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

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New developments in the assessment of young children with the Bayley-III

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
  - Developmental age quotients
  - Accommodations for impairment in each sensory area possible

Introduction (2) – Method – Results - Discussion

- Bayley Scales of Infant (and Toddler) development
  - BSID (Bayley, 1969) - BOS 2-30 (Van der Meulen & Smrkovksy, 1983)
  - BSID-II (Bayley, 1993) - BSID-II-NL (Van der Meulen, Ruiter, lutje Spelberg & Smrkovsky, 2002)
  - Bayley-III (Bayley, 2006) - Bayley-III-NL (Research currently running)

- 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 ***Low motor / Low vision***: Accommodated blue block set.	1	75 seconds ***LM/LVi:*** 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

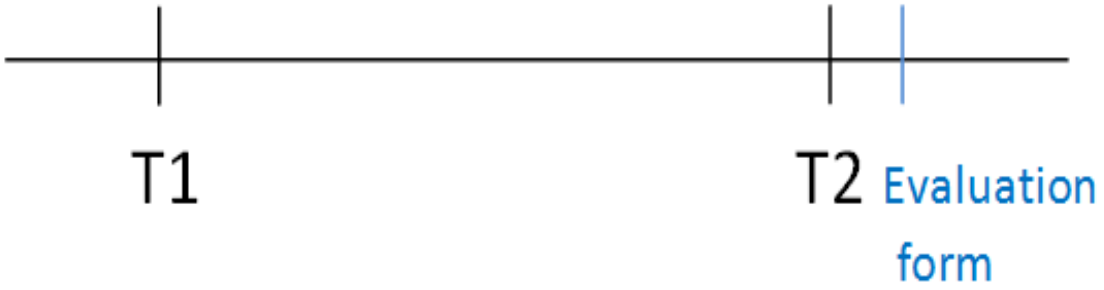
	Impairment			
Diagnosis	Motor	Visual	Motor & Visual	*Total*
Total	*29*	*8*	*26*	*63*

Diverse population

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

Introduction – Method (3) – Results - Discussion

Test order A	- Control group - Special needs group	Standard version	Accommodated version
Test order B	- Control group - 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

› Exploration of results on item level

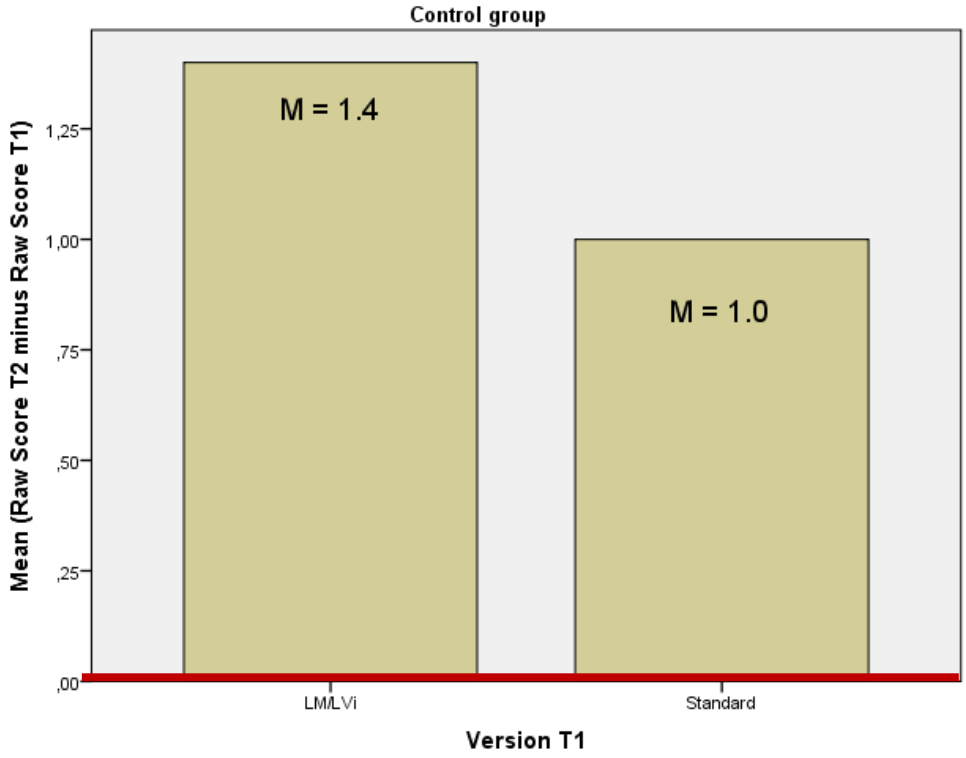
- Example: difficulty (p-value) of item 66 (blue puzzle)

  – Special needs group: p=0.16 (Standard)
    p=0.26 (LM/LVi)

Introduction – Method – # Results (2) - Discussion

› Control group, T-test on difference scores

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

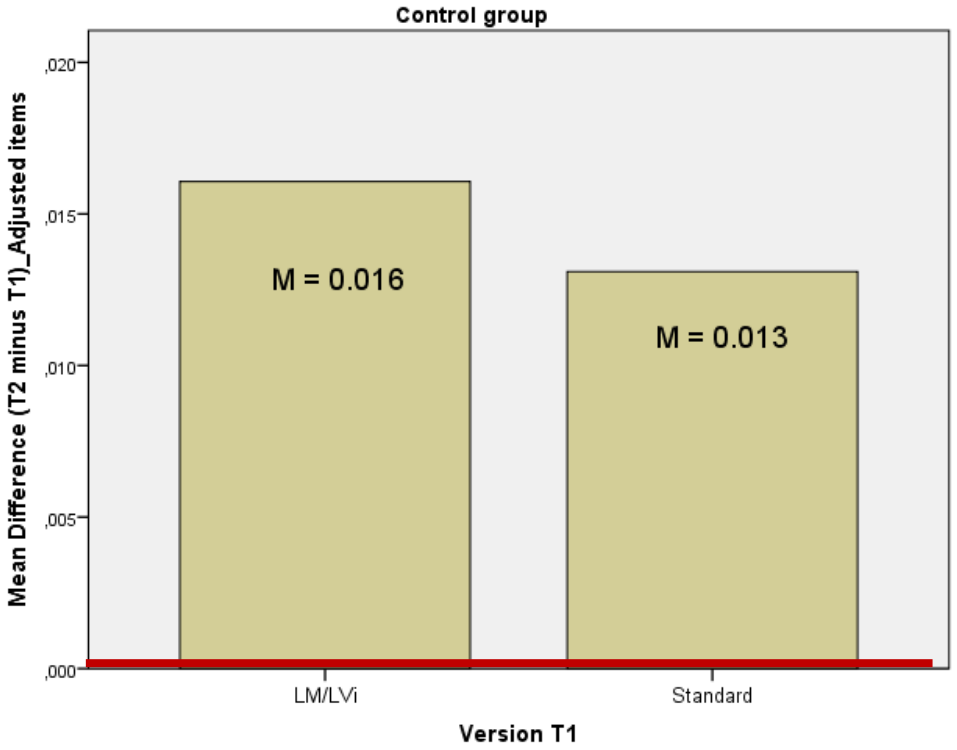


95% CI of difference [-1.6, 2.4], t = 0.41, p = 0.69

Introduction – Method – # Results (3) - Discussion

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

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

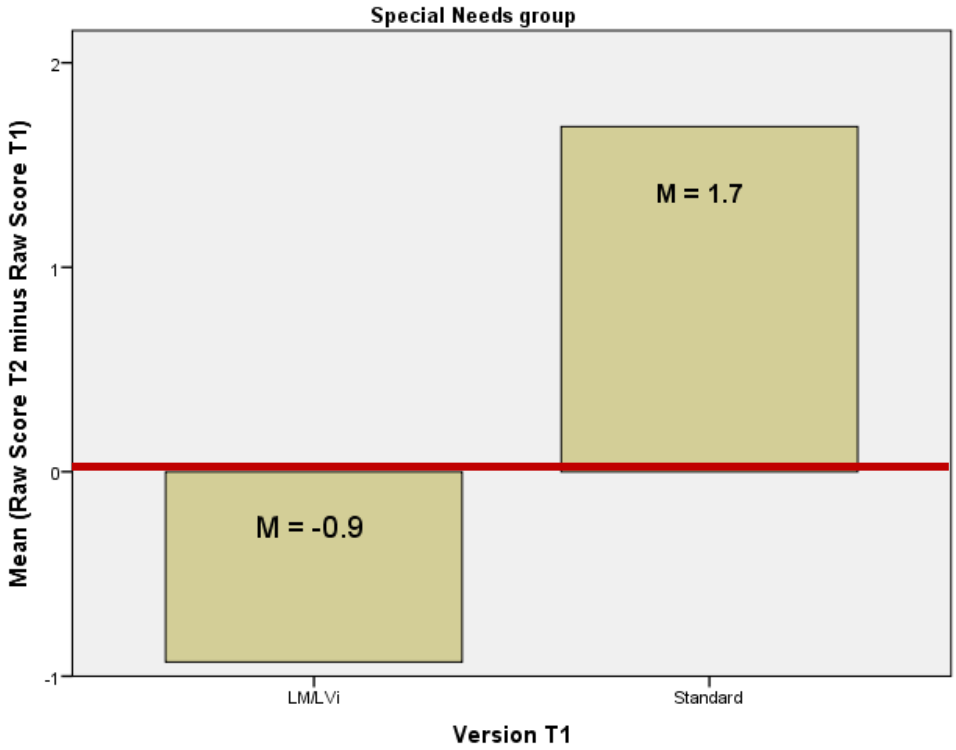


95% CI of difference [-0.023, 0.025], F = 0.01, p = 0.92

Introduction – Method – # Results (4) - 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

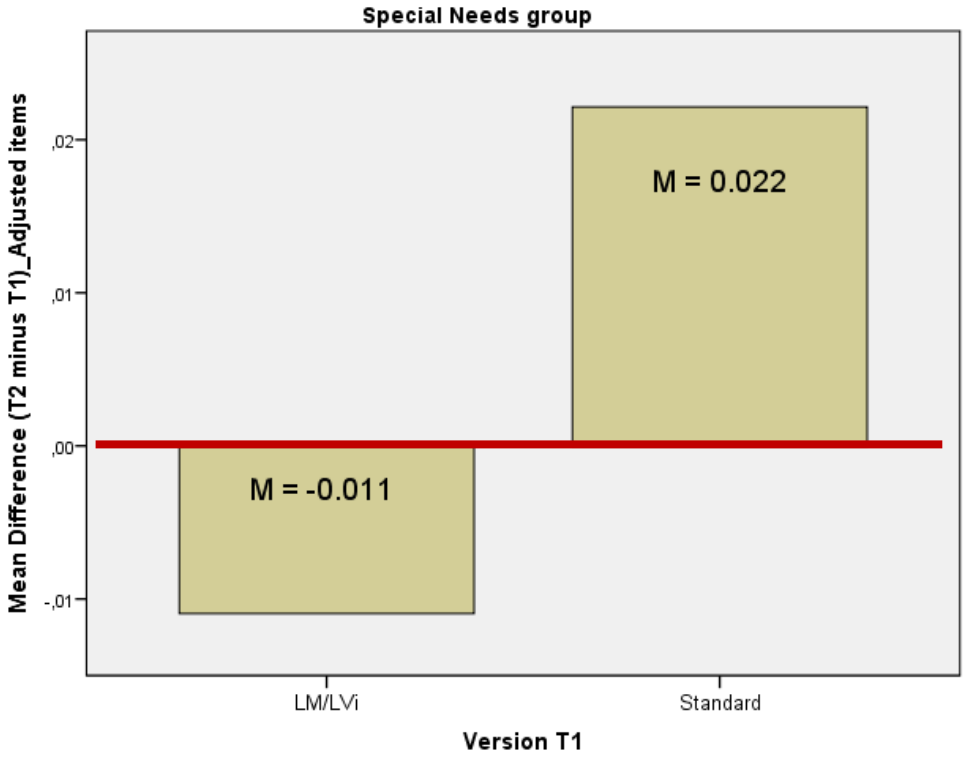
Introduction – Method – **Results (5)** - Discussion

› Special needs group:

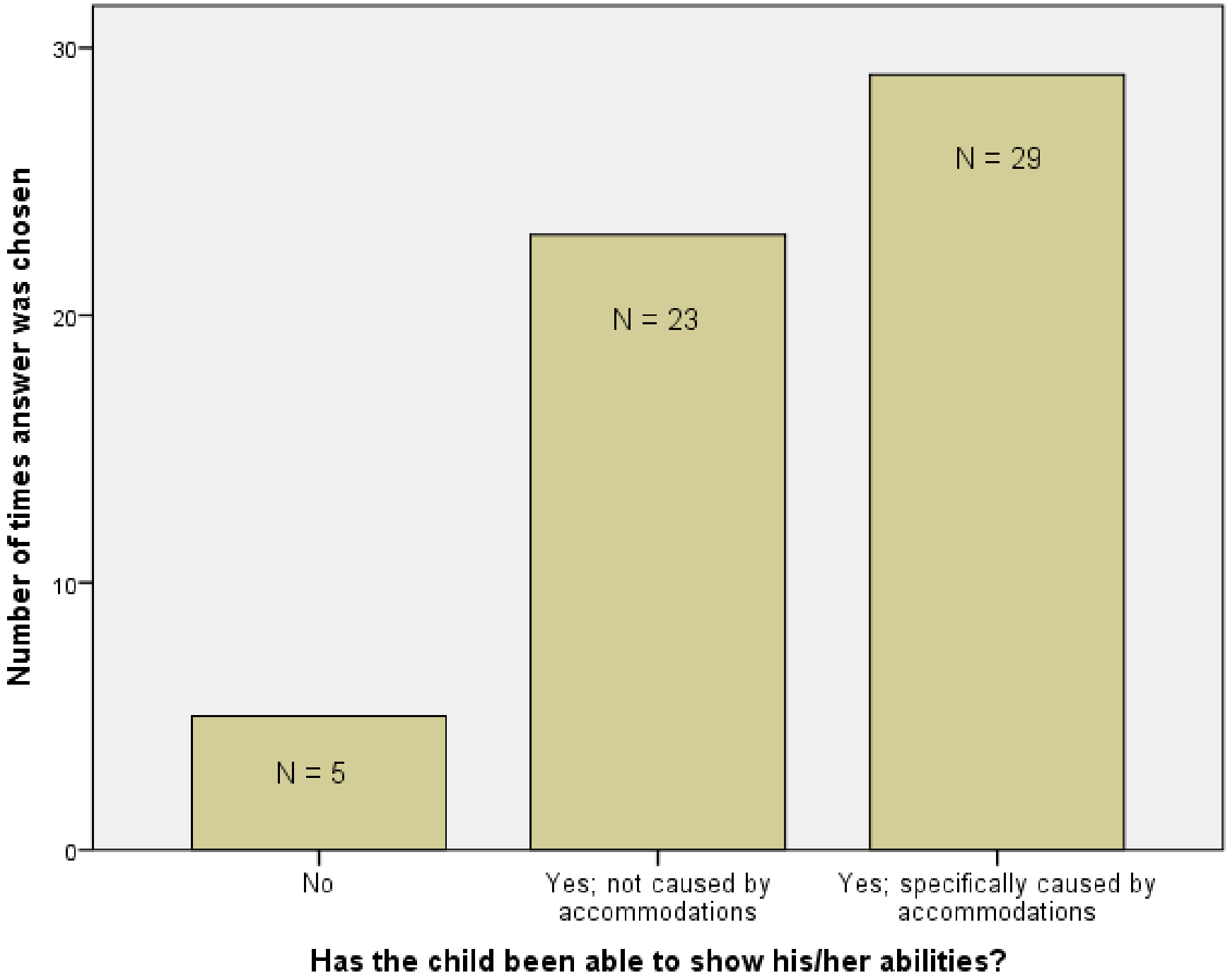
ANCOVA on

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, especially 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.

› Implications:

Possibility of proper assessment of the level of cognitive development of children with motor / visual impairment, with valid arguments.

Introduction – Method – Results – # Discussion (3)

› Future research:

- Research on the application of the LM/LVi version to assess the *development* of cognition, in contrast to the current level alone.

- 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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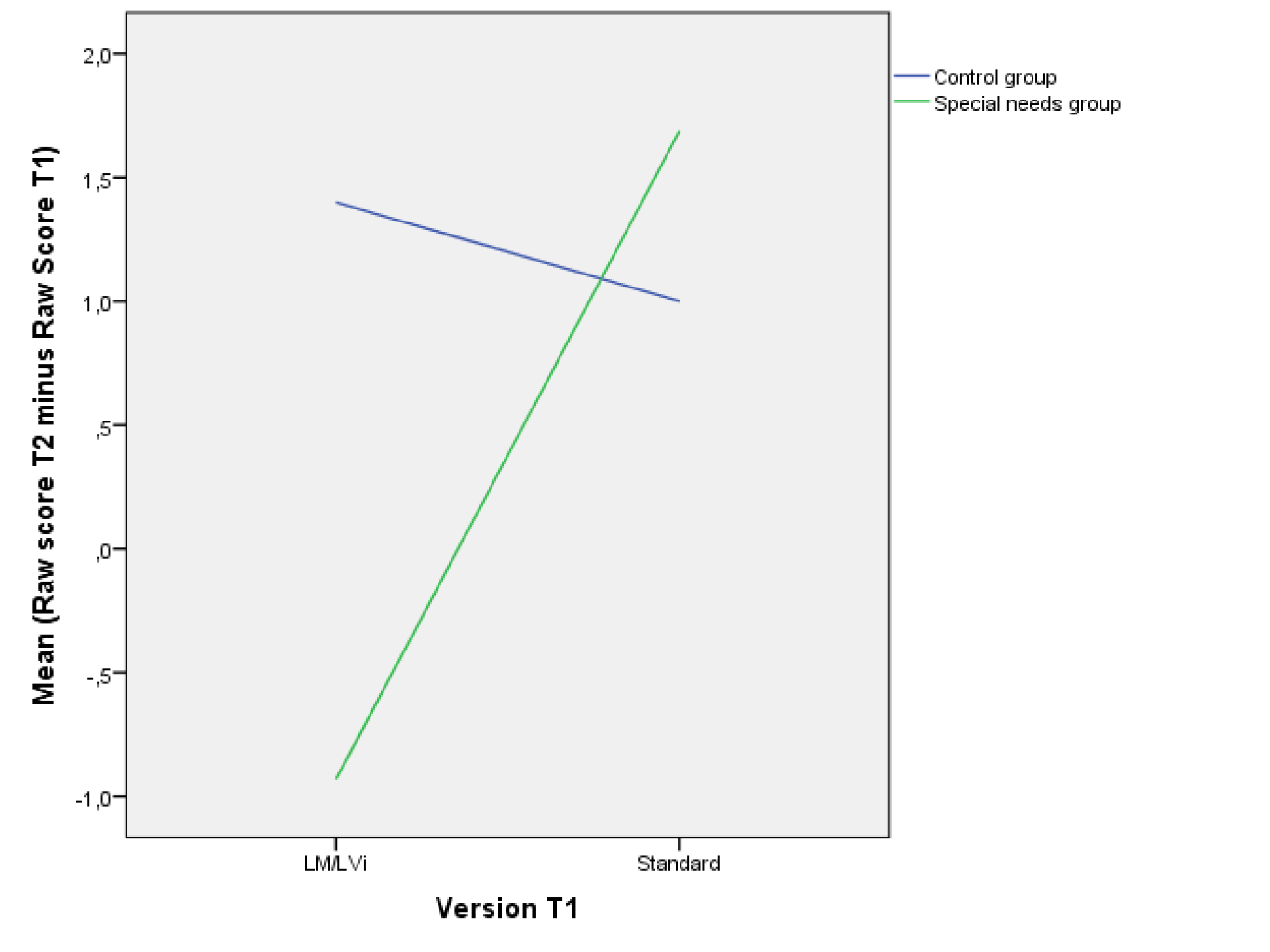
Mean (Raw score T2 minus Raw Score T1)
2,0
1,5
1,0
,5
,0
-,5
-1,0
LM/LVi
Standard
Version T1
Control group
Special needs group