children

French studies continued

Andréanne Gagné & Martha Crago, U de Montréal

- Used the ENNI to compare Francophone children's storytelling to adults versus infants
- Found typically developing children and children with SLI both adjust their MLT-units for infants
- SLI children use more SG units with infants than with adults; TD children used same
- Seemed to be a trade-off between content and syntax

French studies continued

French as Second Language learners (L. Baker, C. Traverse, K. Pollock, P. Schneider)

- 10 children aged 6-8 enrolled in French immersion programs were tested in English and French
  - PPVT and EVIP (French version of PPVT)
  - ENNI in French and English
- Scores were lower on EVIP than PPVT
- Scores not different for A1, lower in French for A3

Other languages

- Icelandic (Elin Thordardottir) – as a second language compared to native language (including Lithuanian, Russian, Polish, Tagalog)
- Cantonese (M. Y. Wong) – typically developing children and children with language impairment

- Finnish– one study with children with autism (P. Pelttari), one with typically developing children (H. M. Vakkuri)
- Kannada speakers, Mysore, India (Padakannaya, Rao, Hayward, Schneider)– typical readers and children with reading disabilities

Future research

- Story Grammar scoring and norms for story B3
- Norms for sets A and B separately
  - First Mentions
  - Syntax measures
  - Word counts
- Narrative intervention study: will the ENNI reveal changes due to intervention?