

# Master Thesis

The relationship between language delays and emotional and behavioral problems during preschool years

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## **Voorwoord**

Dit onderzoek is uitgevoerd binnen mijn masteropleiding orthopedagogiek aan de Universiteit Utrecht, werkveld leerlingzorg. De gegevens die in dit onderzoek zijn gebruikt, zijn verzameld binnen mijn stage-instelling PeuterPlus!. Dit is een samenwerkingsverband tussen de Universiteit Utrecht en de gemeente Utrecht om risicopeuters te ondersteunen. Via deze weg wil ik Lex Wijnroks bedanken voor zijn feedback en het meedenken bij de interpretatie van de gegevens. Verder wil ik mijn vriend en ouders bedanken voor de support tijdens het schrijven van de thesis. Tot slot wil ik mijn medestudenten binnen PeuterPlus! bedanken voor de fijne en gezellige samenwerking.

### Samenvatting

**Doel:** Het doel van dit onderzoek was om meer inzicht te verkrijgen in de relatie tussen receptieve en expressieve taalproblemen en internaliserend en externaliserend probleemgedrag binnen een groep klinisch verwezen peuters. Daarbij werd ook de invloed van de mogelijke moderatoren sekse, thuistaal en sociaal economische status (SES), meegenomen. Verwacht werd dat taalproblemen positief zouden samenhangen met gedragsproblemen. **Methode:** De gegevens van 145 klinisch verwezen kinderen (87 jongens en 58 meisjes) in de leeftijd van 31 tot en met 48 maanden werden gebruikt in dit onderzoek. Internaliserende en externaliserende problemen werden gerapporteerd met behulp van de Caregiver-Teacher Report Form, 1.5-5 jaar (C-TRF). De receptieve taalontwikkeling werd voor 85 kinderen gemeten met de Peabody Picture Vocabulary Test-III-NL en voor 60 kinderen met een verkorte versie van de Vocabulary Task. Expressieve taalontwikkeling werd geobserveerd met behulp van drie schalen van de Preschool Classroom Behavioral Observation System (PCBOS). **Resultaten:** Kinderen met taalproblemen lieten in slechts 3.9% tot 11.0% van de gevallen ook internaliserende of externaliserende problemen zien. In tegenstelling tot de verwachting bleek een goede receptieve taalvaardigheid een significante voorspeller voor internaliserende problemen ( $p < .001$ ) en externaliserende problemen ( $p < .017$ ). Thuistaal was hierbij een significante moderator ( $p < .048$ ). Expressieve taalproblemen waren geen voorspeller voor emotionele en gedragsproblemen. **Conclusie:** Niet alleen komen taalproblemen en emotionele en gedragsproblemen vaak geïsoleerd voor bij klinisch verwezen peuters, ook blijkt in tegenstelling tot resultaten uit onderzoek binnen normale populaties dat hoe lager het taalbegrip des te minder internaliserende en externaliserende problemen de kinderen laten zien.

### Abstract

**Background:** The purpose of the current study was to provide information about the relation between receptive and expressive language delays and internalizing and externalizing problems in clinically referred preschool children. Also the influence of a number of moderators was examined, namely gender, home language and socioeconomic status (SES). It was expected that language delays were positively related to behavior problems. **Method:** The data of 145 clinically referred children (87 boys and 58 girls) aged 31 to 48 months were used in this research. Internalizing and externalizing problems were reported on the Caregiver-Teacher Report Form, 1.5-5 years (C-TRF). Receptive language was measured for 85 children with the Peabody Picture Vocabulary Test-III-NL and for 60 children with a short

version of the Vocabulary Task. Expressive language was observed with three scales of the Preschool Classroom Behavioral Observation System (PCBOS). It was expected that language delays were positively related to behavior problems. **Results:** Children with language delays showed only in 3.9% to 11.0% internalizing or externalizing problems. Contrary to the expectation good receptive language ability significantly predicted internalizing problems ( $p < .001$ ) and externalizing problems ( $p < .017$ ). Home language significantly moderated this relationship ( $p < .048$ ). Expressive language delays did not predict emotional or behavioral problems. **Conclusion:** Not only do language delays and emotional and behavioral problems often occur isolated in clinically referred preschool children, also, contrary to results from research within normal populations, children with a lower level of receptive language show fewer behavior problems.

### **The relationship between receptive language delays and emotional and behavioral problems during preschool years**

The relationship between socio-emotional development and language development is recognized in literature, but most research in this area has focused on school-aged children and adolescents (Benner, Nelson, & Epstein, 2002; Blankenstein & Scheper, 2003; Brownlie et al., 2004; Petersen et al., 2013; Van Daal, Verhoeven, & Van Balkom, 2007; Yew & O’Kearny, 2013). Limited work to date exists on the co-morbidity of language problems and emotional and behavioural problems and the extent of this relation in children aged 2.5 to 4, even though children in that period develop very quickly in their ability to understand and use language (Conti-Ramsden & Durkin, 2012). Also little research exists on moderating factors that influence this relationship. This study builds on previous research by investigating the relationship between language delays and emotional and behavioral problems and will explore moderating variables, so that interventions to treat these problems can be carefully adapted.

The development of language is a complicated process. Within this development, a distinction can be made between receptive language (comprehension or understanding) and expressive (production) use of language. Reception is usually acquired earlier than expression (Conti-Ramsden & Durkin, 2012). Toddlers can follow simple directions, but still be unable to express the used words in their own speech. For example, Menyuk, Liebergott and Schultz (1995) found that toddlers understand 50 words around 13 months, but cannot produce these words until five months later. In the preschool years children further develop the ability to verbally communicate with others. This language development helps them to acquire social and emotional competence, which is a crucial element for later success in life (Adela, Mihaela, Elana-Adriana, & Monica, 2011).

Delays in language development can disturb social and emotional development of children and can lead to emotional and behavioral problems (Im-Bolter & Cohen, 2007). Several possible reasons for this disturbance can be distinguished. First, language skills may influence the development of these problems, because poor language skills may result in the misinterpretation of social interactions. The way children think and reason is influenced by language (Zadeh, Im-Bolter, & Cohen, 2007). Receptive language delays can limit the ability of children to understand verbal directions and a child can look as being oppositional or inattentive when it does not follow the directions given (Fijiki, Brinton, Morgan, & Hart, 1999; Gremillion & Martel, 2013). If children often misinterpret social communications due to receptive language delays, they may become frustrated and develop patterns of antisocial

behavior and inattentiveness (Durkin & Conti-Ramsden, 2010; Prizant et al., 1990; Ruhl, Hughes, & Camarata, 1992). Keenan and Shaw (2003) found for example that parents might use more reasoning in response to misbehavior when children understand what they say, instead of punishment.

Besides problems with receptive language, a second reason for the development of psychopathology is a delay in expressive language. When children are unable to communicate their wishes and needs, they can become frustrated and consequently withdraw or behave aggressively (Petersen et al., 2013). Gallaher (1999) found for example that aggressive children used more physical aggression to solve social problems, because they were unable to use language instead.

Although these mechanisms for the development of emotional and behavioral problems can be described, estimates about the comorbidity between language delays and emotional and behavioral problems vary largely from 40-90% (Redmond & Rice, 1998; Benner et al., 2002). This variation may be due to differences in definition of the variables and to the type of language and behavioral difficulties considered (Lindsay, Dockrell, & Strand, 2007). Concerning the type of language problems, frequency rates of the comorbidity between language problems and behavioral problems are not consistent as well. Multiple studies with school-aged children and adolescents find that receptive language problems predict the highest risk for the development of behavioral problems, compared with expressive language problems (Baker & Cantwell, 1985; Cohen, Davine, Horodezsky, Lipsett, & Isaacson, 1993; Toppelberg & Shapiro 2000). Contrary, some studies find that the comorbidity between expressive language problems and behavioral problems is more frequent, compared to receptive language problems (Nelson, Benner, & Cheney, 2005; Ripley and Yuill, 2005). However, the sample size of the research of Ripley and Yuill (2005) was very limited and more research is necessary to confirm these findings. Therefore receptive and expressive language problems will be considered separately in this study.

Besides the qualitatively analyzed relation and the comorbidity rates between language delays and emotional and behavioral problems, also the extent of this relation can be analyzed to further adapt future interventions. However, limited quantitatively research exists on this topic. A meta-analysis of Yew and O’Kaerny (2013) is, as far as we know, the first attempt to integrate the longitudinal evidence of 19 studies to examine the strength of the relation between language problems and later psychological outcomes. They concluded that there is not enough evidence to relate language problems to specific emotional or behavioral disorders

such as Attention Deficit Hyperactivity Disorder (ADHD), anxiety or conduct problems. However, this meta-analysis does show that children with language problems have a significant heightened risk for the development of overall internalizing and externalizing problems in childhood and later adolescence, with the highest risk for externalizing behavior problems. Still the strength of the relationship between language impairments and social-behavior problems is not related to age, preschool age is not considered and the only moderating factors considered are type of language difficulty and gender.

Therefore in this study also the extent of the relationship between language delays and internalizing and externalizing problems will be examined with children aged 2.5 to 4. Internalizing problems are defined as introvert problem behaviors like emotional reactivity, fears, depression, somatic complaints and social withdrawal, whereas externalizing problems refer to attention problems and aggressive and oppositional behavior (Beg, Casey, & Saunders, 2007). Additionally a number of moderators will be examined. The first one is gender, since girls are slightly faster in their language development than boys (Keenan & Shaw, 2003). The second moderating factor considered is social background, because behavior problems and language deficits are more frequently related among children from families of lower socioeconomic status ([SES]; Keiley, Bates, Dodge, & Pettit, 2000; Stanton-Chapman, Chapman, Bainbridge, & Scott, 2002). The last moderating factor that will be taken into account is whether another language than Dutch is spoken at home, because it is expected that children who do not speak Dutch have more isolated language problems (Bialystok, Luk, Peets, & Yang, 2010; Calvo & Bialystok, 2014). Participants in this study will be clinically referred preschool children with a diversity of problems, ranging from behavior problems to language problems, because it is expected that a significant relationship between language delays and behavior problems is more evident in a population with extremes for either language delays, behavior problems or both.

The following research questions about the relation between language development and social-emotional development are examined in the present study:

1. Is there a relation between language delays and emotional and behavioral problems in children in the preschool years who were clinically referred, and does this differ for internalizing and externalizing problems?
2. Are gender, socioeconomic status, home language and moderating factors on the relation between language delays and emotional and behavioral problems?

Based on the previous discussed research it is expected that for children in the age of 2.5 to 4 also a relationship exist between receptive language deficits and emotional and behavioral problems, namely that language problems lead to behavioral problems. It is expected that this relation is stronger for boys than for girls, since the language development of girls precedes the language development of boys. Further it is expected that this relation is stronger for children from families with low SES, since language problems and behavior problems are often more strongly related in those families. Concerning the last moderating variable home language, it is expected that the relation is stronger for children who are raised in Dutch, because children raised in another language have more isolated language problems.

## Method

### Participants

Children ( $N = 145$ ) aged 31 to 48 months ( $M = 39.75$ ;  $SD = 3.96$ ) were participants in this study, of which 87 (60%) boys and 58 (40%) girls. They attended preschools or playgroups in Utrecht and they were referred for language and/or behavior problems by a clinical consultant to a project called PeuterPlus!. Of these children 38 (26.6%) were monolingual for Dutch, 65 (45.5%) were bilingual for Dutch and another language, and 40 children (28%) were monolingual for another language. Of the participants 35 (24.1%) were from families with low SES, 34 (23.4%) from families with intermediate SES, 12 (8.3%) from families with high SES and of 64 participants (44.1%) no information about SES was available.

### Measures

**Emotional and behavioral problems.** Internalizing and externalizing problems were reported on the Caregiver-Teacher Report Form, 1.5-5 years ([C-TRF]; Verhulst, van der Ende, & Koot, 2000). The validity and reliability of the Dutch version of the C-TRF are not yet determined (Evers, van Vliet-Mulder, & Groot, 2000). At the 99 items of the C-TRF could be rated whether behavior was *not true* (0), *somewhat true* (1) or *very or often true* (2). The scores were clustered into the scales internalizing and externalizing problems. Total problems were the added scores of internalizing and externalizing problems. Scores for internalizing, externalizing and total problems were divided into a *normal range* (T-score till 59, *borderline range* (T-score from 60 till 63) and *clinical range* (T-score of 64 and above).

**Receptive language development.** Receptive language was measured for 85 children with the Peabody Picture Vocabulary Test-III-NL (Dunn & Dunn, 2005). The Peabody has a



good reliability and adequate validity to objectively test the receptive vocabulary (Evers, Braak, Frima, & Vliet-Mulder, 2009-2012). In the test four pictures were shown to the child and a word was mentioned. The child was for example asked to point at the dog. The test consisted of two trial items and seven test sets, increasingly in difficulty. Every set consisted of 12 items and a set was always completely tested. When five or more mistakes were made, an easier set would be applied and when nine or more mistakes were made in a set, the test was aborted. With the number of mistakes made and the number of items tested, a percentile score was calculated.

The receptive language of the other 60 children was measured with a short version of the Vocabulary Task (Mulder and Verhagen, 2010). This receptive vocabulary task is derived from the Peabody Picture Vocabulary Test-III-NL (Dunn & Dunn, 2005). Four pictures were shown to the child and a word was mentioned. The child had to point at the right picture. The test consisted of 24 items and for every item children could score one point. Based on data collected in a sample of 135 typically developing preschool children, a percentile score was calculated to compare the scores of this test to the scores of the Peabody Picture Vocabulary Test-III-NL.

**Expressive language development.** The expressive language of the children was measured with three scales of the Preschool Classroom Behavioral Observation System, ([PCBOS], Wijnroks, 2013). The PCBOS is a modified Dutch version of the CLASS observation system (La Paro, Pianta, & Stuhlman, 2004), with additional scales to observe language development. The validity and reliability of the PCBOS are not yet determined. The used language scales were *language expression*, *speech* and *grammar*. The scale *expression* was defined as the amount of language production and length of the sentences. For *speech* the articulation, fluency, volume, accent and speed were observed. The last scale used was *grammar*, for which basic language rules as use of the correct verb, tenses and conjunctions were observed. Scores could range from very limited (1) to very well developed (7). Furthermore the scores were divided into three categories, namely limited (1-2), average (3-5) and good (6-7).

### **Procedure**

The data is gathered within a large project on preschool children in the Netherlands, called PeuterPlus!. After several observations of the child's behavior in different settings at a preschool or playgroup, the co-workers of PeuterPlus! filled out the C-TRF, which took about 10 to 20 minutes. To measure expressive language development, the co-workers of PeuterPlus! observed two times a part of the day and used the PCBOS to score the child's

expressive language development. The receptive language of the children was tested with the Picture Vocabulary Test-III-NL individually, at the preschool or playgroup and when possible in a separate room.

### **Data Analysis**

First, it was analyzed which percentage of children with language delays also had emotional or behavioral problems. If a child scored under the cut off score of the 5<sup>th</sup> percentile on the receptive language tests, it was considered as having receptive language problems. For expressive language the data of the scales expression, speech and grammar were computed to the variable expressive language with a Cronbach's alpha of .814. If a child scored in the limited range (scores till 2) it was considered as having expressive language problems. Concerning expressive language the data of 68 children were missing, so the analyzes were computed with the data of the other 77 children. There was no significant correlation between the standardized scores for receptive and expressive language ( $r = .043$ ,  $p = .713$ ), so no further analyzes were computed for the predictive value of this interaction. A child was considered as having emotional or behavioral problems if it scored within the borderline or clinical range of the C-TRF.

Secondly, the extent of the relation between language development and the development of emotional and behavior problems was analyzed with a linear regression analysis.

Thirdly, a multiple hierarchical regression analysis was computed to test whether gender, home language and SES had a significant moderating effect on the relation between receptive and expressive language and total, internalizing and externalizing problems. Therefore the data were standardized. To analyze whether home language was a moderator, this variable was divided into two categories, namely children raised in Dutch and children raised in another language than Dutch. For the analysis of SES as moderator, educational level of the mother was taken as representative for SES of the families. Educational level was recoded into a continue variable with 1 (primary or basic vocational education), 2 (secondary vocational school or high school) and 3 (higher professional education or university). Because the data of 60 children were missing concerning this variable, these participants were excluded. The multiple hierarchical regression was computed with the other 85 children.

### **Results**

First the co-occurrence between language delays and emotional and behavioral problems was analyzed. The co-occurrence between receptive language delays and total emotional and

behavioral problems in this sample was 6.2%. For internalizing and externalizing problems it was 8.3% and 11.0% respectively. For expressive language, the co-occurrence with total emotional and behavior problems was 3.9%, for externalizing problems 6.5% and for internalizing problems 5.2%. The descriptive statistics of the different groups are displayed in Table 1. The overall scores for behavioral problems were higher in the groups without receptive or expressive language delays.

Table 1

*Descriptive Statistics of Internalizing, Externalizing and Total Problems for Groups With and Without Receptive or Expressive Language Delays*

Group	n	Total		Internalizing		Externalizing	
		M	SD	M	SD	M	SD
Receptive delays	68	53.35	7.81	50.74	7.80	53.94	8.61
No receptive delays	41	58.39	7.50	57.66	11.13	57.24	8.19
Expressive delays	27	52.63	6.80	50.48	8.21	53.78	7.93
No expressive delays	118	55.91	8.44	53.81	10.20	55.86	8.86

Next a linear regression was used to analyze as to whether language ability predicted the level of total problems, internalizing and externalizing problems. Preliminary analyses were conducted for all variables to control for the assumptions of normality and linearity. The normality of receptive language was slightly right skewed (skewness = 0.968), but there were no violations of the assumptions of normality and linearity. The results of the linear regression are presented in Table 2. Receptive language ability predicted the scores on total problems ( $F(1, 143) = 10.25, p < .002.$ ), internalizing ( $F(1,143) = 12.79, p < .001$ ) and externalizing problems ( $F(1,143) = 5.85, p < .017$ ). It explained 6.7% of the variance in total problems, 7.6% in internalizing problems and 3.9% in externalizing problems. All the beta's were positive, which means that higher levels of receptive language predicted higher levels of emotional and behavioral problems. Expressive language did not significantly predict any variable of emotional and behavioral problems.

Table 2

*Linear Regression of Receptive and Expressive Language and Emotional and Behavioral Problems*

Dependent variable	Receptive		Expressive	
	R <sup>2</sup>	Beta	R <sup>2</sup>	Beta
Total problems	.067**	.259**	.005	-.072
Internalizing problems	.076***	.287***	.001	.038
Externalizing problems	.039*	.198*	.009	-.095

Note. \**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

Next, the influence of three moderating factors was analyzed in this study, namely gender, SES and home language. Since expressive language skills did not significantly predict emotional and behavioral problems, moderating factors were only analyzed for receptive language skills. Again preliminary analyses were conducted to control for the assumptions of normality and linearity and also analyses were conducted for the assumption of multicollinearity. There was no violation of these assumptions.

The moderating effect of gender is presented in Table 3. This shows that gender is not a significant moderator for the relation between receptive language and total, internalizing or externalizing problems.

Table 3

*Moderating Effect of Gender on the Relation between Receptive Language and Emotional and Behavioral Problems*

Variables	Total		Internalizing		Externalizing	
	ΔR <sup>2</sup>	Beta	ΔR <sup>2</sup>	Beta	ΔR <sup>2</sup>	Beta
Step 1						
Receptive language	.067**	.259**	.082***	.301**	.039*	.302**
Step 2						
Gender	.000	-.010	.004	-.061	.000	-.010
Step 3						
Receptive language	.005	-.095	.000	-.023	.015	-.160
x Gender						
Total R <sup>2</sup>	.072*		.086**		.054*	

Note. \**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

The moderating effect of SES is presented in Table 4. This shows that SES is also not a significant moderator for the relation between receptive language and total, internalizing and externalizing problems.

Table 4

*Moderating Effect of SES on the Relation between Receptive Language and Emotional and Behavioral Problems*

Variables	Total		Internalizing		Externalizing	
	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta
Step 1						
Receptive language	.067*	.249	.082**	.273*	.039	.133
Step 2						
SES	.005	-.036	.026	-.098	.001	.122
Step 3						
Receptive language x SES	.002	.055	.006	.106	.010	.140
Total R <sup>2</sup>	.073		.114*		.051	

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

The last moderator analyzed was home language. The results of this multiple regression analysis are presented in Table 5. This shows that home language had no significant moderating effect on the relation between receptive language and total emotional and behavioral problems. However, for externalizing problems a significant result is found ( $p < .048$ ). This means that the relation between receptive language and externalizing problems was moderated by home language, namely the relation was stronger for children who are raised in Dutch.

Table 5

*Moderating Effect of Home language on the Relation between Receptive Language and Emotional and Behavioral Problems*

Variables	Total		Internalizing		Externalizing	
	$\Delta R^2$	Beta	$\Delta R^2$	Beta	$\Delta R^2$	Beta
Step 1	.067**		.082***		.039*	
Receptive language		.259**		.287*		.198*

Step 2	.015	.018	.002
Dutch	-.127	-.137	-.045
Step 3	.018	.001	.027*
Receptive language	.419	-.118	.515*
x Dutch			
Total R square	.100**	.110**	.073*

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### Discussion

In the current literature it remains unclear whether there is a relationship between socio-emotional problems and language problems in preschool children and also moderating factors are not yet determined. The first goal of the current study was therefore to provide information about the relation between language problems and emotional and behavioral problems in clinically referred preschool children. Problems in receptive and expressive language were considered and it was analyzed whether this relation was different for internalizing and externalizing problems. Second, a number of moderators were analyzed.

The co-occurrence of language delays and internalizing and externalizing problems ranged from 3.9% to 11.0%, with the lowest co-occurrence for expressive language delays. Overall the co-occurrence was lower than expected, so only a minority of the children had both language delays and emotional and behavioral problems. This may be partly due to the used definition of language delays. In most research examining the relation between language development and the development of emotional and behavioral problems, children with a language disorder are defined as having language problems. However, it is very challenging to reliably and validly identify young children with language disorders (Gremillion & Martel, 2013), so in this study the broader term of language delays was used. Another explanation might be that distracted behavior could be interpreted as oppositional behavior, while in fact language delays are the reason for the distracted behavior (Fijiki, Brinton, Morgan, & Hart, 1999; Gremillion & Martel, 2013). Since in this study the C-TRF was filled out by independent observers, it might be that they were able to make a better distinction between these problems than the parents and teachers whose information was used in previous studies.

The predictive value of receptive and expressive language development for total, internalizing and externalizing emotional and behavioral problems was also analyzed. Although expressive language did not predict emotional and behavioral problems, receptive language did significantly predict the level of total, internalizing and externalizing problems. However, contrary to our expectation, the relationship between the level of receptive language

and emotional and behavioral problems was positive, pointing to a negative relationship between problems in receptive language ability and emotional and behavioral problems. In other words, better receptive language skills were related to more emotional and behavioral problems. In the current literature, the majority of the studies found a positive relation between delays in language and the development of emotional and behavioral problems (Benner, Nelson, & Epstein, 2002; Blankenstein & Scheper, 2003; Brownlie et al., 2004; Petersen et al., 2013; Van Daal, Verhoeven, & Van Balkom, 2007; Yew & O'Kearney, 2013). Only in the research of Rescorla, Ross, and McClure (2007) no relation between language delays and behavioral problems was found, after excluding children with a neurodevelopmental delay and pervasive disorder from the research group. In all the mentioned studies a clinical population was compared to a group of normally developing children. However, in this study only a clinically referred sample was used and our results showed that the relation between language delays and emotional and behavioral problems is not always evident in a clinical population. Moreover, in this clinically referred group better receptive language ability predicted higher levels of internalizing, externalizing and total emotional and behavioral problems. To our surprise these findings were significant for both externalizing and internalizing problems. It could be argued that children with better vocabulary have more self-esteem and show more acting out behavior, but this is contradictory with the positive relation between internalizing problems and language delays that was also found in our study.

A possible explanation for the results from this study is that children with emotional and behavioral problems were referred only because they had either behavioral problems or language delays, but not both. It is however not clear whether this might be the case, because children could be referred for either language or emotional and behavioral problems, but also for a combination of both type of problems. A second possible explanation for finding a negative relation between language delays and emotional and behavioral problems is that no longitudinal data were used. It is, for example, possible that language delays at this young age do not correlate with current emotional and behavioral problems, but do lead to later problems in the social and emotional development of children. That language delays at a young age can lead to later problems is also confirmed by other research (Brownlie et al., 2004; Durkin & Conti-Ramsden, 2010; Lindsay et al., 2007; Petersen et al., 2013; Yew & O'Kearney, 2013). A third possible explanation is that gender, SES and home language influence this relationship. However, our results showed that the relation between language delays and

behavior problems was not influenced by gender and SES. Only home language had a significant moderating effect on the relation between receptive language ability and externalizing problems. So for children raised in Dutch a stronger relation was found between receptive language abilities and externalizing problems. This finding is in line with our earlier findings and shows that this relationship cannot simply be explained by a language delay.

A restriction of this research is that the validity and reliability of the used instrument (TRF) to measure emotional and behavioral problems is not yet determined, although it is a widely used instrument. Also the validity and reliability for the PCBOS to measure expressive language development is not determined. The results could be biased because of this. A second limitation is that expressive language development is only observed. The observed level of expressive language is especially with shy and anxious children not always the same as their expressive language ability. So it would be better to combine this with a test measuring expressive language. The scale language expression of the Bayley-III might be a good suggestion, since currently the standards for Dutch children are determined.

This research is quite unique, because the data of quite a large sample of clinically referred children was analyzed and to our surprise a positive relation between language ability and emotional and behavioral problem was found. For future research it would be interesting to see if these findings can be replicated in other clinically referred groups and also with older clinically referred children, because it might be characteristic for this early age group. Another relation that was not yet analyzed in this research and is therefore a topic for future research, is the relation between language delays and the development of specific emotional en behavioral disorders as ADHD, anxiety or conduct disorders in preschool children, because this might also differ for young and clinically referred children.

All in all, the relationship between language delays and emotional and behavioral problems is not as evident as expected. Language delays and emotional and behavioral problems often occurred in isolation in clinically referred children aged 2.5 to 4. This must be considered in the treatment of these children, so that interventions can be adapted.

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