

## From context to text

LESLLA learners between situated learning and logic reasoning

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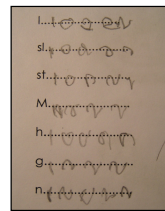
## Overview

- Literature review
  - Literacy and metalinguistic awareness
  - Literacy and processing of linguistic information
- Literacy and cognition
  - Taxonomic classification
  - Syllogistic reasoning

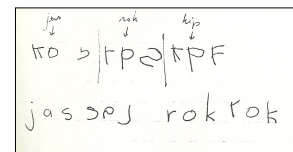
## A few observations

- Reading
  - Could you read this letter to me?
  - Hassans tooth ache
  - Fatma goes to school
- Writing:
  - A book of my life
  - Emergent writers
- Out of school learning
  - Somali interpreter

## Emergent writers



Fatima



Jahmila

**asevtok**

Kwaku

## Literature review

- Long lasting research
  - Does literacy impact metalinguistic awareness?
  - Does literacy impact logic/deductive reasoning? → Today's topic
- More recent research
  - Does literacy impact the processing of (linguistic) information

## Literacy and metalinguistic awareness

- Phonological awareness
  - Sounds: (how many sounds in cat?)
  - syllables
- Word awareness
  - What is a word?
  - What is the last word you heard?
  - How many words in John takes the train?
- Print awareness
  - Street signs, letters, register

## Results metalinguistic tasks

- On nearly all tasks:
- non-literates differ strongly from readers
  - Exception: rhyme recognition and segmentation in syllables

## Segmentation sentences and words

- Could you segment into pieces (orally)
  - I come from the south of Somalia
  - The old man
  - In the shop
  - Tomatoes

## Examples non-literates

- I come from the south of Somalia
  - I come / from south Somalia
  - You have the south and the north, is that it?
- The old man
  - No you can't
  - Do you mean old men and young men?
- In the shop
  - No, that is one place
- Tomatoes
  - Every one a tomato
  - Into four parts
  - To / ma /toes

## Could someone write this?

- I live in Holland
- Outside
- I was raining yesterday
- Ten
- A baby is very old

## Examples non-literates

- Yes, because I do live in Holland.
- You could write 'tree' but not 'outside'
- Ten, yes, that can be written
- No, because it was not raining yesterday
- *If* it was raining yesterday, you could write that down.
- No, of course not, a baby is not old.
- You could write it down, but it is still nonsense

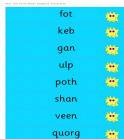
## Impact on language processing

- Repeat table, repeat hable (word and pseudo-word) n
- Verbal fluency
  - Mention as much words as you can with a p
  - Mention as much animals/food as you can
- Working memory: repeat strings of digits or words
- Results:
  - no (big) differences between non-literates and literates in using semantic information,
  - but big differences in processing phonological information

## Language Processing: word repetition

(Reis & Castro-Caldas, 1997)

% correct	Words	Pseudo words
Non-literate	92%	33%
Literate	98%	99%



## Literacy and cognitive operations

- Claim Vygotsky and Luria: literacy changes ways of (deductive) reasoning
- Studies reveal different outcomes
- However: simple syllogistic reasoning tasks reveal intriguing consistent results.

(Luria, 1975; Scribner, 1977; Scribner & Cole, 1981; Kurvers, 2002; Dias et al., 2005; Haan, 2007; Counihan, 2007)

## Examples research on reasoning

(Luria, 1975)

### Taxonomic classification

The odd one out

- glass, pan, glasses, bottle
- rifle, bow and arrow, gun, bird
- Saw, hammer, log, axe

### Syllogisms:

All bears on Nova Zembla, far up in the North, are white.

Last year, my cousin saw a bear on Nova Zembla

What was the colour of the bear?

## Syllogistic reasoning: All X are Y

Premise-based	Non-literates	Literates
Luria (1930)	22.5%	100%
Scribner (1997)	22.3%	75%
Scribner&Cole (1981)*	27%	29% / 50%
Kurvers (2002)	20%	68%
Haan (2007)	14%	-
Counihan (2007)	30%	66%

\* First experiment, percentages literates: resp. Vai-literates and schooled literates

## Study Kurvers (2002)

- Comparison of three groups:
  - preliterate children, non-literate adults, low-educated literate adults
- Tasks:
  - metalinguistic tasks and cognitive tasks
- Question: Impact of literacy or something else?
  - If children differ from adults (irrespective of literacy experience) → **no impact** of literacy
  - If readers differ from non-readers (irrespective of age) → **impact** of literacy

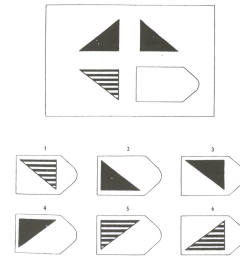
## Respondents

- Pre-literate children, last term Kindergarten (N=23)
- Non-literate adults (N=25)
- Low-educated literate adults, 4 years primary school (N=24)
- All: Berber, Somali, Turks, same backgrounds; adult second language learners of Dutch

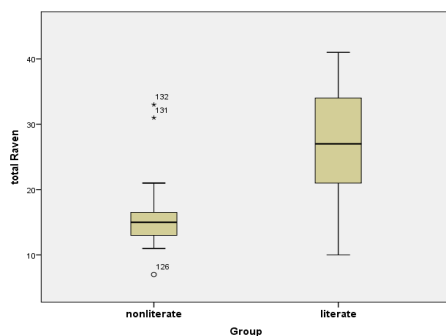
## Cognitive tasks

- Raven SPM: nonverbal IQ test, culture free (adults only) (k=42)
  - Taxonomic classification (k=8)
  - Simple syllogisms (k=5)
- Tasks conducted in L1 (Berber, Turkish, Somali) unless respondent preferred L2.

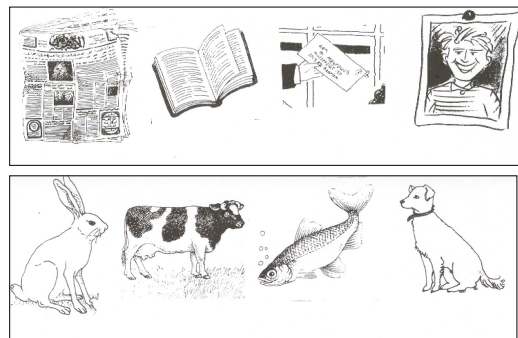
## Cogniton: Raven SPM



## Results Raven SPM (max=42)



## Classification

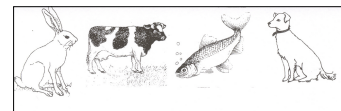


## Examples classification 1



- **Most Literates**
  - Picture, because the other three are for reading
- **Non-Literates**
  - Picture, because that is on the wall
  - Newspaper, because you can throw it away when you have finished reading.
  - Letter, because that comes through the postbox
  - Photo, because you need a son for the other three

## Example classification 2



- **Most literates**
  - Fish
- **Non-literates**
  - Dog, because we do not eat dogs
  - Rabbit, because not useful for people
  - Rabbit, does not live in the Netherlands
  - Dog, because a dog is allowed in the living room
  - Fish, because the others do not live in the water

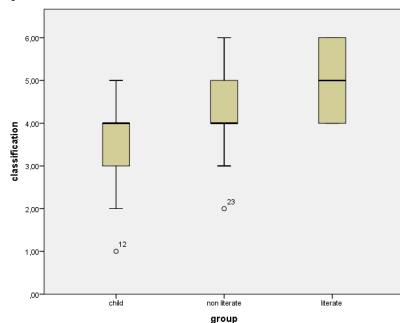
## Analysis classification

- Example: Saw, hammer, log, axe
- Taxonomic
  - (wood)log, because other three are tools
- Situational/functional
  - You also need the wood, because otherwise there is nothing to saw or hammer
- Idiosyncratic
  - The saw, because you cannot saw with the other three

## Results classification

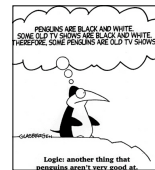
	Child	Non-literate	Literate
taxonomic	38%	55%	77%
situational	19%	26%	16%
idiosyncratic	43%	19%	7%

## Boxplots classification taxonomic



## Examples syllogism

- All women in Markey are married
  - Fatma is not married
  - Does Fatma live in Markey?
- 
- All stones on the moon are blue
  - A man went to the moon and found a stone.
  - What was the colour of that stone?



## Examples reasoning Syllogism task

- Does Fatma live in Markey?
- **Most literates:**
  - No, because all women are married there
- **Non-Literates:**
  - No, because I know Fatma. She lives here.
  - How should I know, I have never been there.
  - We have to ask Fatma.
  - It can not be that there is a country where all women are married.
  - Should I give my opinion, or react on your words?

## Examples reasoning Syllogism task

- What was the colour of that stone?
- **Most literates:**
  - Blue, because all stones are blue there
- **Non-Literates:**
  - Black, because it is very hot there
  - How should I know, I have never been there
  - There are no stones on the moon
  - Brown, just look outside.
  - I think blue, because the sky is blue.
  - Black or white, that depends

## Types of arguments

- Premise based
  - Because all stones on the moon are blue
  - Because otherwise he should have had three heads
  - Because you told me all stones are blue
  - If she lived there, she was married
- Experience based
  - Because I have been in Amsterdam
  - I know Fatma, she is married
  - Because of the color of the water
  - Look outside, all stones are brown
  - We have to ask Fatma
  - People told me it is a nice city

## Types of arguments Ctn.

- Discussion premise (also experience based)
  - It cannot be that there is a country where all women are married
  - There are no stones on the moon
  - A human person cannot have three heads
- Don't know/ no argument
  - How would I know?
  - You didn't tell me.

## Frequencies arguments by group

	Child	Non-literate	Literate
Premise based	33%	19%	67%
Experience based	39%	75%	27%
No argument	28%	6%	6%

## Pearson Correlations

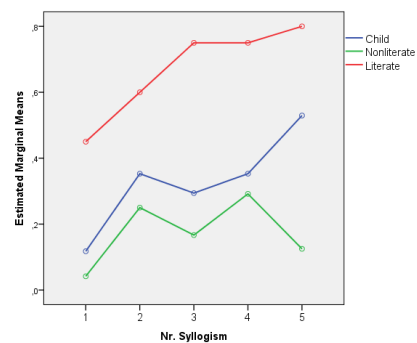
	Classification	Raven	Print awareness	Meta-linguistic	L1 reading
syllogisms	.26	.39*	.57**	.77**	.59**

\*\* p<.000, \* p<.05

## Differences between 5 items?

1. All Cities in Holland are nice
2. All women in Markey are married
3. All stones on the moon are blue
4. All people on Mars have three heads
5. Achmed went for a walk (all stones in the river were yellow)
  - Story embedded syllogism

## Means by group Item 1-5



### Conclusions syllogism 1-5

- Differences between adult non-literates and literates strongest for the moon (syllogism 3) and the river syllogism/story (syllogism 5)
- Children seem to profit from story-embedding (syllogism 5), non-literate adults do not
- Reasoning non-literates in story embedded syllogism similar
  - White, because God made the stones white
  - I don't know, I have never been there
  - Blue, because the water made them blue
  - It must be a beautiful colour. We don't know the colour

### A closer look at reasoning

- Is it the question?
- Is it the verbal aspect?
  - Box task (Haan 2007)
- Is it the meaning of the concept "all"?
  - Brothers (Haan 2007)
- Some in-between answers

### Scribner & Cole (1981)

- E: All Kpelle men are rice farmers. Mr Smith is not a rice farmer. Is he a Kpelle men?
- S: **I don't know the man** in person. I have not laid eyes on the man himself.
- E: Just think about the statement.
- S: **If I know him** in person, I can answer that question, but since I do not know him in person I cannot answer that question.

### Kurvers, 2002

- E: Listen (repeats syllogisme). Does Fatma live in Markey?
- *Arkem: Fatma lives in Markey, or in Turkey (laughs). **Fatma is not married, hè? All women are married, she is not. But why is she not married?***
- E: Does she live in Markey, you think?
- *Arkem: **I don't know. She might live there, or here.***

### Verbal aspect: Box task

(Haan, 2007)

- Three red boxes in a tray.
- Each box contains a ping-pong ball (show).
- Close all three boxes, hide the three boxes, show one of the red boxes again.
- "What is in this box?"



- **Correct: 69%**
- Respondents can deduce information from the 'premises' if the information is presented visually.

### Concept all? (Haan, 2007)

- Simplified syllogism
  - I have three brothers. All three of my brothers live in Rotterdam. Jan is one of my brothers. In which city does Jan live?
- **Correct: 25%**
- What is the difference with the box-task?

## Example brothers' task

- Exp: Where does Jan live?
- Lahcen: [long pause] **You did not tell me** where Jan lives. You told me that your brothers live in Rotterdam, but not where Jan lives.
- Exp: All three of my brothers live in Rotterdam, all three. Jan is one of my brothers. Where does Jan live?
- Lahcen: Those three brothers of yours live in Rotterdam, **he may be one of them.**
- Exp: Jan is one of my brothers.
- Lahcen: Then they all live in Rotterdam

## In-betweens

- High scoring non-literates
  - Khadizja (1 experience based, 4 deductive)
  - Habiba (1 experience based, 4 deductive)
  - Lionel (2 experience based, 3 deductive)
- On no task all in-betweens do differ from the average of the whole group, except for metalinguistic awareness and print awareness

## Ways of reasoning in-betweens

- Blue, **you told me** all stones are blue there
- **If** she lived in Markey, she would have been married
- I think yes, **although I have never been there.**
- No, she is not married. That is not allowed.
- Yes blue, all stones are blue there, **isn't it.**
- **Shall I give my opinion, or react on your words?**

## Compare

- Lahcen: **You did not tell me** where Jan lives
  - Implicit question: "Do you remember what I told you about Jan?"
- Khadizja: Blue, because **you told me**
  - Answer to a different question: "Where does Jan live when A and B are true?"
- Compare experiences with reading comprehension in literacy classes

## Conclusions

- Literacy opens **new ways of handling verbal information**
- Default handling: relating verbal statements (separate facts; exemplars) successively and one by one to the immediate, outside **context**, the direct world; **situated cognition**, combining and integrating acting and speaking: **contextual verbal reasoning**
- Literate (metalinguistic) handling: relating verbal statements first of all to each other, within the **text: textual verbal reasoning.**
- The literate (metalinguistic) point of view: integrating verbal (textual) information before contextual checking
- Next step, **'symbolic'** cognition, with within (inside, text-bound) true and false values: **symbolic reasoning**, formal logic

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Thank you!

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## Do inbetweens differ

- Background (age, schooling etc)?
- Non-verbal intelligence?
- Memory?
- The concept all?
- Ways of reasoning?
- What else?

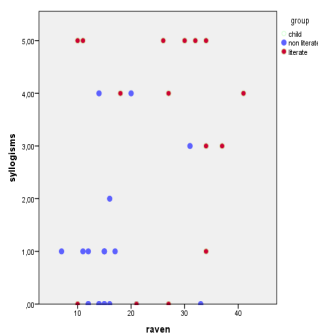
Relevant tasks / tests  
Literacy and raven, adults only

		Correlations				
		sylogisms	literacy	classification	metalinguistic	raven
sylogisms	Pearson Correlation	1	.572	.263	.772	.385
	N	62	62	62	62	34
literacy	Pearson Correlation	.572	1	.431	.663	.583
	N	62	62	62	62	34
classification	Pearson Correlation	.263	.431	1	.202	.202
	N	62	62	62	62	34
metalinguistic	Pearson Correlation	.772	.663	.202	1	.595
	N	62	62	62	62	34
raven	Pearson Correlation	.385	.583	.202	.595	1
	N	34	34	34	34	34

Sylogisms highest correlation with metalinguistic abilities

## Predicting syllogisms

		Coefficients <sup>a</sup>				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-1,750	1,006		-1,739	,093
	raven	-.029	,031	-.136	-.913	,369
	literacy	,004	,015	,052	,277	,784
	classification	-.012	,237	-.007	-.052	,959
	metalinguistic	,078	,017	,826	4,614	,000
2	(Constant)	-1,789	,668		-2,679	,012
	raven	-.028	,031	-.135	-.929	,360
	literacy	,004	,014	,049	,280	,781
	metalinguistic	,078	,017	,825	4,701	,000
	(Constant)	-1,730	,625		-2,769	,009
3	raven	-.026	,029	-.124	-.900	,375
	metalinguistic	,081	,013	,855	6,207	,000
	(Constant)	-1,903	,593		-3,210	,003
4	metalinguistic	,074	,010	,781	7,077	,000



Continuum,  
correlation

## Background NL in-between

	Age	L2	school	textL1
74	25	5 mth	0	yes
76	47	2 mth	0	no
131	37	10 mth	2	Some decoding
Average group	38.8	2.3	0.4	no

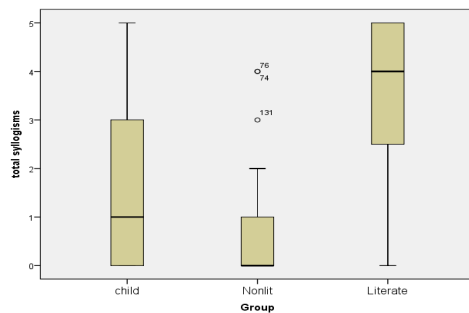
## Background in-betweens

	classification	Raven	Sentence repetition	objectivation	Picture story: coherence	Picture story questions
74	4	14	8	2	3	3
76	4	20	8	2	4	2
131	3	31	2	0	3	3
Average group	4.3	14.9	6.2	0.5	2.2	1.4

## Example brothers' task

- Exp: Can you remember what I told you about my brothers?
- Zina: You told me you have three brothers and one sister, and the place you mentioned I don't know/I cannot remember. [...]
- Exp: All three of my brothers live in Rotterdam. Jan is one of my brothers. In which city does Jan live?
- Zina: **I don't know.**

## Boxplots syllogisms, correct premise-based answers



## Predicting syllogistic reasoning

Model		Standardized Coefficients		Sig.	
		Beta	t		
1	(Constant)		-1,739	,093	
	Raven	-,136	-,913	,369	
	Print awareness	,052	,277	,784	
	Classification	-,007	-,052	,959	
	Metalinguistic	,826	4,614	,000	
	2	(Constant)		-2,679	,012
		Raven	-,135	-,929	,360
Print awareness		,049	,280	,781	
Metalinguistic		,825	4,701	,000	
	(Constant)		-2,769	,009	
	Raven	-,124	-,900	,375	
	Metalinguistic	,855	6,207	,000	
4	(Constant)		-3,210	,003	
	<b>Metalinguistic</b>	<b>,781</b>	<b>7,077</b>	<b>,000</b>	