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Tallinn

Concise Tool for early identification of Specific Language Impairment

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Language delay

- › Primary developmental language disorders
 - › **Specific Language Impairment**
 - › **SLI**
- › Secondary developmental language disorders
- › Insufficient language input

Specific Language Impairment

- › Prevalence SLI
 - › Range 2 – 12%
 - › 7 % (Tomblin)

- › ADHD 5%
- › ASD 1%



Most common developmental disorder

Tomblin JB, Records NL, Buckwalter P, Zhang X, Smith E, O'Brien M. Prevalence of Specific Language Impairment in Kindergarten Children. *J Speech Lang Hear Res.*1997; 40 (6): 1245-1260.

Specific Language Impairment

Negative consequences

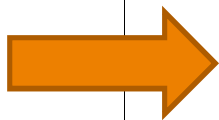
- › Learning problems
- › Social problems
- › Emotional problems
- › Behavioural problems

St Clair MC, Pickles A, Durkin K, Conti-Ramsden G. A longitudinal study of behavioral, emotional and social difficulties in individuals with a history of specific language impairment (SLI). J Commun Disord; 2011;44(2):186–99.

Specific Language Impairment

Early detection important

- › Early start adequate intervention
- › Prevent negative consequences
- › Parents clearness



Better chances for optimal development of potential skills

Difficulties for developmental screening

- › Knowledge of natural course
- › Choosing reference test or golden standard

Camp BW. Evaluating bias in validity studies of developmental/behavioral screening tests. J Dev Behav Pediatr. 2007 Jun;28(3):234–40.

Developmental screening

also important:

- › little time investment,
- › no special training,
- › no special equipment,
- › no parental questionnaires,
- › easily implemented in daily routine,
- › adequate predictive properties

concise tool for identifying specific language impairment as early as possible

Using 4 language milestones

Developmental Language Milestones used for the concise tool

2 years of age

Says 2 word “sentences”

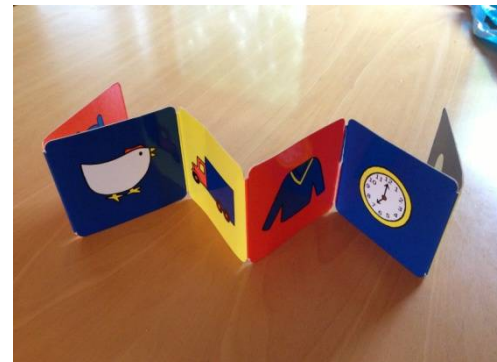
Points at 6 parts of a doll’s body

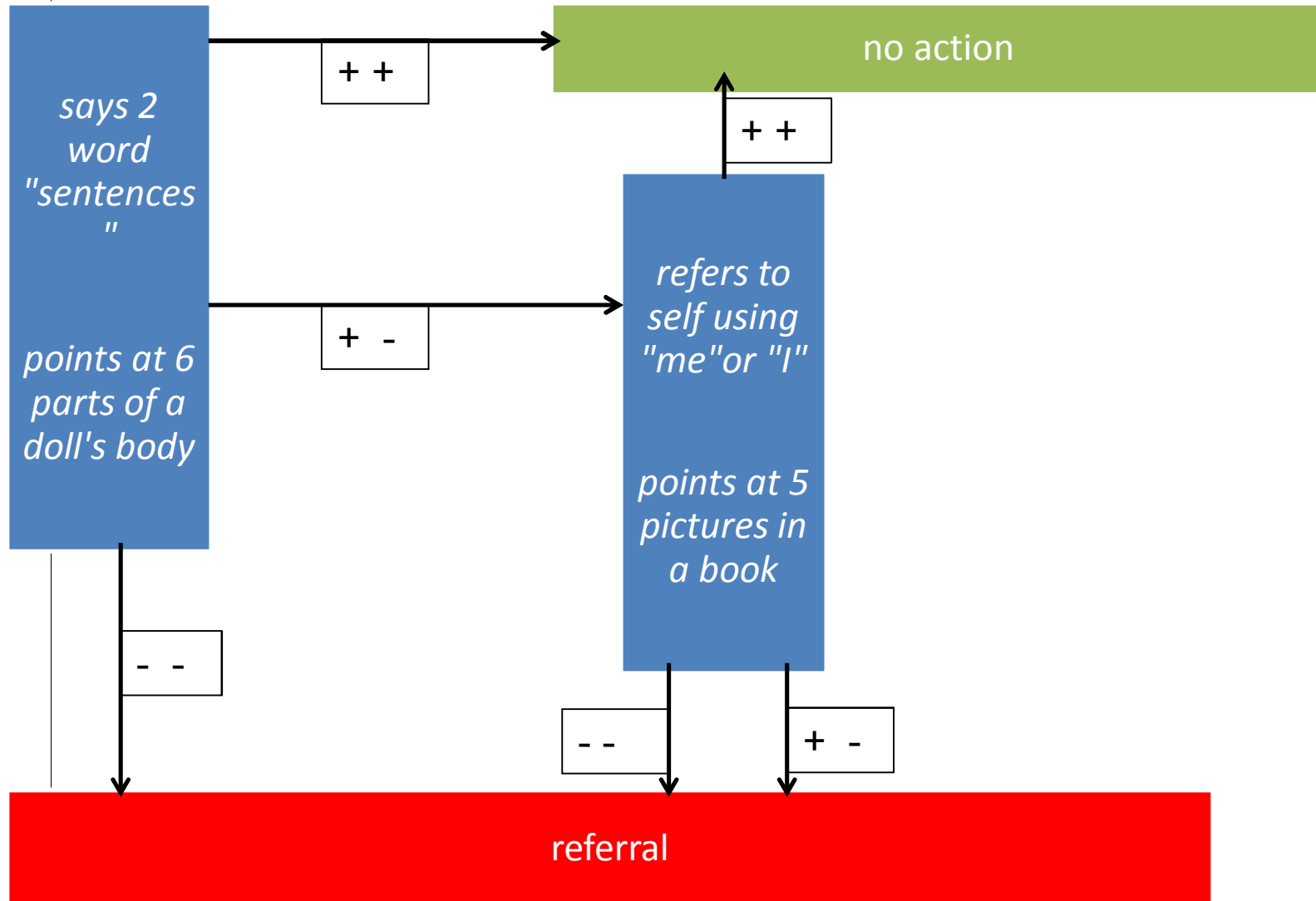


2 ½ years of age

Refers to self using “me” or “I”

Points at 5 pictures in the book



2 years**2 ½ years**

- › What are the predictive properties of the concise tool for early identification of children with SLI?

Previous study

- › Predictive properties isolated language milestones
- › Golden standard: having SLI at school age

Our study

- › Nested case control design
- › Cases
 - › children from special needs school for children with severe speech and language difficulties (=SLI)
- › Controls
 - › Children attending regular education (= typically developing)
- › Matched by date of birth and gender

Our study, cases



Special need schools for children with severe speech and language difficulties

- › strict criteria
- › multidisciplinary teams
- › government regulated

IQ > 85

difference between verbal and intellectual capacities > 1.5 SD

delays in ≥ 2 aspects of language skills

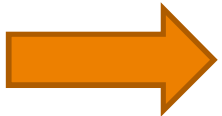


meeting internationally used criteria for SLI

Our study

- › nested case-control design
- › 506 children
 - › Cases ($n = 253$): children of a special need school for Severe Speech and Language difficulties (= SLI)
 - › Controls ($n = 253$): children from school of regular education

matched by date of birth and gender



Data from Child Health Care records:
developmental language milestones

Our study

Dutch Preventive Well-child Care

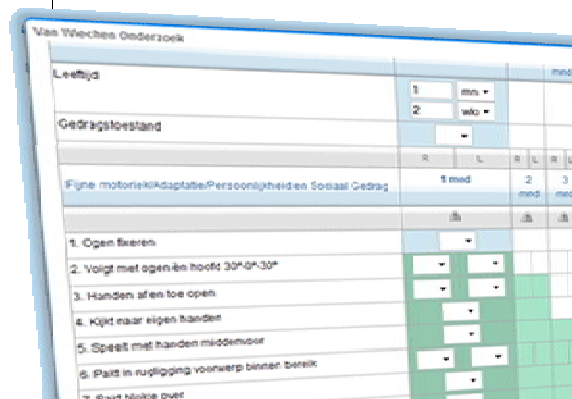
- › almost every child attending regular visits of the well-child care Clinic
- › uniform collection of developmental data
- › by specialized professionals
- › parental consent given at start



Our study

Dutch Developmental Test for developmental surveillance

- › modification of Gesell
- › covering 5 developmental fields
- › 23 items concern language development and communication
- › at 12 different ages from 1 to 48 months old



Laurent de Angulo, M.S., E.A.Brouwers-de Jong et al. (red.) *Ontwikkelingsonderzoek in de jeugdgezondheidszorg. Het Van Wiechenonderzoek - De Baecke-Fassaert Motoriektest*. Van Gorcum, 2005.

Our study

Scores:

+

-

M

VAN WIECHEN ONTWIKKELINGSONDERZOEK 15-54 MND.

Gedragstoestand:	Interactie:	Notatiesysteem:	Naam:
0 = Kind is wakker en alert	0 = Kind is cooperatief	• In de betreffende kolom altijd de kalenderleeftijd vermelden, ook bij prematuren.	Geboortedatum:
1 = Kind maakt een vermoede indruk	1 = Kind is terughoudend en moet gestimuleerd worden	• Voor elk onderzoek nieuwe kolom gebruiken. Na 1½ jaar kolom voor tests consulten.	Zwangerschapsduur: _____ weken
2 = Kind is huiltend	2 = Kind is verlegen of terughoudend zonder actief verzet	• Resultaat noteren met + of - , bij twijfel -	
3 = Kind huilt door	3 = Kind verzet zich actief	• Rechts en links, waar aangewezen, afzonderlijk noteren.	
4 = Anders beschrijf onder opmerkingen	4 = Anders beschrijf onder opmerkingen	• Zo veel mogelijk zelf observeren, kenmerken met (M) zonodig op mededeling van de ouder, bij positief resultaat M noteren.	
		• Kenmerken herhalen.	

Algemeen	15 mnd	1½ jr	2 jr	2½ jr	3 jr	3½ jr	4 jr	4½ jr	Opmerkingen
Leeftijd									
Gedragstoestand									
Interactie									
Fijne mot. / Adapt. / Pers. en Soc. Gedrag	R	L	R	L	R	L	R	L	R
11. Doet blokje ivr uit doos									
12. Speelt "geven en nemen" (M)									
13. Stapelt 2 blokjes									
14. Doet op onderzoek uit (M)									
15. Stapelt 3 blokjes									
16. Doet anderen na (M)									
17. Stapelt 6 blokjes									
18. Plaakt ronde vorm in stoff									
19. Trekt kledingstuk uit (M)									
20. Bouwt vrachtauto na									
21. Plaakt 3 vormen in stoff									
22. Tekent verticale lijn na									
23. Bouwt brug na									
24. Plaakt 4 vormen in stoff									
25. Trekt eigen kledingstuk aan (M)									
26. Tekent cirkel na									
27. Houdt potlood met vingers vast									(met R L hand)
28. Tekent kruis na									
Communicatie	15 mnd	1½ jr	2 jr	2½ jr	3 jr	3½ jr	4 jr	4½ jr	
37. Zegt 2 "geluidwoorden" met begrip (M)									
38. Begrijpt enkele dagelijks gebruikte zinnen (M)									
39. Zegt 3 "woorden" (M)									
40. Begrijpt spelopdrachten (M)									
41. Zegt "zinnen" van 2 woorden (M)									
42. Wijst 6 lichaamsdelen aan bij pop (M)									
43. Noemt schaal "mij" of "u" (M)									
44. Wijst 5 plaatsen aan in boek									
45. Zegt "zinnen" van 3 of meer woorden (M)									
46. Is verstaanbaar voor bekenden (M)									
47. Praat spontaan over gebeurtenissen thuis op bezoek (M)									
48. Stelt vragen naar "wie", "wat", "waar", "hoe" (M)									
49. Is goed verstaanbaar voor onderzoeker									
50. Stelt vragen naar "hoeveel", "wanneer", "waarom" (M)									
51. Begrijpt analogieën en tegenstellingen (M)									
Grove Motoriek	15 mnd	1½ jr	2 jr	2½ jr	3 jr	3½ jr	4 jr	4½ jr	
66. Kruipst vooruit, buik vrij van de grond (M)									
67. Loopt lang (M)									
68. Loopt los / loopt goed los / loopt soepel									(1+ keer los mnd)
69. Gooit bal zonder om te vallen									
70. Raapt vanuit hurkt iets op									
71. Schuift bal weg									
72. Kan in zit soepel roteren									
73. Ploft (op driewieler) (M)									
74. Spring met beide voeten tegelijk									
75. Kan minstens 5 seconden op één been staan									

27. Tekent cirkel na						
Communicatie	15 mnd	1 1/2 jr		2 jr	2 1/2 jr	3 jr
37. Zegt 2 "geluidswoord" met begrip (M)	—			M		
38. Begrijpt enkele dagelijks gebruikte zinnen (M)	M					
39. Zegt 3 "woorden" (M)		—		M		
40. Begrijpt spelopdrachtjes (M)		+				
41. Zegt "zinnen" van 2 woorden (M)				—	M	
42. Wijst 6 lichaamsdelen aan bij pop (M)				M		
43. Wijst op objecten die zijn naam of "ik" (M)					—	M
44. Wijst op objecten die zijn naam of "ik" (M)					+	
45. 2 woorden (M)						M
46. 1 item en (M)						M
47. Praat spontaan over gebeurtenissen thuis/spelzaal (M)						
48. Stelt vragen naar "wie", "wat", "waar", "hoe" (M)						
49. Is goed verstaanbaar voor onderzoeker						
50. Stelt vragen naar "hoeveel", "wanneer", "waarom" (M)						
Grote Motoriek	15 mnd	1 1/2 jr		2 jr	2 1/2 jr	3 jr
65. Kruipt, buik vrij van de grond (M)						
66. Loopt langs (M)						

M= parent telling
the child is able
to preform the
item

Results

Scenario A

M is always a +

Scenario B

M is always a -

Results

Scenario A (M = +)

› Specificity 96 %

› Sensitivity 62 %

Scenario B (M = -)

Specificity 45 %

Sensitivity 89 %

- › **Specificity** (also called the **true negative rate**) measures the proportion of negatives which are correctly identified as such (e.g., the percentage of children with a typical development who are correctly identified as not having SLI)
- › **High specificity is important for**
no needless referral

- › **Sensitivity** (also called the **true positive rate**) measures the proportion of children having SLI at school age which are correctly identified as such

- › **High sensitivity is important for**
 - life threatening diseases
 - and essential early treatment

Important concerning SLI

- › **High specificity**
 - › Less needless referrals
- › **Lower sensitivity** is acceptable
 - › Few evidence for early treatment
 - › Ongoing monitoring is possible

Important for SLI

High specificity (>90%)

- › Most children with a typical language development will pass the test.
- › Less needless referrals

Lower sensitivity (>60%)

- › Some children with SLI will pass the test also
- › Few evidence for early treatment is essential
- › Ongoing monitoring of the language development is required

Results

Scenario A (M = +)

› Specificity 96 %

› Sensitivity 62 %

Scenario B (M = -)

Specificity 45 %

Sensitivity 89 %

M = - gives much lower specificity  more children without SLI will not pass the test, but more children with SLI will be identified.

Results

Scenario A (M = +)

› Specificity 96 %

› Sensitivity 62 %

Scenario B (M = -)

Specificity 45 %

Sensitivity 89 %

M = - gives much lower specificity  more children without SLI will not pass the test, but more children with SLI will be identified.

M = + has good predictive properties

Conclusion

The concise tool is a useful instrument for identification of children at risk for SLI at the age of 2 and 2 ½ years old.

But ongoing monitoring of the language development is necessary

› Thank you for your attention

