# Psychometric properties of the CLASS Toddler in Dutch early childhood education and care

## Pauline Slot,
Jan Boom, Josje Verhagen &

Paul Leseman

Utrecht University

SIG 5 Symposium
**Measuring classroom quality with the Classroom Assessment Scoring System (CLASS) in four different European countries**
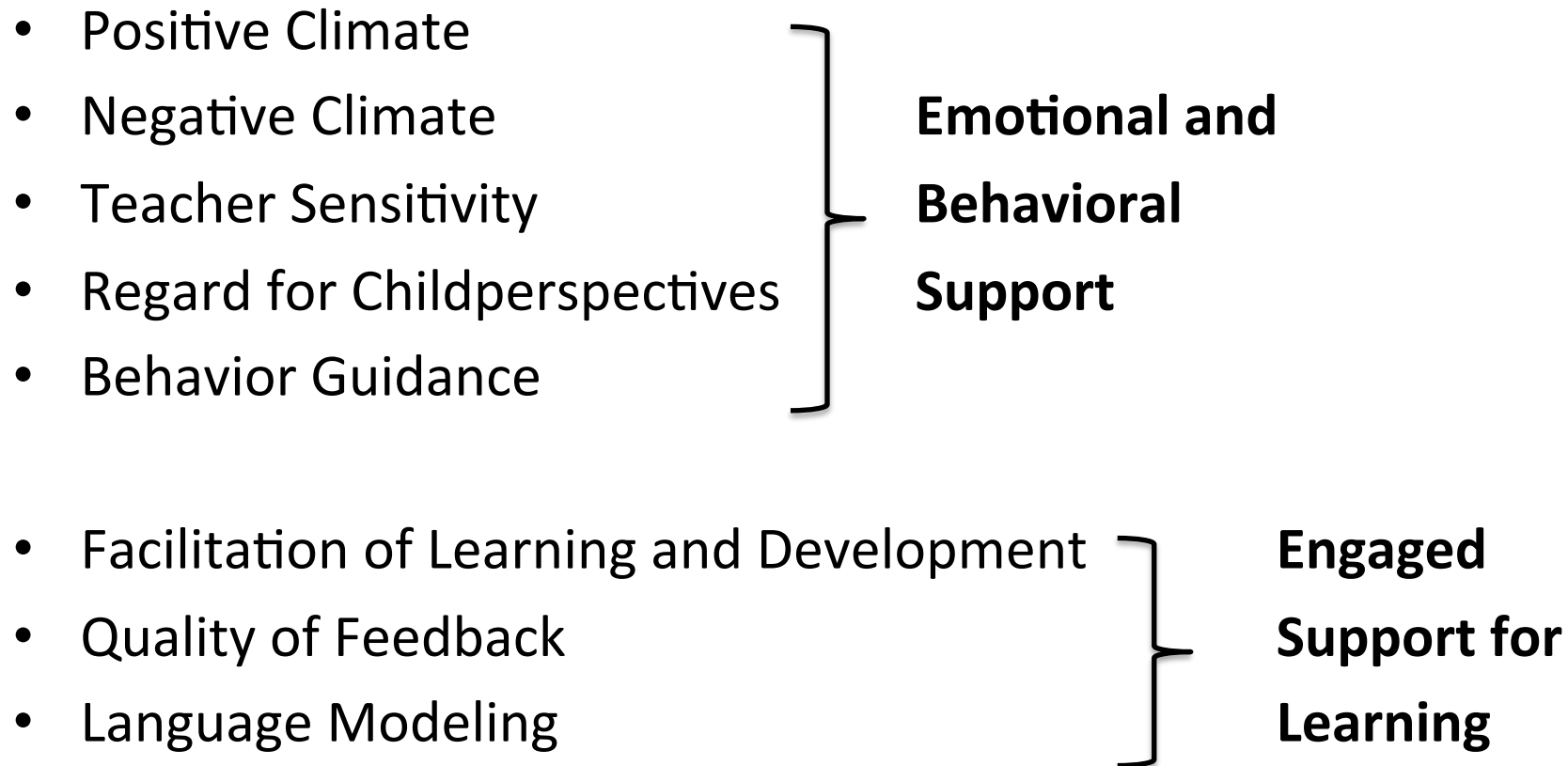
# Introduction

- Increasing use of Classroom Assessment Scoring System (CLASS) in Europe

- Most evidence on psychometric properties based on US studies

  - CLASS Toddler evidence very limited

- Use of Classical Test Theory approach (CTT; e.g. Factoranalysis) vs Item Response Theory approach (IRT; e.g. Item difficulty/item discrimination)

# Psychometric quality of the CLASS

- Multilevel CFA using CTT approach
  - Dimension structure
  - Domain structure

- Item difficulty and item discrimination using IRT approach

- Validity -> correlations with classroom and teacher characteristics

# CLASS Toddler

## Eight different quality dimensions

- Positive Climate
- Negative Climate
- Teacher Sensitivity
- Regard for Childperspectives
- Behavior Guidance

**Emotional and Behavioral Support**

- Facilitation of Learning and Development
- Quality of Feedback
- Language Modeling

**Engaged Support for Learning**

Dimension

Indicators



## Behavior Guidance

Encompasses the teacher's ability to promote behavioral self-regulation in children by using proactive approaches and providing clear behavioral expectations as well as support to prevent and redirect problem behavior.

| | Low (1,2) | Mid (3,4,5) | High (6,7) |
|---|---|---|---|
| **Proactive**<br><br>• Monitors children's behavior and is available<br>• Clear expectations<br>• Specific and consistent reinforcement of expectations | The teacher is unavailable and/or reactive in her approach to guidance of children's behavior. The children show no or very little awareness of classroom rules and expectations. | The teacher sometimes monitors the children for situations that may lead to problem behavior and sometimes makes himself available, but at other times he is more reactive. At times children show an awareness of classroom rules and expectations. | The teacher is proactive in her guidance of children's behavior. Children show evidence of awareness of classroom rules and expectations. |
| **Supporting positive behavior**<br><br>• Effective redirection<br>• Specific reminders<br>• Positive phrasing | The teacher spends significant periods of time attempting to guide children's behavior in the classrooms or does not address children's problem behavior and it continues or escalates. | The teacher sometimes uses effective strategies to promote positive behavior. However, at times the problem behavior continues and escalates as a result of ineffective redirection and/or support. | The teacher consistently uses effective strategies to support positive behavior. Problem behavior is reduced and does not escalate. |
| **Problem behavior**<br><br>• Minimal wandering<br>• Minimal waiting<br>• Lack of disruptive or potentially dangerous behavior | Children are waiting or wandering for significant periods of time. Children may be engaged in disruptive or problem behavior for extended periods of time. | Children are involved in activities and tasks for periods of time, but at other times they are waiting or wandering about the classroom. For brief periods of time, children may be involved in disruptive or problem behavior. | Children are consistently involved in activities and tasks. There are few, if any, instances of disruptive or problem behavior. |

# CLASS procedure

- Four observation cycles of 20 minutes, usually free play, eating/drinking and group activities, like circle time, reading, crafts etc.

- Scoring: first assigning low/mid/high to indicators, than assiging dimension scores (based on the indicators)

- Justified? No prior research into quality of indicators

# Sample

- Observations: <u>162 centers</u> (of which 64 day care and 98 preschool) en <u>271 classrooms</u> (of which 121 day care and 150 preschools)

- Teacher reports: <u>182 centers</u> (response rate 69%; of which 126 day care and 175 preschool) and <u>301 classrooms</u> (of which 126 day care and 175 preschool)

- Overlap between observations and teacher-reports 40%
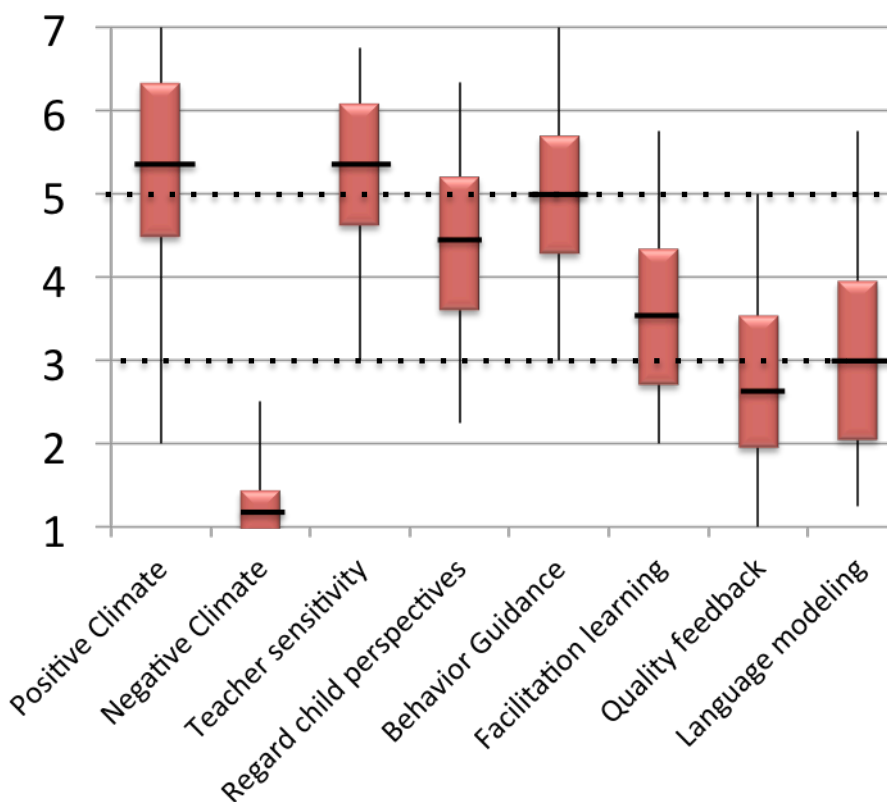
# Analysis strategy

- CFA of the eight dimensions with indicators (IRT): observation cycle level

- CFA with domains: 2-factor model tested against a 1-factor and a 3-factormodel

- IRT analyses: item difficulty and discrimination

# Descriptives CLASS Toddler
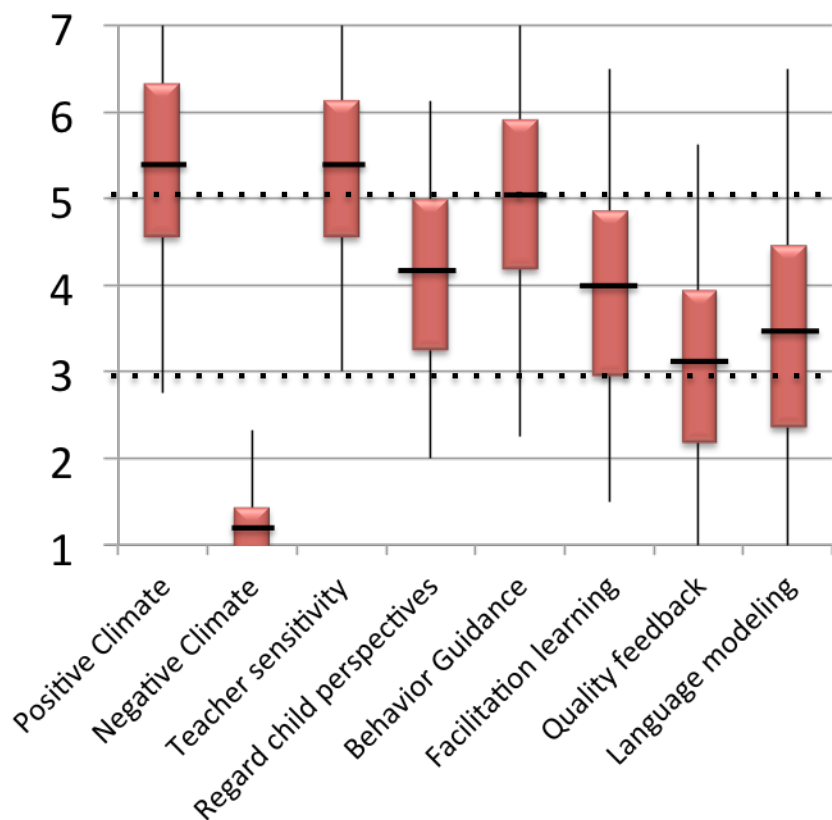


Preschool

Day care

# 8-factor model CLASS dimensions
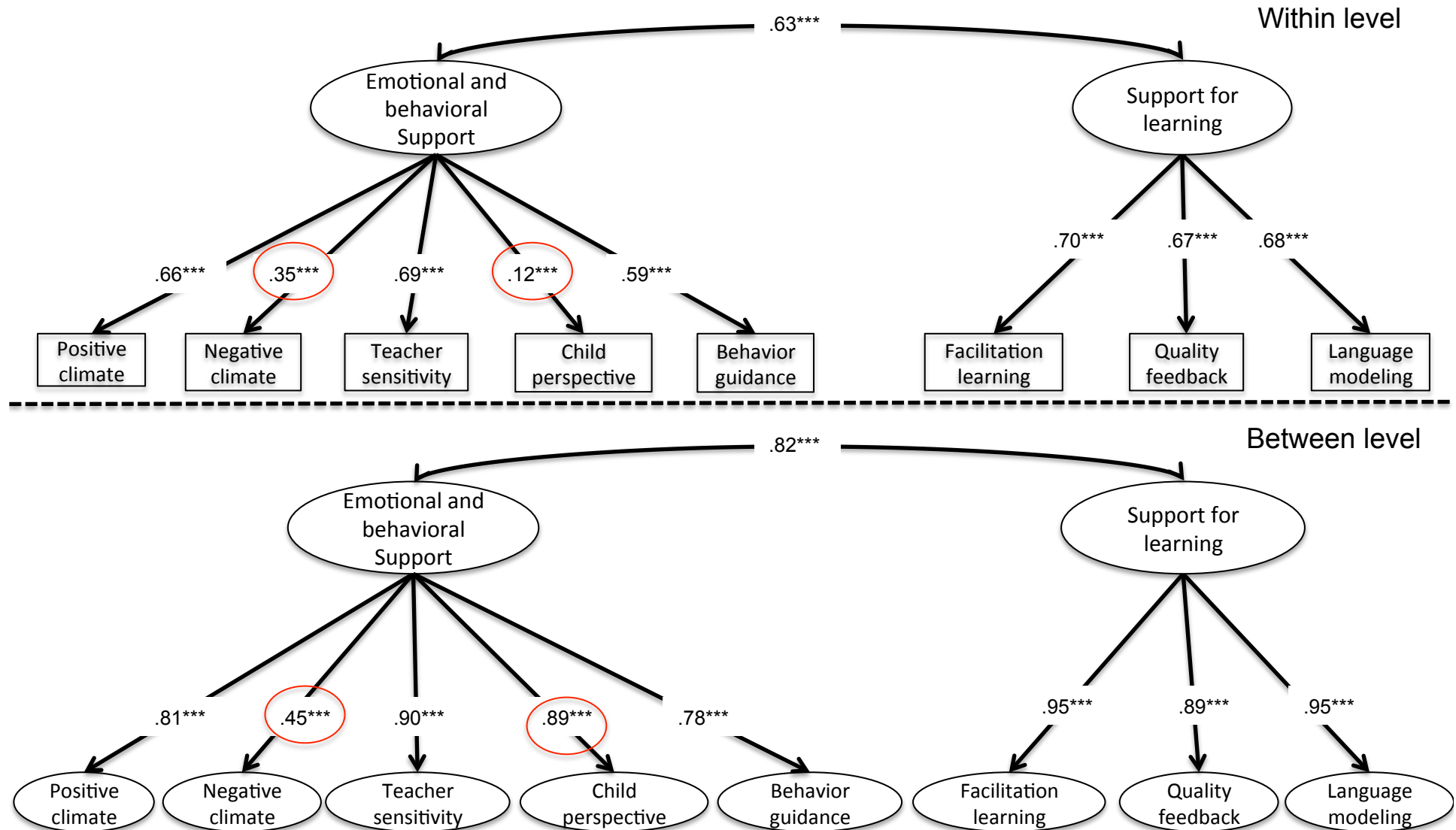
Slot, Boom, Leseman & Verhagen (under review)

-> multilevel analyses revealed good model fit: RMSEA=.04

| Dimensions | Indicator | Factor loading Within level | Factor loading Between level |
|---|---|---|---|
| Positive Climate | Relationships | .57 | .77 |
| | Positive Affect | .64 | .85 |
| | Respect | .56 | .99 |
| Negative Climate | Negative affect | .65 | .85 |
| | Punitive control | .47 | .46 |
| | Teacher negativity | .21 | 1.00[1] |
| | Child negativity | .58 | .57 |
| Teacher Sensitivity | Awareness | .61 | .71 |
| | Responsiveness | .60 | .90 |
| | Child comfort | .52 | .88 |
| Regard for Child Perspectives | Child focus | .83 | .84 |
| | Flexibility | .77 | .73 |
| | Support of independence | .48 | .69 |
| Behavior Guidance | Proactive | .58 | .80 |
| | Supporting positive behavior | .53 | .65 |
| | Problem behavior | .60 | .74 |
| Facilitation of Learning and Development | Active facilitation | .75 | .91 |
| | Expansion of cognition | .81 | .85 |
| | Children's active engagement | .51 | .76 |
| Quality of Feedback | Scaffolding | .54 | .54 |
| | Providing information | .72 | .84 |
| | Encouragement and affirmation | .51 | .77 |
| Language Modeling | Supporting language use | .75 | .80 |
| | Repetition and extension | .61 | .79 |
| | Self- and parallel talk | .36 | .52 |
| | Advanced language | .68 | .65 |

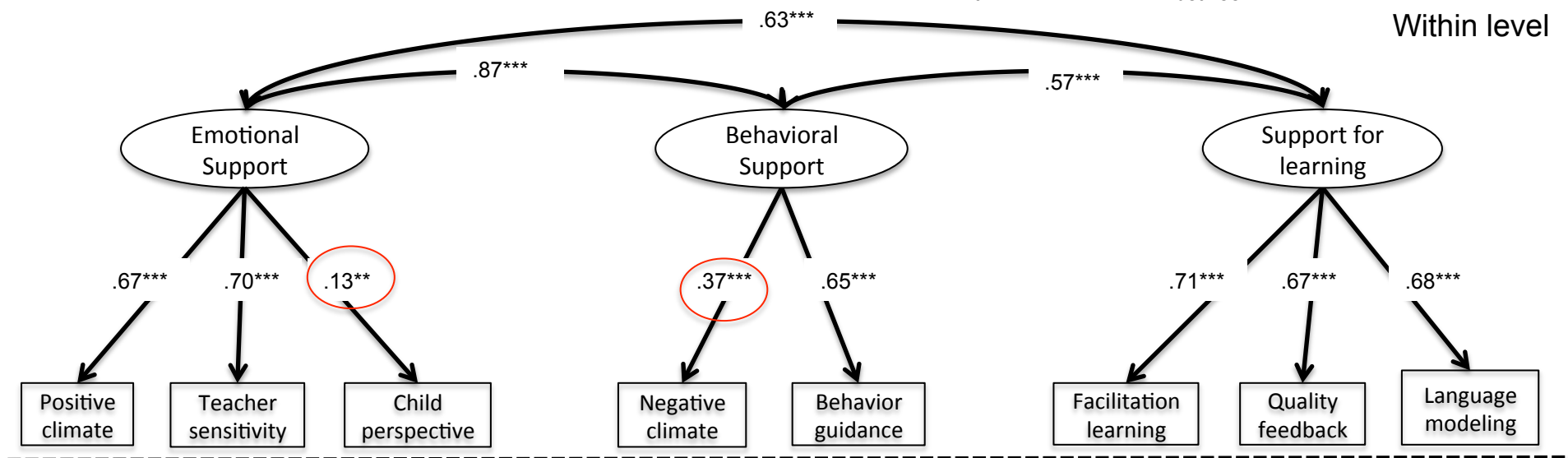[1] value after constraining the residual variance to 0.001

# 2-factormodel

$x^2(38)=101.57$, RMSEA=.04, CFI=.97, TLI=.96, $\text{SRMR}_{\text{within}}$=.03, $\text{SRMR}_{\text{between}}$=.05



Within level

.63***

Emotional and behavioral Support

Support for learning

.66*** .35*** .69*** .12*** .59***

.70*** .67*** .68***

Positive climate | Negative climate | Teacher sensitivity | Child perspective | Behavior guidance

Facilitation learning | Quality feedback | Language modeling

Between level

.82***

Emotional and behavioral Support

Support for learning

.81*** .45*** .90*** .89*** .78***

.95*** .89*** .95***

Positive climate | Negative climate | Teacher sensitivity | Child perspective | Behavior guidance

Facilitation learning | Quality feedback | Language modeling

# 3-factormodel

$x^2(34)=82.50$, RMSEA=.04, CFI=.98, TLI=.96, SRMR$_{within}$=.03, SRMR$_{between}$=.04
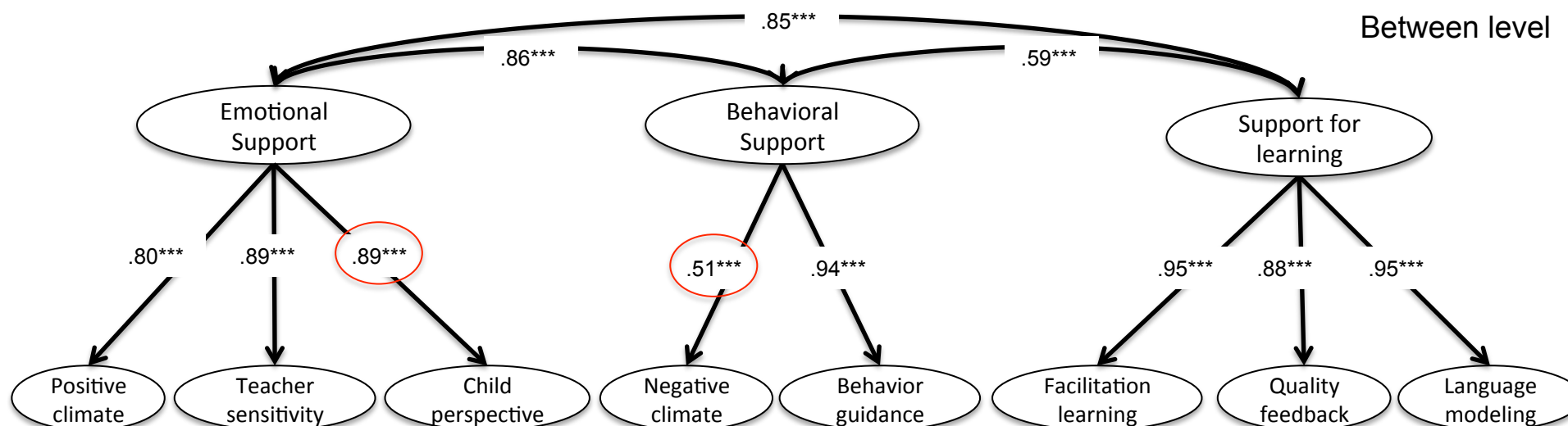
# CLASS: item difficulty and discrimination

| Domain | Dimensions | Indicator | Difficulty | Discrimination |
|---|---|---|---|---|
| Emotional Support | Positive climate | Relationships | -.890 | .703 |
| | | Positive Affect | -.861 | .800 |
| | | Respect | -1.093 | .802 |
| | Teacher sensitivity | Awareness | -.692 | .654 |
| | | Responsiveness | -.840 | .775 |
| | | Child comfort | -1.160 | .737 |
| | Regard for Child Perspectives | Child focus | -.116 | .755 |
| | | Flexibility | -.449 | .877 |
| | | Support of independence | .140 | .610 |
| Behavioral Support | Negative Climate (reversely coded) | Negative affect | -.1.526 | .905 |
| | | Punitive control | -1.667 | .626 |
| | | Teacher negativity | -2.236 | .659 |
| | | Child negativity | -1.523 | .699 |
| | Behavior guidance | Proactive | -.692 | .693 |
| | | Supporting positive behavior | -.417 | .610 |
| | | Problem behavior | -.885 | .651 |
| Engaged Support for Learning | Facilitation of learning and development | Active facilitation | .338 | .751 |
| | | Expansion of cognition | .676 | .795 |
| | | Children's active engagement | -.495 | .527 |
| | Quality of feedback | Scaffolding | .833 | .504 |
| | | Providing information | .788 | .734 |
| | | Encouragement and affirmation | .536 | .591 |
| | Language modeling | Supporting language use | .235 | .821 |
| | | Repetition and extension | .537 | .707 |
| | | Self- and parallel talk | .670 | .513 |
| | | Advanced language | .590 | .704 |

# Criterion validity of the CLASS

## Correlations with structural teacher and classroom characteristics

**Associations Between CLASS Domains and Teacher Characteristics**

|  | Emotional support | Behavioral support | Engaged support for learning |
|---|---|---|---|
| *Categorical classroom characteristics and CLASS domains and t-tests between subgroups* | | | |
| Education program | | | |
| Yes | 4.94 | 5.92 | 3.25 |
| No | 5.02 | 5.78 | 3.23 |
| Type of provision | | | |
| Day care | 5.04 | 5.88 | 3.08[a] |
| Preschool | 4.96 | 5.94 | 3.44[a] |
| *Continuous teacher and classroom characteristics and Pearson correlations* | | | |
| Pre-service education level | -.03 | .05 | -.01 |
| Group size | -.06 | -.02 | -.03 |
| Children-to-teacher ratio | -.12† | -.10 | -.16** |
| Work experience | .14 | .16 | .19* |
| % of children speaking little Dutch | .03 | -.04 | .16† |
| *Provision of activities (based on self-reports) and Pearson correlations* | | | |
| Play | .19* | .07 | .27* |
| Literacy | .17† | .22* | .25** |
| Math | -.05 | -.05 | .06 |

*Note.* Values with the same subscript letters differ significantly at *p* < .05; **p<.01.

*p<.05, †p<.10

# Conclusions psychometric quality CLASS

- Overall psychometric quality of the CLASS seems adequate to good. Some issues pointing to cultural differences.

- Negative climate:
  - Little variation in Negative Climate, in line with other European studies (Pakarinen et al., 2010, von Suchodoletz, under review)
  - Moderate correlations between Negative climate and Behavior guidance -> separate domain

- Regard for child perspectives problematic at the within level, with low factor loadings. In Dutch ECEC this appears to be strongly related to the type of activity setting

# Conclusions continued

- Item difficulty (CLASS indicators):
  - It's easier for teachers to get higher scores on the indicators of the Emotional support and Behavioral support domains than on the indicators of Engaged support for learning.

- Item discrimination (CLASS indicators):
  - All indicators have good discrimination values.

- Therefore: higher scores on Emotional and Behavioral support are not an artifact of the instrument, but based on teacher's actual scoring pattern

- Some evidence for criterion validity: correlations with structural teacher and classroom characteristics in the expected direction

# Future research and implications

- More research into predictive validity of the CLASS -> child developmental outcomes

- Our findings have shown that the psychometric quality of the CLASS Toddler is good, but also revealed a different factorstructure and some issues pointing to cultural differences, hence:

  - Always investigate the psychometric quality of the used measure, even when established in other countries

  - Keep in mind cultural differences in interpreting the results

Thank you for your attention!

p.l.slot@uu.nl