Developing a clinical measure of referring expressions

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Clinical relevance of reference

- Referring expressions are very important for communication

- Example of story beginning:

- *She* was gonna come up. Then *he* said she could have *one*.

Barriers to clinical use

- Rules for determining referential adequacy depend on context, are difficult to describe

- Stories will vary in referential complexity

A Boy, A Dog, and a Frog – 3 targets
RA in Strong (1998): NLI 94%, LI 69%

Frog goes to Dinner – 16 targets
RA in Strong: NLI 73%, LI 48%

Barriers continued

- Adequacy will vary depending on what the child chooses to mention
  - If child only mentions ½ of possible referents, it will be easier to introduce them adequately
  - 2/4 or 10/20 adequate referents attempted; both would score 50%
- Not all inadequate expressions are equally 'bad'
  - Definite article + N not as bad as pronoun

Not all "inadequate" forms are equal

She was gonna come up. Then *he* said she could have *one*.

The hippo was gonna come up. Then *the guy* said she could have *one of the oranges*.

Scoring of *referential adequacy* of referent introductions would score these both the same: all inadequate.

Developing a measure of referent introduction

Part of Edmonton Narrative Norms Instrument

- Picture sets were developed
  - 2 sets of 3 stories each
  - Stories increase in length across the set
  - Each set had 2 main characters and two secondary characters
- Stories were collected from 377 children aged 4-9
- Measures of story quality were developed

Characters and episodes of the ENNI

Story	Pages	Characters
A1	5	Young male giraffe, young female elephant
A2	8	Same plus male adult elephant
A3	13	Same plus female adult elephant
B1	5	Young male rabbit, young female dog
B2	8	Same plus adult female rabbit
B3	13	Same plus adult male rabbit

Participants

Age	Typically developing	With language impairment
4	50	12
5	50	13
6	50	11
7	50	13
8	50	17
9	50	10

Set A referents

Giraffe, elephant, ball
Une girafe, un éléphant, un ball
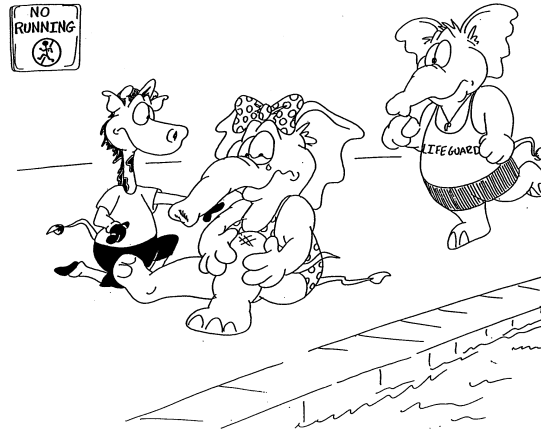
second elephant (lifeguard)
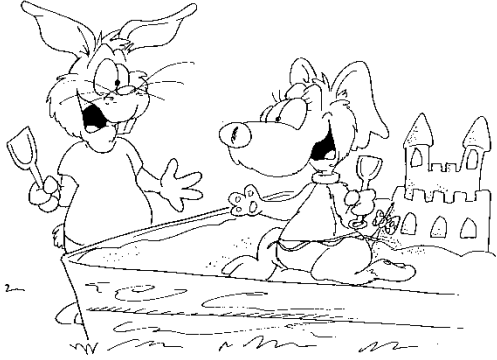un deuxième éléphant (le mâitre nageur)
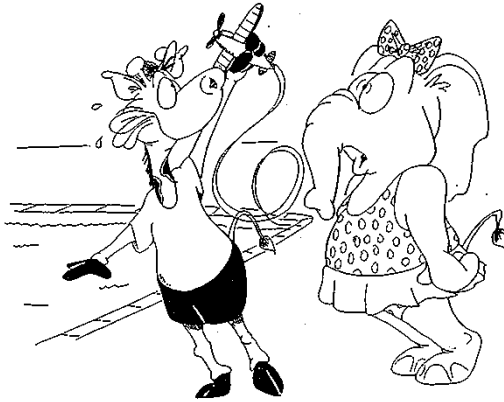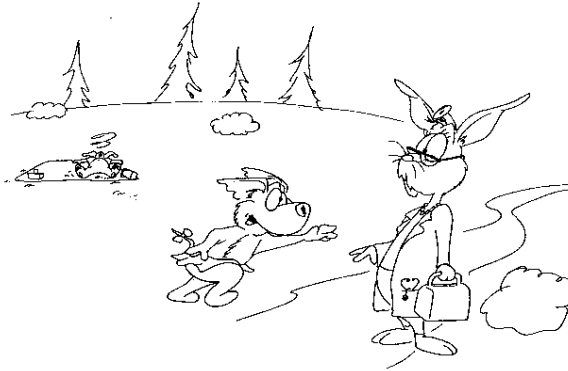

Airplane
Un avion
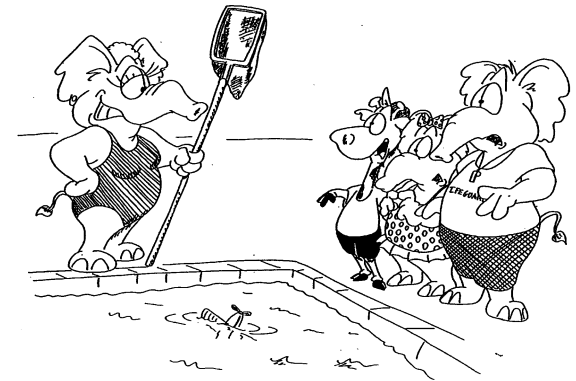
third elephant, net
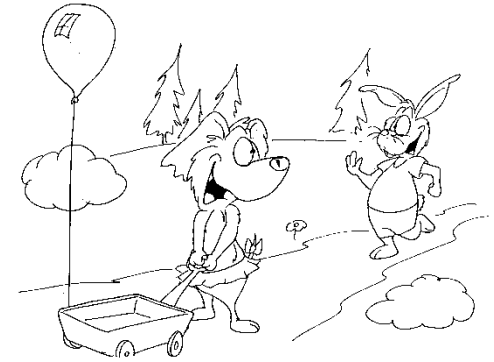un troisième éléphant , un filet
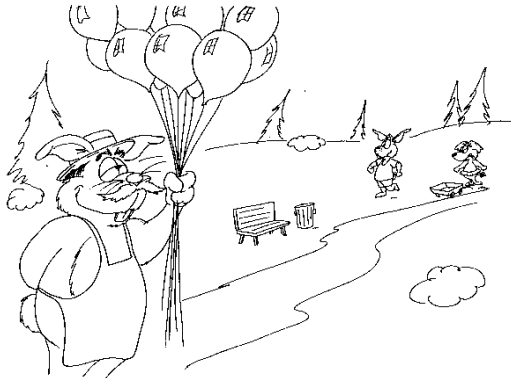
Set B referents

B1. Rabbit, dog, sandcastle
Un lapin, un chien, un chateau de sable

B2. Second rabbit/doctor
un deuxième lapin/un docteur

B3. Balloon
un ballon

B3. third rabbit (balloon seller)
un troisième lapin (un marchand de ballons)

B3. balloons (at end)
ballons (à la fin)

Administration

- See youtube video demonstration:
- http://www.youtube.com/watch?v=xpKzs1JVWxI&feature=youtu.be

Maintenant, je vais te montrer des images qui racontent une histoire. Je vais commencer en te montrant toutes les images et puis je te montrerai le commencement de nouveau. Après, je veux que tu regardes les images et me racontes l'histoire que tu vois dans les images. Je ne serai pas capable de voir les images, donc je veux que tu me racontes la meilleure histoire que tu puisses. Est-ce que tu comprends ?

Developing the First Mentions scoring

- We developed a 4-point scoring system
- We applied it to one-half of the data
- Some objects were eliminated because not mentioned by all older participants

   – Object retained if mentioned by 98% or more of 8 and 9 year olds

First Mentions scoring

| Score	Description	examples
3	Fully adequate for the context	a + N, e.g., *an elephant, a ball* Name, e.g., *Ella, Gerald* Possessive pronoun + N, if relation to previous referent is clear, e.g., an elephant and *her friend*; the giraffe…*his airplane*
2	Not fully adequate but contains information about the character or object referred to	The + N, e.g., *the elephant, the ball* Demonstrative + N, e.g., *that elephant*
1	Not adequate for the context	Pronoun, e.g., *he, she, it* use of definite determiner with a noun that had been used for a previous character, as in "*the elephant*" for the third character)
0	Referent not mentioned	

For clinical use: scoring sheet specifies what counts as 1-2-3 for each target.

For information on scoring, see http://www.rehabresearch.ualberta.ca/enni/analyses/first-mentions
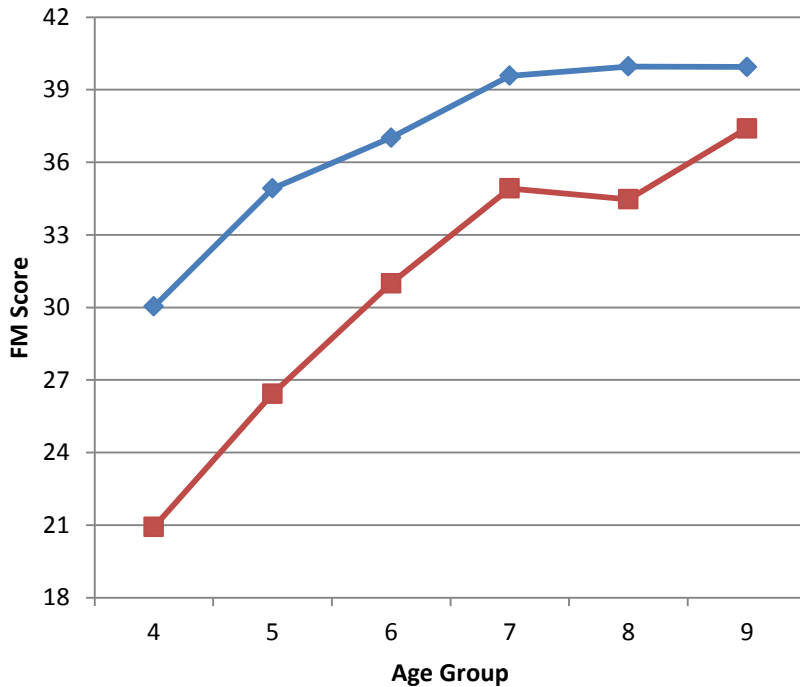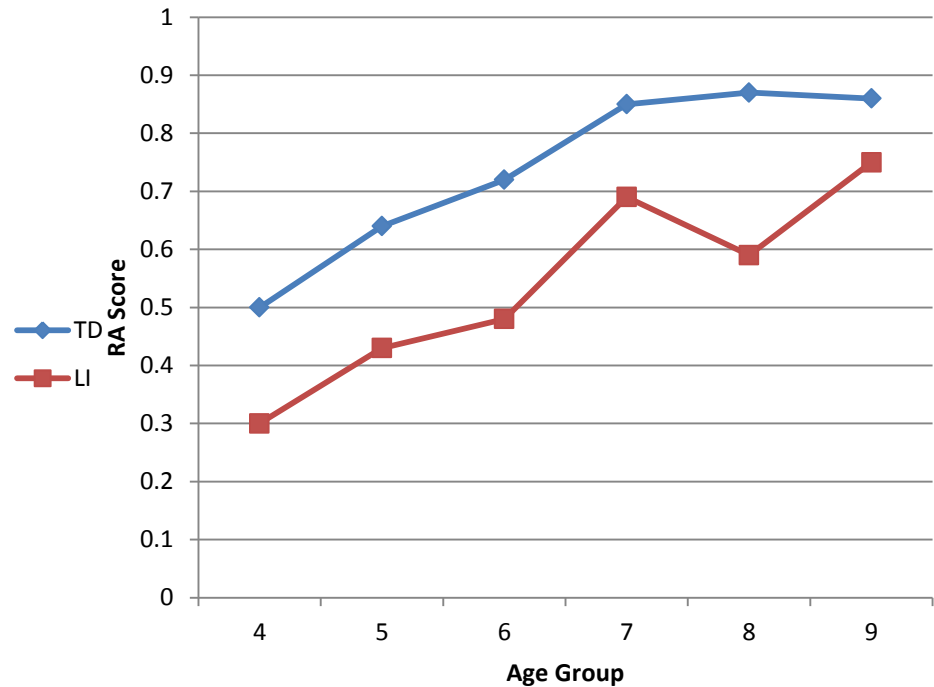
Results

First Mention Mean Scores
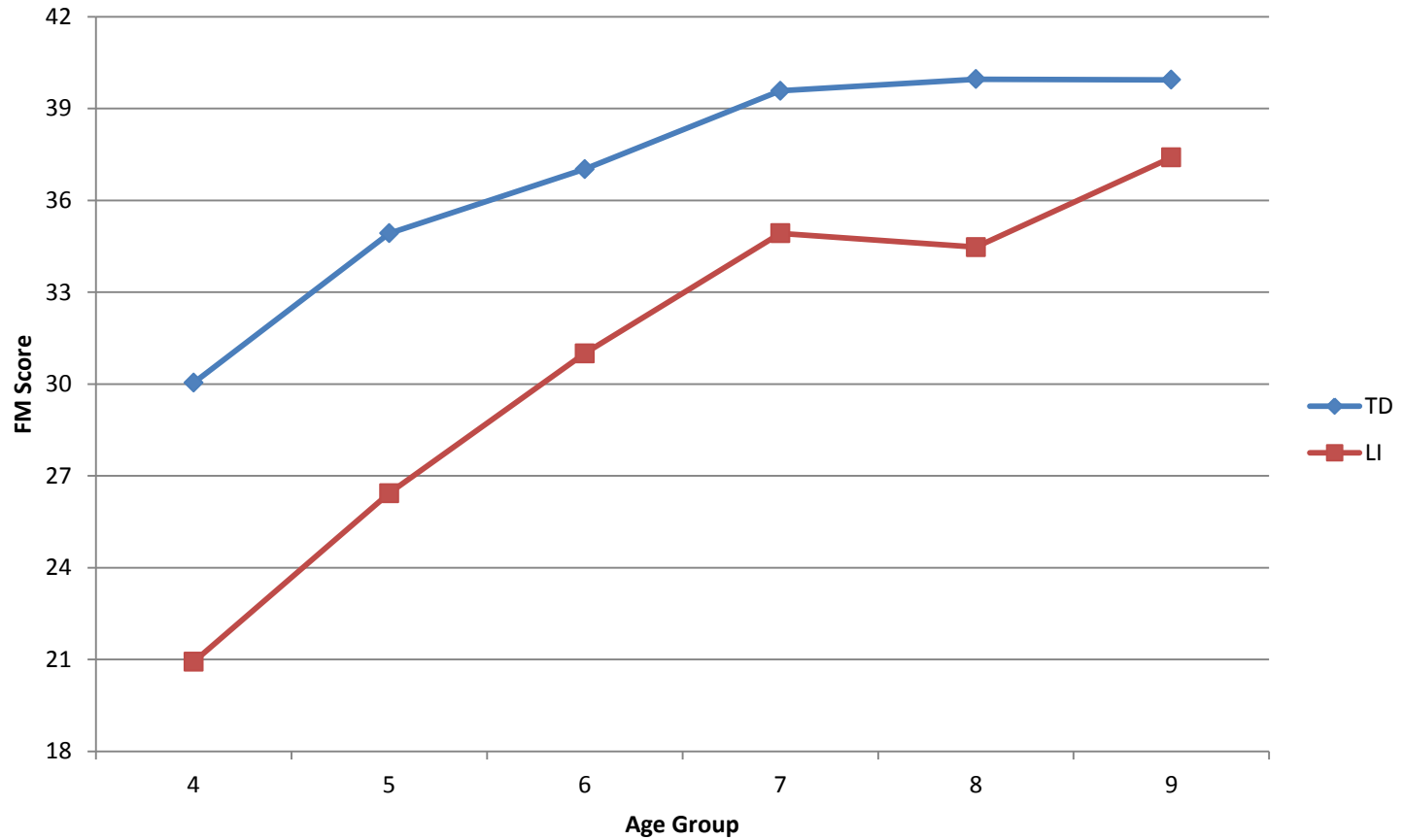
Main effect for age, language status; significant interaction

FM versus RA

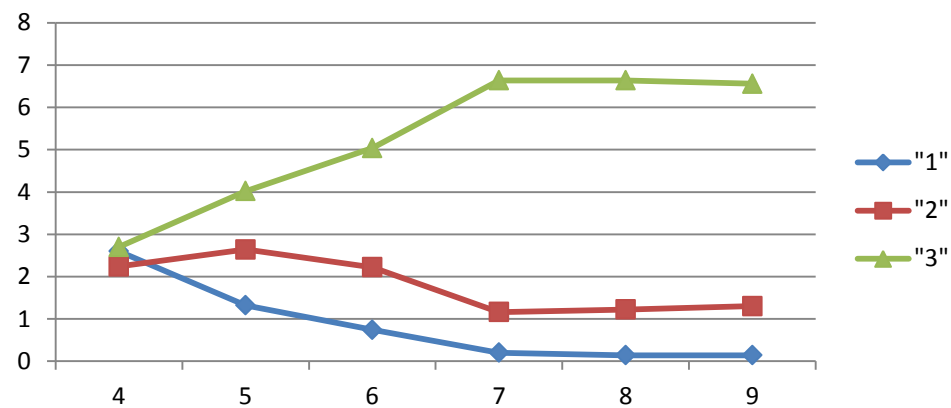**First Mention Mean Scores**

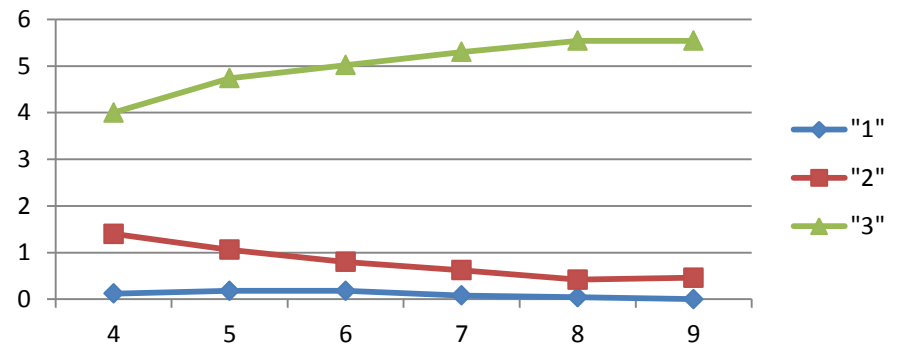**Referential Adequacy Mean Scores**

TD = children typically developing / enfants sans troubles du langage
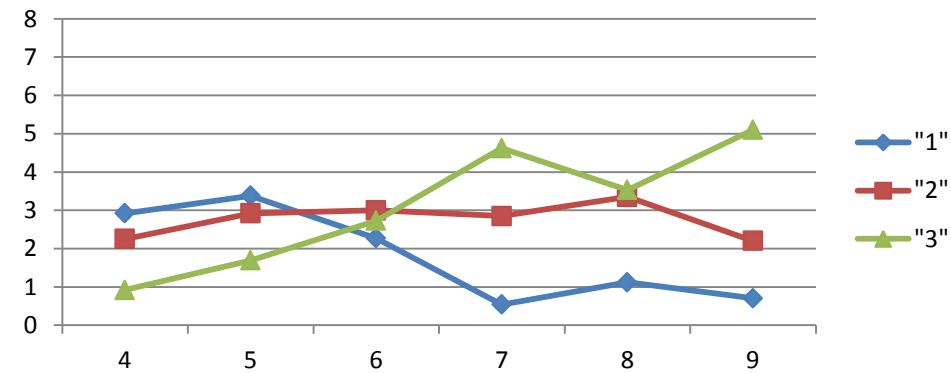LI = children with language impairment / enfants souffrant de trouble du language

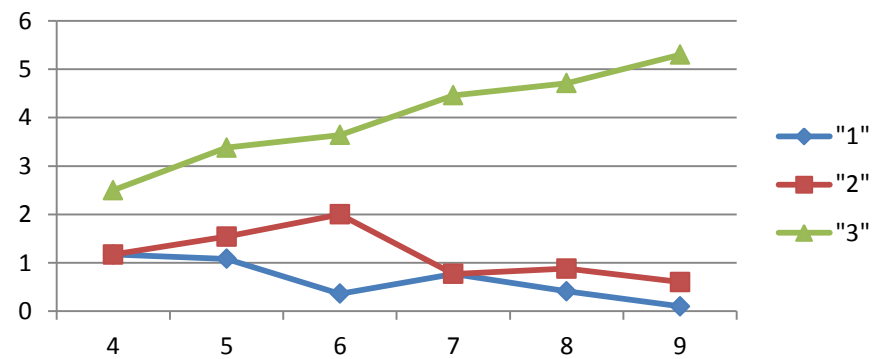**Animate referents -- participants with typical language development**

Object referents -- participants with typical language development

Animate referents -- participants with language impairment

Object referents -- participants with LI

1 = fully inadequate; 2 = partially adequate; 3= fully adequate

Main versus Secondary Characters

Typical Development
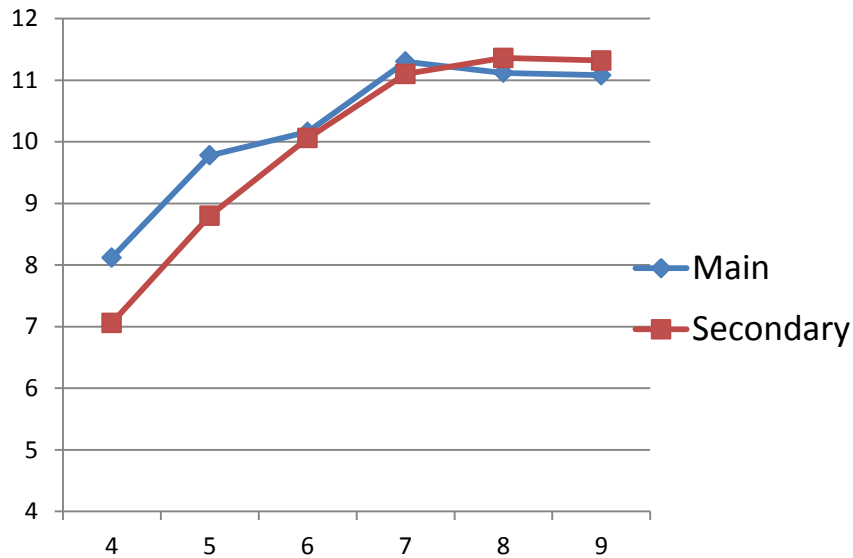
Language Impairment
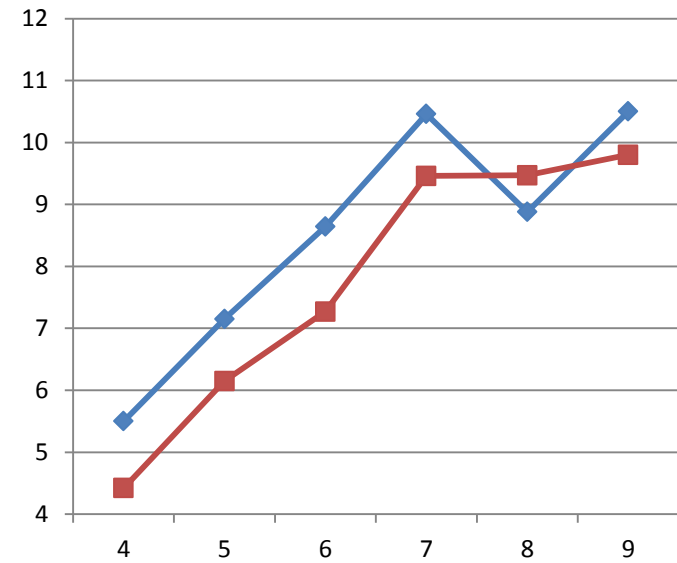
Examples

- Two children, aged 5
- Scored their 14 referents two ways:
  - As 0 or 1 for Referential Adequacy (RA)
  - As 0-3 for First Mentions (FM)
- Compared to their age group using standard scores of mean 10, SD 3
- Thus: scores of 7 or above are in the normal range; scores < 7 are below normal distribution

5-year-old boy, typically developing

Target referent	Child's expression	Referential Adequacy 0 or 1	First Mentions 0-3
Giraffe	*The donkey	0	2
Elephant	Another animal	1	3
Ball	*The ball	0	2
Lifeguard	*The swimming person	0	2
Airplane	His airplane	1	3
Lady elephant	(lifeguard…) his wife	1	3
net	A stick with a rope on the front	1	3
Rabbit	*The bunny	0	2
Dog	*The dog	0	2
Sandcastle	A sandcastle	1	3
Doctor	*The doctor	0	2
Balloon	*The balloon	0	2
Man with balloons	*The balloon man	0	2
Balloon(s) at end	*The two leftover balloons	0	2
TOTAL		5/14 = 36% (SS 6.06)	34/42 = 79% (SS 9.26)

5-year-old boy with language impairment

Target referent	Child's expression	Ref. Adequacy 0 or 1	First Mentions 0-3
Giraffe	he	0	1
Elephant	A girl	1	3
Ball	It	0	1
Lifeguard	A boy	1	3
Airplane	A real airplane	1	3
Lady elephant	The good girl	0	1 (def. + confusable)
net	[not mentioned]	--	0
Rabbit	He	0	1
Dog	He	0	1
Sandcastle	A sandcastle	1	3
Doctor	The rabbit's mommy	1	3
Balloon	A balloon	1	3
Man with balloons	*The balloon man	0	2
Balloon(s) at end	A balloon	1	3
TOTAL		7/13 = 54% (SS 8.78)	28/42= 67% (SS 6.12)

Excerpts from stories:

Child with TD:

um ## *the donkey* wanted to play <uh with> with *another animal* with his balls .

…and the elephant picked *the ball* up .

…and # *the swimming # person* checked if he was okay ## and put the bandaid on her.

…um the # giraffe throwed *his airplane* .

…*the bunny* said hi to # *the dog*.

Child with LI:

it is a <s> real bouncy ball.

…and then <he's gr> # *he*'s getting it .

…<and they're> # and he # give it to *a girl*.

…and *a boy* # say it hurts.

…and then <he> # he got <a real # um # maybe> # maybe <a real # a real> # *a real airplane.*

…<he> *he* have to get it .

Summary

	First Mentions	Referential Adequacy
Child with typical development	In normal range	-1 SD below mean
Child with language impairment	-1 SD below mean	In normal range
Standard score means for LI in the normative sample (M=10, SD=3)	5.94 (SD 3.79)	6.95 (3.25)

FM scoring appears to capture the quality of the stories better than RA scoring

Considerations

To adapt FM to other stories, one must consider:

- Number and 'confusability' of referents

- Importance of referents (can some be omitted without distorting the story?)

- Distribution of FM scores for each story
  - Some stories are more difficult than others

- ENNI is available for free on our website:
- L'ENNI est disponible gratis sur le website:
- http://www.rehabresearch.ualberta.ca/enni/