# The Bayley-III accommodated for motor and/or visual impairment

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# The Bayley-III accommodated for motor and/or visual impairment: "Low motor/vision version"

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Bayley Scales of Infant and Toddler Development™ THIRD EDITION

# Introduction (1) – Method – Results - Discussion

- (Developmental) assessment as part of early intervention

- Limitations of standard instruments: (Visser et al., 2012)
  - Development based on tests with children without impairment; application with children with impairment
  - Dependence of test results on specific skills

- International trend: accommodating instruments
  - Accommodations for impairment in each sensory area possible

# Introduction (2) – Method – Results - Discussion

- Bayley Scales of Infant (and Toddler) development
  - Bayley-III (Bayley, 2006) - Bayley-III-NL (Research currently running)
  - Individually administered

- Bayley-III
  - Cognition
  - Receptive Communication
  - Expressive Communication
  - Fine Motor development
  - Gross Motor development

# Introduction (3) – Method – Results - Discussion

- Current study: Low Motor/Vision version of Bayley-III

- Accommodations
  - Materials
  - Procedures (e.g. Time limits removed)
  - Instructions (e.g. Adjust distance of materials from child)

- Pilot research: practical

(Visser, Ruiter, Van der Meulen, Ruijssenaars, & Timmerman, 2013)

# 66 Blue Board Series: Completes

LM / LV

| Position | Materials | Trials | Time limit |
|---|---|---|---|
| Sitting independently | Blue board, Blue block set (4 round, 5 square), Stopwatch<br>***Low motor / Low vision***: Accommodated blue block set. | 1 | 75 seconds<br>***LM/LVi:***<br>No time limit |
| **Series items** | 51 (1 piece), 58 (4 pieces), 66 (complete) | | |

Put all pieces on the table …

… Stop the time when all nine pieces have been places correctly or when 75 seconds have passed.

**1 point:** Child places all nine pieces correctly within 75 seconds. To be placed correctly, a piece has to lie on the intended place completely.

**0 points:** Child places less than nine pieces correctly within 75 seconds.

***Low vision:*** Make sure to place the board within the visual field of the child.

***Low motor:*** You are allowed to support the elbows of the child.

# Introduction (4) – Method – Results - Discussion

› Hypotheses:

- Test results of children without impairment show invariant test content and difficulty.

- Test results of children with impairment are higher on the accommodated version and are a better reflection of their abilities.

# Introduction – Method (1) – Results - Discussion

- Participants:
  - Control group; n = 41
    - 25 girls, 16 boys
    - Calendar age: M = 2;0 years (range 0;1 – 3;8)
  - Special needs group; n = 63
    - Motor and / or visual impairment
    - 32 girls, 31 boys
    - Calendar age: M = 5;0 years (range 1;1 – 10;6)
    - Referred by 22 different branches of organisations

Introduction – # Method (2) – Results - Discussion

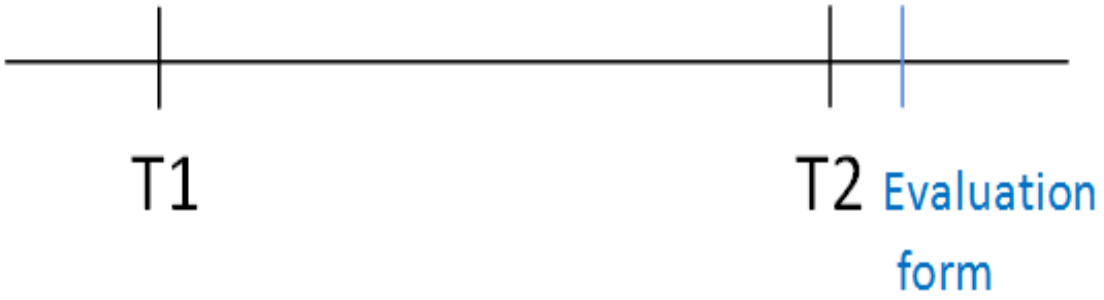
| | Impairment | | | |
|---|---|---|---|---|
| Diagnosis | Motor | Visual | Motor & Visual | *Total* |
| *Total* | *29* | *8* | *26* | *63* |

## Diverse population

Down syndrome / CP / PDD / Angelman / Other genetic disorders / No official diagnosis

# Introduction – Method (3) – Results - Discussion

| | | | |
|---|---|---|---|
| Test order A | - Control group<br>- Special needs group | Standard version | Accommodated version |
| Test order B | - Control group<br>- Special needs group | Accommodated version | Standard version |



# Introduction – Method (4) – Results - Discussion

- Analysis
  - T-test
    - Compare test order A and B, regarding:
    - Difference in Raw score (T2 – T1)
  - ANCOVA
    - Compare test order A and B, regarding:
    - Difference in Accommodated score (T2 – T1)
    - Covariate: difference in Non-accommodated score (T2 – T1)

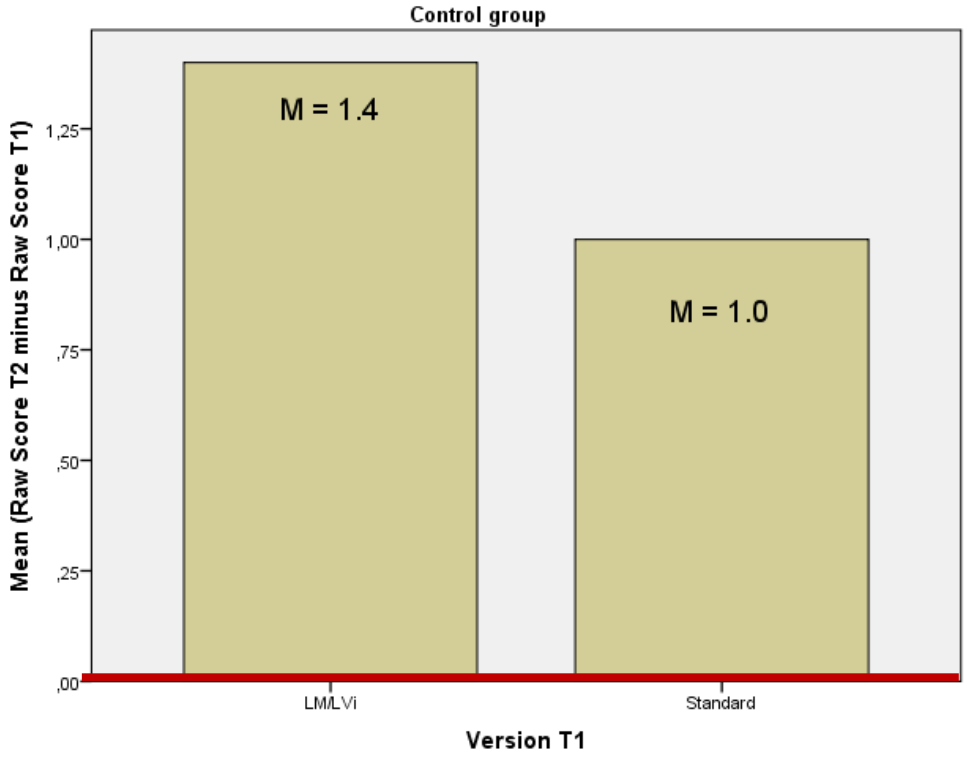
Both separately for control group and special needs group

- Examination of results Evaluation form

Introduction – Method – **Results (1)** - Discussion

› Control group, T-test on difference scores

Test results of children without impairment show invariant test content and difficulty

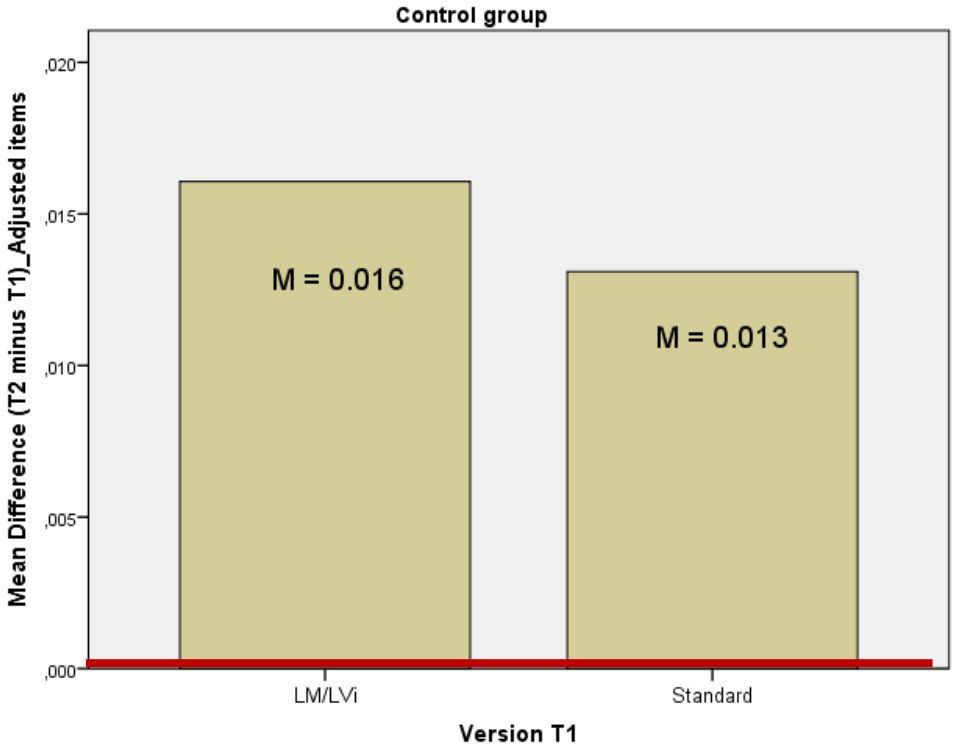



95% CI of difference [-1.6, 2.4], t = 0.41, $p$ = 0.69

Introduction – Method – # Results (2) - Discussion

› Control group, ANCOVA on difference score (adj.)

Test results of children without impairment show invariant test content and difficulty

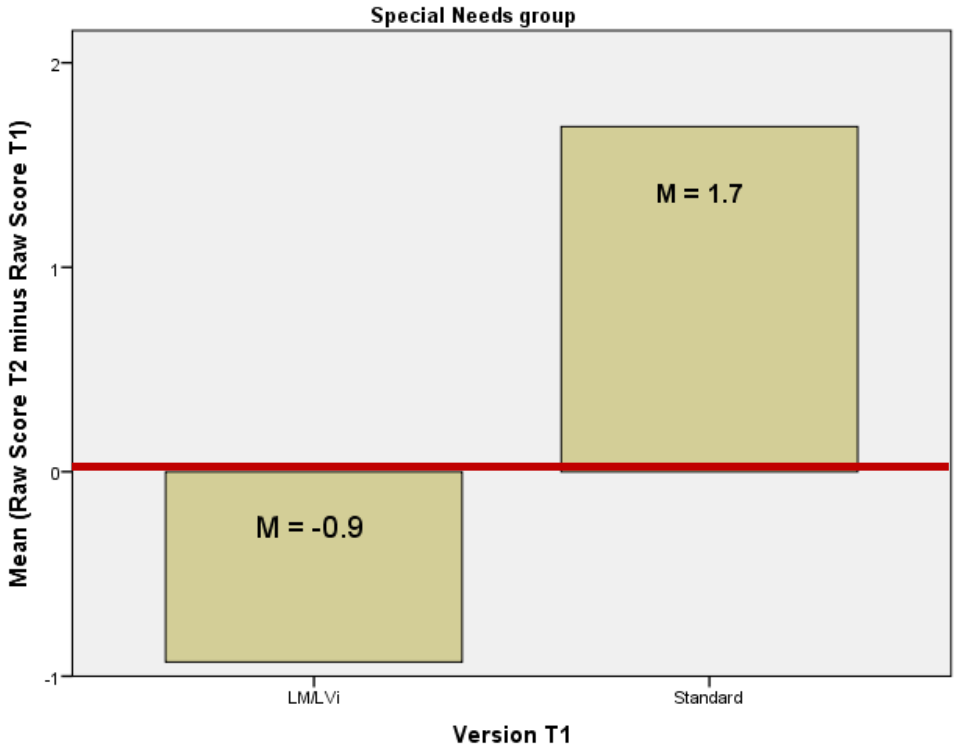



95% CI of difference [-0.023, 0.025], F = 0.01, p = 0.92

Introduction – Method – # Results (3) - Discussion

› Special needs gr., T-test on difference scores:

Test results of children with impairment are higher on the accommodated version




95% CI of difference [-4.6, -0.6], t = -2.59, p = 0.01

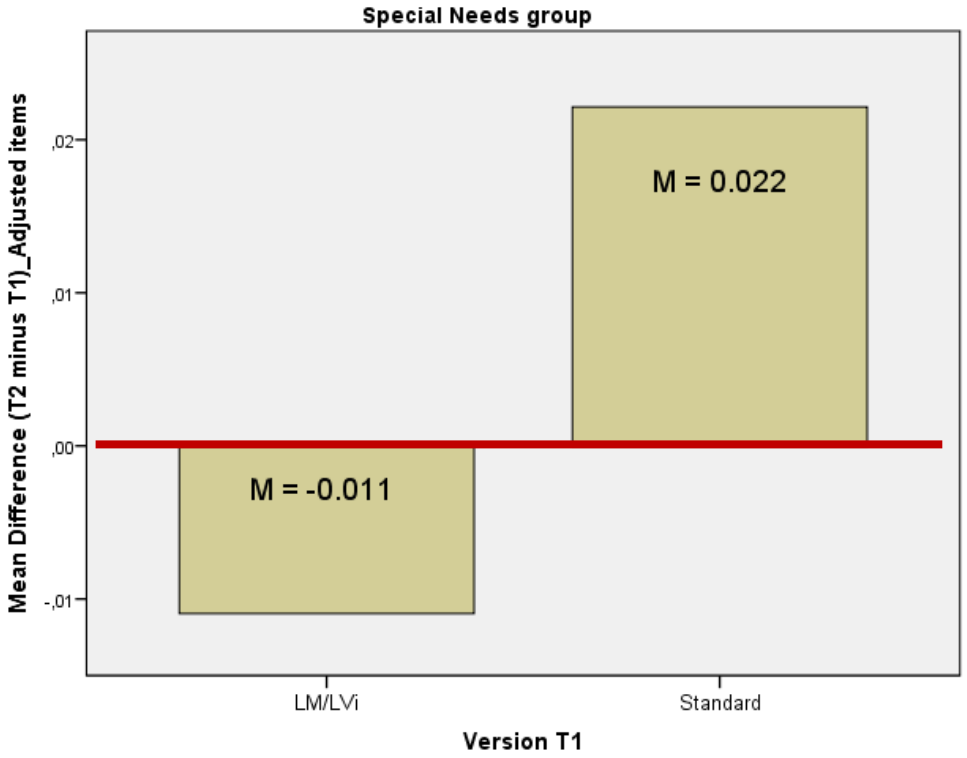
# Introduction – Method – Results (4) - Discussion

› Special needs group:

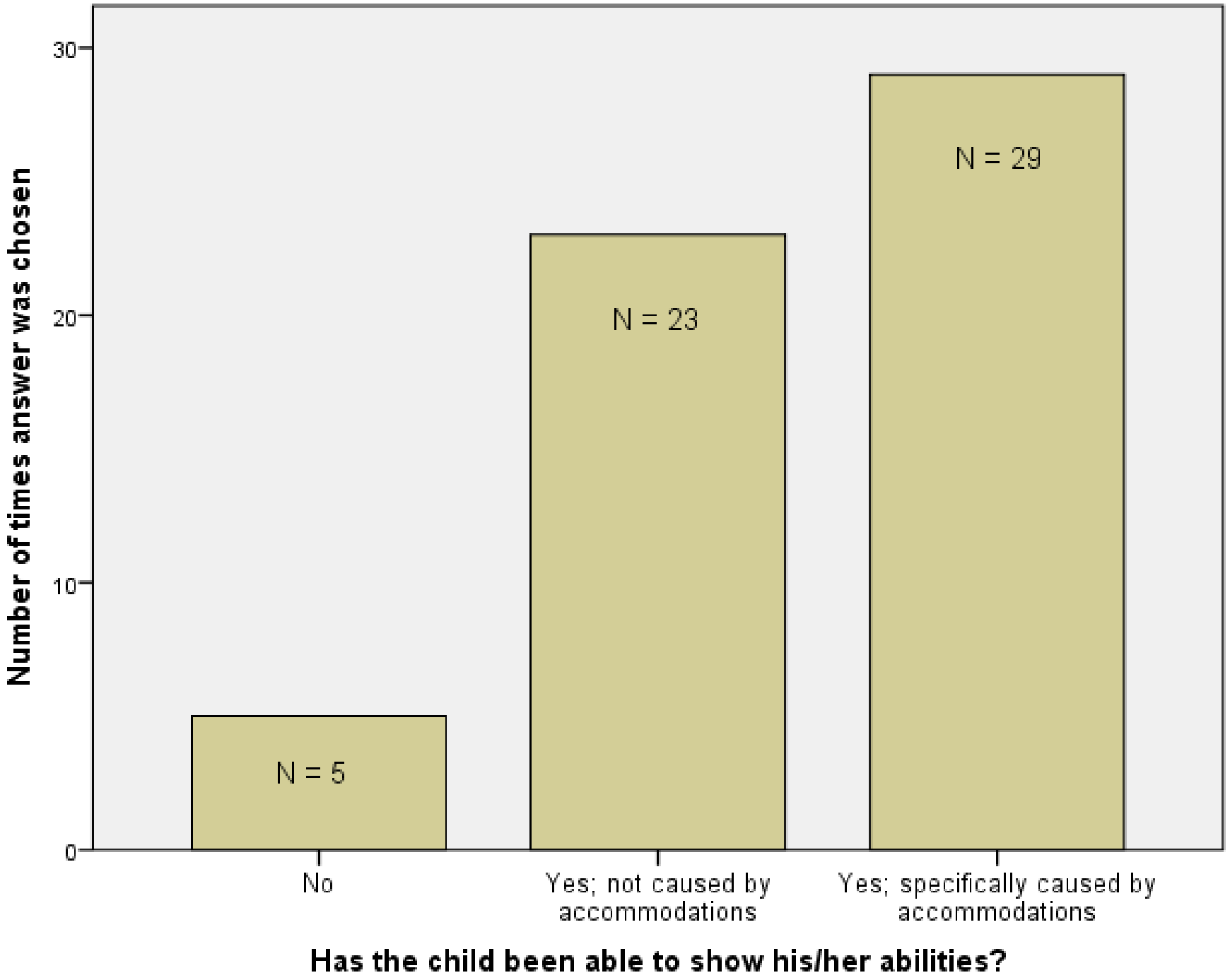
ANCOVA on

difference scores (adj.)

Test results of children with impairment are higher on the accommodated version




95% CI of difference [-0.057, -0.008], F = 7.07, p = 0.01


Number of times answer was chosen
30
20
10
0
N = 5
N = 23
N = 29
No
Yes; not caused by accommodations
Yes; specifically caused by accommodations
Has the child been able to show his/her abilities?

Introduction – Method – Results – # Discussion (1)

## › Limitations:

- Relatively small n for Motor scales
- Large within-child variability (sd of difference scores 3.1 – 4)
- Relatively small n for only visual impairment.

Introduction – Method – Results – # Discussion (2)

## › Conclusion:

Accommodations improve the validity of the Bayley-III when used with special needs children, especially with regard to their Cognition and in case of mild to moderate impairment.

## › Implication:

Increased validity of the assessment of the level of cognitive development of children with motor / visual impairment in the Netherlands.

Introduction – Method – Results – # Discussion (3)

## › Future research:

- Application of Low Motor/Vision in other countries?

- Develop appropriate standardized instrument for developmental assessment of children with profound and multiple learning disabilities.

- Can we test children > 42 months of calendar age with the Bayley-III?

# Thank you for your attention!

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# References

Bayley, N. (2006). *Bayley Scales of Infant and Toddler Development - Third edition*. San Antonio, TX: Harcourt Assessment.

Visser, L., Ruiter, S. A. J., Van der Meulen, B. F., Ruijssenaars, A. J. J. M., & Timmerman, M. E. (2012). A review of standardized developmental assessment instruments for young children and their applicability for children with special needs. *Journal of Cognitive Education and Psychology, 11*(2), 102-127.

Visser, L., Ruiter, S. A. J., Van der Meulen, B. F., Ruijssenaars, A. J. J. M., & Timmerman, M. E. (2013). Accommodating the Bayley-III with regard to motor and/or visual impairment: A comparative pilot study. *Manuscript Submitted for Publication.*