Emotions and the psychosocial development of children with and without developmental langauge disorder

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Contents

“Due to my language disorder I have too much information in my head. It feels as if my head is mixed up. I have pictures in my head, but then I don't know the words anymore”

“If I really have to tell a story about what I once experienced, then I mix up the order. Or then I say something and I come up with a completely different story and then I have to go back again.”

Do you find language difficult?

“Yes, and spelling and reading and reading comprehension ... and gym. I have that during gym too. They talk too quickly and I don't know what they want me to do.”

General Introduction.

Language is a fundamental tool which enables us to communicate with and learn from others. When children have difficulties to develop language, this impedes their social-emotional development (Dunn, Brown, & Beardsell, 1991; Saarni, 1999; Salmon, O'Kearney, Reese, & Fortune, 2016). Approximately two children in every classroom experience severe problems developing and using their first language, without a clear cause for these language problems (Norbury et al., 2016; Tomblin et al., 1997). These children may have Developmental Language Disorder (DLD) and have an increased risk for the development of psychosocial problems, including social problems (such as victimization and friendship problems), internalizing problems (such as social anxiety and depressive symptoms) and externalizing problems (such as aggression; Durkin & Conti-Ramsden, 2010; Yew & O'Kearney, 2013).

In the current project, we examined the level and development of psychosocial problems in children and adolescents with and without DLD and examined the underlying mechanisms causing these problems. Specifically, we examined whether the severity of communication problems explained higher levels of psychosocial problems, or whether these relations were mediated by children's emotional competence, that is the ability to recognize, understand, regulate and express emotions in socially accepted ways (Saarni, 1999).

Emotions provide us with a sense of urgency to act on situations (Scherer, 2000). However, simply acting out emotions is often not adaptive in our complex social world. Children have to learn to use their emotions in a constructive manner. Therefore, children need to gain control over their impulses, gain understanding of their own and others' emotions and intentions, regulate the level of their emotions and learn to think ahead: what are the consequences of my emotional reaction and how can I reach my goal? This learning process is facilitated by the communication of children with their social environment (Eisenberg, Sadovsky, Spinrad, 2005; Saarni, 1999; Schaffer, 2005). If children experience difficulties in aspects of emotional competence, this is an important risk factor for different psychosocial problems (Gross & Jazaiere, 2014; Fernandez & Johnson, 2016; Rieffe, Oosterveld, Miers, Meerum-Terwogt, & Ly, 2008). When communication problems not only have a direct effect on the development of psychosocial problems, but also an indirect effect through their emotional competence, this has important implications for interventions.

Developmental Language Disorder

Most children develop language without much difficulty if they receive sufficient language input. Children react to the language of people around them and learn to match certain sounds or signs to objects, people, or events. Gradually they start expressing themselves through sounds and signs and soon after through words and sentences. Typically, the understanding of language precedes the production of language. Both language areas develop steadily until children are able to express their needs, wishes, thoughts, and fantasies through language and engage in meaningful conversations with people around them. Throughout childhood and adolescence, the language skills of children further increase. Children learn new words and can

understand and produce increasingly complex sentences, learn to produce a coherent story and understand figurative speech (Gillis & Schaerlaekens, 2000). Language is crucial in the development of children as it is the gateway to understanding the social environment. Language enables people to talk about concrete objects, but also about objects which are not present or events in the past and future. Moreover, language enables us to talk and think about abstract concepts such as thoughts and feelings. Thereby, language broadens our (inner) world.

People use language all day to communicate, think, and learn. Therefore, language difficulties can create a broad range of problems for an individual. When children experience severe difficulties developing or using language, they may be diagnosed with DLD (Bishop, Snowling, Thompson, Greenhalgh, & CATALISE consortium-2, 2017). DLD is a neurodevelopmental disorder characterised by low language proficiency, which is not caused by other neurodevelopmental disorders such as autism spectrum disorder (ASD), hearing loss, or mental disability (American Psychiatry Association [APA], 2013). The prevalence of DLD is around 5 to 7 % of the children in preschool (Norbury et al., 2016; Tomblin et al., 1997). Just as in children without DLD, children with DLD develop their language as they become older. However, they often do not close the gap with their peers without DLD, even after language interventions. When children still have DLD when they start primary education, they tend to continue to have language problems as they become older (McKean et al., 2017; Norbury et al., 2017; Snowling, Duff, Nash, & Hulme, 2016).

Children are typically diagnosed with DLD around the age of four when their language development is well behind the language development of their peers. However, language problems may also go unnoticed until children are (much) older (Poll & Miller, 2013; Snowling et al., 2016). Expressive language problems are more easily detected when children have a small lexicon, or have difficulty making sentences. However, due to the large diversity in the typical language development (Gillis & Schaerlaekens, 2010), children may be thought of as late talkers, instead of language disordered. Receptive language problems are even more difficult to detect (Leonard, 2009). Children may follow simple instructions without understanding the exact phrases, because they follow the example of others or because they know what is expected from them in prototypical situations. However, when situations are out of the ordinary, these children may not know what to do and become frustrated. Moreover, when children become older and the language becomes more complex and abstract, their language problems may become more evident (Dockrell, Lindsay, Roulstone, Law, 2014; Poll & Miller, 2013; Snowling et al., 2016).

The language problems that children with DLD experience are heterogenic. Children with DLD can have problems in expressive language and/or receptive language. These language problems can be present in the form, function, and use of language (APA, 2013; Bishop et al., 2017; Norbury, Nash, Baird, & Bishop, 2004). The form of language refers to the building blocks of language, that is the phonology, morphology, and syntax. Children with DLD often have difficulties distinguishing the sounds in words (phonology), which makes it more difficult

to discriminate words. This in turn may negatively affect word learning. Additionally, children with DLD have marked difficulties with morphology such as verb inflection and the correct use of affixes and suffixes, for instance to signal plurality. These morphemes change the meaning of words, but are generally not stressed in speech. Therefore, they are more difficult to learn, especially when children have phonological problems (Gillis & Schaerlaekens, 2010). Children with DLD also often have problems with syntax, such as difficulties with word order, and understanding the meaning of complex phrases. Some children experience problems with the processing speed of language, especially with more complex phrases (Bishop et al., 2017).

The function of language refers to the meaning of words and sentences (semantics). Children with DLD not only have a smaller lexicon, but especially know fewer abstract words or have narrower word meanings. Some children with DLD also experience word finding problems. When they want to say something, the correct word seems to slip away, although they do know the word. These children often use vague words in an attempt to confer meaning, and they need more time to formulate a message (Bishop et al., 2017).

The difficulties with the form and function of language often result in difficulties using language in social interactions, that is pragmatics. Pragmatics refer to the meta-level of language. Children have to learn to use language to confer meaning, to structure a story, understand jokes and change their language to match their conversational partner. For instance, we tend to talk differently to a teacher than to a friend and if we want to tell a story we change the message in line with the knowledge and style of the conversational partner. Children gradually gain pragmatic skills through social interaction. For instance, young children typically do not provide context to a story, whereas older children provide necessary information related to the five W's (Who, Where, When, What, Why). When children have language problems, they do not possess the necessary language to provide this information. Additionally, they have had less opportunities to practise their communicative skills in social interactions. This negatively affects their pragmatic skills development. Indeed, approximately 40 % of children with DLD also have severe pragmatic problems (APA, 2013; Bishop et al., 2017; Norbury et al., 2004).

The severity of DLD and the number of difficulties children experience because of their DLD are dependent on the communicative demands of the environment (Dockrell et al., 2014; Redmond & Rice, 1998). When children start primary education, their world suddenly becomes much bigger, resulting in increased demands on their language abilities. Children not only have to communicate with their teachers, but also with their peers. Adults tend to compensate for the communicative difficulties of children by filling in the gabs of a conversation, or correctly repeating what a child tries to say. Other children typically do not have the communicative abilities to help a child with low language proficiency. Therefore, more independence is necessary in communicative exchanges between peers. Additionally, during primary and secondary education, the topics become increasingly more complex and abstract. Children have to learn new words and understand and produce increasingly more complex grammar to

participate in lessons. Therefore, it is possible that children at certain ages do not seem to have much difficulties because of their DLD, but fall short of expectations when the communicative demands of the environment increase (Dockrell et al., 2014).

Heightened risk for psychosocial problems in children with DLD

The communication problems of children with DLD may impede their development in different developmental areas. Especially when the communicative demands of the environment are too high, or when language problems are not recognized, miscommunication is likely to occur (Redmond & Rice, 1998). These communication problems will impede the ability of children to learn from the social environment. Not only the educational progress of children will be hampered, but also their social-emotional development (Dockrell, Lindsay, & Palikara, 2011; Snowling et al., 2016). Indeed, a growing body of research shows that children with DLD are at risk for the development of psychosocial problems (Durkin & Conti-Ramsden, 2010; Yew & O'Kearney, 2013). Vice versa, the majority of children with severe psychosocial problems also have language difficulties, problems which often are not recognized. It is likely that these language problems play a role in the development and maintenance of their problems (Cohen et al., 1998; Gallagher, 1999; Hollo, Wehby, Oliver, 2014).

Children with DLD seem particularly at risk of social problems. From an early age on, they are less popular with their peers, are more often rejected or bullied and have less friendships than their peers without DLD (Andrés-Roqueta, Adrian, Clemente, & Villanueva, 2016; Botting & Conti-Ramsden, 2004; 2008; Durkin & Conti-Ramsden, 2007; Knox & Conti-Ramsden, 2003; Redmond, 2011; Wadman, Durkin, & Conti-Ramsden, 2011a). Additionally, internalizing problems are reported in children and adolescents with DLD such as depressive symptoms, social anxiety, and psychosomatic complaints (Beitchman et al., 1996; Botting, Toseeb, Pickels, Durkin, & Conti-Ramsden, 2016; Conti-Ramsden & Botting, 2008; Gregl et al., 2014; Maggio et al., 2014; Van Daal, Verhoeven, & Van Balkom, 2007; Wadman, Durkin, & Conti-Ramsden, 2011b). Finally, higher levels of externalizing problems are reported in children with DLD such as anger outbursts, or aggression (Conti-Ramsden, Mok, Pickels, & Durkin, 2013; Lindsay, Dockrell, & Strand, 2007; Maggio et al., 2014; St. Clair et al., 2011; Timler, 2008; Van Daal et al., 2007; Winstanley, Webb, & Conti-Ramsden, 2018).

Overall, longitudinal studies indicated that internalizing problems of children with DLD were higher during the primary school years, but decreased during adolescence (St Clair, Pickles, Durkin, & Conti-Ramsden, 2011). Externalizing problems showed more diverse developmental trajectories in different longitudinal studies, with some studies reporting higher but decreasing levels (St Clair et al., 2011), whereas another study found higher and increasing levels of externalizing problems in the same age range (Lindsay & Dockrell, 2012). Conversely, social problems of children with DLD tended to increase during the primary and secondary school years (Lindsay & Dockrell, 2012; St Clair et al., 2011). However, recent reanalyses of the social and internalizing problems of one of these studies indicated different developmental

trajectories within the group of children with DLD (Conti-Ramsden et al., 2018). Some children experienced high persistent problems in social and internalizing problems (26%), whereas others had increasing problems in these areas during their adolescence (16%). However, there were also children who experienced increasing peer problems only, whereas the internalizing problems remained low (22%); or vice versa children with decreasing internalizing problems and low social problems (24%). Finally, there were children with stable low problems in both areas (11%). These findings show that there are substantial individual differences in the level and development of psychosocial problems in children with DLD (Conti-Ramsden et al., 2018). In order to prevent the development of these problems, examination of the underlying mechanisms that cause these diverse developments is necessary. Moreover, it is important to gain better understanding of specific problems children with DLD experience. Most longitudinal studies to date used an aggregated questionnaire which measures different types of social, internalizing, or externalizing problems together. We can gain better understanding of the vulnerabilities of children with DLD when we differentiate these problems.

To date, most studies have attempted to explain the individual differences in psychosocial problems of children with DLD by examining the severity or type of children's communication problems. Although some relations have been found, the associations between the severity of communication problems and the psychosocial problems of children with DLD are inconsistent and generally not strong (Andrés-Roqueta et al., 2016; Beitchman et al., 1996; Botting et al., 2016; Charman, Ricketts, Dockrell, Lindsay, & Palikara, 2015; Conti-Ramsden et al., 2013; Hart, Fujiki, Brinton, & Hart, 2004; Lindsay & Dockrell, 2012; Maggio et al., 2014; Van Daal et al., 2007). The direct effects of the severity of the communication problems on psychosocial problems are unclear; this is particularly the case for older children. Only pragmatic problems were found to be an important risk factor for social and internalizing problems, whereas relations with receptive and expressive language problems were mixed (Charman et al., 2015; Helland & Helland, 2017; Law, Rush, Clegg, Peters, & Roulstone, 2015; St. Clair et al., 2011; Sullivan et al., 2016; Wadman et al., 2011b).

Because language is a fundamental tool in social learning, it is likely that communication problems also have indirect effects on the development of psychosocial problems in children with DLD (Beitchman et al., 1996; Hart et al., 2004). Therefore, it is important to examine developmental areas which are highly dependent on social learning and, in turn, are protective of the development of psychosocial problems, such as children's emotional competence. Below, we will discuss emotional competence and its development in children through social learning. Next, we will turn to the emotional competence of children with DLD and the importance of emotional competence in the development of psychosocial problems. Finally, we will propose a model which describes the interrelations between these developmental areas, which will be central to this thesis.

Emotional competence

Emotional competence is the ability to use emotions adaptively in social interactions (Denham, Caverly, & Schmidt, 2002; Saarni, 1999). Three important functions of emotions have to be acknowledged. First, emotions help an individual to recognise that something important is going on in a situation. The emotion alerts the individual that a goal is at stake and needs attention. Second, the emotion tends to activate the individual, which enables him or her to protect their goals in the situation. Third, emotions have a communicative function. They not only alert an individual that a goal is at stake, but emotions also show others that something is important. The other person can use this knowledge to alter their behavior (Frijda, 1986; Scherer, 2000). For instance, when a friend notices that a joke is not appreciated, he is able to apologize or make a joke at his own expense to save a positive exchange.

Although emotions are functional, emotional expressions sometimes are not. Our social world has become increasingly complex. Therefore, elemental emotional reactions (fight or flight reactions) are no longer functional. Children need to learn to adapt their emotional expressions to socially accepted levels by asserting cognitive control (using executive functioning) over their emotions and learn different emotion regulation strategies to deal with different types of stressors (Fields & Prinz, 1997; Joormann & Stanton, 2016). For instance, a boy who is frightened for the dentist and a girl who is afraid to speak her mind to a bossy friend, both have to try to regulate their anxiety to deal adaptively with a situation. However, for the boy it may be more adaptive to distract himself to undergo the necessary procedures at the dentist, whereas the girl should try to think of a good argumentation to convince her friend.

Additionally, children have to use knowledge of what others are thinking and feeling (Theory of mind) and how others are likely to react and use this knowledge to plan reactions tactical to reach goal achievement in a given situation (Gross, 1998; 2015). When children react excessively in a situation, they may not reach their goals because their reaction is not in line with socially accepted norms. Alternatively, they may achieve their short-term goals, but in the process lose their long-term goals. A child who is playing soccer, for instance, may become mad at a friend because he never passes him the ball. If the child becomes very angry with his friend, he might reach a short-term goal (being passed the ball), but loses a long-term goal (playing soccer with a friend), because the friend may not be his friend anymore after an excessive anger outburst. However, if the child ignores his emotion and does not show his annoyance to his friend, it is likely that the situation continues, resulting in no goal achievement as well. Moreover, when the situation endures because a child does not react to an emotion, the emotional experience may become stronger. This build up in the emotional experience increases the change of an unregulated reaction later on. Therefore, children have to learn to use their emotions adaptively in social interactions (Saarni, 1999). In order to do this, children need to be aware of their own and other's emotions, recognize and understand the causes of different emotions, learn different strategies to regulate their emotions, and communicate emotions in socially acceptable ways. These four elements of emotional competence develop through social

interactions, in which language plays an important role (Eisenberg et al., 2005; Saarni, 1999; Schaffer, 2005).

Emotional competence develops through social learning

Children are born with a basic, but very effective, emotional repertoire. When they are comforted, they are relaxed and happy, whereas when they are hungry, tired, or scared, they start crying. They also recognise positive and negative affect in people around them. When their parents have a positive expression, babies will start to explore, whereas when a parent frowns, they will freeze or start to cry. As children develop, they learn to differentiate and regulate their own emotional expressions and increasingly recognise different emotional expressions in others (Schaffer, 2005). However, this development is dependent on the experiences of a child and the interactions with their caretakers (Denham & Auerbach, 1995; Dunn, Brown, & Beardsell, 1991; Rieffe, Dirks, Van Vlerken, & Veiga, 2016). For instance, a child who is hungry will first continue crying until the food is within reach, whereas some weeks later, the child will have learned that the preparation of food means that the problem is almost solved. Therefore, preparation of the food is enough for the crying to stop. In this way, children learn to associate different feelings with different situations and solutions. Additionally, parents tend to talk while they are comforting or caring for their child. Thereby, children learn to associate certain words with the events and associated feelings. The language used by caregivers provides children with an extra modality through which they learn to understand their world and slowly become able to communicate their own needs, wishes and feelings (Denham & Auerbach, 1995; Dunn et al., 1991; Schaffer, 2005).

As children become older, their social world also extents. This provides the child with new experiences and also more complex emotions. Children first learn to differentiate different basic emotions, such as happiness, anger, sadness, fear and disgust, which often times have clear observable causes (Pons, Harris & De Rosnay, 2004; Westby & Robinson, 2014). Caregivers often comment on the emotional experiences of a child and their causes (Denham & Auerbach, 1995; Dunn et al., 1991; Zeegers et al., 2018). Additionally, they may help a child to calm down by modelling different emotion regulation strategies, such as going to another room or taking a deep breath to calm down, or by providing social support when a child does not dare to do something (Hughes & Leekam, 2014; Schaffer, 2005). Moreover, when a child misunderstands the intentions of someone else, caregivers can help children to gain insight in the thoughts and intentions of other people by explaining what others think, want and feel (Dunn et al., 1991; Hughes & Leekam, 2014; Yuill & Little, 2018). Additionally, caregivers can use causal language, in which they explain why someone acts in a certain way or what the consequences are of (non) adaptive emotion expression (Yuill & Little, 2018). In these conversations, children not only learn emotion words to talk about emotional experiences, but also gain insight in the internal world of themselves and others and the consequences of

emotions and behaviors (Denham & Auerbach, 1995; Dunn et al., 1991; Eisenberg et al., 2005; Hughes & Leekam, 2014; Yuill & Little, 2018). These mentalizing abilities are an important prerequisite for adaptive emotion expression. Because when children understand what the other is feeling and why, they can use this knowledge to plan a reaction, while foreseeing the response of the other (Denham et al., 2003; Eisenberg, Fabes, & Spinrad, 2006).

Soon after the basic emotions, more subtle or complex emotions also start to emerge, such as shyness, jealousy, nervousness, shame or pride (Westby & Robinson, 2014). Children gradually learn to differentiate these more complex feelings through interactions with caregivers and increasingly with peers. Especially interactions with peers provide new learning opportunities. Because children are similar in their communicative and emotional competencies, these interactions provide other learning opportunities than interactions with adults (Hartup & Stevens, 1999). Children have to negotiate each other´s wishes and feelings and, in the process, gain insight in the thoughts and feelings of others and practise adaptive reactions (Banerjee, Watling, & Caputi, 2011; Barry & Wentzel, 2006; Cutting & Dunn, 2006; Dunsmore & Karn, 2004; Von Salisch, 2018; Von Salisch, & Zeman, 2017; Schaffer, 2005).

Emotional competence development is impeded in children with DLD

The development of emotional competence is largely dependent on social learning and thus on the language abilities of a child (Schaffer, 2005). Conversations explaining emotions, thoughts, and behavior by caregivers are only accessible for children when they have sufficient language abilities. When children have difficulties understanding language, they gain less knowledge through these explanations (Brinton & Fujiki, 2011; Dunn et al., 1991; Hughes & Leekam, 2004; Netten et al., & 2015). Moreover, children with DLD gain less emotion knowledge if they express their own emotions to a lesser extent through language. When children start describing their own feelings and wishes, other people can react on them and provide more detailed or nuanced information or provide support (Dunn et al., 1999; Hughes & Leekam, 2004; Denham & Aucherbach, 1995). In these conversations, children can gain more sophisticated emotion knowledge and at the same time learn strategies to regulate or express their emotions. In addition, children also gain emotion knowledge through observing interactions between others. However, this incidental learning is dependent on the language ability of children (Brown & Dunn, 1996; Denham & Aucherbach, 1995; Netten et al., 2015). When children cannot understand conversations between others, they only see the emotional expressions, but gain less understanding of reasons behind the emotions and possible solutions. Therefore, the language problems of children with DLD negatively affect the quantity of social learning opportunities.

Moreover, not only the quantity of learning opportunities differs between children with and without language problems, also the quality of interactions becomes lower. When children have less language skills, caregivers tend to adjust their language to the abilities of the child by making sentences short, simple, and more directive (Conti-Ramsden, 1990; Conti-Ramsden,

Hutcheson, Grove, 1995; Hammer, Tomblin, Zhang, & Weiss, 2001). These adaptions have the positive effect that the child is better able to follow the conversation. However, as a consequence more abstract and sophisticated information is omitted from the conversation (Brinton & Fujiki, 2011; Yuill & Little, 2018). This again deprives children with DLD of social learning opportunities.

Indeed, research on children with DLD shows a delayed development of different elements of emotional competence. Children and adolescents with DLD had more difficulty recognizing emotions in others (Botting & Conti-Ramsden, 2008; Creusere, Alt, & Plante, 2004; Taylor, Maybery, Grayndler, & Whitehouse, 2015), understanding other's emotions (Yuill & Little, 2018), had a smaller emotion lexicon (Bakopoulou & Dockrell, 2016; Rieffe & Wiefferink, 2017; Spackman, Fujiki, & Brinton, 2006), and experienced more problems regulating their emotions compared to peers without DLD (Fujiki, Spackman, Brinton, & Hall, 2004). Moreover, children with DLD made fewer references to the thoughts and feelings of a protagonist while telling a story (Boerma, Leseman, Timmermeister, Wijnen, Blom, 2016) and their perspective taking abilities (Theory of Mind) have been found to be delayed (Nilsson & Jensen de López, 2016).

Emotional competence as a risk factor for psychosocial problems: a vicious circle

When children have diminished opportunities to learn from their social environment, this negatively effects their emotional competence, which in turn can be a strong predictor of psychosocial problems (Rieffe et al., 2016). Research in children without DLD, shows that problems in emotional competence are a risk factor for different psychosocial problems (Gross & Jazaiere, 2014; Fernandez & Johnson, 2016; Rieffe et al., 2008). Therefore, emotional competence is thought of as a transdiagnostic factor, as it is an important underlying factor of different social, internalizing, and externalizing problems (Wicks-Nelson & Israel, 2015). As such, the relation between emotional competence and the development of psychosocial problems is an important area to explore in children with DLD.

To date, only a small number of studies have examined the relations between various aspects of emotional competence and the psychosocial problems of children with DLD. Bakopoulou and Dockrell (2016) found that the emotional competence of children with DLD between 6 and 11 years old was related to their level of psychosocial problems, whereas the severity of receptive and expressive language problems was not. Similarly, Botting and Conti-Ramsden (2008) found that fewer emotion recognition skills related to lower friendship quality in adolescents with DLD, also after receptive language problems were controlled. The findings to date give a first indication that emotional competence plays an important role in the development of psychosocial problems of children with DLD over and above their communication problems.

To summarize, research to date suggests that emotional competence may be an important mediating factor in the relationship between communication problems and the

development of psychosocial problems of children with DLD. As is illustrated in Figure 1, language problems of children with DLD might not have a direct effect on the development of psychosocial problems, but interfere with the social interactions of children with DLD instead, which negatively effects children's social learning opportunities, resulting in less emotional competence. Problems in emotional competence in turn put children at risk for the development of increased psychosocial problems.

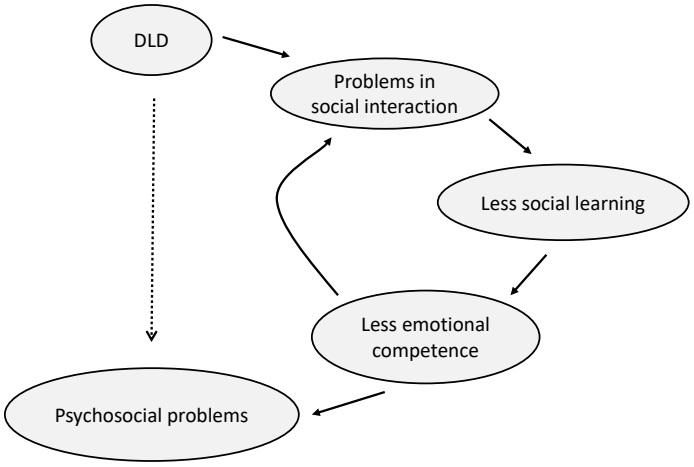


Figure 1. Reduced social learning in children with DLD negatively affects emotional competence, which in turn may explain their psychosocial problems.

Problems in emotional competence also negatively affect new social interactions. When children have difficulties regulating their emotions, or understanding the intentions of others, they are more often rejected by other children (Cook, Wiliams, Guerra, Kim, & Sadek, 2010). Social rejection among peers negatively influences the development of emotional competence (Banerjee et al., 2011; Fink, Begeer, Peterson, Slaughter, & De Rosnay, 2015). Thus, as illustrated in Figure 1, problems in emotional competence may increase the social problems of children with DLD, which can further diminish their opportunities to develop emotional competence resulting in a vicious circle of reduced social learning experiences. In this way, problems in emotional competence may start to overshadow the effect of the initial communication problems. If communication problems of children with DLD become less severe across time, problems in emotional competence and the independent effect of emotional competence on social interactions, may prevent decreasing psychosocial problems.

Recent studies

In the current thesis, a longitudinal study on the social-emotional development of children with DLD is described. We examined the extent to which different indices for

emotional competence could explain the development of psychosocial problems of children with DLD over and above their communication problems. To this end, we examined the psychosocial development, emotional competence and communication problems of 114 children with DLD and 214 children without DLD. This project contributed to the existing literature in several ways.

First, we examined different areas of the social-emotional development of children separately instead of using aggregated measurements. This approach enabled us to gain better insight in which problems are and which are not problematic for children with DLD.

Second, a longitudinal design was used in order to compare the development across time of children with and without DLD. Therefore, children with and without DLD between 8 and 16 years old were followed across 18 months. The children and their parents filled out questionnaires three times, with 9 months in between each measurement. We chose this age range, because social and hormonal changes during this age range make children increasingly sensitive to the opinions of their peers. At the same time, children try to become independent and develop their identity (Crone & Dahl, 2012). This makes this an important developmental area where children become more vulnerable to the development of psychosocial problems (Dahl & Gunnar, 2009).

Third, we examined the extent to which the level and development of different indices for emotional competence could explain the severity of psychosocial problems in children with and without DLD across time. When growth in emotional competence would explain decreasing levels of psychosocial problems, these areas would be important to focus on in interventions.

Fourth, we examined whether problems in emotional competence mediated the relations between the severity of communication problems of children with DLD and their psychosocial problems (Figure 2). If emotional competence indeed mediates the relation between the severity of communication problems and psychosocial problems, emotional competence needs special attention in interventions in addition to language.

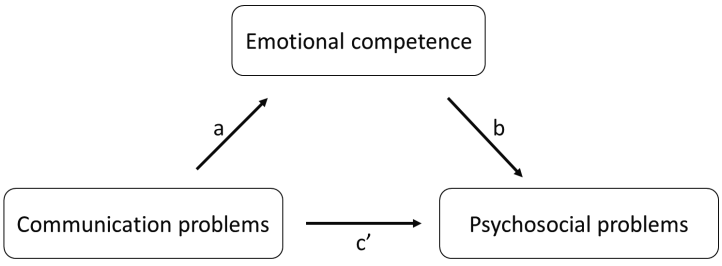


Figure 2. Emotional competence as a mediator of the relation between the severity of communication problems of children with DLD and their psychosocial problems.

Thesis structure

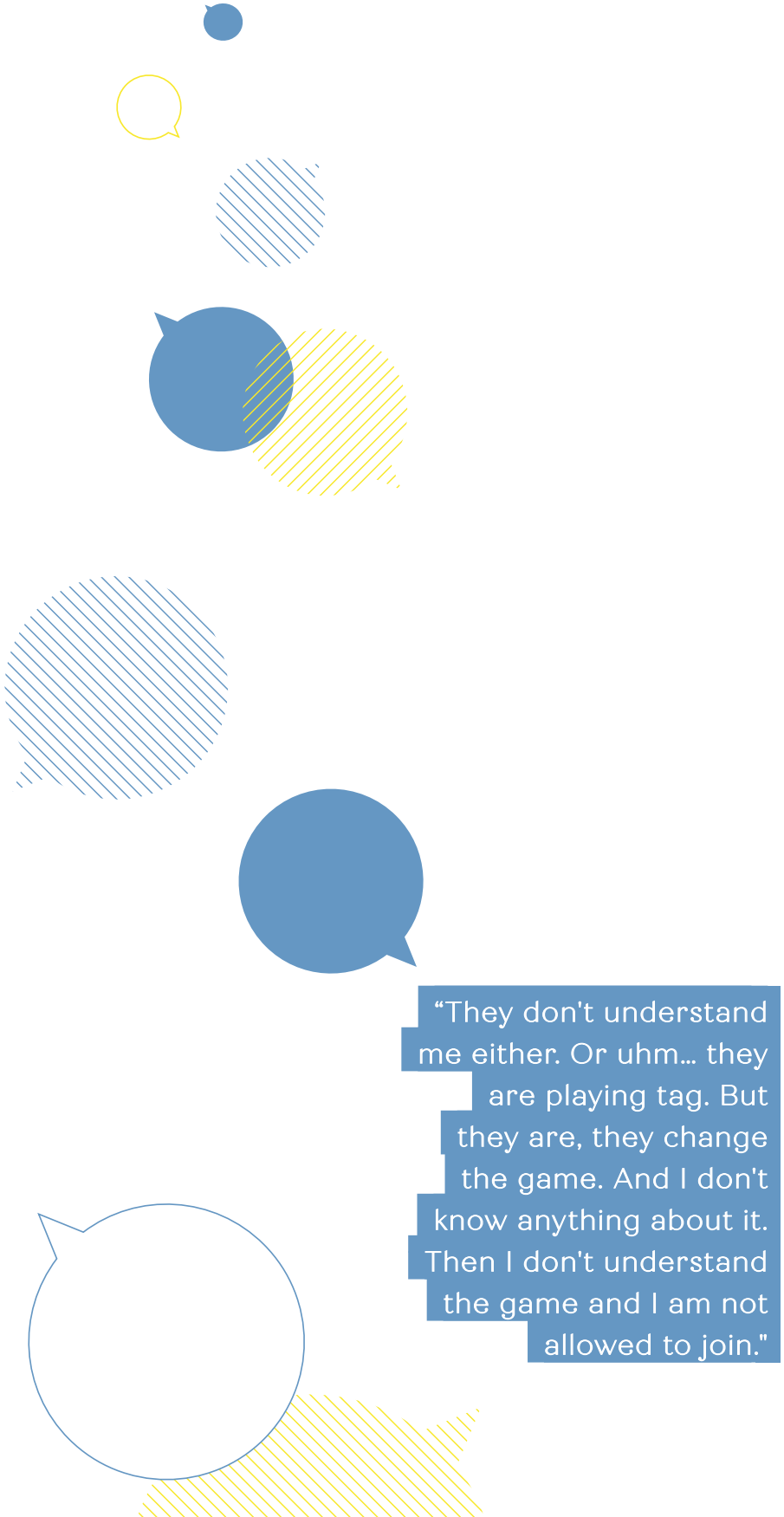
In chapter 2 and 3, social problems of children with DLD are examined. In **chapter 2**, we focused on victimization and bullying of children with and without DLD and examined whether understanding one's own emotions and the level of negative emotions contributed to the prediction of victimization and bullying across time. Additionally, we examined whether the communication problems of children with DLD contributed to the level of victimization and bullying in addition to both indices for emotional competence. In **chapter 3**, the development of friendship quality of children with and without DLD was examined and related to their empathy development. Empathy reflects the abilities to feel (affective empathy), understand (cognitive empathy) and the urge to respond to other's emotions (prosocial motivation; Hoffman, 1990), and is an important prerequisite for positive social interactions, such as friendships (Denham et al., 2003; Rose-Krasnor, 1997). Moreover, empathy is also thought to develop through social learning in positive peer interactions (Eisenberg et al., 2006; Schaffer, 2005). Therefore, we examined the longitudinal relations between empathy and friendship quality in children with and without DLD and examined whether DLD impeded this social learning process.

In chapter 4 and 5 we examined different internalizing problems. In **chapter 4** the levels of social anxiety and somatic complaints were examined and longitudinally related to children's emotion awareness (emotion understanding and bodily unawareness of emotions) and happiness. Additionally, we examined whether the relations between the severity of children's communication problems and both internalizing problems were mediated by children's emotional competence. Social anxiety and somatic complaints were only included in the second and third measurement. Due to attrition, the number of participants is lower in this study (With DLD: 104, without DLD: 183). In **chapter 5** we focused on depressive symptoms of children with and without DLD. We examined whether different emotion regulation strategies explained the level of depressive symptoms across time. Additionally, the mediating role of emotion regulation strategies in the relation between communication problems and depressive symptoms was examined.

In **chapter 6**, different externalizing problems were examined. Externalizing problems can be categorized in reactive and proactive problems (Crick & Dodge, 1996). We examined whether these different externalizing problems were explained by children's emotion recognition and emotion regulation as reported by the parents. Additionally, the mediating role of emotional competence in the relation between the communication problems and externalizing problems was examined. In this study, only children for whom the parents filled out the questionnaires were included (with DLD: 89, without DLD: 156). Table 1 presents an overview of the topics in the different chapters. Finally, in **chapter 7** the outcomes of the different studies and the implications for interventions for children with DLD are discussed.

Table 1 Overview of the psychosocial and emotional topics included in the different chapters.

Chapter	Psychosocial development	Element of emotional competence
2	Bullying and victimization	Emotion understanding and level of negative emotions (anger, sadness, fear)
3	Friendship quality (positive and negative)	Empathy (Affective empathy, cognitive empathy and prosocial motivation)
4	Social anxiety and somatic complaints	Emotion awareness (Emotion understanding and bodily unawareness) and level of happiness
5	Depressive symptoms	Emotion regulation strategies (Approach, avoidant externalizing and worry)
6	ODD symptoms, reactive and proactive aggression	Emotion recognition and anger dysregulation (Parent report)


“They don't understand me either. Or uhm... they are playing tag. But they are, they change the game. And I don't know anything about it. Then I don't understand the game and I am not allowed to join."

Victimization, bullying, and emotional competence:

Longitudinal associations in (pre) adolescents with and without Developmental Language Disorder.

Van den Bedem, N. P., Dockrell, J. E., Van Alphen, P. M., Kalicharan, S. V., & Rieffe, C. (2018). Victimization, bullying, and emotional competence: Longitudinal associations in (pre) adolescents with and without Developmental Language Disorder. Journal of Speech Language and Hearing Research, 61, 2028-2044. Doi: 10.1044/2018_JSLHR-L-17-0429..

ABSTRACT

Purpose: Victimization is a common problem for many children, but is exacerbated for children with a developmental language disorder (DLD). However, the severity of communication problems does not explain their victimization rates. In children without DLD, difficulties with emotional competence are a risk factor for victimization, and also increase the risk of bullying. In this longitudinal study, we examined the extent to which the level and development of emotional competence (understanding of one's own emotions and levels of anger, sadness, and fear) contributed to the prediction of victimization and bullying in children with and without DLD, over and above the type and severity of communication problems of children with DLD.

Method: Clinically referred youngsters (8-15 years) with (n = 112; 48% girls) and without DLD (n = 233; 58% girls) completed self-reports three times over an 18 months period. Parents of children with DLD reported on their children's communication problems.

Results: Participants with DLD reported more victimization but comparable levels of bullying behavior compared to peers without DLD. Higher levels of sadness and fear were risk factors for more victimization in both groups. Better understanding of one's own emotions had a larger effect on less victimization in children with DLD, independent of their communication problems. Additionally, increased levels of anger and lower levels of understanding one's own emotions explained more bullying in both groups.

Conclusions: Outcomes indicate that secondary difficulties in emotional competence in children with DLD make these children more vulnerable to victimization, and warrant specific support and interventions.

INTRODUCTION

Bullying is a common problem among children and adolescents, with long-lasting negative effects on the well-being for both victims and bullies (Ttofi, Farrington, Loesel, 2012; Ttofi, Farrington, Lösel, & Loeber, 2011 for reviews). Bullying is behavior with the intention to harm another person. Often a group of children repeatedly turns against one child, resulting in a power imbalance (Olweus, 2013). Bullying can be either physical (e.g. hitting someone or taking their belongings), verbal (e.g. name calling), or social (e.g. gossiping about someone or ignoring someone) (Olweus, 1996).

Youngsters facing significant communication difficulties, as in a developmental language disorder[1] (DLD), are particularly likely to be targets for bullies (Conti-Ramsden & Botting, 2004; Redmond, 2011). Between 28 and 50% of (pre)adolescents with DLD are victims of physical or verbal bullying, as compared to 12 to 22% of peers without DLD (Conti-Ramsden & Botting, 2004; Knox & Conti-Ramsden, 2003; 2007; Redmond, 2011). To date, social bullying has not been examined, but peers report more dislike of children with DLD (Andrés-Roqueta, Adrian, Clemente, & Villanueva, 2016). However, there are no clear associations between the social problems youngsters with DLD experience and the nature and severity of their language difficulties (Andrés-Roqueta et al., 2016; Charman, Ricketts, Dockrell, Lindsay, & Palikara, 2015; Hart, Fujiki, Brinton, & Hart, 2004). This suggests that the negative effect of language problems is mediated by other factors (Hart et al., 2004), which should be examined in order to help diminish the social problems of (pre)adolescents with DLD.

In youth without DLD, difficulties with emotional competence are a risk factor for victimization (Schwartz, Proctor, & Chien, 2001; Spence, De Young, Toon, & Bond, 2009). Emotional competence is an umbrella term for the ability to recognize one's own and others' emotions, to understand the causes and meanings of these emotions, and to regulate and express emotions in adaptive ways, in order to reach personal and social goals (Saarni, 1999). The development of emotional competence is highly dependent on communication within the social environment (Dunn, Brown, & Beardsall, 1991; Saarni, 1999; Wiefferink & Rieffe, 2012). Therefore, difficulties in emotional competence among children with DLD (Bakopoulou & Dockrell, 2016; Fujiki, Spackman, Brinton, & Hall, 2004) may form an extra risk factor for victimization, over and above their communication problems. However to date, it is unclear to what extent difficulties in emotional competence contribute to victimization in this particular group.

In addition, no research has been conducted on the bullying behavior of youngsters with DLD, although research in the general population shows that many youngsters who are being victimized also bully others (Cho, 2017; Olweus, 2013; Veenstra et al., 2005), especially when their emotional competence is low (e.g. Cook, Williams, Guerra, Kim, & Sadek, 2010). The

[1] DLD was formerly referred to as Specific Language Impairment, but for a discussion on the DSM-5 classification and terminology, see the work by Bishop et al., 2017.

aim of this study is to examine the longitudinal relationship between emotional competence, victimization, and bullying in (pre)adolescents with and without DLD, over and above the type and severity of their DLD. Understanding which factors put youngsters with DLD at risk for negative peer interactions could inform future interventions.

DLD and social development

Most children develop language skills without difficulty. However, approximately two children in every classroom have significant difficulties acquiring and using language (Norbury et al., 2017; Tomblin et al., 1997). According to the DSM-5 (2013), children are diagnosed with a language disorder when their receptive or expressive language problems are not primarily caused by other disabilities, such as sensory disabilities or autism spectrum disorder, nor are their problems explained by intellectual disabilities (APA, 2013). Children with DLD may experience problems in both the content (semantics) and form of language (phonology, morphology, and syntax) (APA, 2013; Bishop, Snowling, Thompson, Greenhalgh, & CATALISE consortium-2, 2017). In addition, children with DLD may also experience problems in language use in, that is pragmatics (Davies, Andrés-Roqueta, & Norbury 2016; Norbury, Nash, Baird, & Bishop, 2004). Some children have initial language delays that diminish over time (Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998). However, children who enter primary school with DLD often continue to have problems (Snowling, Duff, Nash, & Hulme, 2016).

The communication problems of youngsters with DLD negatively affect their academic achievements, but higher levels of emotional and social problems are also consistently reported in this group (Dockrell, Lindsay, & Palikara, 2011; Snowling et al., 2016). For example, children with DLD show reduced friendship quality and more peer rejection (Botting & Conti-Ramsden, 2008; Charman et al., 2015). For some children these social problems further increase during adolescence (St Clair, Pickles, Durkin, & Conti-Ramsden, 2011). This is a worrying finding, because during adolescence young people are more sensitive to negative evaluations by peers, and this in turn is related to increasing levels of internalizing psychopathology in youth (Dahl & Gunnar, 2009). Understanding and addressing the underlying mechanisms that contribute to the development of these social problems in youngsters with DLD could benefit the future mental health of these youngsters.

Victimization in youngsters with DLD

Dealing with small conflicts is an important part of normal social interaction. It allows children to master new skills, such as regulating and expressing negative emotions (Von Salisch & Zeman, 2017). However, unequal power in peer relationships can make such conflicts problematic, such as in bullying. Bullies strive to dominate, and hope to grow in popularity at the expense of their victim. Therefore, they often choose victims who seem more vulnerable

(Olthof, Goossens, Vermande, Aleva, & Van der Meulen, 2011; Pellegrini & Long, 2002), such as children with communication problems.

Social Adaptation Theory (Redmond & Rice, 1998), which states that a child experiences social difficulty when the communicative demands of the environment exceed the communication abilities of the child, may explain the higher levels of victimization of youngsters with DLD. In reaction to a social environment that overwhelms their communication ability, a child with DLD may withdraw or become passive in social interactions, or show externalizing behavior, which in turn results in fewer or shorter social interactions, and thus less practice of their social and language capacities.

There is indeed some evidence that the severity and type of communication problems in children with DLD are associated with victimization or peer problems in general, although results are mixed. In five-year-olds, peer problems were found to be related to poorer semantic and syntactic language abilities (Van Daal, Verhoeven, & Van Balkom, 2007). In a longitudinal study, more expressive language problems at the age of eight predicted higher levels of victimization at the age of 11 (Conti-Ramsden & Botting, 2004). In the same study, problems with pragmatics at age 11 were unrelated to self-reported victimization, but were negatively related to peer competence, as rated by teachers. This is consistent with the finding that pragmatic problems in youngsters with DLD at the age of 11 contributed to the prediction of teacher rated peer problems at age 16 (St. Clair et al., 2011). Conversely, children with better syntactic comprehension reported more victimization in one study (Redmond, 2011), whereas another study found no relation between receptive language problems and peer problems as rated by teachers (Charman et al., 2015). Overall, the severity and type of DLD only explains a small part of the variance in reported victimization. This suggests that there is not a direct link between language problems and social problems in youngsters with DLD, but that this relation is mediated by other factors (Hart et al., 2004).

Victimization and emotional competence

A focus on communication problems alone may limit our understanding of the development of victimization in youngsters with DLD. Research with children without DLD shows that negative peer interactions are more common in children with less emotional competence. Victims have been described as children who experience less understanding of their own emotions, and exhibit higher levels of fear, sadness, and anger (Cook et al., 2010; Camodeca & Goosens, 2005). High emotionality can result from victimization, but emotionality can also trigger bullying, because bullies often target children who are more easily dominated or provoked (Schwartz et al., 2001; Spence et al., 2009).

The high incidence of victimization of youngsters with DLD might be also explained by their difficulties in their emotional competence, which in turn are affected by their communication problems. Emotions play a key role communicating in daily life, signaling what is important (Frijda, 1986). Yet, for children to use this information they must be aware of their

own emotions, and recognize emotions in others (Rieffe, Oosterveld, Miers, Meerum Terwogt, & Ly, 2008). They also need to understand what caused these emotions and what the goal is of a person given their emotion, e.g. an angry person wants to change something in a situation, whereas a sad person tries to come to terms with a loss (Frijda, 1986; Rieffe et al., 2008). Understanding the cause of an emotion is important to deal effectively with an emotion-evoking situation (Eisenberg et al., 1993; Gross, 2015). Finally, children must learn how to express their own emotions in line with the social rules of the environment (Saarni, 1999; Schaffer, 2005). This requires good emotion regulation, i.e. the ability to adapt the level of emotional experience or the expression of the emotion to the social environment (Gross, 2015).

Emotional competence develops through the process of emotion socialization, where children learn through social interaction to recognize, understand, regulate, and express emotions according to the social rules of their environment (Saarni, 1999; Schaffer, 2005). Through language, children have access to their social world and the opportunity for social learning (Saarni, 1999). Social interactions help children acquire the linguistic skills for communicating about emotions, because parents label the feelings of children and help them express their own feelings (Dunn, Brown, & Beardsall, 1991; Saarni, 1999). Indeed, higher quality emotion talk between parents and children is related to more emotional competence (Dunn et al., 1991; Denham & Auerbach, 1995). Furthermore, social interactions provide children with learning opportunities for understanding what caused their emotions, and becoming adept at regulating and expressing their emotions constructively in social interactions (Dunn et al., 1991; Saarni, 1999; Wiefferink & Rieffe, 2012). Peer interactions also form an important context for social learning, as shown by research on free play situations (Veiga et al., 2017). Emotional competence, in turn, is essential for developing meaningful social relationships (Eisenberg et al., 1993; Longobardi, Spataro, Frigerio, & Rescorla, 2016). Through these social relationships, children further develop emotional competence, especially when relationships become more intense and complex, as in the early teenage years (Von Salisch & Zeman, 2017).

When children experience severe communication problems, they have less opportunity for social learning (Botting & Conti-Ramsden, 2008; Rieffe, Dirks, Van Vlerken, & Veiga, 2016). Conversations are less easily processed or can be misunderstood, discussions are more difficult to participate in and social or play situations are less easily joined. Opportunities to develop emotional competence can thus be hindered. There is a growing body of research indicating that children with DLD experience problems with emotional competence. The majority of research has focused on the recognition or understanding of others' emotions. While toddlers with DLD are not reported to have problems matching drawings of basic emotions, labelling others' emotions appears to be more challenging (Rieffe & Wiefferink, 2017). Pupils with DLD in elementary school are reported to have difficulty recognizing emotions from photographs (Taylor, Maybery, Grayndler, & Whitehouse, 2015) and adolescents with DLD have more problems in the recognition of emotions reflected in the eye region in photos (Botting

& Conti-Ramsden, 2008). Additionally, children with DLD are reported to have difficulty recognizing emotions from the intonation of neutral sentences (Creusere, Alt, & Plante, 2004; Fujiki, Spackman, Brinton, & Illig, 2008; Taylor et al., 2015), from discourse (Ford & Milosky, 2008), and inferring emotions from stories (Bakopoulou & Dockrell, 2016; Ford & Milosky, 2003; Spackman et al., 2006).

Considerably less research has focused on the understanding of one's own emotions. As may be expected, children with DLD have a smaller emotion lexicon, and experience more difficulty talking about emotions (Bakopoulou & Dockrell, 2016; Rieffe & Wiefferink, 2017; Spackman et al., 2006), but whether children and adolescents with DLD have difficulty understanding the causes of their own emotions is yet unclear. Emotion regulation has been found to be less adaptive in elementary school children with DLD. Children with DLD are reported to experience more difficulty expressing their own emotions and reacting adaptively to the emotions of others by their teachers (Fujiki et al., 2004). In hypothetical scenarios where someone's feelings might be hurt by the expression of emotions, children with DLD reported less need to regulate their emotions than peers without DLD. However, in real life situations, these children hid their emotions to the same extent as their peers without DLD (Brinton, Fujiki, Hurst, Jones, & Spackman, 2015).

There is increasing evidence that early problems with social-emotional skills outweigh the direct effects of communication problems on the social relations of youngsters with DLD (Bakopoulou & Dockrell, 2016; Botting & Conti-Ramsden, 2008; Hart et al., 2004; Lindsay & Dockrell, 2012; Mok, Pickels, Durkin, & Conti-Ramsden, 2014). Therefore, it is possible that the high incidence of victimization in (pre)adolescents with DLD can be explained by difficulties with emotional competence, over and above the severity of their communication problems.

Bullying and emotional competence

Victims are not the only ones with lower emotional competence. Youngsters with a greater tendency to bully have more problems understanding other people's emotions, have problems regulating their own emotions, and usually show elevated levels of anger (Camodeca & Goosens, 2005; Cook et al., 2010). Additionally, many bullies are also being victimized, and victimization in turn makes children more prone to increased levels of bullying (Cho, 2017; Olweus, 2013; Veenstra et al., 2005). These so-called "bully-victims" are particularly likely to demonstrate problems with emotion regulation (e.g. Cook et al., 2010; Schwartz et al., 2001).

Studies on the development of bullying from childhood to adolescence in children without DLD show an overall decline in bullying. However, bullying tends to peak as children transition from primary to secondary education (Pellegrini & Long, 2002). In addition, there seems to be a wide variety of individual trajectories in the level of bullying (Underwood, Beron, & Rosen, 2009). Therefore, it is important to consider individual differences, in order to understand how bullying behavior develops. To date neither the etiology of bullying, nor the

role of emotional competence in bullying, has been examined in children or adolescents with DLD.

Present study

Victimization is more prevalent in (pre)adolescents with DLD, but it is unclear which factors put these youngsters more at risk than peers without DLD. In this study, we examined the longitudinal relations between victimization and bullying, with two indices of emotional competence (understanding of one's own emotions and level of negative emotions) in (pre)adolescents with and without DLD, over and above communication problems of the children with DLD. A sample of Dutch youngsters between the ages of 8 and 15 years old reported on their victimization, bullying, and emotional competence on three occasions over an 18-month period. We chose this age range because during puberty, children become increasingly sensitive to the opinions of their peers, which makes bullying especially problematic for their mental health (Dahl & Gunnar, 2009). During this period, bullying takes on more covert, social forms, which are less detectable by parents and teachers (Crick, Casas, & Nelson, 2002). Therefore, we used a self-report measure that included social bullying.

First, the level and changes over time of bullying, victimization, and emotional competence in (pre)adolescents with and without DLD were compared. Based on previous research, we expected more victimization and lower emotional competence in youngsters with DLD, compared to those without DLD (Bakopoulou & Dockrell, 2016; Botting & Conti-Ramsden, 2008; Brinton et al., 2015; Conti-Ramsden & Botting, 2004; Fujiki et al., 2004; Knox & Conti-Ramsden, 2003; Redmond, 2011). Because children who are being victimized often bully other children as well (Cho, 2017; Olweus, 2013; Veenstra et al., 2005), higher levels of bullying behavior in youngsters with DLD might also be expected. In addition, we expected decreases in victimization and bullying in adolescents without DLD (Pellegrini & Long, 2002; Underwood et al., 2009). In contrast, increasing levels of victimization might be expected in youngsters with DLD, because more social problems have been reported by parents of this particular group (St. Clair et al., 2011).

Second, we examined the extent to which the level and changes in emotional competence contributed to the prediction of victimization and bullying, in youngsters with and without DLD. Due to the frequently noted problems with emotional competence, (pre)adolescents with DLD may be provoked more easily, and in turn become more vulnerable to victimization, as well as to bullying. Therefore, we expected greater negative relations between indices for emotional competence, with both victimization and bullying in youngsters with DLD, compared to peers without DLD (Camodeca & Goosens, 2005; Cook et al., 2010; Knox & Conti-Ramsden, 2007; Schwartz et al., 2001; Spence et al., 2009).

Third, we examined whether the type and severity of communication problems of youngsters with DLD could explain within group differences in the level of bullying or

victimization. We expected higher levels of victimization in youngsters with DLD with more communication problems (Conti-Ramsden & Botting, 2004; St. Clair et al., 2011).

Finally, we examined whether emotional competence contributed to the prediction of victimization and bullying in children with DLD, when we controlled for the type and severity of their communication problems. We expected that indices for emotional competence would contribute to the prediction of victimization over and above the severity of their communication problems (Hart et al., 2004; Knox & Conti-Ramsden, 2007; Lindsay & Dockrell, 2012).

METHODS

Design

Youngsters with and without a clinical diagnosis of DLD were followed over a period of 18 months. There were three measurements, with 9 months between each wave. At each measurement, youngsters reported on their own victimization, bullying, and two indices for emotional competence: understanding of one's own emotions, and level of negative emotions. Parents of children with DLD reported on the type and severity of communication problems of their child at Time 1. In addition, performance IQ (PIQ) information was obtained from school files for children with DLD, or it was tested at the second measurement.

Participants

A total of 326 Dutch (pre)adolescents between the ages of 8 and 15 years old participated in this study. Of these, 112 were previously diagnosed with DLD (Table 1). Participants with DLD were recruited through primary and secondary schools for children with DLD, and through specialised organisations that support children with DLD in regular education. Participants were included when they had a diagnosis of DLD according to DSM-4 criteria, and no other disorders such as autism spectrum disorder or a hearing impairment.

In line with government protocols, diagnoses are provided by an audiological centre where qualified professionals examine the language abilities, PIQ, and hearing of children using standardized tests. Children receive a diagnosis of DLD when their receptive or expressive language problems fall 1.5 SD below the mean in two out of four language areas, which are auditory working memory, speech production, language form, and language content. These language problems should not be resolved after six months of speech and language therapy. Typically, the Dutch version of the Clinical Evaluation of Language Fundamentals (CELF) is used to test the language abilities of children (Kort, Schittekatte, & Compaan, 2008). Diagnosis are renewed every five years and children with a diagnosis of DLD are eligible for governmental support.

Eleven children with DLD also had a diagnosis of ADD or ADHD. AD(H)D is frequently diagnosed in children with DLD (e.g. McGrath et al., 2008). This could be due to high co-morbidity of both disorders, but it could also be caused by difficulties distinguishing initial language problems from secondary behavioral problems (Im-Bolter & Cohen, 2007).

Therefore, children with an additional diagnosis of AD(H)D were not excluded from the DLD group. All analyses were conducted with and without these children, which did not change the results.

The majority of the children with DLD (n = 80, 71.4%) attended a specialised school for children with DLD, where they received specialised education in smaller groups with extra attention for their language development, and speech and language therapy at school. The other children with DLD attended mainstream schools where they received extra help from specialized organizations. Children typically have a counsellor who regularly visits the school to inform teachers of the communication needs of the child, and to help the child with schoolwork, communication with others, and related issues. In addition, children with DLD often receive speech and language therapy outside of school.

The youngsters without DLD were recruited through mainstream schools and were included when they had no diagnoses (including ADHD), no language problems as measured with two sub-tests of the CELF (Semantic Relations and Text Understanding), and PIQ within the normal range. The present study is part of a larger research project on the social and emotional development of children and adolescents who face less access to the social environment while growing up because of deafness, autism spectrum disorder, or DLD. Cross-sectional data of a subsample of the group without DLD has been reported before (Kouwenberg, Rieffe, & Theunissen, 2011; Rieffe et al., 2011).

Table 1 Characteristics of participants at Time 1

	TD	**DLD**
Number of children - *n*	214	112
Age range (years; months)	8.4 – 14.8	8.5 – 16.0
Mean Age (years; months) (*SD*)	11.7 (1.5)	11.6 (2.0)
Gender - *n* (%)		
Male	89 (41.6%)	58 (51.8%)
Female	125 (58.4%)	54 (48.2%)
Mean Neighborhood SES***	.53 (1.27)	.02 (1.09)
Range Neighborhood SES	-5.24 – 2.44	-4.19 – 2.50
Performance IQ***	n = 183	n=107
	107.10 (17.28)	93.54 (12.71)
Range performance IQ	78 – 140	70 – 140

Note. The neighborhood SES represents the mean level of education, income, and occupation of all adults in a neighborhood as compared to all other neighborhoods in the Netherlands with Mean of 0.28, *SD* =1.09, and Range = -6.8 to 3.1, *** $p < .001$.

The groups with and without DLD, were comparable in terms of the mean age and gender distribution (Age: t (165.88) = .84, p = .401, d = .10; Gender: X^2 (1) = 2.07, p = .155)

(Table 1). Both groups consisted predominantly of youngsters with one or two Dutch parents (without DLD: 91.4%, with DLD: 92.5%). The parents of other participants came from Turkey, Morocco, Surinam, and other unspecified countries. Participants with DLD had lower PIQ than those without DLD ($t(264, 99) = 7.56$, $p < .001$, $d = .93$), and lived in less wealthy neighborhoods than youngsters without DLD, as indicated by their postal code ($t(316) = 3.81$, $p < .001$, $d = .45$). This has been found in many studies of children with DLD (e.g. Norbury et al., 2017), but this was also due to above average Neighborhood SES of the group of participants without DLD. The analyses were controlled for PIQ and Neighborhood SES.

All parents and the youngsters with DLD above 12 years of age gave written informed consent. The study was approved by the ethical committee of Psychology at Leiden University.

Materials

Bullying and *Victimization* were measured using the Dutch version of the revised Bully/Victim Inventory (Kouwenberg et al., 2011; Olweus, 1996). This self-report questionnaire was found to be reliable in previous research with Cronbach's alpha's ranging between .80 and .90 in different samples, and good convergent validity with peer nomination measures (for a review see Olweus, 2013). Also in deaf youngsters, good reliability was found for the victimization scale ($\alpha = .82$; Kouwenberg, et al., 2011). Children were first introduced to a definition of bullying, including several examples. Next, they were presented with nine questions describing different forms of bullying, including physical bullying (e.g. taking or breaking someone's belongings), verbal bullying (e.g. name-calling), and social exclusion (e.g. acting like you cannot see or hear someone). Children could answer on a three-point Likert scale if they *never (1)*, *sometimes (2)*, or *often (3)* bullied others.

To measure *victimization*, the same questions were presented to the youngsters, but this time they were asked if they had been the victim of these different bullying behaviors. Because children with disabilities more often are ignored or neglected by their peers, an extra item was added to the questionnaire, asking if they were invited to birthday parties (reversed scored) (Kouwenberg et al., 2011). The Cronbach's alpha for the bullying and victimization questionnaires was found to be acceptable for the group without DLD ($\alpha > .70$) and good for children with DLD ($\alpha > .80$; Table 2).

Understanding one's own Emotions was measured using a scale from the revised Emotion Awareness Questionnaire for children (Rieffe et al., 2008), a questionnaire that has been cross-validated in different languages and countries (Lahaye et al., 2011). The "differentiating emotions" scale asked children to rate how well they understood the causes of their own basic emotions (anger, sadness, and fear), and whether they could differentiate between their own emotions, as opposed to having a vague general negative feeling about a situation (7 items; e.g., *I often do not know why I am mad*; *I find it difficult to know if I feel mad, sad, or something else*). Children indicated whether the statements were *not true (3)*, *sometimes true (2)*, or *often true (1).* A high score represented good understanding of one's own emotions.

The scale showed good convergent validity, indicated by a positive correlation with emotional intelligence (r = .52**), and by the expected negative correlations with depression and social anxiety (r = -.36**, r = -.43** respectively) (Rieffe et al., 2008). Acceptable reliability has been reported in different samples (α > .67), including in children with communication difficulties (Lahaye et al., 2011; Rieffe et al., 2008; Rieffe et al., 2011). In our study, reliability was also found to be acceptable for both groups (α > .70; Table 2).

The level of *negative emotions* was measured with the Mood questionnaire (Rieffe, Meerum Terwogt, & Bosch, 2004). Children were asked how they felt in the past four weeks, and were presented with a list of emotions, including different words for anger (4 items; e.g. *mad*, *angry*, *furious*), sadness (4 items), fear (5 items), and happiness (5 items). Children could indicate whether they had felt the emotion *(almost) never (1)*, *sometimes (2)* or *often (3)*. The simple language makes this questionnaire well suited for children with communication difficulties. The internal consistency of the scales has been established in earlier studies (α > .70) (Rieffe et al., 2004). For this study, only the three negative emotion scales were used. Reliability for all scales was acceptable to good for both groups (α > .78; Table 2).

Performance IQ data were unavailable from school files for eight (7.1%) youngsters with DLD and all youngsters without DLD. Therefore, an indication of PIQ was obtained through two subscales of the Wechsler Intelligence Scale for Children, Third Edition (Block Design and Picture Arrangement; Kort et al., 2005). These subtests provide a good estimation of the PIQ of children tested with a complete version of the WISC (Theunissen et al., 2011). Ten children with DLD scored between 70 and 78 and four children without DLD had a PIQ of 78. Because this score falls within the 95% confidence interval of a PIQ of 85, these children were not excluded. All analyses were repeated without the children with low PIQ scores, and this did not change the results. Data were missing for five (4.5%) youngsters with DLD and 31(14.5%) youngsters without DLD due to attrition, or because parents did not give their consent to obtain information about PIQ (Table 1).

Communication problems of youngsters with DLD were assessed with the Dutch version of Bishops' Childs Communication Checklist (CCC-2-NL), which measures communication problems in children between 5 and 15 years old (Norbury et al., 2004; Geurts et al., 2009). The CCC-2-NL consists of 56 questions about speech production, syntax, semantics, coherence in discourse, and four pragmatic scales: initiation of conversations, non-verbal communication, use of context, and stereotypical language use. The two scales which were developed to screen for an autism spectrum disorder were not administered in this study. Parents were asked to indicate whether a certain communication behavior occurred *three or more times a day (3), once or twice a day (2), once a week (1), or less than once a week (0)*. Sum scores were calculated for all scales. Higher scores represented more communication problems. Data from the CCC-2-NL were missing for 17 (15.2 %) youngsters with DLD due to non-response of parents, or due to unreliable answers in the positively stated questions. All scales had acceptable to good reliability (Table 2).

Table 2 Psychometric properties of the questionnaires for children with DLD and typically developing children (TD)

Variable	Range	N items	α Time 1 DLD	α Time 1 TD	Means (*SD*) Time 1 DLD (n = 112)	Means (*SD*) Time 1 TD (n = 214)	Means (*SD*) Time 2 DLD (n = 104)	Means (*SD*) Time 2 TD (n = 183)	Means (*SD*) Time 3 DLD (n = 98)	Means (*SD*) Time 3 TD (n = 156)
Victimization	1 – 3	9	.84	.77	1.54 (.41)[a]	1.39 (.30)[b]	1.47 (.34)[a]	1.37 (.28)[b]	1.46 (.43)[a]	1.31 (.28)[b]
Bullying	1 – 3	9	.80	.77	1.50 (.35)	1.51 (.33)	1.46 (.36)	1.48 (.33)	1.46 (.40)[a]	1.35 (.30)[b]
Understanding one's own emotions	1 – 3	7	.72	.77	2.32 (.38)	2.39 (.43)	2.41 (.42)	2.42 (.39)	2.34 (.47)	2.39 (.39)
Sadness	1 – 3	4	.86	.81	1.62 (.47)[a]	1.39 (.43)[b]	1.59 (.54)	1.50 (.47)	1.46 (.49)	1.41 (.43)
Fear	1 – 3	4	.81	.81	1.53 (.49)[a]	1.31 (.39)[b]	1.52 (.47)[a]	1.40 (.42)[b]	1.42 (.49)	1.39 (.42)
Anger	1 – 3	4	.78	.78	1.57 (.50)[a]	1.41 (.44)[b]	1.58 (.52)	1.46 (.48)	1.40 (.47)	1.41 (.40)
Communication Problems					n = 95 (85%)					
Speech	8 - 24	7	.75		16.03 (3.59)					
Syntax	7 - 20	7	.59		15.28 (2.45)					
Semantics	5 - 18	7	.69		14.21 (1.72)					
Coherence	6 - 20	7	.80		15.00 (2.35)					
Pragmatic	24 - 78	28	.83		54.71 (7.48)					

Note. Group differences between children with and without DLD on every time point are indicated by the superscripts for that variable, $p < .05$

Common measure variance

Because we use different self-reports, common measure variance may influence our results. However, it has been shown that this effect is especially salient when different measures are highly related both conceptually and in the way questions are stated (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). In our study, the emotional competence measures were used to predict the social problems. These topics and the way questions were stated in the different questionnaires were not very similar. Therefore, the common measure variance may not have such a strong effect on the relations between these measures. However, the bullying and victimization questions do resemble each other strongly and the two concepts are closely related. In order to diminish this effect, the questionnaires about bullying and victimization were not presented right after each other, as recommended by Podsakoff and colleagues (2003).

Procedure

Participants were tested individually at school or at home by a trained test leader following a detailed protocol. The group of test leaders consisted of four PhD students, three research assistants with a master degree in child psychology and 24 master students in developmental psychology. It was emphasized that all answers would be anonymous and that there were no right or wrong answers. Participants filled out self-report questionnaires on a laptop or tablet. For children with DLD, all questions were read aloud by the test leader. Participants were able to ask for explanations at any point if they did not understand a question. Parents of children with DLD filled out the CCC-2 on paper or through the internet.

Statistical Analyses

The current study uses longitudinal data at three points in time. Multiple observations in participants causes dependency within the data, which violates the assumption of linear regression analyses. Therefore, we used multi-level regression models, which can correct for the dependency in the data (Singer & Willett, 2003; Snijder & Bosker, 2012). The analyses were run using the lme4 package in R 3.3.2 (The R Foundation, 2016).

As in most longitudinal studies, we had to deal with attrition. There were eight (7%) youngsters with DLD and 31 (14.5%) without DLD who did not participate at Time 2, and another 6 (5.4%) youngsters with and 27 (12.6%) without DLD who could not be retraced, or did not want to participate anymore at Time 3. Information was available at all three time points for 98 (88%) youngsters with and 156 (73%) without DLD. We compared participants who participated three times with participants who did not participate throughout the whole study. No differences were found within the DLD group, but in the group without DLD, youngsters who did not participate three times lived in less wealthy neighborhoods (t (56.79) = 3.59, p = .001). Multi-level data analyses are appropriate for dealing with missing data, because it uses all available data for every participant (Van Buuren, 2012). Therefore, children with missing

data on one or two time points were included in the study. Maximum Likelihood estimation was used (Van Buuren, 2012).

We used a formal model testing procedure where we compared increasingly more complex models with each other. The best fitting models explained the most variance within the data with the fewest predictor variables. This was indicated by Akaike's Information Criterion (AIC). The AIC compares the model fit to the data, but penalizes models with more predictor variables. When the model explains sufficiently more variance when a variable is added, the AIC becomes lower (Singer & Willett, 2003). Models were only reported when the reduction in AIC was significantly lower with $p < .05$. We calculated the 95% Confidence Intervals (CI) of all predictor variables within a model. When the CI does not contain 0, the variable makes a significant contribution to the prediction of the dependent variable.

The first aim of the study was to compare the level and changes across time of Bullying, Victimization, and indices for Emotional Competence between (pre)adolescents, with and without DLD. We fitted basic mean models as a baseline. Then, we examined whether the age in years (centered around the mean) of the children was related to the level of bullying, victimization, and emotional competence, while controlling for the Gender and Neighborhood SES of the children. Next, in order to examine differences between youngsters with and without DLD, Diagnosis (without DLD = 0, with DLD = 1) was added to the model. In addition, we examined whether the changes across time in the level of Victimization, Bullying, and the indices for Emotional Competence differed in youngsters with and without DLD by adding the interaction of Age x Diagnosis.

All analyses were examined for differences between children with DLD from special education and children in regular schools, but no differences occurred. Therefore, children with DLD from mainstream and special education were collapsed over group. In addition, all analyses were repeated with the addition of random slopes, but these did not provide better model fits and were excluded.

The second aim was to examine the predictive value of Emotional Competence (Understanding one's own Emotions and level of Negative Emotions) on the development of Victimization and Bullying. Therefore, the predictor variables were decomposed to form a Mean score (mean of Time 1, Time 2, and Time 3 for every participant) and time-varying Change score (the score on every time point minus the mean score for every participant). The mean score was added to the model in order to examine whether differences in the level of a predictor variable explained differences between participants in the level of Victimization and Bullying. The Change scores were added to examine whether individual changes over time in the predictor variable predicted increasing or decreasing levels of Victimization and Bullying (Singer & Willett, 2003). First, a model was fitted with Age, Neighborhood SES, Gender, Group, and Bullying or Victimization (Mean and Change), to account for the high interrelation between Victimization and Bullying (Olweus, 2013). Second, the Mean and Change score of Understanding of one's own Emotions were added to the model. Finally, the interaction terms

of Group x Understanding of one's own Emotions (Mean and Change) were added in order to compare the predictive value of Understanding one's own Emotions for children with and without DLD. A parallel analysis was run with the Mean and Change scores of the three Negative Emotions (Anger, Fear, and Sadness).

The third aim was to examine whether the Communication problems of children with DLD at Time 1 contributed to the prediction of the development of Victimization and Bullying. The CCC-2 was not filled out for 17 (15%) children with DLD, but we did not find any differences between children whose parents did and did not fill out the CCC-2. Therefore, we were fairly confident that the missing data were at random. A multilevel model with Age, Gender, and Neighborhood SES was compared with a model with the addition of one of the CCC-2 scales.

The final aim was to examine if the indices of Emotional Competence could explain the level of Victimization and Bullying over and above the severity of Communication Problems of children with DLD. Therefore, a multi-level model with the indices of Emotional Competence was compared to models with the addition of one of the CCC-2 scales.

RESULTS

Preliminary analyses

Because children reported on their own emotional and social problems, we tested whether the common method bias influenced our results. We performed an exploratory factor analysis with the items of the victimization, bullying, and emotional competence questionnaires. The number of allowed factors was constrained to one. The analysis showed that the first factor only accounted for 20.4% of the variance, which indicates that common method bias was not significantly influencing the results (Podsakoff et al., 2003).

Group differences

Our first aim was to compare the level and development of Victimization, Bullying, and the indices for Emotional Competence of youngsters with and without DLD. Table 3 presents the models that showed the best model fit (see Appendix 1 for an overview of all models). In Figure 1 all longitudinal data, as well as the predicted values based on the age and diagnosis of the participants, are presented. Youngsters with DLD reported higher levels of Victimization, Sadness, and Fear. No group differences were found for Bullying, Understanding of one's own Emotions, and Anger. Victimization and Bullying showed a decrease in older children in both groups alike, whereas Understanding of one's own Emotions increased in adolescents. The level of Anger, Sadness, and Fear did not differ across time in the group without DLD, whereas in youngsters with DLD, the three negative emotions decreased in older children. The addition of PIQ did not alter the results, and is therefore not reported.

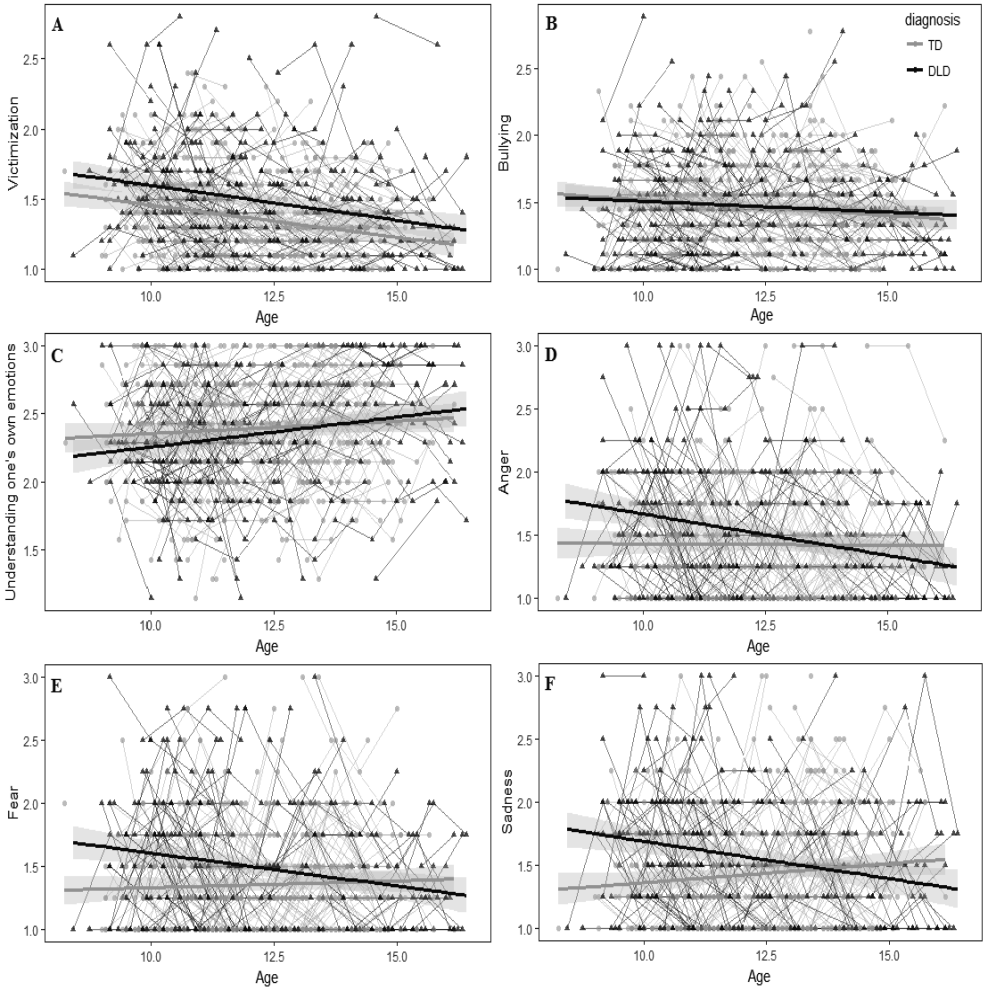


Figure 1. Graphic representation of age at three time points and the level of victimization (1A), bullying (1B), understanding of one's own emotions (1C), anger (1D), sadness (1E), and fear (1F). Every measurement is represented by a dot (without DLD), or a square (with DLD). The measurements of one participant are connected with lines. The graphic shows the predicted value of the variables based on the age and diagnosis of the participant.

Table 3 Goodness of fit (AIC) and regression weights with 95% CI for Multi- level models explaining the level and development of Victimization, Bullying, and the indices for Emotional Competence.

Variables	AIC	Age	Neigh. SES	Gender	Diagnosis	Diagnosis x Age
Victimization	282.4	**-.05 [-.06 to -.03]**	-.01 [-.03 to .02]	-.03 [-.08 to .04]	**.13 [.07 to .16]**	
Bullying	416.5	**-.02 [-.04 to -.00]**	-.00 [-.03 to .02]	**-.12 [-.18 to -.06]**		
Understanding one's own emotions	744.1	**.03 [.01 to .05]**	.02 [-.01 to .05]	-.02 [-.10 to .05]		
Anger	956. 2	-.00 [-.03 to .03]	-.01 [-.05 to .02]	**-.09 [-.17 to -.00]**	.08 [-.01 to .17]	**-.07 [-.11 to -.03]**
Sadness	996.7	.03 [-.00 to .06]	-.01 [-.05 to .03]	**.09 [.01 to .18]**	**.13 [.04 to .22]**	**-.08 [-.13 to -.04]**
Fear	903.6	.01 [-.02 to 0.4]	-.02 [-.05 to .02]	**.12 [.04 to .20]**	**.13 [.05 to .21]**	**-.06 [-.10 to -.02]**

The predictive power of Emotional Competence on Victimization and Bullying

Our second aim was to examine the extent to which indices for emotional competence could explain the development of Bullying and Victimization in (pre)adolescents with and without DLD (Table 4; and see Appendix 2 for an overview of all models). First, we controlled for the interrelation between Bullying and Victimization. Youngsters who reported more Bullying (Mean), as well as an increase in Bullying over the 18 months of the study (Change), reported higher levels of Victimization. In addition, the Mean level of Understanding of one's own Emotions explained lower levels of Victimization in both groups. However, this relation was moderated by Diagnosis, indicating that Understanding of one's own Emotions had a greater effect on less Victimization in (pre)adolescents with DLD than in peers without DLD (Figure 2).

Table 4 Goodness of fit (AIC) and regression weights with 95% CI for Multi- level models explaining Victimization and Bullying with the Gender, SES, Diagnosis (DLD = 1), Bullying/Victimization, and Understanding of one's own Emotions (Mean and Change).

Predictors		**Victimization**	**Bullying**
AIC		141.5	301.1
Age		**-.03 [-.05 to -.02]**	.00 [-.01 to .02]
Neighborhood SES		-.00 [-.03 to .02]	.00 [-.02 to .03]
Gender		.01 [-.04 to .06]	**-.12 [-.17 to -.06]**
Diagnosis		**.66 [.29 to 1.03]**	-.06 [-.12 to .00]
Bullying	Mean	**.34 [.25 to .44]**	-
	Change	**.22 [.14 to .29]**	-
Victimization	Mean	-	**.37 [.27 to .48]**
	Change	-	**.29 [.20 to .38]**
Understanding one's	Mean	**-.15 [-.25 to -.06]**	**-.13 [-.22 to -.04]**
own Emotions	Change	-.07 [-.15 to .01]	**-.11 [-.18 to -.05]**
Diagnosis x Understanding	Mean	**-.23 [-.38 to -.07]**	
one's own Emotions	Change	.01 [-.11 to .13]	

Bullying was also explained by higher levels of Victimization and an increase in Victimization over time. In addition, youngsters with more and increasing levels of Understanding of one's own Emotions were less likely to Bully their peers in both groups.

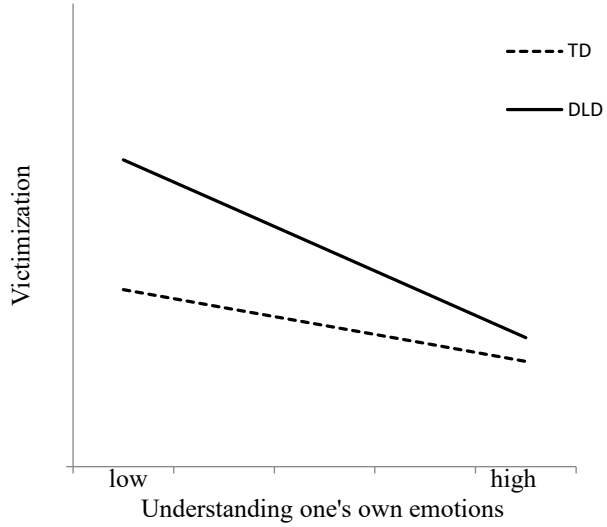


Figure 2. Moderation effect of Group on the longitudinal relation between Mean Understanding of one's own Emotions and Victimization.

Table 5 Goodness of fit (AIC) and regression weights with 95% CI for Multi-level models explaining the level of Victimization/Bullying with the control variables, Diagnosis (DLD = 1), Bullying/Victimization, and Anger, Sadness, and Fear (Mean and Change).

Predictors		**Victimization**	**Bullying**
AIC		78.0	277.4
Age		**-.04 [-.05 to -.03]**	.00 [-.01 to .02]
Neighborhood SES		-.00 [-.02 to .02]	.00 [-.02 to .03]
Gender		-.03 [-.08 to .02]	**-.10 [-.15 to -.04]**
Diagnosis		**.08 [.03 to .13]**	**-.06 [-.12 to -.01]**
Bullying	Mean	**.28 [.19 to .38]**	-
	Change	**.18 [.11 to .25]**	-
Victimization	Mean	-	**.31 [.20 to .42]**
	Change	-	**.26 [.17 to .35]**
Anger	Mean	.05 [-.03 to .13]	**.23 [.14 to .31]**
	Change	.04 [-.02 to .10]	**.11 [.05 to .17]**
Sadness	Mean	**.19 [.10 to .27]**	-.02 [-.11 to .08]
	Change	**.07 [.01 to .13]**	.01 [-.05 to .08]
Fear	Mean	**.15 [.06 to .24]**	.02 [-.08 to .12]
	Change	**.09 [.03 to .15]**	.03 [-.03 to .10]

Next, we examined the predictive power of Anger, Sadness, and Fear on the level and development of Victimization and Bullying. As Table 5 shows, higher levels of Sadness and Fear, as well as an increase in Sadness and Fear over time, explained higher levels of Victimization in both groups. Anger did not contribute to the model. Conversely, Bullying was only explained by higher and increasing levels of Anger. The strengths of these longitudinal associations were comparable in both groups.

The predictive power of Communication Problems on Victimization and Bullying

Our third aim was to examine whether higher levels of Victimization in (pre)adolescents with DLD could be explained by the type and severity of their Communication Problems. The separate scales of the CCC-2 were added one by one to the model, including Age, Gender, Neighborhood SES, and Bullying (Mean and Change). The results showed that Speech, Semantic, Coherence, and Pragmatic problems at Time 1 were associated with more Victimization in youngsters with DLD. Syntax problems did not contribute to Victimization. Pragmatic problems provided the best model fit (Table 6). Moreover, when more than one scale was added to the model, only the Pragmatic Problems remained significant.

Table 6 Goodness of fit (AIC) and regression weights with 95% CI for regression models explaining the level of Victimization in youngsters with DLD with the control variables, Bullying, and the addition of Pragmatic Problems, the indices for Emotional Competence and both Pragmatic Problems and Emotional Competence.

Predictors:		**Pragmatic problems**	**Emotional Competence**	**Pragmatic and Emo. Comp.**
AIC		128.4	112.3	108.6
Age		**-.03 [-.06 to -.01]**	.01 [-.04 to .01]	-.01 [-.04 to .01]
Neighborhood SES		.01 [-.04 to .07]	-.01 [-.03 to .06]	.03 [-.02 to .07]
Gender		.04 [-.08 to .16]	-.00 [-.11 to .11]	-.01 [-.12 to .09]
Bullying	Mean	**.44 [.25 to .63]**	**.23 [.02 to .43]**	.18 [-.02 to .38]
	Change	**.25 [.11 to .39]**	**.20 [.06 to .35]**	**.20 [.06 to .35]**
Pragmatic problems		**.01 [.00 to .02]**	**-**	**.01 [.00 to .02]**
Understanding one's	Mean		**-.29 [-.47 to -.11]**	**-.29 [-.47 to -.11]**
own emotions	Change		-.01 [-.13 to .13]	-.01 [-.13 to .13]
Anger	Mean		.02 [-.17 to .20]	.02 [-.17 to .20]
	Change		.03 [-.08 to .13]	.03 [-.08 to .13]
Sadness	Mean		**.29 [.09 to .49]**	**.29 [.10 to .49]**
	Change		.08 [-.02 to .19]	.08 [-.02 to .19]
Fear	Mean		-.05 [-.25 to .15]	-.08 [-.27 to .12]
	Change		.06 [-.05 to .16]	.06 [-.05 to .16]

Bullying behavior of youngsters with DLD was also associated with higher levels of Pragmatic, Semantic, and Coherence problems. However, when the level of Victimization was accounted for in the model, the communication problems did not explain any additional variance.

Our final aim was to examine whether indices for Emotional competence would predict Victimization over and above the type and severity of Communication Problems of children with DLD. Table 6 shows that less Understanding of one's own Emotions, and more Sadness and Fear, contributed to higher levels of Victimization, also after controlling for Pragmatic language problems of youngsters with DLD. Speech, Syntax, Semantic, and Coherence problems did not contribute to Victimization when Emotional Competence was controlled for.

DISCUSSION

Being involved in bullying, either as aggressor, victim, or both, can have lifelong negative consequences (Ttofi et al., 2011; 2012). Some (pre)adolescents are more at risk for these kinds of peer problems, including youngsters with DLD (Conti-Ramsden & Botting, 2004; Redmond, 2011). The level of communication difficulties might cause more peer problems as youngsters get older (St. Clair et al., 2011). However, difficulties with emotional competence may also underlie and reinforce peer problems. The current study examined the role of emotional competence in the victimization and bullying of children with DLD.

The results confirm previous studies that (pre)adolescents with DLD reported higher levels of victimization than their peers without DLD (Conti-Ramsden & Botting, 2004; Knox & Conti-Ramsden, 2003; 2007; Redmond, 2011). Our study is the first to examine the development of victimization over time in this particular group. Victimization decreased over time in participants with DLD, just as in youngsters without DLD. Yet victimization increased over time in youngsters who also bullied others more often. Participants with DLD reported more sadness and fear than peers without DLD and these levels decreased in older children. Higher and increasing levels of sadness and fear, but not anger, contributed to the prediction of more victimization in youngsters with and without DLD (Camodeca & Goosens, 2005; Schwartz et al., 2001; Spence et al., 2009). The level of understanding of their own basic emotions did not differ between the groups, but higher levels of understanding of one's own emotions contributed more strongly to less victimization in youngsters with DLD, over and above their communication levels. In fact, understanding of one's own emotions in youngsters with DLD had a greater effect on victimization than their communication levels. Gender, performance IQ, and our index for socio-economic status did not alter these outcomes.

To the best of our knowledge, this study is also the first to examine bullying in children with DLD. The outcomes showed that the groups with and without DLD did not differ in how often they bullied others on a general measure including different forms of physical, verbal, and social bullying (Olweus, 1996). Boys in both groups reported higher levels of bullying behaviors than girls. Yet neither group nor gender interacted with the outcomes of the models

that examined the occurrence of bullying. It appeared that higher and increasing levels of victimization contributed to the prediction of more bullying. As for emotional competence, higher and increasing levels of anger, and lower and decreasing levels of understanding of one's own emotions, contributed to the prediction of more bullying over and above victimization. These outcomes did not change when communication levels of children with DLD were controlled for. Gender, performance IQ, and socio-economic status did not alter these outcomes.

Consistent with studies in community samples (Cho, 2017); our data supported a bi-directional causal relationship between bullying and victimization in youngsters with DLD. It has been argued that victims of bullying start bullying others in order to defend themselves. In turn, especially these 'reactive' bullies, who react emotionally, are more vulnerable to victimization (Cook et al., 2010). In addition, victims might become habituated to this kind of violence and think that this is normal behavior to 'survive' socially (Bushman & Anderson, 2009). Because (pre)adolescents with DLD are victimized more often, this makes them vulnerable to becoming bully-victims. Interventions can prevent this from escalating.

As predicted, better communication levels contributed to the development of less victimization in children with DLD. However as expected, these relations were less important than the emotional competence of these youngsters in the longitudinal models that were tested in this study (Hart et al., 2004; Knox & Conti-Ramsden, 2007; Lindsay & Dockrell, 2012). Increased levels of fear and sadness, both emotions that reflect the tendency to withdraw from the situation causing negative feelings (Frijda, 1986), contributed to the development of more victimization in youngsters with and without DLD. It is possible that individuals who show their fear or sadness validate the bully's sense of power (Olthof et al., 2011). Yet increasing levels of anger, an emotion that aims to confront the other person with perceived injustice (Frijda, 1986), contributed to predicting more bullying behavior. With heightened levels of anger, bullies can justify their harmful behavior towards another person (Thornberg, Pozzoli, Gini, & Jungert, 2015).

Although we expected the predictive value of emotional competence to be greater in children with DLD, this was only true for the understanding of one's own basic emotions. Understanding of one's own emotions in this study was represented by a scale from the Emotion Awareness Questionnaire (Rieffe et al., 2008). The items in this scale reflect the capacity to identify the important antecedents in the emotion-evoking situation and how one wants to deal with these in order to arrive at a most optimal outcome (the so-called "action tendency", Frijda, 1986). This capacity forms the basis for adaptive emotion regulation (Crick & Dodge, 1994; Gross, 2015). For example, "feeling bad" is only a global negative evaluation of a situation that does not offer any insights about how to deal with it. Youngsters who can distinguish between anger and sadness evoked in a peer conflict indicate that they have also identified the harmful elements in the situation that bring different action tendencies (e.g., "I want him to say sorry", aimed at restoring harm, or "I thought he was my friend", aimed at coming on terms with a

perceived loss, respectively). This higher level of understanding of one's own emotions is not only related to better mental health (Sendzik, Schäfer, Samson, Naumann, & Tuschen-Caffier, 2017), but also to more positive peer interactions (Eisenberg et al., 1993; Mavroveli, Petrides, Sangareau, & Furnham, 2009). The outcomes of our study now confirmed that a better understanding of one's own basic emotions is also predictive of less bullying and less victimization in (pre)adolescents, with and without DLD.

Importantly, this protective factor for victimization was more strongly evident in children with DLD, over and above their communication levels, suggesting that youngsters with DLD benefit differentially from this kind of emotion understanding in their peer relationships. Although only speculative, (pre)adolescents with DLD who have a better understanding of their own emotions can more easily and more strategically express their emotions, or choose not to, because they have a better understanding of the emotion-evoking situation. Future studies could further examine the mechanism underlying this protective factor in youngsters with DLD. In addition, the understanding of more complex emotions in children with DLD should be examined, such as empathy, shame, guilt, and pride. These social and moral emotions are highly dependent on the understanding of others, and may therefore be more difficult to acquire than the understanding of basic emotions when children experience communication problems (Rieffe et al., 2016; Schaffer, 2005).

Notably, only pragmatic language problems were uniquely associated with victimization in addition to emotional competence. This confirms that the social use of language is of more significance than language form and content in peer interactions in adolescence (St. Clair et al., 2011). However, these abilities to use language in social communication are often not captured by formal language tests (Norbury et al., 2004). Children are only eligible for extra help when their receptive and/or expressive language abilities fall within the clinical range. Therefore, youngsters who have less pronounced language problems in addition to pragmatic problems may not receive the necessary help.

The social patterns within a classroom affect how youngsters interact (Veenstra et al., 2005). Therefore, the context in which a child is educated may be important to consider (Redmond & Rice, 1998). Surprisingly, no differences were found in the current study between (pre)adolescents with DLD in mainstream and special education, whereas individuals in special schools are often there due to the severity of their language problems or additional social, emotional, and behavioral difficulties (Knox & Conti-Ramsden, 2003). However, being among peers who also have DLD, in a setting where teachers are aware of DLD, may make youngsters more patient with each other, which could contribute to better mutual understanding. Because an increasing number of children with DLD are currently being integrated into mainstream schools, it will be important to monitor their emotional and social well-being in these integrated settings.

Limitations

This study had several limitations. First, some parents of youngsters with DLD did not fill out the questionnaire on communication difficulties, which might not have occurred completely at random. Although we found no differences in children with missing data, the analyses where we accounted for level of communication problems could be less generalizable.

Second, the study is based on self-reports, which may result in bias, as children have to be able to reflect on their own functioning and answer honestly about their perceptions of sensitive topics such as bullying and victimization. In particular in youngsters with DLD, it could be questioned whether they are able to understand the language of the questions and reflect their own understandings. However, previous studies which included both self-reports and parent or teacher reports found similar ratings of social, emotional, and behavioral problems in adolescents with DLD (Brownlie et al., 2004; St. Clair et al., 2011). Additionally, the questionnaires we used have proven to be reliable in other groups with communication difficulties and in our study the internal consistencies of the scales were also good. Self-report measures provide an important insight in the experience of youngsters. Parents and teachers often are unaware of these problems, and peer nominations are usually taken in the classroom, whereas bullying can also happen outside the school, in the sport club, or neighborhood. Nevertheless, future studies should include more informants in order to have a clearer picture as to what extent bullying and victimization are occurring within the DLD population.

Third, bullying might involve levels or dimensions that were not detected in the current study. For example, being excluded or ignored in a group is very different and more difficult to detect than deliberate harmful actions by peers. The social form of bullying is a complex construct since it encompasses both overt behaviors, such as making a child do something he or she does not want to do or telling a child he or she cannot play along, and covert behaviors, such as deliberately ignoring a child or spreading nasty rumors about a child (Olweus, 2013). Because bullying becomes more covert during adolescence, detection of these problems can be more difficult (Crick et al., 2002). Future studies should address these different facets of bullying.

Practical implications and conclusion

Youngsters with DLD are being victimized more often than their peers without DLD. Although the severity of communication problems was associated with victimization, the importance of emotional competence overshadowed their communication problems in (pre)adolescence. High levels of understanding of one's own emotions were protective of victimization, especially in children with DLD. Therefore, interventions for (pre)adolescents with DLD should include techniques that can increase understanding of one's own emotions and emotion regulation strategies. This could help youngsters with DLD adapt their reactions to social situations. Moreover, understanding of one's own emotions might help this group to better understand the emotions of others, and interpret social interactions in a more nuanced

fashion. Finally, the results underscore that many youngsters bully reactively following victimization, or out of anger. Teachers and parents should be aware of the reactive nature of bullying, and adapt their interventions to interaction patterns between peers.

Appendix 1 Goodness of fit (AIC) and regression weights with 95% Confidence Intervals (CI) for Multi- level models explaining the level and development of Victimization, Bullying, and the indices for Emotional Competence.

	M	AIC	Age	Neigh. SES	Gender	Diagnosis	Diagnosis x Age
Victimization	0	332.0					
	1	295.1	-.05 [-.06 to -.03]	-.02 [-.04 to .01]	-.04 [-.10 to .02]		
	2	282.4	-.05 [-.06 to -.03]	-.01 [-.03 to .02]	-.03 [-.08 to .04]	.13 [.07 to .16]	
Bullying	0	431.6					
	1	416.5	-.02 [-.04 to -.00]	-.00 [-.03 to .02]	-.12 [-.18 to -.06]		
Understanding one's	0	749.3					
own emotions	1	744.1	.03 [.01 to .05]	.02 [-.01 to .05]	-.02 [-.10 to .05]		
Anger	0	972.4					
	1	965.4	-.03 [-.05 to -.01]	-.02 [-.05 to .02]	-.08 [-.17 to .00]		
	2	964.0	-.03 [-.05 to -.01]	-.01 [-.05 to .03]	-.08 [-.16 to .01]	.08 [-.01 to .17]	
	3	956. 2	-.00 [-.03 to .03]	-.01 [-.05 to .02]	-.09 [-.17 to -.00]	.08 [-.01 to .17]	-.07 [-.11 to -.03]
Sadness	0	1017.3					
	1	1016.5	-.01[-.03 to .01]	-.02 [-.05 to .02]	.09 [.01 to .18]		
	2	1009.7	-.01[-.03 to .01]	-.01[-.04 to .03]	.11 [.02 to .19]	.14 [.05 to .23]	
	3	996.7	.03 [-.00 to .06]	-.01 [-.05 to .03]	.09 [.01 to .18]	.13 [.04 to .22]	-.08 [-.13 to -.04]
Fear	0	927.2					
	1	918.6	-.02 [-.04 to .00]	-.03 [-.06 to .01]	.12 [.04 to .19]		
	2	909.9	-.02 [-.04 to .00]	-.01 [-.05 to .02]	.13 [.05 to .21]	.14 [.06 to .22]	
	3	903.6	.01 [-.02 to .04]	-.02 [-.05 to .02]	.12 [.04 to .20]	.13 [.05 to .21]	-.06 [-.10 to -.02]

Appendix 2 Goodness of fit (AIC) and regression weights with 95% Confidence Intervals (CI) for Multi- level models explaining Victimization and Bullying with Age, Neighborhood SES, Gender (Girls = 1), Diagnosis (DLD = 1) and Bullying/Victimization in Model 1, Understanding one's own emotions in Model 2, and the interaction of Diagnosis x Understanding one's own emotions in Model 3.

		Victimization			**Bullying**	
		Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**
AIC		177.4	145.9	141.5	315.9	301.1
Age		-.04 [-.06 to -.03]	-.04 [-.05 to -.02]	-.03 [-.05 to -.02]	.00 [-.02 to .02]	.00 [-.01 to .02]
Neighborhood SES		-.00 [-.03 to .02]	-.00 [-.03 to .02]	-.00 [-.03 to .02]	.00 [-.02 to .03]	.00 [-.02 to .03]
Gender		.03 [-.03 to .08]	.01 [-.04 to .07]	.01 [-.04 to .06]	-.11 [-.17 to -.06]	-.12 [-.17 to -.06]
Diagnosis		.13[.07 to .19]	.12 [.07 to .18]	.66 [.29 to 1.03]	-.06 [-.12 to .00]	-.06 [-.12 to .00]
Bullying	Mean	.44 [.35 to .54]	.35 [.26 to .45]	.34 [.25 to .44]	-	-
	Change	.22 [.15 to .30]	.21 [.14 to .29]	.22 [.14 to .29]	-	-
Victimization	Mean		-	-	.44 [.34 to .53]	.37 [.27 to .48]
	Change		-	-	.30 [.22 to .40]	.29 [.20 to .38]
Understanding one's	Mean		-.23 [-.31 to -.15]	-.15 [-.25 to -.06]		-.13 [-.22 to -.04]
own emotions	Change		-.06 [-.12 to .00]	-.07 [-.15 to .01]		-.11 [-.18 to -.05]
Diagnosis x Understanding	Mean			-.23 [-.38 to -.07]		
one's own emotions	Change			.01 [-.11 to .13]		

“I have two friends with DLD, but we often do not understand each other. And then we get into a fight. And then you just get miscommunication. Just like when you are on Whats App. Then you still have DLD."

“I prefer playing alone. I am used to that by now.”

“My best friend sometimes finds it difficult to understand me. But somehow she understands, because she also knows what I have.”

Interrelation between empathy and friendship development during (pre)adolescence and the moderating effect of Developmental Language Disorder:

A longitudinal study.

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Van den Bedem, N. P., Willems, D., Dockrell, J. E., Van Alphen, P. M., & Rieffe, C. (2018). Interrelation between empathy and friendship development during (pre)adolescence and the moderating effect of developmental language disorder: A longitudinal study. Social Development, 28, 599–619. Doi: 10.1111/sode.12353

ABSTRACT

The association between empathy and friendship quality in children and adolescents is well established, but longitudinal studies are lacking. Because social interactions typically involve language, these relations might be moderated by children's communication problems. The current study examined the interrelation of friendship quality (positive and negative) and empathy (affective, cognitive, and prosocial motivation) development of 317 children (8-16 years old) at three time points across 18 months. Of these children 112 had a developmental language disorder (DLD). Results confirmed a bidirectional relation between empathy and friendship quality across time. Cognitive empathy and prosocial motivation contributed to the development of more positive friendship features in children with and without DLD. For children with unstable friendships, more cognitive empathy was related to fewer negative friendship features. Positive friendship features in turn contributed to higher empathy on all three aspects. Negative friendship features were related to higher affective empathy and lower prosocial motivation in both groups, but did not predict empathy development across time. These results imply that positive friendship features are important for development of empathic skills and vice versa that empathy enables children to grow in friendship quality in children with and without DLD.

INTRODUCTION

High-quality friendships are characterized by more features of positive friendship, such as mutual support, intimacy, and trust, and by fewer negative features of friendship such as jealousy and conflicts (Berndt, 2004). Friendship quality is often found to be related to empathy, that is the ability to share the emotions of others (affective empathy), to understand the thoughts and emotions of others (cognitive empathy), and the urge to react to these empathic feelings (prosocial motivation) (Ciarrochi et al., 2017; Hoffman, 1990; Meuwese, Cillesen & Güroglu, 2017). It is thought that empathy allows children to develop high-quality friendships more quickly (Denham et al., 2003; Rose-Krasnor, 1997), but also that empathic skills develop in these close social interactions, through a process of emotion socialization (Eisenberg, Fabes, & Spinrad, 2006; Schaffer, 2005). However, the cross-sectional nature of previous research does not differentiate between a selection effect, i.e. empathic children tend to pick empathic children who value closeness in their friends, or the effect of these different developmental processes through which empathy and friendship quality strengthen each other (Berndt, 2004). Therefore, the first aim of the current study was to examine the bidirectional relations of empathy and friendship quality across time during (early) adolescence.

Second, we aimed to understand how individual differences in access to the social world would influence these developmental processes. Communication is a prerequisite for social learning (Dunn, Brown, & Beardsall, 1991; Hughes & Leekam, 2004). Children with significant communication problems, such as children with developmental language disorder (DLD, American Psychiatric Association [APA], 2013; Bishop, Snowling, Thompson, Greenhalgh, & CATALISE consortium-2, 2017), experience more peer problems, and have fewer empathic skills (Bakopoulou & Dockrell, 2016; Botting & Conti-Ramsden, 2008). These difficulties may be a direct effect of their communication problems, but friendships and problems with empathy may also interact, causing children with DLD to gain less social understanding through their friendships (Hart, Fujiki, Brinton, & Hart, 2004). However, better empathic skills of children with DLD also may buffer the negative effects of their communication problems in the formation of friendships (Durkin & Conti-Ramsden, 2007). The second aim of the study was to examine the moderating effect of DLD on the interrelation between the development of empathy and friendship quality.

Below, we describe the development of friendship quality and empathy and the relations between both areas of development. Next, we outline the processes by which both developmental processes may be interrelated and review the available longitudinal studies on this topic. Finally, we discuss why these developmental processes may be different in children with DLD.

Friendship quality and empathy development

The development of close social relations with peers is an important developmental task during (early) adolescence. During this period, children increasingly focus on their peers for

social support, and are highly sensitive to negative peer evaluations (Crone & Dahl, 2012). Positive friendship features are predictive of good psychosocial adjustment later in life, whereas negative friendship features are associated with more externalizing behaviour problems (Berndt, 2004; Hartup & Stevens, 1999; Kouwenberg, Rieffe, & Banerjee, 2012). The quality of friendships typically improves throughout childhood and adolescence, with girls generally reporting more positive friendship features than boys (Berndt, 2004; Meeuws, 2016). During adolescence, the level of support and the level of intimacy (how much children share their thoughts and feelings) especially are increasing (Meeuws, 2016).

Empathy is an important aspect of social life. Affective empathy is reported to be present at birth, when babies mirror the emotions of others (Hoffman, 1990). The tendency to support other persons when distressed (prosocial motivation) can be observed in toddlers. The first signs of cognitive empathy typically develop around the age of four through interaction with the child's social environment. As children become older, these last two aspects of empathy become more sophisticated (Denham et al., 2003; Eisenberg et al., 2006; Hoffman, 1990). Girls reported higher levels of empathy than boys and different developmental paths for gender have been reported during adolescence. Girls between the ages of 10 and 18 years reported higher and stable or increasing levels of affective and cognitive empathy, whereas boys between the ages of 10 and 15 years reported stable, or even decreasing levels (Meeuws, 2016; Overgaauw, Rieffe, Broekhof, Crone, & Güroğlu 2017).

Empathy and friendship quality are closely related in children and adolescents. Children and adolescents between 11 and 18 years old with higher levels of affective and cognitive empathy and prosocial motivation reported more positive friendship features (Ciarrochi et al., 2017; Meuwese et al., 2017). In addition, higher levels of cognitive empathy and prosocial motivation were related to fewer negative friendship features, whereas no relations were found between affective empathy and negative friendship features (Meuwese et al., 2017).

Direction of effect of friendship quality and empathy development

Although the associations between the different aspects of empathy and friendship quality are well established, the developmental path underlying these associations is less well understood. One possibility is that children's empathic skills foster their positive peer relations. Empathy is thought to be an important prerequisite for social interactions (Eisenberg et al., 2006). When children are sensitive to the emotions of others and are able to adapt their behaviours to the needs and wishes of others, this may help them to build intimacy and trust in their friendships (Denham et al., 2003). Thus, a stronger increase of friendship quality over time in more empathic children than in children with fewer empathic skills would be expected.

To date, the influence of affective empathy and prosocial motivation on friendship quality has not been studied longitudinally, but the available evidence suggests that cognitive empathy indeed helps children to build friendships. For instance, children with lower levels of cognitive empathy were more likely to have no friends around the age of 6 than children with

higher levels of cognitive empathy (Fink, Begeer, Peterson, Slaughter, & De Rosnay, 2015). Additionally, preschool children with higher levels of cognitive empathy were liked more by their peers 2 years later, even controlling for likability at the start of the study (Denham et al., 2003).

Conversely, the association between empathy and friendship quality may also be explained through a process of emotion socialization, in which children learn to understand emotions and act on emotions in socially accepted ways through social interaction (Schaffer, 2005). Piaget (1932/1965) argued that social disclosure among friends provides children with the opportunity to learn about intentions, emotions, and thoughts of others. As friends tend to be more equal in their abilities and power in the relationship (Hartup & Stevens, 1999), this requires negotiating the wishes and concerns of both partners (Schaffer, 2005). Therefore, friendships may provide children with important learning opportunities. Furthermore, children learn from their friends by modelling their behaviour, and children's behaviour is reinforced by group norms (Bandura, 1986; Berndt, 1999). For instance, when children experience that their friends trust them and disclose their secrets, they may in turn respond similarly, further reinforcing the friends' behavior. This close bond can also increase the opportunity to gain better insights into others' feelings and thoughts. More positive friendship features are therefore likely to enhance children's empathic skills.

There is some longitudinal evidence for this emotion socialization process among friends. Cognitive empathy was found to increase more across 6 months in 5-year-olds with stable friendships than for those without stable friendships (Dunsmore & Karn, 2004). Furthermore, the prosocial motivation of adolescents (14 -16 years old) increased over a one year period when they had a prosocial friend, but only when they interacted on an almost daily basis (Barry & Wentzel, 2006). Finally, an experimental study showed that adolescents between 12 and 16 years old increased their prosocial decisions when peers encouraged more prosocial choices, whereas their prosocial decisions decreased when peers encouraged fewer prosocial choices (Van Hoorn, Van Dijk, Meuwese, Rieffe, & Crone, 2014).

In sum, the relation between different aspects of empathy and friendship quality development may be bidirectional. Cognitive empathy is reported to enhance popularity in children between 9 and 11 years old, whereas children who were rejected by their peers developed cognitive empathy to a lesser extent over a one-year period. The authors argued that as long as children are not rejected by their peers, they have enough opportunity to develop their empathic skills (Banerjee, Watling, & Caputi, 2011). However, closer social relationships, such as high-quality friendships, may provide special learning opportunities, which are not provided in interactions with the peer group at large (Rose-Krasnor, 1997).

The influence of communication problems

Social interactions typically involve language. Children who experience problems in the development and use of language in social interactions (i.e. communication) are therefore

disadvantaged in social interactions compared to children with typical language abilities (Redmond & Rice, 2002). Approximately two children in every classroom have significant difficulties acquiring and using language (Norbury et al., 2017). When these language problems are severe, but not explained by other developmental disorders, children can be diagnosed with DLD (DSM-5, APA, 2013; Bishop et al., 2017). Children with DLD often experience problems understanding and producing language, as well as using language in social interactions, that is pragmatics (APA, 2013; Norbury, Nash, Baird, & Bishop, 2004). Although DLD is a relatively common disorder, these communication problems and their effects on the social and emotional development are not always recognized and understood (Cohen, Menna, Vallance, Barwick, Im, & Horodezky, 1998).

Children with DLD experience more problems with their peers than typically developing children, such as peer rejection and fewer friendships. These problems occur in preschool and continue throughout childhood and adolescence (Lindsay & Dockrell, 2012; St. Clair et al., 2011). During (early) adolescence, the demands on the communication abilities of children further increase, because adolescents spend most of their time chatting with their friends (Hartup & Stevens, 1999). Between the ages of 7 and 16, social problems of children with DLD become more pronounced (Lindsay & Dockrell, 2012; St. Clair et al., 2011), especially in children with DLD including pragmatic problems, whereas no relations were found with receptive and expressive language problems alone (St. Clair et al., 2011). Although most 16-year olds with DLD reported at least one good friend (61%), these friendships were lower in quality than in peers without DLD (Durkin & Conti-Ramsden, 2007; Wadman, Durkin, & Conti-Ramsden, 2011). Poorer friendship quality has also been associated with more aggression and less social integration in early adults with DLD (Toseeb, Pickles, Durkin & Conti-Ramsden, 2017).

However, communication abilities alone cannot explain why some children with DLD develop high-quality friendships, whereas others do not (Botting & Conti-Ramsden, 2008; Durkin & Conti-Ramsden, 2007). It has been suggested that the different social experiences of children with DLD, caused by their communication problems, can set in motion a different developmental trajectory in which children gain less knowledge and experiences from interactions with others (Hart et al., 2004). This trajectory may affect the development of empathy negatively. First, language is a prerequisite for the development of empathy, because language is an important medium through which emotion socializing occurs (Schaffer, 2005). For instance, the quality of emotion talk between parents and children is related to better understanding of emotions in toddlers and preschoolers (Dunn et al., 1991). Second, language helps children to gain emotion knowledge incidentally, through overhearing conversations between others (Dunn et al., 1991; Hughes & Leekam, 2004). When children lack the communication skills to follow and actively interact in these conversations, they have diminished opportunities to learn about emotions, which in turn may affect their cognitive

empathy negatively (Netten et al., 2015) and social skills development (Denham et al., 2003; Eisenberg et al., 2006).

Previous research found that children with DLD between 4 and 11 years old had more difficulties with perspective taking and emotion understanding than children without DLD (Bakopoulou & Dockrell, 2016; Nilsson & Jensen de López, 2016), and these problems have also been identified in adolescence (Botting & Conti-Ramsden, 2008). The communication problems of children may impede their opportunities to learn from their peers and develop these empathic skills. Problems in empathy may in turn have a negative effect on the formation and development of social relations, over and above the initial communication deficits experienced by children. To date, it appears that prosocial behaviour is related to more positive friendship features in 16 and 24-year-olds with DLD (Durkin & Conti-Ramsden, 2007; Toseeb et al., 2017). In fact, prosocial behavior may be more important for friendship quality in children with DLD than in children without DLD, because it may buffer the negative effect of their language problems. Durkin and Conti-Ramsden (2007) found that the friendship quality of 16-year olds with DLD was positively related to their prosocial behavior, whereas no relation was found for peers without DLD. To date, it is unknown how affective and cognitive empathy are related to the quality of friendships in children with DLD. In addition, no research has examined the negative features of friendship in children and adolescents with DLD.

Present study

The first aim of the current study was to examine the interrelation between empathy and friendship quality across time in children between 8 and 16 years old. The longitudinal data enabled us to examine both differences between participants and within individuals over time. We expected that individual differences in empathy between participants would be related to their friendship quality. Therefore, we expected positive relations between the three aspects of empathy and positive friendship features. For negative friendship features a negative relation was expected with cognitive empathy and prosocial motivation, but not with affective empathy (Ciarrochi et al., 2017; Meuwese et al., 2017).

Additionally, we expected that developments in the level of empathy within individual children would contribute to their friendship quality and vice versa that friendship quality would contribute to the development of empathic skills. Specifically, we expected increasing levels on the three empathy scales to be related to a greater increase in positive friendship features (Banerjee et al., 2011; Denham et al., 2003; Fink et al., 2015), and we also expected increasing levels of positive friendship features to enable children to gain more empathic skills (Barry & Wentzel, 2006; Dunsmore & Karn, 2004; Schaffer, 2005). This effect may be most salient for cognitive empathy and motivation to support which are dependent on social learning (Dunn et al., 1991; Hoffman, 1990). Because girls typically report higher levels of empathy and friendship quality, and show a different developmental trajectory than boys (Meeuws, 2016), the analyses were controlled for gender differences.

The second aim was to examine whether DLD moderated the relation between empathy and friendship quality. In children with DLD a stronger positive relation might be expected between more empathy and friendship quality, because the empathic skills of children could buffer the negative effect of their communication problems in the formation of good quality friendships (Durkin & Conti-Ramsden, 2007). However, the communication problems of children with DLD could impede their ability to gain new insights and skills from their friendships. Therefore, we expected that individual growth in friendship quality across time would be less strongly related to growth in empathy in children with DLD compared to children without DLD. Additionally, we anticipated that these effects could be stronger in children with severe communication problems. Therefore, the analyses on the relations between empathy and friendship quality controlled for the severity of the communication problems of children with and without DLD.

METHOD

Design

Children with and without DLD were followed over an 18-month period. The participants were tested three times with 9 months in between each measurement. During each measurement, children reported on their friendship quality and empathy. In addition, the performance IQ (PIQ) of children was tested during the second measurement, or PIQ information was obtained from school files. Parents reported on their children's communication problems.

Participants

A total of 325 children between 8 and 16 years old participated in this longitudinal study, of which 114 children had a diagnosis of DLD (Van den Bedem, Dockrell, Van Alphen, De Rooij, et al., 2018; Van den Bedem, Dockrell, Van Alphen, Kalicharan, & Rieffe, 2018). Typically developing children were recruited through schools for primary or secondary education. They were included in the study when they had no diagnosis of neurodevelopmental disorders, when their communication abilities were not in the clinical range, as tested with two subtests of the CELF-4 (Kort, Schittekatte, & Compaan, 2008) and their PIQ fell within the 95% Confidence Interval of an PIQ of 85 or higher. Three children reported no best friend on any of the three measurements and were excluded (Table 1). Cross-sectional data of these children without DLD have been reported on before (Netten et al., 2015; Rieffe et al., 2018).

Participants with a diagnosis of DLD were recruited though specialized schools for children with communication problems and through organizations who provide specialized treatment for children with communication problems in mainstream education. Approximately three quarters of the DLD group attended schools for special education where children received specialized education in smaller classrooms with other children with DLD (Table 1). The other children attended mainstream schools where a counselor regularly visited them to advise

teachers and provide extra help for the child. Children with DLD were included when they had a diagnosis of DLD which they received in line with the DSM-4 criteria (APA, 1994) and had no autism spectrum disorder or hearing impairment. In the DSM-4, children were only eligible for a diagnosis of DLD when they had a significant discrepancy between the language and PIQ abilities, which is no longer a requirement in the DSM-5 (APA, 2013).

Children with DLD had lower PIQ than children without DLD ($t(275.00) = 7.84$, $p < .001$, $d = .91$). Additionally, children with DLD had lower socio-economic status (SES) than children without DLD, as indicated by their postal code ($t(323) = 3.74$, $p < .001$, $d = .43$), which is often found in children with DLD (e.g. Norbury et al., 2017). Both groups, predominantly, had one or two Dutch parents (92%). A minority of the children had parents who originated from other European countries, Morocco, Turkey, or Surinam, or other unspecified countries. The mean age and gender distribution did not differ between children with and without DLD (Age: $t(177.89) = .31$, $p = .758$, $d = .04$; Gender: $X^2(1) = 2.52$, $p = .129$).

Table 1 Characteristics of participants at Time 1 for children with a typical development (TD) and children with DLD

	TD	DLD
N children	211	114
Age range in years	8.3 – 14.7	8.4 – 16.0
Mean Age in years (*SD*)	11.6 (1.4)	11.5 (2.0)
Male	94 (44.5%)	58 (50.9%)
Female	117 (55.4%)	56 (49.1%)
Mainstream schools	211 (100%)	32 (28.6 %)
Special education	-	80 (71.4 %)
primary/secondary education		
Time 1	128/77	79/33
Time 2	99/76	64/40
Time 3	38/112	50/49
Performance IQ***	*n* = 183	*n* =108
	107.3 (17.3)	93.4 (12.7)
Range performance IQ	78 – 140	70 – 140
Neighbourhood SES***	.53 (1.27)	.01 (1.09)
Range Neighbourhood SES	-5.24 – 2.44	-4.19 – 2.50

Note. *** $p < .001$; The neighbourhood SES represents the mean level of education, income, and occupation of all adults in a neighbourhood as compared to all other neighbourhoods in the Netherlands (Mean (*SD*) = 0.28 (1.09), Range = -6.8 to 3.1).

Materials

Friendship quality was examined with the Best Friend Index (BFI) for children and adolescents (Kouwenberg et al., 2012) which measures positive friendship features (e.g. I share secrets with my best friend), and negative friendship features (e.g. My friend tries to boss me around). Participants were asked whether they had a best friend and what the name of the friend was. Thereafter, they were asked to rate if statements about their friendship were almost never (1), sometimes (2), or often (3) true. The BFI scales show good external validity (Kouwenberg et al., 2012). The Cronbach's alpha indicated acceptable consistency of the scales in both groups on the different measurements (α >.69; Table 2) except for the negative friendship features in children without DLD (α = .60,.72, .63). During each wave, some children did not report having a best friend (Time 1: two with and six without DLD; Time 2: five without DLD; Time 3: six without DLD). All available data points of the participants were included in the analyses. Approximately, half of the children in both groups reported different best friends at each measurement point. A quarter of the children reported the same best friend on two occasions and the final quarter maintained the same best friend throughout the study. Data about the best friend was missing for 98 children without DLD due to an error in the test session.

Table 2 Psychometric properties of the questionnaires

Range		N items	α Time 1,2,3 TD	α Time 1,2,3 DLD	Mean (*SD*) Time 1,2,3 TD	Mean (*SD*) Time 1,2,3 DLD
Friendship quality						
Positive	1-3	11	.69, .70, .74	.75, .75, .78	2.68 (.21)	2.53 (.27)
Negative	1-3	9	.60, .72, .63	.71, .70, .69	1.22 (.17)	1.32 (.23)
Empathy						
Affective	1-3	5	.67, .78, .73	.64, .66, .63	1.94 (.40)	1.86 (.37)
Cognitive	1-3	3	.73, .73, .70	.75, .80, .81	2.42 (.41)	2.10 (.49)
Prosocial	1-3	5	.73, .74, .74	.75, .80, .78	2.67 (.31)	2.55 (.36)
Communication problems	50 - 160	56	.87	.83	n = 139 73.58 (15.03)	n = 95 115.63 (13.57)

Empathy was examined with the Empathy Questionnaire for Children and Adolescents (EmQue-CA; Overgaauw et al., 2017). This questionnaire assesses affective empathy (e.g. If someone in my family is sad, I feel really bad), cognitive empathy (e.g. If a friend is angry, I tend to know why) and prosocial motivation (e.g. If a friend has an argument, I try to help; I want everyone to feel good). One item (I often feel sad when I watch a sad movie) was not

included in the affective empathy scale, because this item was added to the questionnaire during the validation process and after the start of the present study. Children indicated if the statement was almost never (1), sometimes (2), or often (3) true. The questionnaire has good internal consistency and concurrent validity (Overgaauw et al., 2017) and uses simple language which makes it suitable for children with less language proficiency. The internal consistency of the scales ranged from .63 to .81 (Table 2).

PIQ was examined with two non-verbal subtests of the WISC (i.e. Block design and Picture Arrangement; Kort et al., 2005). These subtests are highly correlated with a complete PIQ test (Theunissen et al., 2011). Data were missing for 34 (16.1%) children without and eight (7.0%) children with DLD because they did not participate during time 2, or because parents did not give permission to test PIQ.

Parents filled out the Dutch version of the Children's Communication Checklist (CCC-2; Geurts et al., 2009; Norbury et al., 2004) in order to get an indication of the severity of communication problems. The CCC-2-NL assesses whether children between 5 and 15 years old have communication problems in language form, content, and use. The eight scales (speech, syntax, semantics, coherence, initiation of conversations, non-verbal communication, use of context, and stereotypical language) can be summed to provide a general communication problems score (Norbury et al., 2004). Parents indicated on a 4-point Likert scale whether communication problems occured multiple times a day (3), once or twice a day (2), once a week (1), or less than once a week (0). The Cronbach's alpha was good for both groups (α >.83; Table 2).

Procedure

The study was approved of by the ethical committee of Leiden University. All parents and children above 12 years of age signed an informed consent. Children were tested individually by a researcher in a quiet room in school or at home. Children were told that all answers were anonymous and that there were no right or wrong answers. The questionnaires were presented on a laptop or tablet where children could read the questions and privately answer by clicking on an answer. For children with DLD, all questions were also read aloud from paper. Researchers were trained to read the questions with a neutral expression and intonation in order not to influence the children. The researchers could not see the responses that children gave during the test session. Parents filled out the questionnaire on paper or through the internet.

RESULTS

Preliminary analyses

We first performed preliminary analyses to examine the development of empathy and friendship quality in children with and without DLD. We used multi-level modelling in order to deal with the dependency of multiple observations in participants (Singer & Willett, 2003).

Additionally, multilevel analyses use all available data points for every child. Therefore, it is well suited to deal with missing data due to attrition (Van Buuren, 2012). There were 40 participants (30 without and 10 with DLD) who dropped out of the study at time 2 and another 31 (26 without and five with DLD) at time 3. Children without DLD who did not participate at all time points lived in lower SES neighbourhoods than children without DLD who completed all assessments. No other differences occurred. Therefore, we used Maximum likelihood estimation in all analyses, assuming data were missing at random (Van Buuren, 2012).

Multi-level models were fitted using R 3.3.2 (R Development Core Team, 2016). We compared increasingly more complex models and examined whether the addition of a predictor variable provided a better model fit, as indicated by a significantly lower Akaikes Information Criterion (AIC). AIC compares the goodness of fit of a model with the data, relative to the amount of predictor variables in the model (Singer & Willett, 2003). In order to examine the robustness of our findings we used a clustered bootstrap procedure with 5000 bootstrap samples (Field, 2013). Confidence Intervals (95% CI) were used to interpreted which factors made a significant contribution to the model. When the CI does not contain 0, the predictor is significant.

Group differences in children with and without DLD

We examined group differences in the level of empathy and friendship quality in children with and without DLD, while controlling for gender and neighbourhood SES. An unconditional means model (model 1) was compared with a model with age in years (centered), gender, and neighbourhood SES (model 2). All models were fitted with the addition of random slopes, which were only reported when they made a significant contribution to the model. Diagnosis (without DLD = 0 and DLD = 1) was added in order to compare the mean levels in both groups (model 3). In order to compare the development across time for different subgroups, the interactions gender x age x diagnosis were added (model 4). Non-significant interactions were excluded. The best fitting models predicting empathy and friendship quality are provided in Table 3 (see the appendix for the fit indices for all models).

Children with DLD reported fewer positive, and more negative friendship features, as well as less cognitive empathy and prosocial motivation. For affective empathy, an interaction effect of diagnosis x gender was found (model 4), which indicated that affective empathy was lower in girls with DLD compared to girls without DLD, whereas boys with and without DLD reported similar levels of affective empathy. Children with DLD in special education reported lower levels of prosocial motivation than children with DLD in mainstream schools, whereas both groups reported lower levels than children without DLD. No other differences occurred. Therefore, the children with DLD from both school types were collapsed over group.

Table 3 Regression weights with 95% CI for best fitting models with age, neighbourhood SES, gender (girls = 1), and diagnosis (DLD = 1) as predictors

	Positive friendship model 4	Negative friendship model 3	Affective empathy model 4	Cognitive empathy model 3	Prosocial motivation model 3
Age (centered)	**.044** [.017, .071]	**-.013** [-.025, -.001]	.028 [.006, .051]	**.054** [.026, .081]	**.031** [.012, .050]
Neighbourhood SES	-.009 [-.029, .011]	.002 [-.016, .020]	-.002 [-.038, .033]	.001 [-.035, .046]	-.010 [-.039, .019]
Gender	**.206** [.156, .256]	**-.048** [-.091, -.004]	**.383** [.285, .480]	**.224** [.124, .046]	**.212** [.142, .283]
Diagnosis	**-.127** [-.207, -.046]	**.085** [.035, .135]	.074 [-.045, .193]	**-.296** [-.401, -.191]	**-.138** [-.216, -.060]
Diagnosis x gender	-.025 [-.127, .077]	-	**-.238** [-.407, -.068]	-	-
Gender x age	.034 [-.051, .013]	-	-	-	-
Diagnosis x age	-.040 [-.082, .003]	-	-	-	-
Diagnosis x age x gender	**.096** [.041, .150]	-	-	-	-

*Note. S*ignificant predictors are in bold

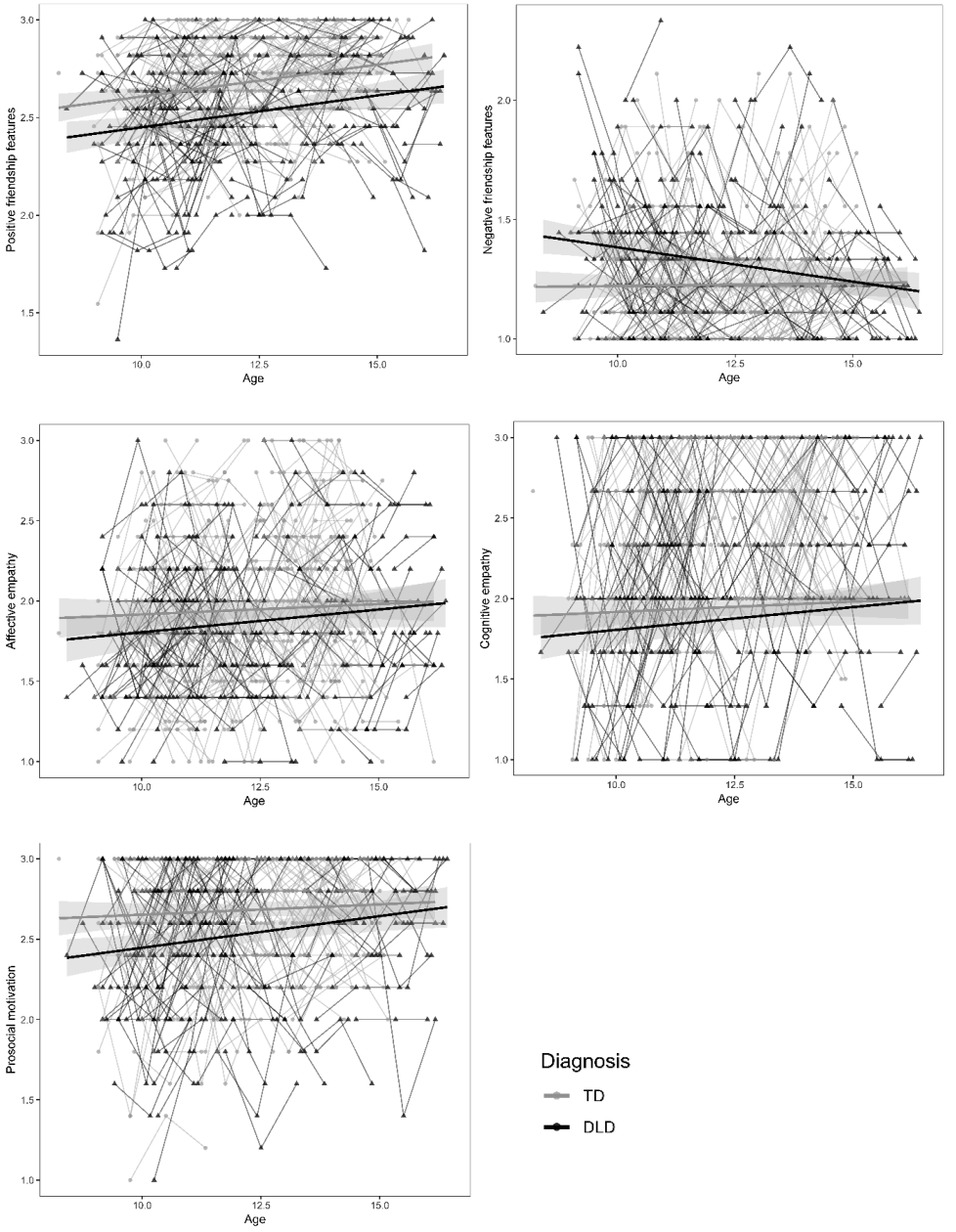

Figure 1. Level of friendship quality (positive and negative) and empathy (affective, cognitive and prosocial motivation) of all participants on three time points (data points of one participant are connected with lines) with regression lines depicting the predicted value based on age and diagnosis with 95% CI's.

Next, the development of empathy and friendship quality in children with and without DLD was compared. Figure 1 shows the longitudinal data for children with and without DLD across time. Affective empathy and prosocial motivation increased, whereas negative friendship features decreased in both groups as they became older (model 3). Positive friendship features increased in all children, but the effect was stronger in girls with DLD as indicated by an interaction effect of diagnosis x age x gender (model 4). Cognitive empathy also increased in both groups as they became older (model 3). However, an interaction effect between school level x age x diagnosis showed that cognitive empathy increased during primary school in children without DLD, but not during secondary school (model 5). By contrast, in children with DLD, no differences in the mean level of cognitive empathy were found during both primary and secondary school.

Main analyses

The first aim of the study was to examine the extent to which the level and development of the three empathy scales contributed to the prediction of the development of friendship quality, and vice versa whether the level and development of friendship quality contributed to the prediction of empathy. Therefore, we decomposed the friendship and empathy variables in a participant specific mean score and a score representing the within participant deviation from the individuals' mean (Time 1 – mean, Time 2 – mean, Time 3 – mean) and added these variables to the multi-level models (model 6).

Table 4 Pearson's correlations for all study variables

	1	2	3	4	5	6	7
1. Positive friendship	-						
2. Negative friendship	-.18**	-					
3. Affective empathy	.33***	.03	-		.		
4. Cognitive empathy	.53***	-.10	.44***	-			
5. Prosocial motivation	.53***	-.21***	.47***	.59***	-		
6. PIQ	.12*	-.12*	-.04	.15*	.11	-	
7. Neighbourhood SES	.05	-.02	.02	.12	.01	.15*	-
8. Age	.24***	-.16**	.16**	.17**	.17***	-.12	-.02

*** < .001, ** <.01, * <.05

Empathy predicting friendship quality

We first considered whether the mean level and the within-participant deviation of the three empathy scales contributed to the prediction of positive and negative friendship features (See Table 4 for the correlations between all study variables). As Table 5 shows, positive friendship features were explained by higher mean levels of cognitive empathy and prosocial

motivation, but not by higher mean affective empathy when the three scales were included in the model. Additionally, children who had increasing affective empathy, cognitive empathy, and prosocial motivation during the 18 months of the study, reported an increase in their positive friendship features.

Table 5 Regression weights with 95% CI with empathy scales predicting friendship quality (model 6)

		Positive friendship	Negative friendship
Age (centered)		**.030** [.004, .056]	-.013 [-.025, -.001]
Neighbourhood SES		-.008 [-.025, .010]	.001 [-.016, .018]
Gender		**.148** [.095, .202]	**-.054** [-.101, -.007]
Diagnosis		-.065 [-.139, .009]	**.080** [.028, .132]
Diagnosis x gender		-.027 [-.114, .060]	-
Gender x age		-.010 [-.041, .021]	-
Diagnosis x age		-.032 [-.069, .004]	-
Diagnosis x age x gender		**.072** [.025, .119]	-
Affective empathy	Mean	-.039 [-.101, .023]	**.101** [.040, .162]
	Deviation	**.046** [.001, .091]	.035 [-.020, .091]
Cognitive empathy	Mean	**.121** [.065, .178]	.031 [-.032, .094]
	Deviation	**.067** [.028, .107]	-.014 [-.062, .033]
Prosocial motivation	Mean	**.197** [.112, .282]	**-.141** [-.223, -.048]
	Deviation	**.099** [.031, .168]	-.023 [-.089, .043]

Note. Significant predictors are in bold

Negative friendship features were associated with higher mean affective empathy, and lower mean prosocial motivation, whereas cognitive empathy did not add to the prediction of negative friendship features in either group. However, when we examined the continuity of the friendships of children the pattern changed (AIC without: -.54.9 and with continuity of friendships: -62.4, $X^2(df)$: 11.8, p =.002; Table 6). Within–participant growth in cognitive empathy across time was related to decreasing levels of negative friendship features, but only in children who did not have the same best friend across time. In children with a best friend on two or three time points this relation was not significant (*B:* -.132 + .163 = .031). Note that

these analyses were performed on a smaller sample excluding 98 children without DLD for whom the name of the best friend was not recorded.

Table 6 Regression weights with 95% CI for same best friend and empathy interaction predicting negative friendship features

		Negative friendship
Age (centered)		**-.016** [-.030, -.002]
Neighbourhood SES		.005 [-.016, .026]
Gender		-.035 [-.088, .019]
Diagnosis		**.107** [.048, .166]
Same friend		**-.327** [-.613, -.041]
Affective empathy	Mean	**.141** [.064, .218]
	Deviation	.034 [-.033, .100]
Cognitive empathy	Mean	.049 [-.170, .072]
	Deviation	**-.132** [-.256, -.007]
Prosocial motivation	Mean	**-.169** [-.277, -.062]
	Deviation	-.003 [-.076, .071]
Same friend x	Mean	**.126** [.007, .246]
cognitive empathy	Deviation	**.163** [.027, .300]

Note. Significant predictors are in bold.

Friendship quality predicting empathy

Next, we examined whether the quality of friendships contributed to the prediction of the empathy development (model 6). As Table 7 shows, more as well as increasing positive friendship features within individuals contributed to the development of the three empathic skills. In line with expectations, more negative friendship features were associated with less prosocial motivation. However, more negative friendship features also were associated with more affective empathy. Within-participant deviations of their own mean in negative friendship features did not contribute to the prediction of the three empathy scales (model 6).

The moderating effect of DLD

The second aim of the study was to examine the moderating effect of DLD on the interrelation between empathy and friendship quality. Therefore, the interaction terms of

diagnosis x empathy or friendship quality were added to the model (model 7). However, DLD was not found to have a moderating effect on any the longitudinal relations between empathy and friendship quality.

Table 7 Regression weights with 95%CI with friendship quality predicting empathy (model6)

		Affective empathy	Cognitive empathy	Prosocial motivation
Age (centered)		.021 [-.000, .044]	**.027** [.001, .052]	.008 [-.009, .026]
Neighbourhood SES		-.001 [-.036, .035]	.012 [-.025, .050]	-.005 [-.030, .021]
Gender		**.334** [.228, .440]	.071 [-.025, .167]	**.091** [.020, .162]
Diagnosis		.089 [-.031, .209]	**-.185** [-.290, -.079]	-.038 [-.110, .034]
Diagnosis x gender		**-.227** [-.396, -.058]	-	-
Positive Friendship	Mean	**.296** [.096, .493]	**.810** [.603, 1.016]	**.588** [.434, .743]
	Deviation	**.221** [.086, .357]	**.532** [.342, .721]	**.400** [.246, .554]
Negative Friendship	Mean	**.273** [.065, .480]	.090 [-.142, .323]	**-.150** [-.318, -.017]
	Deviation	.088 [-.060, .236]	-.008 [-.207, .191]	-.003 [-.143, .137]

Note. significant predictors are in bold.

The influence of the severity of communication problems

Finally, we examined whether the relations between empathy and friendship quality would remain after controlling for the severity of communication problems of children with and without DLD. We examined whether children with missing data from the parent questionnaire differed from children without missing data (61 without and 17 with DLD). In the group without DLD, children with missing data lived in lower SES neighbourhoods and had lower PIQ ($t(88.99) = 2.86$, $p = .005$, $d = .43$, and $t(175) = 3.50$, $p = .001$, $d = .63$ respectively). In the group with DLD no differences were found. We reran the earlier analyses without the children with missing CCC-2 data, which did not change the patterns found.

Next, the general communication problems score and the interaction of diagnosis x communication problems were added to a model with age, gender, and neighbourhood SES. The severity of communication problems did not contribute to the prediction of positive friendship features, affective empathy, cognitive empathy, or prosocial motivation in either group. However, negative friendship features were associated with more severe communication problems, but only in children with DLD (AIC without: -.86.9 and with communication problems: -92.1; $X^2(df)$: 9.2, p =.010; B = .005, 95% CI = .002 to .009). When the severity of

communication problems was controlled in the analyses on the interrelations of empathy and friendship quality, this did not change the pattern of results.

DISCUSSION

The current study is the first to examine longitudinally the bidirectional relations among different aspects of empathy and friendship quality. We found evidence that empathy contributed to the development of positive friendship features in children and adolescents, whereas positive friendship features in turn enhanced children's empathic skills. This pattern of findings provides further evidence that empathic skills scaffold children's positive peer interactions (Denham et al., 2003; Rose-Krasnor, 1997) and that children at the same time gain insight in others' emotions through social learning (Bandura, 1986; Piaget, 1932/1965). Cognitive empathy and prosocial motivation, specifically, showed significant contributions to the development of more positive friendship features and vice versa positive friendship features contributed to the development of empathic skills. The contribution of affective empathy to friendship quality development was less clear, as it was related to more positive but also to more negative friendship features. Negative friendship features also were related to lower prosocial motivation, but not to cognitive empathy. However, in children with unstable friendships, growth in cognitive empathy across time was related to decreasing negative friendship features.

In addition, we examined whether the longitudinal relation between empathy and friendship quality was moderated by DLD. As expected (Durkin & Conti-Ramsden, 2007; Toseeb et al., 2017), children with DLD with more empathic skills developed more positive friendship features across time, even though children with DLD had lower mean levels of friendship quality, cognitive empathy, and prosocial motivation compared to children without DLD. Children with DLD also benefitted from positive features in their friendships and developed more affective empathy, cognitive empathy and prosocial motivation through these positive interactions just as children without DLD. These results were not affected by the severity of the communication problems of children with DLD, but children with more communication problems did report more negative friendship features.

Affective empathy

Some unexpected findings appeared in relation to affective empathy. First, affective empathy was positively related to more positive friendship features, but the mean level of affective empathy no longer contributed when cognitive empathy and prosocial motivation were controlled. This finding is in line with the suggestion of Van Lissa and colleagues (2014) that affective empathy precedes cognitive empathy in development during adolescence. Possibly, the role of affective empathy becomes less important when the two other aspects of empathy have developed.

Second, affective empathy not only was related to more positive but also to more negative friendship features. This double role of affective empathy might be explained by the different effects others' emotions can have on an individual. By mirroring the emotions of others, children are able to attend to the emotions of others and act prosocially (Hoffman, 1990). However, when the emotions of others are too overwhelming, children may instead focus on their own emotions and experience distress (Eisenberg et al., 2006). This distress may prevent them from reacting adaptively to the emotions of a friend, resulting in less favorable interactions and more negative interactions with friends (Denham et al., 2003; Eisenberg et al., 2006). The fact that we found relations between affective empathy and both positive and negative friendship features may reflect these different responses in children when experiencing the emotions of others. Please note that the reliability of the affective empathy scale was quite low for children with DLD (Range α: .63, .66). This low reliability may have may have been caused by the small number of items in the scale, but could also indicate that the scale measures more than one construct (Field, 2013).

Cognitive empathy

We expected cognitive empathy to be a protective factor for negative friendship features (Ciarrochi et al., 2017; Meuwese et al., 2017), but did not find this relation in all children. Children with unstable friendships reported less negative friendship features when their cognitive empathy increased across time. This was the case both in children with and without DLD. Although no buffering effect was found specifically for children with DLD as was expected, our data indicated that in all children with unstable friendships cognitive empathy was protective in the development of friendship quality. The fact that we did not find a positive effect of cognitive empathy for all children may be explained by a ceiling effect. The questionnaire we used only examined the understanding of others' basic emotions, whereas during (early) adolescence increased understanding of more complex and social emotions also may be expected, such as pride, shame, guilt and sympathy (Hoffman, 1990). A more sophisticated measure examining the understanding of more subtle and social emotions in others may increase the sensitivity to find developmental changes in empathy during adolescence.

Additionally, we did not find that children with DLD benefitted to a lesser extent from the socializing effect of their peers. Positive friendship quality influenced the three aspects of empathy to the same extent in children with and without DLD. This finding suggests that, as long as children with DLD experience positive interactions with friends, they are able to gain better empathic skills. However, it is possible that children with DLD will experience more problems learning to understand more sophisticated and subtle emotions, as mentioned above, which is an important area to explore in future studies.

The severity of communication problems in children with DLD

In addition to differences between children with and without DLD, we also examined whether the severity of communication problems of children affected the relations we observed. Only one relation was found, but only within the group of children with DLD. Children with DLD reported more negative friendship features when their communication problems were more severe. Difficulties to express ideas and wishes verbally and less sensitivity to the communicative needs of others are likely to cause more misunderstandings and disagreements between children with DLD (St. Clair et al., 2011). However, over and above these communication problems, prosocial motivation was associated with fewer negative friendship features. Therefore, it seems important to help children with DLD develop both their communication and empathic skills in order to diminish these negative peer interactions.

Limitations and future directions

The current study provides important evidence for the often-voiced belief that empathy and friendship quality are closely intertwined in development. The longitudinal design enabled us to distinguish between a selection effect between friends and the developmental advantages of having good friends and empathic skills. Moreover, the addition of a relatively large group of children who have less access to the social environment due to DLD enabled us to examine the socializing effect of friendships further.

The study also has some limitations. Children with DLD had on average a lower SES than children without DLD. Although no relations with SES were found, the differences in SES may have influenced the experiences of children in both groups. Future studies should match children on their SES to diminish possible confounding factors. Another limitation is that the reliability of some of our scales showed fluctuating levels at different time points with sometimes Cronbach's alphas between .6 and .7. This is often found in scales with less than 10 items (Field, 2013), but the lower reliabilities could have influenced our results. Additionally, we only included self-report measures, but future studies should also include observational measures and friend-reports in order to examine the social interaction between friends, whether the friendships are reciprocated, and how friends' mutual abilities affect their development. Further, we compared the development of children in primary and secondary schools, but were unable to look further into the development during different age ranges due to power. Greater increases in empathy might be expected at certain ages in relation to cognitive maturity or hormonal changes (Meeuws, 2016). Finally, future studies should consider how much time children interacted with their friends, because the time spent may increase the socializing effect of friendships and further enhance children's empathy development (Barry & Wentzel, 2006).

Concluding remarks

Having friends who you can trust, who will help you, and comfort you is highly important for children's and adolescents' wellbeing, but these friendships also provide

important learning opportunities to learn about others thoughts, emotions, and wishes. Children who lack positive friendships, or are less socially skilled are therefore at risk of getting stuck in a vicious circle of having fewer empathic skills and less friendship quality. Therefore, it is important to help children find friends with whom they are able to go through these important developments, both in and outside of school. Especially free time spent with peers provides children with social interactions during which they are able to learn from each other (Veiga et al., 2017). Our data indicated that although children may start out with lower levels of friendship quality or empathic skills, they can still develop their relations and social skills when they experience positive interactions. Therefore, interventions seem warranted in children who are vulnerable. For children with DLD, an important venue to explore is social leisure projects for children who experience comparable problems. This sort of projects can help children to socially interact with others who understand their experiences, to make friends, and to learn new skills through these social interactions which they can in turn use in
in relation to the socio-emotional competence of primary age children with specific language impairment. other social relationships (Myers, Davies-Jones, Chiat, Joffe, & Botting, 2011).

Appendix Goodness of fit of the different models

Model	1	2	3	4	5	6	7
With	Unconditional	Age, gender, SES	Diagnosis	Diagnosis x age x gender	School level x age	Empathy or friendship quality	Diagnosis x empathy or friendship quality
Positive friendships							
AIC	-19.3	-115.4	-144.2	-152.6	-.139.3	-259.06	-254.2
BIC	-5.1	-77.5	-101.6	-91.0	-73.0	-169.0	-135.8
Log Likelihood	12.7	65.7	81.1	89.3	83.7	148.5	152.1
Deviance	-25.3	-131.4	-162.2	-178.6	-167.3	-297.1	-304.2
X^2(df)		106.1 (5)***	30.9 (1)***	16.4 (4)**	0.0 (1)	118.4 (6)***	7.2 (6)
Random effect age (*sd*)		.002 (.051)	.002 (.050)	.002 (.046)	.002 (.049)	.002 (.042)	.001 (.034)
Intraclass *r* age		-.49	-.47	-.47	-.47	-.43	-.41
Negative friendships							
AIC	-76.2	-80.1	-93.1	-99.5	-100.9	-101.4	-91.4
BIC	-62.0	51.7	-60.0	-61.6	-44.0	-39.8	-1.4
Log Likelihood	41.1	46.0	53.6	57.7	62.5	63.7	64.7
Deviance	-82.2	-92.1	-107.1	-115.5	-124.9	-127.4	-129.4
X^2(df)		9.9 (3)*	15.0 (1)***	8.3 (1)**	17.7 (5)**	20.3 (6)**	2.0 (6)
Affective empathy							
AIC	863.6	816. 4	817.1	811.5	813.0	793.7	797.0
BIC	877.9	844.8	850.2	849.4	860.4	850.6	872.8
Log Likelihood	-428.8	-402.2	-401.5	-397.7	-396.5	-384.9	-382.5
Deviance	857.6	804.4	803.1	795.5	793.0	769.7	765.0

X^2(df)		53.3 (3)***	1.3 (1)	7.6 (1)**	2.5 (2)	25.7 (4)***	4.8 (4)
Cognitive empathy							
AIC	1273.2	1232.6	1203.5	1205.3	1200.6	1127.1	1134.5
BIC	1287. 4	1261.1	1236.6	1257.4	1257.5	1179.2	1205.6
Log Likelihood	-633.6	-610.3	-594.7	-591.6	-588.3	-552.5	-552.2
Deviance	1267.2	1220.6	1189.5	1183.3	1176.6	1105.1	1104.5
X^2(df)		46.5 (3)***	31.2 (1)***	6.2 (4)	12.9 (5)*	84.4 (4)***	0.6
Prosocial motivation							
AIC	679.5	639.9	629.0	627.1	630.5	540.9	543.3
BIC	693.7	668.3	662.2	665.1	687.4	593.1	605.2
Log Likelihood	-336.7	-313.9	-307.5	-305.6	-303.3	-259.5	-258.8
Deviance	673.5	627.9	615.0	611.1	606.5	518.9	517.6
X^2(df)		45.6 (3)***	12.9 (1)***	3.9 (1)*	8.5 (5)	96.1 (4)***	1.3 (2)

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; The interaction effects of gender x age x diagnosis in model 4 for negative friendship features, affective empathy and prosocial motivation were not significant after the bootstrap procedure.

“I still try to say something really well. And I start sweating a little. I feel very nervous. That I almost have a blackout."

“I have a stomach ache every night and that isn’t nice at all. Then I remember things from the past and then I make it worse and then again I can't sleep.”

“I actually never speak with teachers. I am pretty quiet in class and everything."

4

Positive aspects of emotional competence in preventing internalizing symptoms in children with and without Developmental Language Disorder:

A longitudinal approach.

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ABSTRACT

In order to better understand protective factors for internalizing problems, this longitudinal study examined positive emotions, emotion awareness and (non-)emotional communication skills in relation to somatic complaints and social anxiety in children with (N=104) and without (N=183) Developmental Language Disorder (DLD) using self-reported measures twice with a 9-month interval. Additionally, parents reported on their child's communication problems and emotion communication at Time 1. Most importantly, since we found that increasing levels of emotion awareness related to decreases in social anxiety and somatic complaints in children with and without DLD, we conclude that children with DLD are likely to benefit from interventions aimed at improving their emotion awareness in addition to language interventions.

INTRODUCTION

Developmental Language Disorder (DLD) is characterized by profound difficulties in acquiring and using receptive or expressive language (Bishop et al., 2017). Furthermore, individuals with DLD experience increased levels of internalizing symptoms including somatic complaints and social anxiety (St Clair et al., 2010). Very little is known about potential protective factors that may inhibit such symptoms developing in individuals with DLD (such as experiencing positive emotions and being aware of and communicating about emotions), although such factors have already been well-studied in children without DLD (Rieffe et al., 2008; Rieffe & de Rooij 2012; Zeman et al., 2002) and in individuals with other developmental disorders, including Autism Spectrum Disorder (ASD) (Cai et al., 2018; Mazefsky & White 2014). The present longitudinal study aims to extend this research by examining the contribution of these potential protective factors to the well-being of children with DLD.

Internalizing Symptoms and Developmental Language Disorder

Approximately two children in the average classroom experience significant problems developing and using language (Norbury et al., 2016). Although problems are heterogenic, children typically experience problems in the content (semantics) and the form (phonology, morphology, and syntax) of language (Bishop et al., 2017). These problems in the structural aspects of language often also cause problems in the use of language during social interactions (i.e., pragmatics; Norbury, Nash, Baird, & Bishop 2004). In order to be diagnosed with language impairment in line with DSM-5 criteria, these specific communication problems cannot be explained by other conditions (e.g., hearing impairment, ASD), by intellectual disability, or by a general developmental delay (APA, 2013). In the DSM-IV, a significant discrepancy between the non-verbal intellectual abilities and language abilities was also a prerequisite for the diagnosis (APA, 1994). Therefore, these children were referred to as having a specific language impairment (SLI) in the research literature. However, in the updated version, DSM-5, this discrepancy is no longer a prerequisite for diagnosis (APA, 2013; for a discussion see Bishop et al., 2017). Recently, this group of children have been referred to as having DLD, indicating that they experience significant problems acquiring and using language from early in life, and that these problems cause severe problems in daily life functioning (Bishop et al., 2017). This term will be adopted throughout this article. The communication problems of children with DLD continue to affect development, with little evidence that the differences with their peers disappear (McKean et al., 2017; Norbury et al., 2017).

As mentioned briefly above, children and adolescents with DLD also tend to experience socio-emotional difficulties and internalizing symptoms (Redmond & Rice, 1998; St Clair et al., 2010) including increased levels of somatic complaints (Gregl et al., 2014; Maggio et al., 2014; Redmond & Rice, 1998; van Daal et al., 2007) and social anxiety (Beitchman et al., 2001; Wadman et al., 2011). Somatic complaints, such as headaches, stomach-aches, fatigue, or other physical ailments are not uncommon in youths (e.g., about 30% of 8- to 14-year-olds report

somatic complaints; Rieffe, Terwogt, & Bosch, 2004), and have been linked to increased stress levels, negative emotions, and depressive or anxiety symptoms (e.g., Rieffe et al., 2004; Shanahan et al., 2015). The same is true for social anxiety, which refers to the fear of social or performance situations and is linked to avoidance, anxious anticipation, or distress in such contexts (APA, 2013). Clinical levels of social anxiety are reported in 5-15% of adolescents without DLD (Heimberg et al., 2000).

Although social anxiety and somatic complaints are more common in children with DLD as a group, the severity of the language problems cannot fully explain individual differences within the DLD group. For instance, the internalizing problems of children with DLD between 7 and 16 years old were unrelated to their level of expressive and receptive language problems. Only pragmatic problems, such as the initiation of conversations, non-verbal communication, use of context, and stereotypical language use, represented a risk factor for higher levels of internalizing problems (St Clair et al., 2010). Similarly, the level of somatic complaints of 5-year-olds with DLD were unrelated to their phonological, semantic, and syntactic language problems, whereas social anxiety was related to more phonological and semantic language problems (van Daal et al., 2007). Adolescents with DLD also reported more social anxiety when they had more expressive language problems, but this relation was fully mediated by their social skills (Wadman et al., 2011). Therefore, it seems warranted to look beyond the communication problems of children with DLD and try to identify other factors that might contribute to the development of somatic complaints and social anxiety.

Protective Factors for Internalizing Symptoms

A rich literature in children without DLD suggests that protection for developing internalizing symptoms includes, amongst others, having high levels of positive emotions, emotion awareness, and the ability to communicate about emotions. Positive emotions have the power to momentarily broaden people's repertoires of thoughts and actions (Fredrickson & Branigan, 2005), improve mental and physical health (Lyubomirsky, King, & Diener 2005), and are linked to experiencing fewer symptoms in a variety of psychopathologies, including internalizing disorders (Hechtman et al., 2013; Kashdan & Roberts, 2004). Positive emotions may protect mental health since they serve as a buffer against the adverse psychological and physiological consequences of negative emotions (Fredrickson, 2001; Tugade & Fredrickson, 2007).

Emotion awareness, which includes being able to identify, understand and label one's own emotions, is associated with lower levels of internalizing problems in children, adolescents and adults without DLD (Begeer et al., 2008; Rieffe & de Rooij, 2012; Sendzik et al., 2017). Indeed, the ability to understand one's own emotions is crucial to being able to regulate those emotions adaptively (Lambie & Marcel, 2002). However, focusing too much on the internal arousal and bodily changes of emotions is likely to diminish the attention to environmental causes of emotions, which has been associated with higher levels of internalizing problems

(Rieffe & de Rooij, 2012; Rieffe et al., 2008). In this sense, being relatively unaware of the body may be protective, when the situation actually requires paying more attention to the external sources of emotions (Rieffe & de Rooij, 2012).

Finally, being able to communicate, especially about one's own feeling states, may present another potential protective factor for the development of internalizing symptoms. Communicating about emotions may help focus on the social and environmental triggers rather than on bodily reactions and would suggest that children are in tune with the social environment in which the emotion-evoking event occurs (Hess, 2001). Additionally, emotion communicating enables children to express their wishes and feelings, thereby affecting their social environment or their ability to gain social support (Dunn et al., 1991).

The general language problems of children with DLD may impede their ability to learn emotional skills through social interaction with their environment (Hart et al., 2006; Salmon et al., 2016; van den Bedem et al., 2019). Moreover, when children experience difficulties expressing themselves through language, this may create misunderstandings and frustration. These problems may in turn contribute to the development of somatic complaints and social anxiety over and above the severity of the communication problems of children with DLD. While there is a growing body of research on emotions in children with DLD (Bakopoulou & Dockrell, 2016; van den Bedem et al., 2018,2019), the impact of positive emotions, emotion awareness, and emotion communication on the development of internalizing symptoms in individuals with DLD has not been studied to date.

The Current Study

The overall goal of this longitudinal study was to examine the contribution of potential protective factors of somatic complaints and social anxiety in children with and without DLD. Specifically, the first aim was to examine the level and development across time of somatic complaints, social anxiety, happiness (as a representative of positive emotions), and emotion awareness (including emotion understanding and bodily unawareness) in children with and without DLD. The second aim was to examine whether the level and development of happiness and emotion awareness can explain individual differences in somatic complaints and social anxiety in children with and without DLD across time. The third aim was to examine whether the communication skills (structural and pragmatic) or rather the ability to communicate about emotions were related to the severity of somatic complaints and social anxiety. Furthermore, we explored whether the contribution of these factors was comparable in children with and without DLD. Because children with DLD experience more difficulties developing their emotional skills (Bakopoulou & Dockrell, 2016; van den Bedem et al., 2019), these factors may have a stronger impact on the development of somatic complaints and social anxiety than in children without DLD.

METHODS

Participants

The current study is part of a larger longitudinal study on children with and without communication problems (Rieffe et al., 2014, Theunissen et al., 2011; van den Bedem et al., 2018). In the current study, 104 Dutch children and adolescents with DLD and 183 without DLD participated. They were between 9 and 16 years old with a mean age of 12 years (Table 1). Participants with DLD were included when they had received a formal diagnosis of DLD in line with the DSM-IV criteria for language impairment, which is provided in the Netherlands when receptive or expressive language problems are at least 2 SD below the mean on a general language measure, or 1.5 SD below the mean on two out of four language areas (i.e. auditory working memory, speech production, syntax, and semantics). Additionally, these problems should persist after six months of speech and language therapy.

Most of the children with DLD were recruited through specialized schools for children with communication problems (73%), where children are educated in smaller classes by specialized teachers and often receive speech and language therapy during school hours. The other children with DLD were recruited through organizations providing support for children with DLD in mainstream education. These children and their teachers receive regular support by counsellors and children often receive speech and language therapy outside of school.

Children without DLD were recruited through mainstream schools for primary and secondary education. They were included in the control group when they had no diagnosis as indicated by their parents, had no clinical levels of language problems as measured with two subtests of the CELF (Kort et al., 2008) and had performance intelligence (PIQ) in the normal range as measured with two subtests of the WISC (see materials section).

Table 1 Characteristics of participants at Time 1

	Without DLD	With DLD
Number of children - *n*	183	104
Male	76 (41.5%)	54 (51.9%)
Female	107 (58.5%)	50 (48.1%)
Mean Age in years (*SD*)	12.3 (1.4)	12.2 (1.9)
Age range in years, months	9.8–15.4	9.2–16.3
Performance IQ***	107.2 (17.2)	93.8 (12.5)
Range performance IQ	78–140	70–140
Neighborhood SES***	.72 (.95)	.06 (1.08)
Range neighborhood SES	-2.10–2.44	-4.19–2.50

Note. The neighborhood SES is the mean level of education, occupation, and income of all adults in a neighborhood as compared to all other neighborhoods in the Netherlands (M=0.28, SD=1.09, Range=-6.8 to 3.1), ***p< .001

Children with and without DLD were comparable in age and gender distribution (Age: t (166.94) = .30, p=.767; Gender: X^2 (1) = 2.89, p=.109). However, children without DLD had higher PIQ than children with DLD (t (260, 98) = 7.51, p < .001). Additionally, children without DLD lived in neighborhoods with higher socio-economic status (SES) than the children with DLD (t (285) = 5.30, p < .001). Therefore, the analyses were controlled for PIQ and SES.

Materials

The present study used self-report measures for the internalizing problems (social anxiety and somatic complaints), emotion awareness and happiness, because these introspective topics are best judged by children themselves (Lambie and Marcel 2002). Additionally, parents reported on their child's structural and pragmatic language ability as well as the ability to communicate about emotions. The (emotion) communication problems a child may experience in social interactions, may be best judged by the parent.

The Somatic Complaints List (Jellesma et al., 2007) assesses how often children experience bodily complaints, such as fatigue or stomach aches. Children rated whether they experienced these complaints never (1), sometimes (2), or often (3). The internal consistency of the somatic complaints list is good (Jellesma et al., 2007; Rieffe et al., 2004), as it was for children with and without DLD in the present study (α >.80; Table 2). Mean scores were calculated.

The Social Anxiety Scale for Children – revised (SASC-R) (La Greca & Stone, 1998) assesses how frequently (almost never (1), sometimes (2), or often (3)) children are afraid of negative evaluations, or experience stress of social situations and avoid them. This widely used questionnaire has good internal consistency (La Greca & Stone, 1998), which was confirmed in for children with and without DLD in the present study (α >.85; Table 2).

Happiness was measured with the positive emotion labels of the Mood Questionnaire (Rieffe et al., 2004). Children indicated how often (almost never (1), sometimes (2), or often (3)) they felt this emotion during the previous four weeks. Internal consistency in both groups was high (α >.85; Table 2).

Emotion awareness was measured with two sub-scales of the Emotion Awareness Questionnaire (Rieffe et al., 2008). Emotion understanding measures the capacity of children to differentiate between their own negative emotions and to understand what caused their emotions (e.g. 'I am often confused about how I feel' [reversed scored]). Bodily awareness measures how much children notice their bodily reactions of emotions, such as feeling weak when being sad. Children report if they never (1), sometimes (2), or often (3) feel something in their body when they are emotional (reversed scored). Both scales have sufficient internal consistency (α = *.64* - .77) and good construct and external validity (Rieffe et al., 2008). In the present study, emotion understanding had acceptable reliability in both groups (α >.72), but bodily awareness was low for children with DLD (α =.53). After deleting one item with a negation in the question, which may have been confusing for children with DLD, the internal

consistency improved (α =.62). In children without DLD, internal consistency was satisfactory with (α =.74) or without (α =.72) the item.

Performance IQ (PIQ) was measured with two non-verbal subtests of the WISC (Block Design and Picture Arrangement; Kort et al., 2005), which give a good indication of the PIQ of a child (Theunissen et al., 2011). PIQ scores of the children with DLD were obtained from school or medical files, or tested when unavailable (n = 8). Children without DLD were included in the study when their PIQ fell within the 95% Confidence Interval of a PIQ of 85. Performance IQ data were missing for four children (three of them with DLD).

The Child Alexithymia Measure (CAM, Way et al, 2010) was used to assess the children's difficulty in communicating about their emotions. Parents indicated how often their child avoids emotional topics, has difficulty expressing emotions, or shows incongruent emotion expression and emotion communication (almost never (1), sometimes (2), often (3), almost always (4)). The questionnaire had good internal consistency in both groups (α >.90), as in the validation study (Way et al., 2010). Data were missing for 17 children with DLD (16.3%) and 32 children without DLD (17.5%) due to non-response of parents.

The severity of communication problems was examined with the parent-reported Children's Communication Checklist (CCC-2-NL; Geurts et al., 2009; Norbury et al., 2004), which measures the severity of structural language problems (speech, syntactic, semantic, coherence problems) and pragmatic problems of children (initiation of conversations, non-verbal communication, use of context, and stereotypical language use). In addition, all scales of the CCC-2-NL can be summed providing a general communication problems score (Norbury et al., 2004). Standard scores are available for the Dutch population. The pragmatic problems and general communication problems scales are reliable in both groups. However, the separate structural language scales are only reliable in children with communication disorders (Geurts et al., 2008) and were only examined for children with DLD. Data were missing for 16 (15.4%) children with DLD and 41 (22.4%) children without DLD due to non-response of parents, or because of unreliable answers in the positively stated questions.

When the parent questionnaires (CCC-2-NL and CAM) were used in the analyses, children for whom this data was missing were excluded. However, children without DLD whose parents did not fill out the parent's questionnaires were older (t (182) = -2.43, p = .016) and had lower PIQ (t (181) = 3.88, p < .001) compared to the children for whom all information was available. In the DLD group, no differences were found on any of the study variables. Additionally, the analysis revealed that the pattern of results was not different when children with missing data were excluded. Consequently, we were confident that the missing data did not affect our results.

Table 2 Psychometric properties of the questionnaires

	Range	N items	α Time 1		Means (*SD*)	
			Without DLD	With DLD	Without DLD 183	With DLD 104
Somatic Complaints	1-3	11	.83	.86	1.48 (.31)	1.60 (.38)
Social anxiety	1-3	18	.87	.90	1.61 (.35)	1.72 (.40)
Happiness	1-3	5	.90	.85	2.81 (.30)	2.78 (.31)
Emotion understanding	1-3	7	.72	.78	2.40 (.34)	2.38 (.39)
Unawareness bodily symptoms	1-3	4	.72	.62	1.95 (.48)	2.17 (.47)
Communication problems N (% of total diagnostic group)					142 (77.6%)	88 (84.6%)
General***	53-157	56	.87	.91	73.13 (14.73)	115.40 (13.45)
Pragmatic***	24-78	28	.82	.85	35.86 (7.86)	54.86 (7.45)
Speech	8 - 24	7		.73		16.07 (3.48)
Syntax	7 - 20	7		.60		15.31 (2.43)
Semantic	5 - 18	7		.70		14.19 (1.76)
Coherence	6 - 20	7		.79		14.97 (2.37)
Emotion communication problems N					151 (82.5%)	87 (83.7%)
Emotion communication Problems***	1-4	14	.91	.91	1.42 (.42)	2.02 (.58)

Note: Only the group differences for communication problems were examined; Speech, syntax, semantic and coherence problems are only examined in children with DLD because these scales are unreliable in children without DLD; ***p<.001, α=Cronbach's alpha.

Study Procedure

Children filled out all self-report measures at two time points with a 9-month interval. Children were tested individually in a quiet room at school or at home. All questionnaires were presented on a laptop or tablet. For children with DLD, all questions were read aloud. It was explained that all the answers were to be treated anonymously and that there were no right or wrong answers. In addition, parents filled out questionnaires about general communication problems and emotion communication of their child at Time 1. Prior to participating, all parents and children above 12 years of age signed an informed consent form. The study was approved by the local Ethical Committee of Leiden University in the Netherlands.

Statistical Analyses

Preliminary analysis showed that there were no differences between children with DLD in special education or in mainstream education so both groups were combined. There were also no differences on any of the study variables between children who participated on two time points and children who only participated once (with DLD=14, without DLD=27).

Because we have two data-points for the participants, we performed longitudinal analyses using multi-level modeling in R (The R Foundation, 2016), which uses all the available data of participants, and models the dependency within the data (Singer & Willett, 2009). We used Maximum likelihood estimation in the analyses, assuming that the missing data were missing at random.

We compared the model fit of increasingly more complex models. Models were preferred when they accounted for the most variance within the data with the fewest number of predictor variables. Model fit was compared with the Akaike information criterion (AIC). Models were only reported when the AIC was significantly lower with $p < .05$ (Singer & Willett, 2009). The distribution of social anxiety and somatic complaints were positively skewed in both groups. Therefore, we used a clustered bootstrap procedure with 5000 samples as a robust method to deal with non-normally distributed data (Field 2017). Predictors are significant when 0 is not in the 95% Confidence Interval (CI). Assumptions of linearity, multicollinearity and homoscedasticity were met. Additionally, residuals of the final models were normally distributed.

We first examined the level and development of social anxiety, somatic complaints, emotion awareness and happiness in both groups, while controlling for age, gender, PIQ and SES. Second, we examined the contribution of happiness and emotion awareness to the prediction of social anxiety and somatic complaints. Third, we examined the relations between social anxiety and somatic complaints with the general communication problems and the emotion communication problems of children with and without DLD. Because these communication variables were only measured once, we were unable to perform longitudinal analyses with these variables.

RESULTS

Group differences and Developmental Trajectories

The first aim of the study was to examine the level and development of somatic complaints, social anxiety, happiness, and emotion awareness in both groups. We fitted a basic means model as baseline and added age (centered around the mean) as a time-varying predictor. The control variables SES, gender, and PIQ were added one by one. The control variables were only kept in the model when they made a significant contribution to the model. PIQ did not contribute to any of the models, nor did the contribution of PIQ change the pattern of results of other factors. Therefore, PIQ was excluded from all analyses. Next, diagnosis (without DLD=0, with DLD=1) and the interaction between diagnosis and age were added to the model in order to examine differences in the level and development of somatic complaints, social anxiety, happiness, and emotion awareness across time between groups.

The best fitting models are presented in Table 3 (see the Supplementary Material for model fit indices). On mean levels, children with DLD reported more somatic complaints and social anxiety than children without DLD. In children with DLD, both internalizing problems decreased as children became older. In children without DLD only social anxiety decreased across time, whereas somatic complaints increased in older children without DLD. Positive emotions and emotion understanding did not differ in children with or without DLD. Emotion understanding increased as children became older. Children with DLD reported less awareness of bodily symptoms in response to emotions (or more external focus) than children without DLD. As Figure 1 shows, there were many individual differences across time.

The Role of Happiness and Emotion Awareness in Somatic Complaints and Social Anxiety

The second aim of the study was to examine happiness and emotion awareness as protective factors for the level of social anxiety and somatic complaints. Therefore, we examined whether differences between persons in somatic complaints and social anxiety could be explained by the level of happiness and emotion awareness, and whether growing levels of happiness or emotion awareness within persons were longitudinally related to decreasing levels of social anxiety and somatic complaints. We first computed the mean happiness and emotion awareness on both time points for individual participants. This mean score was added to the model to examine whether between-person differences in happiness or emotion awareness explained differences in the level of somatic complaints or social anxiety.

We then computed person specific change scores (score at both time points minus the mean score) for happiness and emotion awareness. The change scores were added to the model to examine whether within-person changes in happiness and emotion awareness were longitudinally related to changes in the level of somatic complaints and social anxiety across time (Singer and Willet 2009). In order to examine whether the relations were moderated by DLD, the interaction terms of diagnosis and Mean and Change of the happiness and emotion awareness were added to the model.

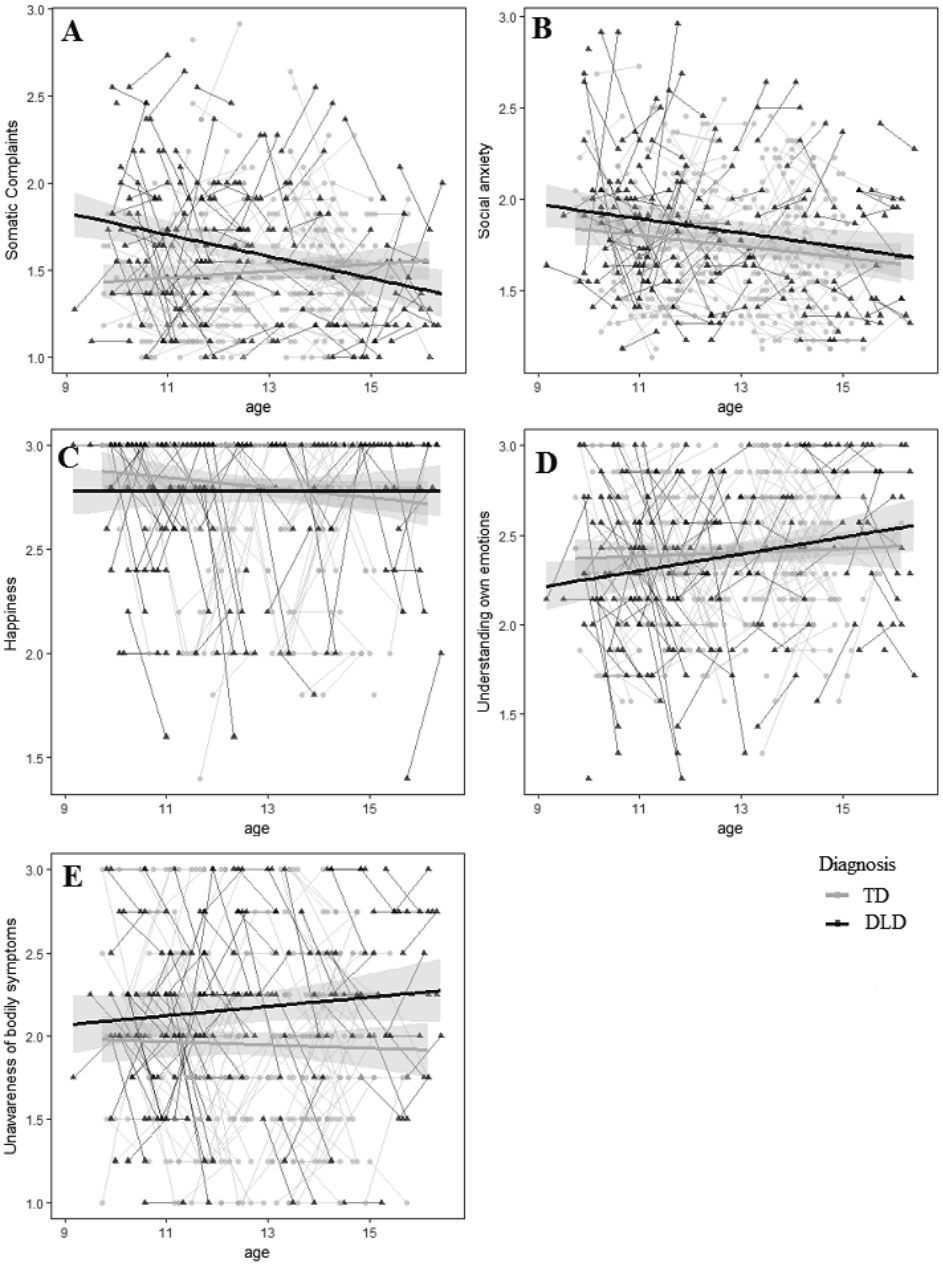

Figure 1. Representation of the raw data for somatic complaints (A), social anxiety (B), happiness (C), Emotion understanding (D), and bodily unawareness of emotions (E). The regression lines represent the mean level in children with and without DLD across time with 95% CI

Table 3 Regression weights with 95% CI for the best fitting models

	Somatic complaints	Social Anxiety	Happiness	Emotion Understanding	Bodily Unawareness
Age	**.019** [.002, .051]	**-.031** [-.058, -.007]	-.012 [-.035, .007]	**.028** [.011, .061]	.009 [-.015, .049]
SES	-.045 [-.087, .006]	-	-	-	-
Gender	**.079** [.005, .161]	-	-	-	**-.153** [-.273, -.049]
Diagnosis	**.093** [.002, .194]	**.105** [.012, .192]	-	-	**.201** [.093, .320]
Diagnosis x Age	**-.080** [-.131, -.046]	-	-	-	-

Note: Significant regression weights are bold. Gender: girls = 1; Diagnosis: DLD = 1.

As Table 4 shows, higher mean levels of happiness, emotion understanding, and bodily unawareness, as well as increasing levels of emotion understanding across time (change) were related to lower levels of somatic complaints and social anxiety in both groups. For children with DLD, the relation between mean bodily unawareness and somatic complaints was stronger. Additionally, in children with DLD only, increasing levels of bodily unawareness (change) were related to decreasing social anxiety. The interaction effects of diagnosis x emotion understanding and diagnosis x happiness did not contribute to the model and were excluded.

Table 4 Regression weights with 95% CI for best fitting models with emotion awareness and happiness predicting somatic complaints and social anxiety

		Somatic complaints	Social anxiety
Age		.014 [-.004, .040]	-.021 [-.039, .003]
Neighborhood SES		-.030 [-.061, .011]	-
Gender		.030 [-.029, .096]	-
Diagnosis		**.527** [.241, .826]	.342 [-.047, .672]
Diagnosis x Age		**-.050** [-.087, -.017]	-
Happiness	Mean	**-.381** [-.505, -.265]	**-.252** [-.376, -.133]
	Change	-.066 [-187, .052]	.003 [-.135, .131]
Emotion understanding	Mean	**-.228** [-.307, -.126]	**-.338** [-.460, -.221]
	Change	**-.126**, [-.231, -.025]	**-.154** [-.285, -.020]
Bodily unawareness	Mean	**-.135** [-.207, -.057]	**-.198** [-.296, -.115]
	Change	-.026 [-.112, .061]	.011 [-.101, .123]
Diagnosis x	Mean	**-.191** [-.320, -.064]	-.096 [-.244, .079]
Bodily unawareness	Change	-.097 [-.275, .097]	**-.318** [-.538, -.087]

Note. Significant regression weights are bold.

The Role of (Emotion) Communication in Somatic Complaints and Social Anxiety

The third aim of the study was to examine whether general communication skills and the ability to talk about emotions were related to the severity of social anxiety and somatic complaints, also in addition to emotion awareness and happiness. First, Pearson's correlations between the communication problems and the other study variables were examined (Table 5). For children with DLD, we also examined the structural language scales (speech, syntax, semantics, and coherence). Second, the models with the control variables were rerun excluding children with missing data on the (emotion) communication questionnaires. Third, either emotion communication, pragmatic problems, or the GCS as well as the interaction effects with diagnosis were added to the model. Fourth, the contribution to the models of the separate communication problem scales were examined for children with DLD alone. Finally, in order

to examine the unique contribution of the different predictors, happiness and emotion awareness were added to the models.

The results showed that higher levels of general communication problems and pragmatic problems were unrelated to somatic complaints in both groups when the control variables were taken into account. Additionally, none of the communication scales (speech, syntax, semantics, coherence, pragmatics and general communication problems) were related to the level of somatic complaints when only the children with DLD were examined. In contrast, emotion communication problems were related to more somatic complaints in both groups (*B*=.117 [.032, .200], also in addition to emotion awareness and happiness (*B*=.073 [.001, .147]). The contribution of emotion awareness and happiness to both internalizing problems remained when emotion communication was controlled for.

More general communication problems were related to more social anxiety, but only in children with DLD (*B*=.006 [.003, .017]). Pragmatic problems were unrelated to social anxiety when both groups were examined together. However, when only children with DLD were taken into account, more pragmatic problems were related to higher levels of social anxiety (*B*=.001 [.011, .022]). Emotion communication was unrelated to social anxiety in both groups. Additionally, none of the structural language scales contributed to social anxiety in children with DLD.

As Table 5 shows, more structural language problems in children with DLD (speech, semantics and coherence) were related to lower levels of emotion understanding and more semantic problems related to less bodily unawareness. When emotion understanding, bodily unawareness and happiness were added to the model predicting social anxiety, the general communication problems and pragmatic problems no longer contributed to the model.

DISCUSSION

Since individuals with DLD are at risk of developing internalizing problems which can have a strong, negative impact on people's lives, it is important to gain insight into which factors could be addressed in interventions in order to prevent suboptimal developmental trajectories. The present study identified for the first time several protective factors for the development of social anxiety and somatic complaints in DLD. This is of particular relevance, since the communication problems seem to be stubborn and persistent (Norbury & Sonuga-Barke, 2017), challenging the potential success of interventions (McCartney, 2017).

According to our longitudinal study, having higher levels of positive emotions, being aware of the causes and consequences of emotions, and focusing less on internal bodily states of emotions were linked to lower levels of social anxiety and somatic complaints in children with and without DLD. Additionally, growing awareness of emotions was linked to decreasing social anxiety and somatic complaints. These findings suggest that emotion awareness may have a protective function for the development of internalizing symptoms in children with and without DLD.

Table 5 Pearson's correlations with the communication problem scales in children with and without DLD

	With DLD							Without DLD		
	Speech	Syntax	Semantics	Coherence	Pragmatics	General	Emotion	Pragmatics	General	Emotion
Somatic complaints	.22*	.06	.16	.16	.17	.21*	.26*	-.07	-.06	.09
Social Anxiety	.21*	.08	.18	.17	.25*	.26*	.10	-.05	-.11	.09
Happiness	.02	.03	-.02	.04	-.09	-.03	-.22*	.05	.04	.03
Emotion Understanding	-.22*	-.09	-.21*	-.29*	-.18	-.25*	-.10	.21*	.18*	-.12
Bodily unawareness	-.15	-.02	-.23*	-.18	-.10	-.16	-.08	.24*	.28**	-.02
Emotion communication	.10	.14	.15	.12	.41***	.32**	-	.20*	.14	-

*p<.05; ** p<.01; ***p<.001

In addition to the protective functioning of emotion awareness and happiness for the development of internalizing problems, the current study also examined the relations with (emotion) communication abilities. Difficulties expressing oneself may create misunderstandings and frustration resulting in more stress related to somatic complaints or anxiety in social interactions. However, it could also be that the general language problems are not the main problem. Instead, the communication problems may cause an inability to effectively differentiate and communicate emotions, which in turn puts children at risk for internalizing problems. As in previous studies, we found mixed results between the severity of communication problems in children with DLD and their internalizing problems (St Clair et al., 2011; van Daal et al., 2007).

For somatic complaints, no relation was found between the structural and pragmatic language problems after controlling children's age, gender and SES. However, somatic problems were higher in children with and without DLD who experienced problems to communicate about their own emotions according to their parents and who reported to be less aware of their own emotions. This suggests that it is not the communication problems themselves, but rather the inability to communicate and differentiate emotions that is an important area to focus on in interventions. When children are unable to understand what they are feeling and why, it is more difficult to deal with the cause and consequences of an emotional situation. Additionally, when children are unable to express their emotions, other people are less able to support them in their emotional experiences, to help them regulate their emotions, for example. Moreover, when children are unable to explain to others what they are feeling and why, it is more likely that the situation will remain unchanged, potentially fueling increasing levels of the (negative) emotional experience (Eisenberg et al., 2005; Gross, 1998, 2015). As a consequence, the emotional experience of children may remain high, causing stress reactions in the body such as tensed muscles, which may lead to increased somatic complaints. Therefore, it is important to help children understand what they are feeling, what causes their emotions, and how they can constructively react to their emotions.

For social anxiety, a different pattern of results was found. Emotion communication problems were unrelated to the level of social anxiety in children with and without DLD. The severity of general communication problems (the sum of structural and pragmatic problems) and the pragmatic problems was related to more social anxiety in children with DLD. However, the severity of communication problems was no longer related to social anxiety when emotion awareness was taken into account. This suggests that difficulties understanding emotions rather than the severity of communication problems causes stress reactions in social interactions in children with DLD. Therefore, it is important to help children understand their own emotional experiences and recognize the causes of these emotions.

Interestingly, children with DLD with more severe structural language problems reported less emotion awareness. This suggests that the communication difficulties of children with DLD have a negative impact on the development of emotion awareness which in turn puts

them at risk for internalizing problems. A previous study found that use of this causal emotion language is especially important for better emotion understanding in children with DLD (Yuill & Little, 2018). Therefore, caregivers and professionals can help children, not only by labelling different emotions, but also by explaining the causes and consequences of emotions.

The findings of the current study suggest that prevention and intervention programs focusing on increasing emotion awareness may be beneficial for individuals with DLD to the same extent as for children without DLD. Focusing on language improvement, which has been shown to have only transient or limited effects (McCartney, 2017), combined with increasing emotion awareness may be more promising, since emotional competences may be more malleable.

Interestingly, it appears that happiness and emotion awareness seem to have comparable effects in both groups, in spite of the reports of higher levels of somatic complaints and social anxiety in the DLD group. There were a few exceptions, however, which may suggest an intervention specifically tailored to DLD would be more effective. For example, compared to children without DLD, children with DLD reported more somatic complaints and lower bodily awareness when emotional. Moreover, decreasing levels of bodily awareness were related to decreasing social anxiety in children with DLD only. Although these results should be interpreted with caution since the internal consistency of the bodily awareness scale was rather low, the results suggest that children with DLD who focus on the causes of their emotions instead of having an inward focus are less vulnerable to developing internalizing problems. This, in turn, may be a good starting point for intervention or prevention programs.

Although the content of interventions could be similar for children with and without DLD, special care should be taken to make interventions accessible for children with DLD. Firstly, the amount and level of language in an intervention should be adapted to the language abilities of the child. Secondly, visual material should be used to facilitate the understanding and discussion of emotional situations. Preferably, ecologically valid material should be used such as pictures and videos of interactions of children. These materials could be used to discuss the thoughts, emotions and resulting behavior of multiple people in particular situations. By making the implicit thoughts and feelings explicit, children will gain better insight concerning their own and others' emotions and gain the necessary emotion language to reflect upon and discuss emotions (Brinton & Fujiki, 2011; Dunn et al., 1991). Finally, it is important to gain understanding of the level of emotional awareness which is needed to understand the intervention. When said basic abilities are absent, it is likely that children would benefit less from such interventions.

Limitations

The present study is one of the first studies to look at protective factors that are linked to internalizing symptoms in individuals with DLD. However, there are a few limitations of the current study. For several measures (communication difficulties and difficulties to

communicate emotions) we only had data from one time point, which prevented us from examining whether changes in these skills contributed to the development of internalizing problems. Additionally, we primarily used child-report questionnaires which could provide common method bias. Yet, for the emotion communication only parent reports were used. Future studies would benefit from using multiple informants to examine whether children, parents and peers experience, perceive and report problems to the same extent. Furthermore, the age range of our participants was quite large, whereas the mechanisms underlying internalizing problems may change as children develop into adolescence. Power issues prevented us from examining age-related differences more closely, which would be an interesting topic for future studies. Finally, longitudinal studies in younger age groups would help to gain a better understanding of causal effects of emotion communication problems on the development of internalizing problems in children.

Conclusions and Outlook

We were able to identify several protective factors for internalizing symptoms in individuals with DLD. This has implications for future prevention or intervention programs aiming to reduce internalizing symptoms in individuals with DLD. Our study suggests that such programs may benefit from focusing on increasing positive emotions (Quoidbach and Gross 2015), emotion understanding and bodily unawareness (Havighurst et al., 2010; Suveg, Kendall, Comer, & Robin, 2006; Wilamowska et al., 2010). Moreover, being better able to communicate about emotions may help reduce internalizing symptoms in the long run (Brinton & Fujiki, 2011; Brumariu & Kerns, 2015; Mathews et al., 2016).

Supplementary Material Goodness of fit (AIC and log likelihood test) of the different models

Model	Somatic complaints	Social Anxiety	Happiness	Emotion Understanding	Bodily Unawareness
Basic means model	342.89	467.55	334.30	506.34	755.33
Addition of:					
Age	341.76	462.71**	334.89	503.11*	757.18
Gender	339.82*	463.05	336.45	504.55	750.01**
SES	333.28**	462.43	333.55	504.79	757.95
Diagnosis	330.28*	459.17*	336.34	504.55	740.01***
Diagnosis*age	318.79***	460.32	336.89	504.63	741.10
Happiness, emotion understanding, bodily unawareness	172.72***	318.39***	-	-	-
Diagnosis x Bodily unawareness	167.16**	310.25**	-	-	-

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

“Then I think: what is he saying this time? And then I just get mad at myself. Because then I don't understand. And I really want to understand."

“Sometimes it's too much Then I want rest and watch birds in the schoolyard."

“You don't dare to ask for help very quickly. Then you think you are stupid or you can't do it."

5

Depressive symptoms and emotion regulation strategies in children with and without Developmental Language Disorder:

A longitudinal study.

Van den Bedem, N. P., Dockrell, J. E., Van Alphen, P. M., De Rooij, M., Samson, A. C., Harjunen, E. L., & Rieffe, C. (2018). Depressive symptoms and emotion regulation strategies in children with and without developmental language disorder: A longitudinal study. International Journal of Language and Communication Disorders, 53, 1110-1123. Doi: 10.1111/1460-6984.12423

ABSTRACT

Background: Depressive symptoms are common in children with Developmental Language Disorder (DLD). However, risk and protective factors contributing to these problems are currently underspecified.

Aims: The current longitudinal study examined the role of emotion regulation strategies in the severity of depressive symptoms in children with and without DLD, taking into account the severity of communication problems of children with DLD.

Method: We followed clinically referred children with DLD (n = 114, 49% girls) and without DLD (n = 214, 58% girls) between the ages of 8 and 16 years across an 18 months period. At three time points, participants completed self-report questionnaires. Parents of children with DLD reported on their child's communication problems.

Results: Multilevel analyses confirmed higher levels of depressive symptoms in youngsters with DLD, compared to peers without DLD, with a decrease across time in the DLD group. In both groups, higher levels of approach and increasing avoidant strategies aimed at distraction or trivializing a problem explained lower depressive symptoms, whereas more worry and externalizing strategies contributed to more depressive symptoms. Within the DLD group, semantic language problems were associated with higher depressive symptoms. However, this relation was mediated by the tendency to worry or use externalizing strategies.

Conclusion: Results suggest that interventions for children with DLD should focus on enhancing children's adaptive emotion regulation strategies, to help them cope with daily stressors just as in the general population.

What this paper adds

The high prevalence of depressive symptoms in children with Developmental Language Disorder (DLD) is not well explained by the severity of their communication problems alone. Therefore, a better understanding of the underlying mechanisms is warranted. Difficulty regulating negative emotions may put children with DLD at risk for the development of depressive symptoms.

The study showed that adaptive emotion regulation strategies, such as approaching a problem or distracting oneself, contributed to lower levels of depressive symptoms both in children with and without DLD. Conversely, maladaptive strategies, such as worrying or externalizing, contributed to more depressive symptoms in both groups. Within the DLD group, more semantic problems related to more depressive symptoms, but this relation was mediated by the use of maladaptive emotion regulation strategies.

These findings suggest that children with DLD may benefit from improving their emotion regulation skills, just as children without DLD. Improving these strategies would be expected to contribute more to decreasing depressive symptoms in children with DLD than improving their communication abilities. However, the depressive symptoms of children with DLD remained elevated, even after their emotion regulation strategies were accounted for. Therefore, additional risk factors should be considered in future research.

INTRODUCTION

Seven percent of children are reported to have a Developmental Language Disorder (DLD) (Norbury et al., 2017; Tomblin et al., 1997), which was formerly referred to as Specific Language Impairment (For a discussion of DSM-5 classification and terminology, see Bishop, Snowling, Thompson, Greenhalgh, & CATALISE consortium-2 [2017]). DLD can severely impact on children's mental health, and an increased risk for depressive symptoms is consistently reported in this group. Clinical levels of depression range from 20-39% in children and adolescents with DLD, compared to 14-18% in peers without DLD (Beitchman et al., 1996; Botting, Toseeb, Pickels, Durkin, & Conti-Ramsden, 2016; Conti-Ramsden & Botting, 2008). Yet, the level of depressive symptoms is often unrelated to, or shows only small correlations with the type and severity of communication problems in children with DLD (Beitchman et al., 1996; Botting et al., 2016; St. Clair et al., 2011). The study examines why children with DLD are more vulnerable to developing depressive symptoms than children without DLD, given that the severity of their communication problems only makes a small contribution to explaining these symptoms.

Various studies with children from a community population have demonstrated that emotion regulation (ER) is related to fewer depressive symptoms (Joormann & Stanton, 2016; Schäfer et al., 2017). ER refers to the cognitive and behavioral processes a person uses to monitor emotions, to modify the strength of the own emotional experience and the strength and timing of the expression of emotions in order to reach personal and social goals (Gross, 1998). When negative emotions are overwhelming, they can impede the ability to address the emotion-evoking situation adequately, resulting in greater negative affect (Fields & Prinz, 1997; Joormann & Stanton, 2016). Children with DLD are reported to experience difficulties regulating negative emotions (Brinton, Fujiki, Hurst, Jones, & Spackman, 2015; Fujiki, Spackman, Brinton, & Hall, 2004). However, these difficulties have not yet been shown to be associated with higher levels of depressive symptoms. Therefore in this study, we used a longitudinal design to examine the extent to which different ER strategies were risk or protective factors for the level of and changes in depressive symptoms in children with and without DLD.

Developmental language Disorder and Depressive symptoms

The DSM-5 describes language disorders as significant difficulties with the acquisition and use of language (American Psychiatric Association [APA], 2013). These language problems cannot be explained by other conditions, such as hearing impairment or autism spectrum disorder, nor are the language difficulties better explained by intellectual disability or general developmental delay. Language disorders are present early in life, and continue to affect development (APA, 2013). Children with DLD experience problems in the content (semantics) and/or the form of language (phonology, morphology, and syntax) (APA, 2013; Bishop et al.,

2017). Problems can occur in both receptive (e.g. understanding of word meanings, or understanding the meaning of complex phrases) or expressive language (e.g. finding the right words to express ideas, or production of grammatical sentences). Additionally, children with DLD often also encounter difficulties using language in social interaction, that is pragmatics (APA, 2013; Bishop et al., 2017; Norbury, Nash, Baird, & Bishop, 2004).

In addition to problems acquiring and using language, depressive symptoms are frequently noted in children with a diagnosis of DLD (Beitchman et al., 1996; Botting et al., 2016; St. Clair et al., 2011). Children who have depressive feelings generally have low-self-esteem, and experience feelings of hopelessness about their lives, their future and their own ability to change their situation (Wicks-Nelson & Israel, 2015). Depressive symptoms become more prevalent during puberty, which has been related to physical and social changes in the lives of youngsters (Dahl & Gunnar, 2009). However, children who experience many life stressors early are vulnerable to develop depressive symptoms (Wicks-Nelson & Israel, 2015). DLD provides children with many stressors in communication, in social interactions, and in educational contexts (Andrés-Roqueta, Adrian, Clemente, & Villanueva, 2016; Bakopoulou & Dockrell, 2016). These stressors may contribute to the higher levels of depressive symptoms, which are found in children with DLD (Beitchman et al., 1996; Conti-Ramsden & Botting, 2008; St. Clair et al., 2011). During adolescence, the levels of internalizing problems, including depressive symptoms, have been reported to show a small decrease in youngsters with DLD, although these levels still remained elevated compared to the norm of the general population (St. Clair et al., 2011). This different developmental path may indicate that children with DLD develop strategies to deal with the stressors associated with their DLD as they become older.

Depressive symptoms of children with DLD have been reported independently of the type or severity of DLD. Specifically, longitudinal studies report no associations between the severity of receptive and expressive language problems at the age of 7 and depressive symptoms in adolescence (St. Clair et al., 2011). In addition, 5-year-olds with primarily expressive problems, or with both receptive and expressive problems, did not differ in their level of depressive symptoms at age 12 (Beitchman et al., 1996). Only difficulties in pragmatic language, contributed to the prediction of depressive symptoms in adolescents with DLD. But again, this only accounted for a small amount of variance (St. Clair et al., 2011; Sullivan et al., 2016). The contribution of pragmatic language problems to depressive symptoms may play a more important role than structural aspects of language, because pragmatic language is an important prerequisite for social interactions, even after controlling for other language abilities (Ketelaars, Cuperus, Jansonius, & Verhoeven, 2010; St. Clair et al., 2011). Positive social interactions in turn are an important protective factor for depressive symptoms (Botting et al., 2016; Van Harmelen et al., 2016).

ER in children with DLD

Learning to regulate emotions is highly dependent on social interaction with other people, in which communication plays an important role (Dunn, Brown, & Beardsall, 1991; Rieffe, Dirks, Van Vlerken, & Veiga, 2016). Typically, caregivers talk with their children about their feelings, why they happen, how to control themselves when emotions run high, and how children may express their emotions in ways that help achieve both personal and social goals (Denham & Auerbach, 1995; Dunn et al., 1991; Rieffe et al., 2016). When children grow older, they continue to learn from their social environment, through interactions with friends and incidental exposure to others' interactions, such as overhearing and observation (Brown & Dunn, 1996). For children with DLD, communication problems limit interaction with others from an early age (Andrés-Roqueta et al., 2016). Children with DLD miss important information, need more processing time, and often lack the vocabulary to fully understand what is going on in social interactions. Therefore, this process of emotion socialization may be hampered (Fujiki et al., 2004; Rieffe et al., 2016).

A limited number of studies has examined emotion regulation in children with DLD. These studies report that children with DLD show more inappropriate expressions of emotions, with less consideration of the consequences for others, or less congruent with the level of emotions expressed by other persons. This is indicative of emotion regulation problems (Brinton et al., 2015; Fujiki et al., 2002; 2004). Additionally, more negative outburst and behavior problems have been reported, especially in younger children with DLD. However, these problems decrease during primary school (Horowitz, Jansson, Ljungberg, & Hedenbro, 2005; St. Clair et al., 2011). These studies suggest that children with DLD have developed less adaptive strategies to regulate their emotions. However, there has been no research examining the emotion regulation strategies of children with DLD to date.

ER strategies and depressive symptoms

ER strategies can be categorized in different ways, here we focus on four main categories: approach and avoidant ER strategies, which are often found to be adaptive, as well as worry and externalizing strategies, which are considered maladaptive strategies (Fields & Prinz, 1997; Wright, Banerjee, Hoek, Rieffe, & Novin, 2010).

Approach strategies involve strategies which try to solve a problem or diminish the negative impact of the emotion-evoking event. This can be either behaviorally (by trying to find a solution, or through seeking help from others), or cognitively (by trying to reappraise the situation). Approach strategies typically increase during late childhood and adolescence (Fields & Prinz, 1997; Zimmer-Gembeck & Skinner, 2011) and are related to lower levels of depressive symptoms (Schäfer et al., 2017). Several studies have shown that children with DLD tended to seek adult support to a greater extent than children without DLD (Rice, Sell, & Hadley, 1991; Timler, 2008). However, they are reported to have more difficulty negotiating with peers and navigating peer conflicts throughout the primary education years (Brinton & Fujiki, 1999; Rice

et al., 1991; Timler, 2008). These difficulties in social skills may make it more challenging for children with DLD to use approach strategies.

In contrast, avoidant strategies involve trying to diminish the impact of a negative event by actively withdrawing from the situation, such as ignoring, distracting, or distancing oneself from the situation (Fields & Prinz, 1997). Avoidant strategies such as procrastination or suppression of emotions are associated with higher levels of depressive symptoms in children and adolescents (Schäfer et al., 2017). However, other avoidant strategies, aimed at distracting oneself or trivializing a situation, are associated with lower levels of depressive feelings (Joormann & Stanton, 2016). The use of these adaptive cognitive avoidant strategies increases during adolescence (Zimmer-Gembeck & Skinner, 2011).

Beyond approach and avoidance strategies, a further ER strategy involves worry or rumination. By worrying, children keep reminding themselves of their problems without coming any closer to a solution, thus emotional arousal remains at a high level (Rieffe et al., 2008). This usually does not decrease, but rather increases the impact of a negative situation. In fact, worrying is a strong predictor of depressive symptoms (Schäfer et al., 2017), and is considered to be a maladaptive ER strategy (Joormann & Stanton, 2016). It has been noted that school-aged children with DLD tend to withdraw from social situations (Brinton & Fujiki, 1999; Fujiki et al., 2004). While this may lead to feelings of relief at the time, or help children organize their thoughts, it may also result in worrying, which presents a risk factor for depressive symptoms.

Finally, yet another maladaptive ER strategy involves venting negative emotions through externalizing behaviors, such as yelling, hitting, or slamming a door. This behavior is usually not adaptive, because it provokes new negative situations, instead of diminishing the impact of the first one (Burks, Laird, & Dodge, 1999). Indeed, more externalizing strategies are associated with higher levels of depressive symptoms in children (Wright et al., 2010). Although externalizing strategies are common in toddlers, a sharp decrease in externalizing strategies is noted when children become able to communicate their emotions through language (Field & Prinz, 1997), During childhood and adolescence relatively low and stable levels of externalizing strategies are found (Field & Prinz, 1997; Zimmer-Gembeck & Skinner, 2011), although some studies found an increase during puberty (Zimmer-Gembeck & Skinner, 2011). Children with DLD in late childhood reported more externalizing strategies in response to peer conflict situations than their peers without DLD (Timler, 2008). This may form another risk factor for depressive symptoms for these children.

The present study

In this longitudinal study, our first aim was to explain the differences in depressive symptoms in children with and without DLD. We examined depressive symptoms in clinically referred children between 8 and 16 years old with DLD, compared to children without DLD at three time points across 18 months. In line with previous research, we expected higher levels

of depressive symptoms in children with DLD, as compared to those without DLD (Conti-Ramsden & Botting, 2008; Sullivan et al., 2016). The level of depressive symptoms may be expected to decrease in older children with DLD (St. Clair et al., 2011), while increasing levels were expected in children without DLD (Dahl & Gunnar, 2009).

We expected that the tendency to use different ER strategies would explain differences in the severity of depressive symptoms both between and within children across time in both groups (Joormann & Stanton, 2016; Schäfer et al., 2017). In line with earlier findings in the general population, we expected more frequent use of approach and avoidant strategies and lower levels of worry and externalizing strategies to be associated with lower levels of depressive symptoms (Joormann & Stanton, 2016; Schäfer et al., 2017). Additionally, we expected that the increasing tendency to use more adaptive and less maladaptive ER strategies across time, would explain decreasing depressive symptoms (Rieffe et al., 2008; Schäfer et al., 2017). In children with DLD, more difficulties in appropriate emotion expression have been reported, which may indicate ER problems (Brinton et al., 2015; Fujiki et al., 2002; 2004). This may be an important underlying factor for the elevated levels of depressive symptoms in children with DLD. Therefore, we expected stronger associations between the different ER strategies and depressive symptoms in children with DLD compared to children without DLD.

Our second aim was to explain differences in depressive symptoms within the group of children with DLD. We examined whether the type and severity of communication problems of children with DLD could explain their depressive symptoms, and we explored whether their communication problems were related to the tendency to use different ER strategies. Previous research on depressive symptoms in children with DLD found only small associations with their communication problems, or associations with pragmatic problems only (St. Clair et al., 2011; Sullivan et al., 2016). Therefore, we hypothesized that the type and severity of communication problems of children with DLD would not contribute to the depressive symptoms when we accounted for their ER strategies (Conti-Ramsden & Botting, 2008; Botting et al., 2016). Because communication problems were not expected to play a significant role in depressive symptoms of children without DLD, we only examined this in children with DLD.

METHODS

Design

In this repeated measure longitudinal study, the severity of depressive symptoms was examined in children with and without DLD between the ages of 8 and 16 years across 18 months. Children completed self-report questionnaires on three occasions with nine months in between each measurement. Participants were recruited through primary and secondary schools in different areas of the Netherlands including cities and more rural areas. Children with DLD were recruited through both regular and specialized schools. An active consent procedure was used.

Participants

A total of 114 children with a diagnosis of DLD and 214 without DLD participated in the study (Table 1). Children with DLD were included if they had a formal diagnosis of DLD and had no identified autism spectrum disorder or hearing impairment. Information about any formal diagnoses were provided by the parents and were verified in school or medical files. In the Netherlands, children receive a diagnosis of DLD if they experience receptive and/or expressive language abilities of 1.5 SD below the mean of the population. The diagnosis is provided by a team of professionals, including a speech and language pathologist, a psychologist, and an audiological scientist in line with DSM-4 criteria (APA, 1994) and has to be renewed every five years to make children eligible to support from the government.

Children without DLD were included if they had no neurodevelopmental disorders as indicated by their parents and had language abilities in the average range, which was assessed with two subtests of the CELF (Semantic relations and Text understanding; Kort, Schittekatte, & Compaan, 2008). The current study is part of a larger research project on the effects of communication problems on the social and emotional development of children. Earlier studies reported on deaf and hard of hearing children and children with an autism spectrum disorder in comparison to a subsample of the children without DLD of the current study (Bos et al., 2018, Rieffe et al., 2014, Theunissen et al., 2011) and on children with DLD (Van den Bedem et al., 2018).

Table 1 Characteristics of participants at Time 1

	With DLD	Without DLD
Number of children - *n*	114	214
Age range in years	8.4 – 16.0	8.3 – 14.7
Mean Age in years (*SD*)	11.5 (2.0)	11.5 (1.4)
Male	58 (50.9%)	89 (41.6%)
Female	56 (49.1%)	125 (58.4%)
Regular schools	32 (28.1 %)	214 (100%)
Special education	82 (71.9 %)	-
PIQ***	*n* =108	*n* = 184
	93.41 (12.73)	107.23 (17.22)
Range PIQ	70 – 140	78 - 140
Neighborhood SES***	.02 (1.08)	.55 (1.25)
Range Neighborhood SES	-4.19 – 2.50	-5.24 – 2.44

*** $p < .001$

Children with and without DLD were comparable in mean age at Time 1 ($t(176.49) = .36$, $p = .747$) and gender distribution ($\chi^2(1) = 2.60$, $p = .130$), with an almost equal number of boys and girls in the DLD group (Table 1). Children in the DLD group had a lower Performance

IQ (PIQ) than the children without DLD ($t(264.65) = 7.6$, $p < .001$). Children with DLD had a lower socio-economic status as indicated by the neighborhoods they lived in. The Neighborhood SES reflects the mean income, occupation, and educational level of all adults in a neighborhood, as compared to all other neighborhoods in the Netherlands (with a mean of 0 and a range of -6.8 to 3.1). Children with DLD lived in lower rated neighborhoods than children without DLD ($t(326) = 3.76$, $p < .001$), which was mostly due to above average Neighborhood SES of children without DLD.

Materials

Depressive symptoms were assessed with the Child Depression Inventory (CDI; Kovacs, 1992), which examines behavioral, cognitive, and emotional symptoms of depression in children from the age of 8. In the current study, the adapted version of the CDI (Theunissen et al., 2011) was used in order to reduce the amount of language for children with DLD. Children read one statement and endorsed if a statement was not (1), a bit (2), or most of the time (3) true. In order not to upset the children, the item about suicide was not included in this version leaving 26 items. The CDI shows moderate to good reliability and construct validity in different age groups (Kovacs, 1992). The adapted version of the CDI has also shown to be reliable in children who have lower language abilities and showed high correlation with the original CDI (Theunissen et al., 2011). We also found acceptable Cronbach's alphas in children with (α = .75) and without DLD (α = .74). Participants completed the CDI at Time 1, 2, and 3.

ER strategies were measured with the self-report Coping scale (Wright et al., 2010), which has shown to be reliable in children with lower language abilities (Theunissen et al., 2011). This questionnaire measures whether children almost never (1), sometimes (2), or often (3) use specific behaviors when they have a problem. Approach strategies were measured with 12 items ("I try to think of different ways to solve the problem", and "I ask someone in my family for advice"). Avoidant strategies (12 items) measured if children tended to trivialize problems or distract themselves from a problem ('I tell myself it doesn't matter" or "I do something else to help me forget about it"). The externalizing subscale measured the venting of emotions through verbal or physical aggressive behaviors (e.g., "I stamp my feet or slam or bang doors"). In addition, the Worry/Rumination Questionnaire (10 items) (Miers, Rieffe, Meerum Terwogt, Cowan, & Linden, 2007) measured how much children had the tendency to dwell on a problem without trying to change anything (e.g., "When I have a problem, I cannot stop thinking about it"). Mean scores were obtained for all scales. The internal consistency of the scales was good for approach, avoidant, and worry in both groups ($\alpha > .80$) and acceptable for externalizing strategies in children with (α = .68 and without DLD (α = .66). Children completed the ER questionnaires at Time 1, 2, and 3. However, the externalizing scale was missing for children without DLD at the third measurement. Additionally, for three participants with and one without DLD the ER strategies were not completed at one time point.

The level of *communication problems* of children with DLD was measured with the Dutch version of the Childs Communication Checklist-2 (CCC-2, Norbury, Nash, Baird, & Bishop, 2004; Geurts et al., 2009), which was completed by the parents at Time 1. The CCC-2 contains eight scales measuring problems with speech, syntax, semantics, coherence, and pragmatic problems: initiation of conversations, non-verbal communication, use of context, and stereotypical language. Acceptable to good reliability was found for all scales (Table 2). Data were missing for 17 (14.9%) children with DLD due to non-response of parents, or because of inconsistent answers in the positively stated questions. These children were excluded from the analyses with the CCC-2.

Table 2 Psychometric properties of the CCC-2 for children with DLD (n = 97).

Communication problems	Range	N items	α	Means (*SD*)
Pragmatic	24 - 78	28	.83	54.86 (7.49)
Speech	8 - 24	7	.75	16.08 (3.57)
Syntax	7 - 20	7	.59	15.31 (2.44)
Semantics	5 - 18	7	.69	14.22 (1.70)
Coherence	6 - 20	7	.80	15.02 (2.35)

PIQ scores of children with DLD were obtained from school or medical files. Children were tested with the Wechlers Intelligence Scale for Children (WISC, Kort et al., 2005), Snijders-Oomen Non-verbal intelligence test (Tellegen & Laros, 2011), or Wechlers Non-Verbal test (Wechsler & Naglieri, 2008), which all give an indication of PIQ with a mean of 100 and *SD* of 15. When data were unavailable, which was the case for 11 children with DLD and all children without DLD, two non-verbal subtests of the WISC (i.e., Block Design and Picture Arrangement; Kort et al., 2005) were administered at Time 2. These two subtests are highly correlated with full intelligence tests (r =.71, p <.001; Theunissen et al., 2011). Data were missing for six (5.3%) children with DLD and 30 (14.0%) children without DLD, because they did not participate at Time 2 or because parents did not give permission to obtain information.

Procedure

Children were tested individually in a quiet room by a trained test leader. Before the test session started, it was emphasized that there were no right or wrong answers, and that all answers were anonymous. Children were able to read the questions and answer options on a laptop or tablet and privately responded by clicking on an answer. For children with DLD, all questions were read aloud. Parents and children with DLD above 12 years of age signed an informed consent form. The study was approved by the Ethical Committee of Leiden University.

Statistical Analyses

In this longitudinal study, we had three measurements of the same participants across time. This means that there is dependency in the data, which violates the assumption of linear regression analyses. Therefore, we used multi-level modeling, which distinguishes between variables of an individual which stay constant across time (such as gender) and variables which change across time (such as age) and models the dependency within the data (Singer & Willett, 2003; Snijder & Bosker, 2012). Analyses were run using R 3.3.2 (The R Foundation, 2016). Multi-level modeling is well suited to deal with longitudinal data, because it can handle missing data points of a participant. Therefore, when participants had missing data on one or two of the three measurements, they were still included in the analyses (Van Buuren, 2012). We had missing data at Time 2 (eight with and 29 without DLD) and Time 3 (14 with and 56 without DLD). For 100 children with DLD (87.7%) and 158 children without DLD (73.8%), data were available at all three time points. Participants without DLD who did not participate three times lived in lower SES neighborhoods than children without DLD who did participate every time ($t(56.79) = 3.59$, $p = .001$), and reported lower levels of externalizing strategies ($t(136.61) = 2.27$, $p = .025$). For children with DLD, no differences were found between children with and without missing data on any of the study variables. Maximum Likelihood estimation was used, assuming the missing data were missing at random (Van Buuren, 2012).

As in step-wise linear regression analyses, in multi-level modeling increasingly more complex models are fitted to the data in order to diminish the unexplained variance in the dependent variable. Models are preferred when they explain more variance, with the lowest number of predictor variables. This is indicated by the Akaike information criterion (AIC). Lower levels of AIC indicate a better model fit (Singer & Willett, 2003). Additionally, the likelihood ratio test can be used to test whether the deviance in AIC is significant. The regression weights of the predictor variables of a significant model can be interpreted with the 95% Confidence Intervals (CI). When the value 0 is not in the 95% CI, the predictor is significantly contributing to the model (Singer & Willett, 2003; Snijder & Bosker, 2012).

We ran preliminary analyses examining the level of depressive symptoms and ER strategies in children with and without DLD across time. We fitted a basic means model with random intercept only (model 0) as a base-line and a model with the control variables gender, neighborhood SES, and age (centralized) as fixed effects (model 1). In the next models, diagnosis (without DLD = 0, DLD = 1) was added (model 2) and the interaction of age x diagnosis (model 3), in order to compare the level of depressive symptoms in both groups across time. The same steps were undertaken to compare the level of ER strategies in children with and without DLD across time. All analyses were repeated with the addition of PIQ, which did not result in a better model fit. Therefore, these results were not reported.

We also included age as a random effect, in order to allow for individual differences in the rate of change of depressive symptoms during the time frame of the study (Singer & Willett, 2003). However, the random slope was not found to contribute to the model. Examination of

the data showed that there were many individual differences across time within participants, but that these changes were not well represented by a linear trend (Figure 1). Therefore, we were unable to predict the rate of change in depressive symptoms within individuals. However, we were able to explain the individual changes in depressive symptoms across time by modeling time-changing predictor variables (Singer & Willett, 2003).

We hypothesized that the use and the changes in the use of different ER strategies explained differences in the level of depressive symptoms. Therefore, we decomposed the different ER strategies in a person specific mean score and a person specific change score (Singer & Willett, 2003). The mean score represents the mean level of an ER strategy of an individual across the three time points and was added to the model to explain differences between individuals in the level of depressive symptoms. The change scores of an individual were calculated by subtracting the mean score of a strategy from the score on every time point (Time 1 – mean, Time 2 – mean, Time 3 – mean). The combined time-varying change score represents the changes of an individual across time in the tendency to use an emotion regulation strategy. The change scores were added to the model in order to examine whether individual changes in depressive symptoms across the three measurements, could be explained by the changes in ER strategies (Singer & Willett, 2003).

First, a model was fitted with gender, neighborhood SES, age, diagnosis, and the mean and change scores of one of the ER strategies. Second, in order to examine whether the effect of the ER strategy differed for children with and without DLD, the interaction terms of diagnosis x ER strategy (mean and change) were added to the model. Finally, a model was fitted including all ER strategies in order to examine the unique contribution of the different ER strategies on depressive symptoms. We fitted the final model with and without non-significant predictors and control variables in order to examine whether the number of predictors in the model obscured small effects, which was not the case.

In order to better understand differences within the group of children with DLD, we examined whether the type and severity of their communication problems explained the severity of their depressive symptoms and their ER strategies. Therefore, a model with age and the control variables was compared with a model where one of the CCC-2 scales was added. Finally, the CCC-2 scales were added, one at the time, to the multi-level model on depressive symptoms, to examine whether the addition would generate a better model fit in addition to the ER strategies.

RESULTS

Preliminary analyses

The mean levels of depressive symptoms and ER strategies at different ages (in years) of children with and without DLD are shown in Table 3. In Table 4, the models examining whether there were differences between the groups across time are described.

Children with DLD reported higher levels of depressive symptoms than children without DLD, as shown by the significant contribution of diagnosis in model 3 (Table 4). Additionally, the significant interaction between age and diagnosis showed a small decrease in depressive symptoms across time for children with DLD (-.03 per year), whereas the change in depressive symptoms of children without DLD was not significant. However as can be seen in Figure 1, there was high variability within individuals in depressive symptoms across time in both groups.

No differences between children with and without DLD were found for approach strategies, worry, and externalizing strategies, but children with DLD reported higher levels of avoidant strategies than children without DLD (model 2). Children in both groups reported increasing approach strategies and decreasing worry across time (model 1).

Figure 1. Depressive symptoms of participants with and without DLD. The measurements of one participant are connected with lines. The regression line represents the predicted value based on the age and diagnosis of the participant with 95% CI's.

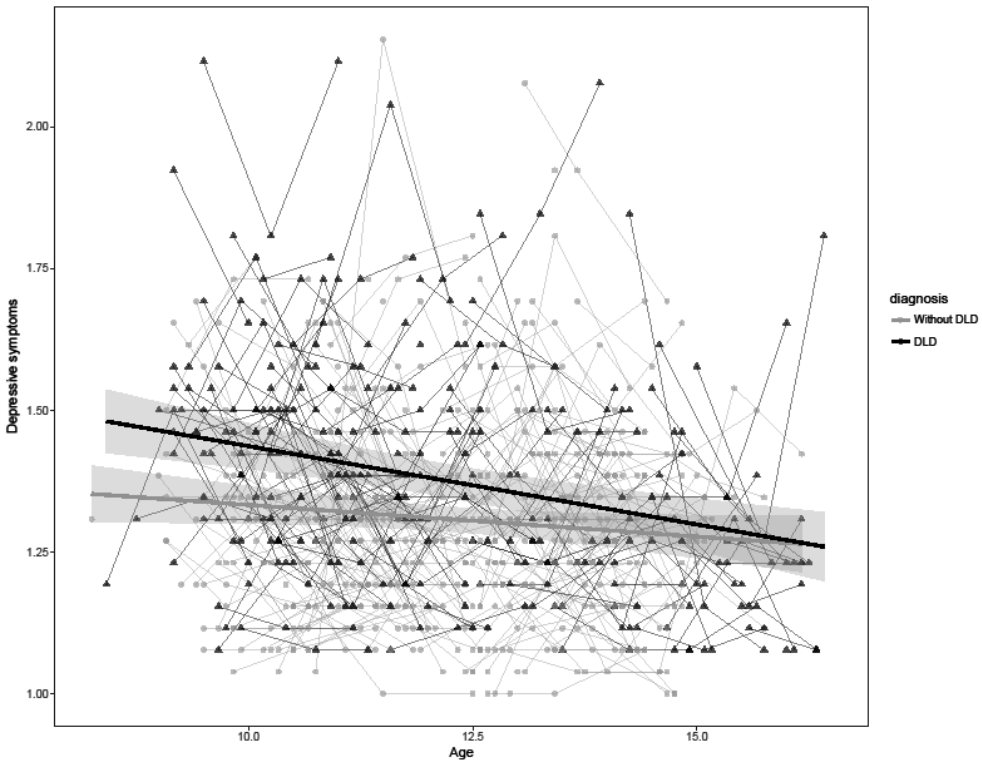

Table 3 Mean levels (SD) of depressive symptoms and ER strategies of children with DLD and typically developing children (TD) at different ages in years.

	n		Depressive symptoms		Approach ER		Avoidant ER		Worry		Externalizing	
Age	DLD	TD	DLD	TD	DLD	TD	DLD	TD	DLD	TD	DLD	TD
< 10	38	40	1.45 (.21)	1.33 (.18)	2.10 (.41)	2.13 (.39)	2.03 (.43)	1.98 (.34)	1.92 (.46)	1.81 (.44)	1.32 (.34)	1.23 (.30)
10	65	88	1.43 (.17)	1.32 (.18)	2.08 (.39)	2.14 (.43)	2.07 (.40)	1.97 (.41)	1.99 (.49)	1.9 (.40)	1.32 (.41)	1.25 (.32)
11	69	122	1.39 (.20)	1.3 (.18)	2.12 (.45)	2.16 (.42)	2.01 (.42)	1.95 (.40)	2.01 (.46)	1.86 (.40)	1.35 (.44)	1.29 (.39)
12	38	108	1.42 (.20)	1.27 (.17)	2.12 (.46)	2.20 (.42)	2.03 (.39)	1.97 (.39)	1.94 (.43)	1.91 (.40)	1.47 (.47)	1.25 (.32)
13	30	105	1.34 (.21)	1.33 (.20)	2.10 (.42)	2.25 (.43)	2.09 (.40)	1.89 (.37)	2.03 (.45)	1.90 (.42)	1.45 (.53)	1.24 (.36)
14	38	77	1.31 (.18)	1.28 (.17)	2.38 (.48)	2.38 (.40)	2.04 (.45)	1.87 (.39)	1.72 (.51)	1.86 (.38)	1.25 (.38)	1.27 (.37)
≥15	38	15	1.24 (.16)	1.34 (.10)	2.29 (.39)	2.36 (.37)	1.90 (.44)	1.76 (.45)	1.76 (.45)	1.83 (.30)	1.18 (.30)	1.27 (.12)

Note. Children were between 8 and 15 years old at the start of the study and were tested three times with nine months in between each measurement. Therefore, the mean scores per age often includes two measurement points of one participant.

Table 4 Goodness of fit (AIC) and regression weights with 95% Confidence Intervals explaining depressive symptoms, and emotion regulation strategies (approach, avoidant, worry, and externalizing), with the best fitting models and significant predictor variables made bold.

	Model	AIC	Age	Gender	Neigh. SES	Diagnosis	Age x Diagnosis	*Chi²*
Depressive	0	-647.3						
Symptoms	1	-663.7	**-.02 [-.03 to -.01]**	-.01 [-.04 to .03]	**-.02 [-.03 to -.00]**			22.41***
	2	-671.9	**-.02 [-.03 to -.01]**	-.00 [-.04 to .03]	**-.01 [-.03 to -.00]**	**.06 [.02 to .10]**		10.27**
	3	**-673.9**	-.01 [-.02 to .00]	-.01 [-.04 to .03]	-.01 [-.02 to .01]	**.06 [.02 to .10]**	**-.02 [-.03 to -.00]**	3.92*
Approach	0	829.6						
	1	**789.5**	**.05 [.03 to .07]**	**.17 [.09 to .24]**	.00 [-.03 to .03]			46.03***
	2	790.8	**.05 [.03 to .07]**	**.17 [.09 to .24]**	-.00 [-.03 to .03]	-.03 [-.10 to .05]		.69
	3	792.7	**.05 [.03 to .07]**	**.16 [.09 to .24]**	-.00 [-.03 to .03]	-.03 [-.10 to .05]	-.01 [-.05 to .03]	.19
Avoidant	0	778.7						
	1	779.8	-.01 [-.03 to .01]	-.06 [-.13 to .01]	-.02 [-.05 to .02]			5.02
	2	**776.5**	-.01 [-.03 to .01]	-.05 [-.12 to .06]	-.01 [-.02 to .02]	**.09 [.01 to .16]**		5.24*
	3	778.3	-.01 [-.03 to .01]	-.05 [-.12 to .06]	-.01 [-.02 to .02]	**.09 [.01 to .16]**	-.01 [-.05 to .03]	.23
Worry	0	767.2						
	1	**757.6**	**-.02 [-.04 to -.00]**	**.12 [.05 to .20]**	-.02 [-.06 to .02]			15.61**
	2	759.0	**-.02 [-.04 to -.00]**	**.13 [.05 to .21]**	-.01 [-.06 to .02]	.04 [-.06 to .14]		.67
	3	761.0	**-.02 [-.04 to -.00]**	**.13 [.05 to .21]**	-.01 [-.06 to .02]	.04 [-.06 to .14]	-.00 [-.04 to .04]	.01
Externalizing	**0**	**528.7**						
	1	533.0	.01 [-.01 to .02]	-.04 [-.12 to .02]	.00 [-.03 to .03]			1.71
	2	530.7	.00 [-.02 to .02]	-.04 [-.11 to .03]	.01 [-.02 to .04]	**.08 [.00 to .15]**		4.23
	3	531.3	.02 [-.02 to .02]	-.04 [-.11 to .03]	.01 [-.02 to .04]	.07 [-.00 to .15]	-.02 [-.06 to .02]	1.48

*p<.05, **p < .01; ***p < .001

Explaining individual differences in depressive symptoms of children with and without DLD

All ER strategies contributed to the prediction of the depressive symptoms in both groups (AIC without ER: -667.0, and with the addition of approach: -691.9***; avoidant: -683.5***; worry; -753.8***; and externalizing: -705.3***). However, the addition of the interaction effects of diagnosis with one of the ER strategies did not provide better model fits (AIC with the interaction diagnosis and approach: -688.2; avoidant: -679,8; worry; -750.1; and externalizing: -704.5). This indicates that the strengths of the effects of the ER strategies on depressive symptoms did not differ between children with and without DLD.

Table 5 Goodness of fit (AIC) and regression weights with 95% Confidence Intervals for a regression model explaining depressive symptoms with control variables, diagnosis (DLD = 1), and the Mean and Change scores of all predictors, with significant predictors made bold.

		Depressive symptoms
AIC		-842.5***
Age		-.00 [-.01 to .02]
Neighborhood SES		-.01 [-.02 to .02]
Gender		-.00 [-.02 to .03]
Diagnosis		**.05 [.02 to .07]**
Diagnosis x age		-.01 [-.03 to .00]
Approach	Mean	**-.15 [-.19 to -.11]**
	Change	-.03 [-.06 to .01]
Avoidant	Mean	-.04 [-.09 to .00]
	Change	**-.06 [-.09 to -.03]**
Worry	Mean	**.20 [.17 to .24]**
	Change	**.06 [.02 to .10]**
Externalizing	Mean	**.10 [.06 to .15]**

Table 5 shows the unique contribution of the ER strategies explaining the severity of depressive symptoms in children with and without DLD (See the Appendix for the correlations between all study variables at Time 1). Children in both groups reported lower levels of depressive symptoms when they reported higher mean levels of approach strategies, less worry, and less externalizing strategies. Higher mean levels of avoidant strategies also explained lower levels of depressive symptoms, but when the other ER strategies were included in the model, this effect did not reach significance anymore. Additionally, increasing levels of avoidant strategies and decreasing levels of worry across the 18 months, explained decreasing levels of depressive symptoms across time within individuals. The change in externalizing strategies was not included in the final analysis, because it was not administered at Time 3. However, when

only Time 1 and 2 were taken into account, change in externalizing did not contribute to the model.

Explaining individual differences within the DLD group

Individual differences in the severity of pragmatic, speech, syntax, or coherence problems of children with DLD did not explain the severity of their depressive symptoms. However, more semantic problems of individuals with DLD contributed to the prediction of more depressive symptoms (Table 6).

Table 6 Goodness of fit (AIC) and regression weights with 95% Confidence Intervals for regression models explaining depressive symptoms of children with DLD with the control variables, with the addition of semantic problems, and with semantic problems, worry, and externalizing strategies, with significant predictors made bold.

		Depressive symptoms		
AIC		-175.9	-178.5*	-213.4***
Age		**-.03 [-.04 to -.01]**	**-.03 [-.04 to -.01]**	**-.02 [-.03 to -.01]**
Neighborhood SES		-.00 [-.03 to .02]	-.00 [-.03 to .03]	-.00 [-.03 to .02]
Gender		.02 [-.04 to .09]	.03 [-.04 to .09]	.02 [-.05 to .08]
Semantic problems			**.02 [.00 to .04]**	.00 [-.01 to .02]
Worry	Mean			**.16 [.09 to .23]**
	Change			.04 [-.02 to .10]
Externalizing	Mean			**.14 [.06 to .22]**

Approach and avoidant strategies of children with DLD were also not related to any of the CCC-2 scales. However, semantic problems were related to higher levels of worry (*AIC* without: 290.7, and with semantic problems: 285.0**; *B* = .07, 95% *CI* [.02 to .13]) and externalizing strategies (*AIC* without: 205.8, and with semantic problems: 201.6**, *B* = .05, 95% *CI* [.01 to .10]). Finally, more pragmatic problems contributed to the prediction of more externalizing strategies in children with DLD (*AIC* without: 205.8, and with pragmatic problems: 200.0**; *B*= .01 95% *CI* [.00 to .02]).

Semantic problems thus seem to contribute to both depressive symptoms and maladaptive ER strategies of children with DLD. However, when both the semantic problems and maladaptive ER strategies were included, semantic problems failed to be significant, while the contribution of worry and externalizing remained (Table 6). Therefore, we tested whether the relation between semantic problems and depressive symptoms was mediated by worry (mean and change) and externalizing strategies (mean). We used a direct test of mediation following Hayes (2013) with 10,000 clustered bootstraps, testing the indirect path of semantics problems, through worry and externalizing strategies to depressive symptoms. The results

indicated that the relation between semantic problems and depressive symptoms was mediated by the mean level of worry and externalizing strategies (95% CI [.004 to .157] and [.003 to .153] respectively).

DISCUSSION

In line with previous studies (Conti-Ramsden & Botting, 2008; Sullivan et al., 2016), the outcomes of this study showed that children with DLD reported higher levels of depressive symptoms than their peers without DLD. Although the mean level of depressive symptoms decreased over time in older children with DLD, supporting the findings by St. Clair and colleagues (2011), we found individual differences and changes across time in the level of depressive symptoms in children with and without DLD. The current study explored whether differences in ER strategies and communication problems could elucidate the differences in depressive symptoms across time.

ER strategies explain level and changes in depressive symptoms in both groups

In a community population, worry has been shown to be an important risk factor for the emergence of depression (Muris, Roelofs, Meesters, & Boomsma, 2004), which was confirmed in this study. Worry contributed similarly in children with and without DLD to both the level of and changes in depressive symptoms. In line with earlier studies, we found relatively low levels of externalizing strategies (Field & Prinz, 1997; Zimmer-Gembeck & Skinner, 2011), which remained stable over time. We did not find an increase in externalizing strategies during puberty, possibly because a relatively small proportion of the children showed changes in their level of externalizing strategies. However, children from both groups who reported externalizing strategies also reported higher levels of depressive symptoms.

Besides risk factors, we also examined protective factors in this study: approach and avoidant ER, which both explained lower levels of depressive symptoms across time. Children with DLD reported more avoidant strategies, but did not differentially benefit from this strategy in relation to depressive symptoms compared to peers without DLD. Avoidant strategies are sometimes thought to be maladaptive, since the situation causing the negative feelings is not changed. However, when a situation is considered uncontrollable, it could be more adaptive to distract oneself from a situation or try to minimalize the importance of the situation. In contrast, when a situation is perceived as controllable, it could be more adaptive to act on the situation in order to diminish the chances of reoccurrence of the negative event. ER strategies are therefore especially adaptive when children are able to choose a strategy that fits the situation (Joormann & Stanton, 2016). Earlier studies found more behavioral withdrawal in children with DLD (Brinton & Fujiki, 1999; Fujiki et al., 2004). The current study suggests that children with DLD use more cognitive avoidant strategies, which appear to help them deal with their negative feelings.

ER strategies explain differences within the DLD group

In contrast to the ER strategies, the severity of communication problems that children with DLD experienced did not explain their depressive symptoms. Semantic problems were associated with more depressive symptoms in children with DLD, but not once ER strategies were accounted for. In fact, the relation between semantic problems and depressive symptoms was mediated by the tendency to worry and to use externalizing strategies. These findings are in line with other studies that did not find any, or only weak relations with the level of depressive symptoms in children with DLD and their communication abilities (Beitchman et al., 1996; St. Clair et al., 2011; Sullivan et al., 2016).

These findings suggest that although children with DLD are at greater risk for depressive symptoms, this is not a direct effect of their communication problems in late childhood and adolescence. Beitchman and colleagues (1996) suggested that communication problems of children in early life may set in motion a different developmental trajectory, where the severity of communication problems has less influence in later developmental stages. Communication problems impede children with DLD in social interactions from an early age, which leads to fewer opportunities for incidental social learning (Rieffe et al., 2016). Social rules and expectations about how to regulate and express emotions are usually not made explicit, but rather "go without saying," and children typically learn a great deal through the observation of others and through overhearing others' conversations (Brown & Dunn, 1996; Denham & Aucherbach, 1995). However, it is much more difficult to pick up on implicit rules when children struggle to follow the conversations of others, and have less access to the social world around them. This is reflected in an impaired understanding of other people's motives, emotions, and behaviors in children with DLD (e.g. Andrés-Roqueta et al., 2016; Bakopoulou & Dockrell, 2016). This problem is also found in other groups that have less access to the social world, albeit for different reasons, such as children with a hearing loss (Rieffe et al., 2016).

When children, as a consequence of fewer social learning opportunities early in life, develop less adaptive ways of coping with their emotions, this may also affect their level of depressive symptoms later in life. Our study suggests that children with more communication problems use more maladaptive ER strategies. These maladaptive strategies in turn contributed to the prediction of higher levels of depressive symptoms. These kinds of secondary problems in ER strategies should therefore receive special attention in interventions, to support children with DLD in coping with negative life events, and in preventing negative emotionality.

Higher levels of depressive symptoms in DLD remained

Despite the reduction in the reported symptoms of depression in children with DLD over time, they continued to report more depressive symptoms than their typically developing peers did even when ER strategies were accounted for. Therefore, other explanatory factors should be considered in future research to explain these differences. First, emotion awareness, or the ability to identify one's own emotions and their antecedents in the situation causing them, has

a strong protective function in the development of depressive symptoms (Sendzik et al., 2017). It has been argued that one first has to understand the cause of one's emotions before one can adaptively cope with them (Gross, 1998; Lambie & Marcel, 2002). Children with DLD have shown impairments in the recognition of emotions, and in their understanding of emotional antecedents (e.g. Bakopoulou & Dockrell, 2016; Fujiki et al., 2004). These capacities are highly dependent on emotion talk with parents in social interaction, and on social learning (Denham & Auerbach, 1995; Dunn et al., 1991; Rieffe et al., 2016). It is possible that the associations we found between the semantic language problems of children with DLD and their maladaptive ER strategies are mediated by this ability to understand emotions.

Second, the frequently reported social problems of children with DLD could affect their feelings of well-being, as a high incidence of being bullied has been shown to explain elevated levels of depressive symptoms in children with DLD (Botting et al., 2016). Third, children with DLD might be particularly vulnerable to depressive symptoms during transitional periods when they must cope with new and demanding situations. Adolescents with DLD reported a decrease in depressive symptoms when they finished compulsory education. However, when these youngsters had difficulties finding jobs as young adults, their level of depressive symptoms increased again (Botting, Durkin, Toseeb, Pickles, & Conti-Ramsden, 2016). Although we found a more gradual decline in depressive symptoms from childhood to adolescence, it is important to consider how contextual changes affect the development of depressive symptoms of children with DLD.

While this longitudinal study provides insight into the underlying mechanisms contributing to the depressive symptoms in a large group of clinically referred children with DLD, there are a few limitations to be addressed. First, this study relied on the use of self-reports only. Although the internal consistencies of the questionnaires were sufficient, and although internal states can best be measured through self-report (Lambie & Marcel, 2002), the extent to which these symptoms of depression are also related to DLD children's social functioning could be measured through observational studies. Second, we did not include children within the clinical range for depression. Future research could examine the role of ER in depression in a group with a clinical diagnosis for depression.

Conclusion

Depression is one of the most common mental health problems in late childhood and young adolescence, and for children with DLD, the risk for early depressive symptoms is even higher than for those without DLD. It is therefore crucial to have a better understanding of factors contributing to these mental health problems. Children with DLD who had more communication problems were more inclined to use maladaptive strategies, such as worrying and externalizing strategies, which in turn are important risk factors for depressive symptoms. However, an important finding of this study was that independently of communication levels, the risk and protective factors of using different ER strategies made similar contributions to

predicting depressive symptoms, in children with and without DLD. Thus, it is important for professionals working with children with DLD to know that the same approach and avoidant strategies that help children without DLD seem also to be beneficial for children with DLD. It is critical that future studies further identify factors related to the development of depression for children with DLD, in order to decrease the risk for depression in this particular group.

Appendix Pearson's correlations between Time 1 variables (without DLD/DLD).

	Approach	Avoidant	Worry	Externalizing	Age	PIQ	Education parents	Neigh. SES
Depressive symptoms	-.21**	-.06	.39***	.28***	-.19**	-.07	-.02	-.13*
Approach		-.01/ .46***	.07	-.23**/.04	.13*	.08	.03	-.02
Avoidant			-.10	.07	-.05	-.12*	-.13*	-.08
Worry				.13*	-.04	-.04	.10	-.05
Externalizing					-.06	-.07	-.05	.01
Age						-.12	-.04	-.02
PIQ						¤	.35***	.14*
Education parents								.24***

Note. Differences in relations in the children with and without DLD have been tested with Fisher r to Z transformations: Avoidant and Approach Coping: Z = -4.31, p < .001; and Approach and Externalizing: Z = -.2.31, p = .021, *p<.05, **p < .01; ***p < .001

“When I lose my temper, it just turns red in my head. Then I see red, or sometimes black and then I just explode. Then I only have curse words in my head. Then I want to hit something Then I'm going to hit myself or someone else. Then I slam the door shut."

“Sometimes I feel ashamed when I get help. Then I get irritated and moody. I want to do my own things. Then I get into a fight with my parents again and I think: Just leave me alone, I want to figure it out myself. They want to help me, but I want to go my own way."

Emotional competence mediates the relation between communication problems and reactive externalizing problems in children with and without Developmental Language Disorder: A longitudinal study.

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ABSTRACT

Language problems are a risk factor for externalizing problems in children, which relation may be mediated by problems in emotional competence, especially when externalizing problems are reactive in nature such as in Oppositional Deviant Disorder (ODD) or reactive aggression. In this longitudinal study we examined the development of externalizing problems (proactive and reactive aggression and ODD symptoms) in children with (n = 98) and without (n = 156) a formal diagnosis of Developmental Language Disorder (DLD; age: 8-16 years). We examined the relations between externalizing problems and children's communication problems (structural, pragmatic and problems communicating about emotions) and the mediating role of emotional competence (emotion recognition and anger dysregulation). Children and their parents participated three times over an 18-month period. Multilevel analyses revealed that problems in emotional competence are a risk factor for the development of reactive, but not for proactive externalizing problems. Increasing emotion recognition and decreasing anger dysregulation were longitudinally related to fewer ODD symptoms in both groups, whereas anger dysregulation related to reactive aggression in children with DLD alone. Pragmatic and emotion communication problems were related to more ODD symptoms, which relations were fully mediated by emotion recognition in both groups and by anger dysregulation in children with DLD. Moreover, anger dysregulation partially mediated the relation between communication problems and reactive aggression in children with DLD. Therefore, in addition to interventions for communication skills, there is a need to address the emotional competence of children with DLD, as this decreases the risk for reactive externalizing problems.

INTRODUCTION

Approximately two children in every classroom experience significant language problems which are not explained by other disorders (Norbury et al., 2016). These children are eligible for a diagnosis of developmental language disorder (DLD) (Bishop, Snowling, Thompson, Greenhalgh, & CATALISE consortium-2, 2017). Children with DLD experience difficulties expressing their own thoughts and wishes through language, and often have misunderstandings with others. These communication problems may cause frustration and negative affect, resulting in externalizing behavior problems, such as aggression or oppositional behavior. Indeed, higher levels of externalizing problems have been found in children with DLD (Lindsay, Dockrell, & Strand, 2007; Maggio et al., 2014; St. Clair, Pickles, Durkin, & Conti-Ramsden, 2011; Van Daal, Verhoeven, & Van Balkom, 2007). By corollary, children with severe externalizing problems also often have language problems, but these language problems go unnoticed in the majority of these children (Hollo, Wehby, Oliver, 2014). However, their language problems may have contributed to the development and maintenance of their externalizing problems (Cohen et al., 1998; Salmon, O'Kearney, Reese, & Fortune, 2016). Therefore, it is important to gain a better understanding of direct and indirect effects of language problems on the development of externalizing problems in order to help professionals recognize and target the underlying causes of these problems.

Language problems have a direct effect on externalizing problems (Chow & Wehby, 2018), but also play a fundamental role in the development of emotional competence, that is the ability to recognize, understand, regulate, and express emotions in an adaptive way in social interactions (Saarni, 1999; Salmon et al., 2016). Problems in emotional competence are in turn important risk factors for the development of externalizing problems (Crick & Dodge, 1996; Fernandez & Johnson, 2016). The current longitudinal study examined externalizing problems in children between 9 and 16 years old with and without a formal diagnosis of DLD. We examined direct factors (severity of communication problems) and indirect risk factors (problems in emotional competence) for the development of externalizing problems.

Externalizing problems in children with Developmental Language Disorder

DLD is a neuro-developmental disorder which causes a significant problem in language development and severe difficulties using language in daily live. Children with DLD often experience problems in the structural aspects of expressive language (e.g. word finding problems, or difficulty making grammatical sentences) and/or in the understanding of language (e.g. small lexicon, difficulty understanding complex phrases, or slow processing of language). Additionally, children often experience problems in the social use of language (the pragmatics), such as ordering information to tell a story and understanding jokes. The communication problems of children with DLD are not explained by other neuro-developmental disorders, hearing loss, or intellectual disabilities (American Psychiatry Association, 2013; Bishop et al., 2017). Language problems are often present form an early age and persist as children became

older (Conti-Ramsden, St Clair, Pickles, & Durkin, 2012). However, the language problems may also appear during middle school when the communicative demands of the environment increase (Poll & Miller, 2013; Snowling, Duff, Nash, & Hulme, 2016).

Communication problems often result in misunderstandings and frustration in social interactions, which may impede the social-emotional development of children with DLD (Hart, Fujiki, Brinton, & Hart, 2004). In children and adolescents with DLD, elevated levels of externalizing problems have been reported both by parents and teachers (Lindsay et al, 2007; Maggio et al., 2014; St. Clair et al., 2011; Timler, 2008; Van Daal et al., 2007), although problems are often not in the clinical range (Beitchman, Brownlie et al., 1996; Lindsay & Dockrell, & Strand, 2007; Snowling, Bishop, Stothard, Chipchase, & Kaplan, 2006; St. Clair et al., 2011). Two longitudinal studies found different developmental trajectories of externalizing problems in children with DLD (Lindsay & Dockrell, 2012; St. Clair et al., 2011). Both studies used teacher reports on the Strengths and Difficulties questionnaire (SDQ). Whereas one study found stable levels of externalizing problems from 10 to 12 years of age with increasing levels to the age of 16 (Lindsay & Dockrell, 2012), the other study found decreasing levels of externalizing problems in children and adolescents between the age of 7 and 16, resulting in norm like levels at the age of 16 (St. Clair et al., 2011). However, the adolescents of the latter study themselves reported higher levels of externalizing problems at the age of 16 compared to their peers without DLD on the self-report version of the SDQ (Conti-Ramsden, Mok, Pickels, & Durkin, 2013). The different patterns of results between the two studies may reflect the fact that various forms and functions of externalizing problems such as disobedience, lying, bullying, fighting and anger outbursts were not differentiated. Distinguishing between different forms and functions of externalizing problems may provide a clearer picture of the difficulties of children with DLD.

Distinguishing reactive and proactive externalizing problems in children with DLD

Externalizing problems can be categorized as reactive or proactive behaviors. Reactive externalizing problems have the goal to vent anger, or to harm other persons after provocation or goal thwarting. In contrast, proactive externalizing problems are typically not anger induced, but are more instrumental in nature, such as threatening or manipulating someone to gain something from that person or to gain social status (Crick & Dodge, 1996).

Reactive and proactive externalizing problems often co-occur in children, but different antecedents and developmental routes have been distinguished (Tremblay, 2010; Vitaro, Brendgen, & Tremblay, 2002). For instance, reactive externalizing problems are common in young children but show a sharp decrease between 2 and 4 years of age and decreases further during the primary school years (Tremblay, 2010). This decrease has been linked to improved abilities of emotion understanding and emotion regulation (Fields & Prinz, 1997). In contrast, proactive externalizing problems increase during the primary school years, which reflects the

growing ability of children to plan their actions and manipulate others, related to cognitive growth (Tremblay, 2010).

To date, only one small study (n = 12) examined reactive externalizing problems in children with DLD (Timler, 2008). The study found a trend towards more reactive aggressive reactions of children with DLD between 8 and 12 years old in reaction to hypothetical peer conflict situations compared to their peers without DLD. The teachers of these children also reported that children with DLD more often reacted angrily or aggressively when provoked by their peers.

Proactive aggression has not been examined in children with DLD to date. Some studies have examined rule-breaking, or delinquent behavior of children and adolescents with DLD, but found no differences between children with and without DLD (Maggio et al., 2014; Van Daal et al., 2007; Winstanley, Webb, & Conti-Ramsden, 2018). However, 19-year-olds with DLD reported more convictions than their peers without DLD (Brownlie et al., 2004), but the reasons for these convictions (reactive or proactive) were not described. Overall, children with DLD seem at risk for externalizing problems, but primarily for reactive types of externalizing problems.

Explaining externalizing problems in children with DLD

There is much variation within the group of children with DLD in the severity and developmental trajectories of externalizing problems. Previous studies examined the type and the severity of DLD to explain these individual differences. Although some associations have been found between externalizing problems and more severe pragmatic or expressive language problems (Beitchman, Wilson et al., 1996; St. Clair et al., 2011; Van Daal et al., 2007), other studies found no associations with the severity of expressive and receptive language problems (Conti-Ramsden et al., 2013; Lindsay & Dockrell, 2012; Maggio et al., 2014). Therefore, other factors are likely to play a mediating role. One possibility is that the language problems of children with DLD impede the development of emotional competence which in turn affects the development of externalizing problems, making children with DLD prone to angry, or reactive aggressive behavior. In young children form community samples, the relation between language problems and externalizing problems is mediated by children's emotional competence (Salmon et al., 2016). To date, studies in older samples and in children with clinical levels of language problems are lacking.

Emotional competence in children with DLD

Language is an important prerequisite for the development of emotional competence (Saarni, 1999; Salmon et al., 2016). Emotional competence develops through interaction with the social environment. People learn to recognize, understand, and negotiate each other's wishes through mutual expression of knowledge, wishes and ideas, in which language plays an important role (Dunn, Brown, & Beardsell, 1991; Saarni, 1999). For children with DLD, this

development may be hampered because they experience difficulties understanding the comments and explanations of others, and have difficulty expressing their own ideas and wishes. Moreover, the emotion lexicon of children with DLD is typically smaller compared to their peers (Bakopoulou & Dockrell, 2016). These communication problems have a negative effect on both the quality and the quantity of the social interactions of children with DLD, which may impede their emotional competence development (Andrés-Roqueta, Adrian, Clemente, & Villanueva, 2016; Van den Bedem, Willems, Dockrell, Van Alphen, & Rieffe, 2019; Yuill & Little, 2018). Indeed, children and adolescents experience more difficulties recognizing their own and other's emotions, have difficulties to regulate their emotions, and experience difficulties to communicate about their own emotions (Bakopoulou & Dockrell, 2016; Fujiki, Spackman, Brinton, & Hall, 2004; Van den Bedem et al., 2019; Yuill & Little, 2018).

Problems in emotional competence in turn are important risk factors for the development of externalizing problems (Fernandez & Johnson, 2016). Children who have difficulty regulating their negative emotions, especially anger, can become more irritable and externalize their feelings when provoked (De Castro, Merk, Koops, Veerman, & Bosch, 2005; Rolfh, Holl, Kirsch, Krahé, & Elsner, 2018). Additionally, children who have difficulty recognizing and understanding others´ intentions and emotions, may interpret social interactions as hostile, resulting in more reactive aggressive or oppositional reactions (Crick & Dodge, 1996; De Castro et al., 2005).

Proactive aggression is typically not related to anger dysregulation, as children are thought not to act out of spite or frustration, but rather act in a calculative manner (Crick & Dodge, 1996; Rolfh, Busching, & Krahé, 2017). Nevertheless, when children experience problems in expressing their emotions orally, this may also lead to more proactive aggression. Children who lack skills to communicate about their own emotions may use more behavioral strategies to show others what they want and feel, resulting in more acts of aggression (De Paula & Befi-Lopes, 2013; Fields & Prinz, 1997; Gallagher, 1999).

Present study

Overall, previous studies suggest that externalizing problems are more prevalent in children and adolescents with DLD, although different studies provide mixed results. However, these studies did not differentiate different intentional and more uncontrolled reactive behaviors (Tremblay, 2010). Distinguishing these different externalizing problems may provide a clearer picture of the externalizing problems in children and adolescents with DLD. Therefore, the first aim of the current study was to examine longitudinally reactive (oppositional behavior and reactive aggression) and proactive externalizing problems (proactive aggression) of children with and without DLD between 8 and 16 years old across an 18-month period. We expected more reactive externalizing problems in children with DLD (Timler, 2008), but no differences in proactive problems (Maggio et al., 2014; Van Daal et al., 2007; Winstanley et al., 2018).

The second aim of the study was to examine longitudinally whether emotional competence could explain individual differences in externalizing problems across time. We expected that lower levels of emotional competence would be related to less reactive externalizing problems (De Castro et al., 2005; Rolfh et al., 2018), but not to reduced proactive problems (Crick & Dodge, 1996; Rolfh et al., 2017). Additionally, we expected increasing levels of emotional competence across time to be related to decreasing levels of reactive externalizing within individuals (Fields & Prinz, 1997). Further, we explored whether the strengths of these relations were similar in children with and without DLD. As children with DLD have more difficulties developing their emotional competence, this may be a stronger risk factor for externalizing problems in these children.

The third aim of the study was to examine whether problems in emotional competence mediated the relation between the severity of communication problems and externalizing problems in children with and without DLD. Because previous studies examining the relationships between communication problems and externalizing problems had mixed results, we distinguished between different types of communication problems (St. Clair et al., 2011; Lindsay & Dockrell, 2012; Maggio et al., 2014). We examined relations with structural and pragmatic communication problems, but also specifically whether children had difficulties communicating about their own emotions with others (emotion communication problems; Way et al., 2010). We expected that communication problems would relate to more reactive externalizing problems, but that these relations would be mediated by problems in emotional competence (Figure 1; Fields & Prinz, 1997; Salmon et al., 2016). Additionally, we expected more proactive aggression in children with more communication problems (De Paula & Befi-Lopes, 2013; Fields & Prinz, 1997; Gallagher, 1999), but did not expect that emotional competence mediated this relation (Crick & Dodge, 1996; Rolfh et al., 2017).

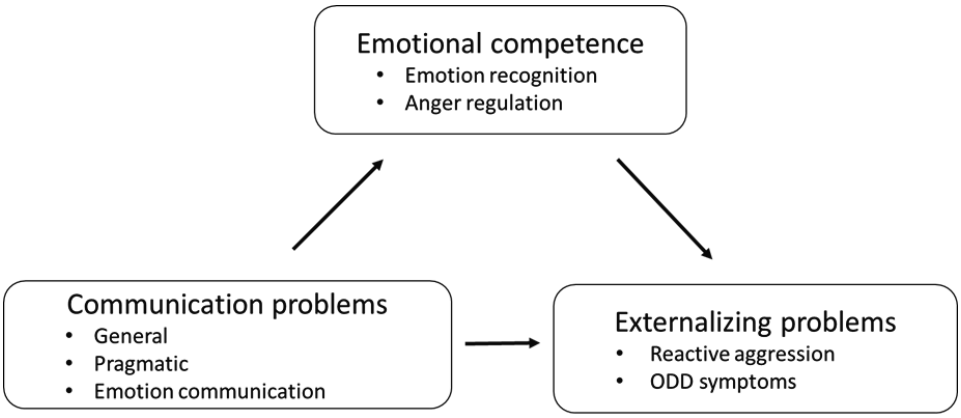


Figure 1. Emotional competence as mediator between communication problems and reactive externalizing problems

METHOD

Design

The present study is part of a larger study on the social-emotional development of children with DLD (Van den Bedem et al., 2019). Children with and without DLD and their parents filled out questionnaires at three time points across 18 months. Children reported on their reactive and proactive aggression, while parents reported on oppositional behavior and emotional competence of their child. Additionally, parents reported on the communication problems of their child at one time point. In the current study, we only reported on children for whom parent reports were available.

Participants

A total of 254 children between 8 and 16 years old participated in the study, of whom 98 children had DLD. Children with DLD were included in the study when they had a formal diagnosis of DLD and no diagnosis of autism spectrum disorder or hearing loss. Most children with DLD attended specialized schools for children with communication problems (72.4%), where they received education in small class rooms with extra support for their language development and more visual support. The other children with DLD attended mainstream schools with specialized help within their schools (27.6%). Children typically have a counsellor who regularly visits the school to advise the teacher and support the child in school work and social issues.

Table 1 Characteristics of participants at Time 1 for children with and without DLD

	With DLD	Without DLD
Number of children - *n*	98	156
Male	47 (48.0%)	68 (43.6%)
Female	51 (52.0%)	88 (56.4%)
Mean Age in years (*SD*)	11.5 (1.1)	11.6 (1.4)
Age range in years, months	9.2–16.3	9.8–15.4
Neighborhood SES***	.00 (1.10)	.66 (1.12)
Range neighborhood SES	-4.19–2.50	-5.24–2.44
PIQ – *n*	92	146
PIQ***	93.8 (13.1)	109.4 (17.1)
Range PIQ	70–140	78–140

Note. The neighborhood SES of the participating parents is determined by the mean level of education, occupation, and income of all adults of a neighborhood compared to the other neighborhoods in the Netherlands ($M = 0.28$, $SD = 1.09$, Range = -6.8 to 3.1); ***$p < .001$

Children without DLD were included when they did not have any diagnosis as indicated by their parents and when their language abilities and performance IQ (PIQ) were within the normal range (95% Confidence Interval of a score of 85 or higher) as tested with two subtests of the Dutch version of the Clinical Evaluation of Language Fundamentals (Kort, Schittekatte, & Compaan, 2008) and two subtests of the Wechsler Intelligence Scale for Children (WISC; Kort et al., 2005).

The groups with and without DLD were comparable in age ($t(160.05) = .27$, $p = .801$) and gender distribution ($X^2(1) = .405$, $p = .604$). Children with DLD had a lower PIQ than their peers without DLD ($t(228.28) = 7.91$, $p < .001$), and lived in neighborhoods with a lower socio-economic status as indicated by their postal code ($t(251) = 4.57$, $p < .001$) (Table 1). Therefore, these variables were controlled in the analyses.

Materials

Externalizing problems were measured with the oppositional-defiant disorder (ODD) scale of the Child Symptom Inventory (CSI; Gadow & Sprafkin, 2002), which measures whether the child often argues with the parent, becomes angry easily, blames others when something goes wrong, and wants to take revenge. Parents indicated on a 4-point Likert scale how often the behavior occurred. Additionally, children reported on their reactive and proactive aggressive behavior using the Instrument for Reactive and Proactive Aggression Self-report (IRPA; Rieffe et al., 2016). Children were presented with five different aggressive behaviors (hitting, pushing, kicking, scolding, or picking a fight) with three reactive reasons: because I was mad, because I was being bullied, or because I was scolded at, and three proactive reasons: because I wanted to be mean, because I thought it was fun, or because I wanted to be the boss. Children reported for each reason whether they had performed the aggressive act (almost) never (1), sometimes (2), or often (3). If children did not perform the aggressive act, they reported never on every question. The validity and reliability of the CSI and the IRPA are good (Gadow & Sprafkin, 2002; Rieffe et al., 2016), as was the reliability in our study for children with and without DLD ($\alpha > .79$; Table 2). Mean scores were obtained for all scales.

Emotional competence was measured with the Emotion Expression Questionnaire (Rieffe, Ketelaar, & Wiefferink, 2010). Parents indicated how often their child correctly recognized the emotions of others (emotion recognition), and how often, how long and how strongly children expressed their anger (anger dysregulation) on a 5-point Likert scale. Both scales have acceptable reliability ($\alpha > .72$; Rieffe et al., 2010), as was found in our study for children with and without DLD ($\alpha > .75$; Table 2). Mean scores were obtained for both scales.

Communication problems were measured with the Child Communication Checklist-second edition (Geurts et al., 2009; Norbury et al., 2004). Parents rated how often their child experiences problems in four structural language areas (speech, syntax, semantics, and coherence) and four pragmatic language areas (initiation of conversations, non-verbal communication, use of context, and stereotypical language use). The sum of the final four scales

gives the pragmatic problems scale, while all scales combined give an indication of the severity of the general communication problems of a child. Standardized scores are available for the Dutch population. The general and pragmatic scales are reliable in children with and without DLD, as was found in our study ($\alpha > .83$; Table 2). However, the separate structural scales are not reliable in children without DLD (Geurts et al., 2009) and were only examined in children with DLD. There were missing data for six children with DLD and 13 children without DLD, due to non-response of the parents or invalid filled-out questionnaires. These children were excluded from the analyses where the CCC-2 was used.

Table 2 Psychometric properties of the questionnaires.

	Range	N items	α Time 1		Grand Means (*SD*)	
			With DLD	Without DLD	With DLD	Without DLD
Externalizing problems						
ODD symptoms	1-4	8	.89	.79	1.76 (.49)	1.65 (.34)
Reactive aggression	1-3	15	.96	.89	1.33 (.40)	1.28 (.24)
Proactive aggression	1-3	15	.91	.91	1.09 (.17)	1.04 (.07)
Emotional competence						
Emotion recognition	1-5	6	.75	.75	3.77 (.56)	4.08 (.53)
Anger dysregulation	1-5	4	.81	.75	2.45 (.74)	2.30 (.56)
Communication problems						
Emotion	1-4	14	.91	.91	2.03 (.58)	1.43 (.42)
General	53-157	56	.83	.87	115.52 (13.65)	73.33 (15.01)
Pragmatic	24-78	28	.83	.79	54.92 (7.46)	35.97 (7.94)
Speech	8 - 24	7	.75		16.10 (3.54)	
Syntax	7 - 20	7	.59		15.29 (2.48)	
Semantics	5 - 18	7	.69		14.21 (1.74)	
Coherence	6 - 20	7	.80		15.00 (2.38)	

Note. N communication problems: Emotion: DLD = 87, without DLD = 151; general and pragmatic: DLD = 92, without DLD = 142.

Additionally, we examined problems children experience when communicating about emotions with the Children Alexthymia Meassure (CAM; Way et al., 2010). Parents rated whether their child had difficulties to communicate about their own emotions, deflected

attempts to talk about emotions, or said that they were fine while they seemed not. Parents reported on a 4-point Likert scale how often problems occurred. As in the validation study (Way et al., 2010), good reliability was found for both groups ($\alpha > .91$; Table 2). Mean scores were obtained. There were missing data for 11 children with DLD and four children without DLD due to non-response of the parents. These children were excluded from the analyses where the CAM was used.

When data were not available from school or medical files, PIQ was measured with two subtests of the WISC (Kort et al., 2005), namely block design and picture arrangement. Eight children with DLD and all children without DLD were tested during the second assessment point. Data were missing for six children with DLD and ten children without DLD due to attrition, or because we did not obtain permission of the parents to test the PIQ.

Procedure

Children with and without DLD were invited to participate in the study through their schools, and through organizations, that help children with DLD in regular education. An active consent procedure was used. Parents reported on the diagnosis of their children, which was verified for the children with DLD in their school or medical files. The study received approval from the ethical committee of Leiden University in the Netherlands.

Children were tested in a quiet room by a test leader who had received an extensive training. We used a detailed protocol for the test session in order to provide the same instructions to participants. At the start of the test session it was stressed that there were no right or wrong answers and that answers were anonymous. Participants could read the questions and answer options on a laptop or tablet. For children with DLD, everything was also read aloud. Children could privately answer the questions by clicking on one of the answer options. Parents filled out anonymized questionnaires about their child on paper or via the internet. The externalizing problems and emotional competence scales were filled out three times, whereas the communication problems and PIQ were measured once during the second measurement.

RESULTS

Group differences

Our first aim was to examine the mean level and development of different externalizing problems of children with and without DLD. We fitted multi-level models using R.3.3.2 (R Development Core Team, 2016) to account for the dependency in the longitudinal data. First, we fitted a basic means model and entered age and control variables (gender, SES, and PIQ) one at the time. Control variables were only kept in the model when they provided a better model fit (as indicated by a significantly lower Akaike's Information Criterion [AIC]). Next, in order to compare the mean levels of externalizing problems of children with and without DLD, diagnosis was added to the model. Additionally, we added the diagnosis x age interaction in order to compare the mean levels of both groups across time.

Table 2 shows the grand means of all study variables. The self-reported levels of aggression and the parent-reported ODD symptoms were generally low in both groups. Approximately half of the children with and without DLD never reported a proactive act of aggression. Reactive aggression and ODD symptoms showed a more diverse distribution, but were positively skewed. Therefore, we used a bootstrap procedure with 5000 bootstrap samples as a robust procedure to deal with non-normally distributed data (Field, 2013). Predictor variables are significant when zero is not in the 95% Confidence Interval (CI).

Below, we report the best fitting multi-level models on group differences (see Appendix A for the fit indices of all models). The level of ODD symptoms, as reported by the parents, was higher in children with DLD compared to children without DLD (B = .11, 95%*CI* [.003, .215]). A decline in ODD symptoms was found in older children in both groups (B = -.04, 95%*CI* [-.061, -.009]). Gender, SES, and PIQ did not provide better model fits and were excluded.

Reactive aggression did not differ in children with and without DLD. Children in both groups reported lower levels of reactive aggression when they were older (B = -.021, 95%*CI* [-.039, -.002] and girls reported lower levels than boys (B = -.077, 95%*CI* [-.151, -.003]. SES and PIQ did not contribute to the model.

The level of proactive aggression also did not differ in children with and without DLD. In both groups a decline with age was found (B = -.013, 95%*CI* [-.021, -.005]. Girls reported lower levels of proactive aggression than boys (B = -.030, 95%*CI* [-.058, -.001]) and PIQ was negatively related to proactive aggression in both groups (B = -.001, 95%*CI* [-.002, -.000]. SES did not contribute to the model.

Additionally, we compared the mean level and development across time of emotion recognition and anger dysregulation in children with and without DLD. Emotion recognition as reported by the parents was lower in children with DLD than in children without DLD (B = -.336, 95%*CI* [-.467, -.207]). An increase was found in older children in both groups (B = .040, 95*%CI* [.005, .074]). Anger dysregulation did not differ in children with and without DLD and showed decreasing levels in older children (B = -.073, 95*%CI* [-.116, -.030]). PIQ, SES, nor gender affected these results.

Finally, the level of communication problems (general, pragmatic, and emotion communication) of children with and without DLD were compared using independent t-tests. Children with DLD had more general, pragmatic, and emotion communication problems compared to children without DLD ($p < .001$).

In summary, we found higher levels of ODD symptoms in children with DLD compared to children without DLD, whereas proactive and reactive aggression were similar in both groups. The three externalizing problems decreased as children became older. Emotion recognition was lower in children with DLD whereas anger dysregulation did not differ between groups. Emotion recognition increased and anger dysregulation decreased as children became

older. Finally, the communication problems were higher in children with DLD than in children without DLD.

Longitudinal relations between emotional competence and externalizing problems

The second aim was to examine whether individual differences in externalizing problems could be explained by children's level and development of emotional competence (see Appendix B for correlations between all study variables). We examined whether between-person differences in emotional competence explained their level of externalizing problems. Therefore, the mean level (of the three measurements) of emotion recognition and anger dysregulation were added to the model. Additionally, the longitudinal data enabled us to examine whether within-person increases in emotional competence related to decreasing levels of externalizing problems across time. Therefore, we added person specific change scores for every time point (Time1 - mean, Time2 - mean, and Time3 - mean) which reflect the changes in emotional competence within individuals across time. Further, we examined whether the relations between emotional competence and externalizing problems were similar in children with and without DLD by adding the interaction terms of diagnosis x emotion recognition (mean and change) and diagnosis x anger dysregulation (mean and change). Non-significant predictors were excluded from the model.

The level of ODD symptoms was longitudinally related to emotion recognition and anger dysregulation. Higher mean levels of emotion recognition (*B* = -.198, 95%*CI* [-.286, -.123]) as well as within-person growth in emotion recognition (*B* = -119, 95%*CI* [-.189, -.050]) were related to fewer ODD symptoms as reported by the parents. However, when anger dysregulation was added to the model the mean level of emotion recognition was not significant anymore (Table 3). The mean level of anger dysregulation was related to more ODD symptoms in both groups, which relation was stronger in children with DLD as indicated by the significant interaction effect. Additionally, longitudinal increases in anger dysregulation within children were related to increasing levels of ODD symptoms in both groups. When anger dysregulation was added to the model, the difference in the level of ODD symptoms between children with and without DLD was no longer significant. These findings suggest that problems in emotional competence explain the higher levels of ODD symptoms in children with DLD. Moreover, increasing emotional competence across time relates to decreasing levels of ODD symptoms in children with and without DLD.

Reactive aggression was not explained by emotion recognition (mean and change) and was excluded from the model. The mean level of anger dysregulation did contribute to higher levels of reported reactive aggression, but only in children with DLD, as indicated by the significant interaction effect. Changes across time within individuals in anger dysregulation did not contribute to changes in reactive aggression (Table 3). Additionally, proactive aggression was unrelated to emotion recognition and anger dysregulation after bootstrapping. These findings suggest that children with DLD who have more anger dysregulation are at risk for

higher levels of reactive aggression, but not proactive aggression. Growth in emotional competence across time did not relate to lower levels of reactive and proactive aggression in both groups.

Table 3 Regression weights with 95% CI for best fitting models with emotion recognition and anger dysregulation predicting reactive externalizing problems

		Reactive aggression	ODD symptoms
Age		-.021 [-.031, .008]	-.007 [-.024, .010]
Gender		**-.073[-.149, -.005]**	-
Diagnosis		**-.404 [-.707, -.057]**	-.207 [-.436, .021]
Emotion recognition	Mean	-	-.049 [-.112, 013]
	Change	-	**-.108 [-.177, -.038]**
Anger dysregulation	Mean	.041 [-.014, .118]	**.384 [.312, .455]**
	Change	.018 [-.052, .094]	**.133 [.060, .207]**
Diagnosis x	Mean	**.182 [.025, .312]**	**.105 [.003, .208]**
Anger dysregulation	Change	.090 [-.037, .230]	.092 [-.044, .229]

Note. Significant regression weights are bold.

Mediating role of emotional competence in the relation of communication problems and externalizing problems

The third aim was to examine whether the relations between externalizing problems and communication problems were mediated by children's emotional competence (Figure 1). First, we examined the direct path of communication problems to externalizing problems. We reran the best fitting models as described above excluding children with missing data on the CCC or CAM. Then the severity of communication problems (general [structural language and pragmatic scales combined], or pragmatic and emotion communication), as well as the interaction effects with diagnosis, were added to the model.

Pragmatic problems (B = .012, 95%*CI* [.006, .018]) and emotion communication problems (B = .264, 95%*CI* [.118, .391]) related to higher levels of ODD symptoms in both groups. Reactive aggression was higher in children with more emotion communication problems in both groups (B = .092, 95%*CI* [.006, .178]) and in children with DLD with more general (B = .009, 95%*CI* [.003, .015]), or pragmatic communication problems (B = .015, 95%*CI* [.003, .026]), whereas no relations were found for children without DLD (B = .-.001, 95%*CI* [-.004, .001]; B = .-.001, 95%*CI* [-.008, .004] respectively). When the CCC scales (speech, syntax, semantics, coherence, pragmatics) were examined separately in children with DLD, only semantic and pragmatic problems related to more reactive aggression.

Proactive aggression was positively related to more emotion communication problems in both groups (B = .043, 95%*CI* [.014, .073]). Additionally, proactive aggression was related

to more general communication problems, but only in children with DLD (*B* = .002, 95%*CI* [.000, .005]), but when the separate CCC scales were examined in children with DLD, none of them reached significance, suggesting that these relations were not strong.

Second, we examined the direct path of communication problems to emotional competence. Emotion recognition was related to fewer general, pragmatic, and emotion communication problems in both groups (*B* = -.012, 95%*CI* [-.016, -.007]; *B* = -.028, 95%*CI* [-.035, -.020]; *B* = -.484, 95%*CI* [-.626, .341] respectively). When the structural language scales were examined separately in children with DLD, none of them were significant, whereas the pragmatic scale was (*B* = -.035, 95%*CI* [-.048, -.022]). Anger dysregulation was related to more general and pragmatic and emotion communication problems in both groups (*B* = .004, 95%*CI* [.001, .008]; *B* = .012 95%*CI* [.005, .019]; *B* = .371, 95%*CI* [.212, .530] respectively). However, when the structural language scales were examined separately in children with DLD, none of them reached significance, whereas the syntactic and pragmatic problems were borderline significant in children with DLD (*p* = .083; *p* = .077).

Third, we examined the indirect route of communication problems through emotional competence to reactive externalizing problems (Figure 1). Therefore, we added the (emotion) communication problems scales which contributed to the prediction of externalizing problems to the analyses with emotional competence. Mediation was not examined in proactive aggression, because it was unrelated to emotional competence.

The level of ODD symptoms was related to the severity of communication problems (pragmatic, and emotion communication) and the two indices for emotional competence in both groups. However, when the communicative and emotional factors were combined, communication problems did not add to the model in addition to the indices of emotional competence, suggesting mediation. Therefore, we performed direct tests of mediation using 10,000 clustered bootstraps to test the indirect paths of pragmatic problems and emotion communication problems, through emotion recognition and anger dysregulation to ODD symptoms (Hayes, 2013). The results indicated that the relations between pragmatic problems or emotion communication problems and ODD symptoms were mediated by the mean level of emotion recognition (*B* = -.035, 95%*CI* [-.307, -.080]; *B* = -.033, 95%*CI* [-.094, -.020] respectively). The results showed that more communication problems were related to lower levels of emotion recognition, which in turn predicted higher levels of ODD symptoms in children with and without DLD.

Anger dysregulation was not a mediating factor of the relation between communication problems and ODD symptoms when both groups were examined together. However, because anger dysregulation was more strongly related to ODD symptoms in children with DLD, we also performed this test of mediation for the DLD group alone. Within the DLD group, increasing levels of anger dysregulation across time mediated the relation between ODD symptoms and pragmatic problems (*B* = .007, 95%*CI* [.002, .024]), or emotion communication problems (*B* = .129, 95%*CI* [.065, .342]). The results showed that lower levels of

communication problems were related to decreasing levels of anger dysregulation across time, which in turn predicted decreasing ODD symptoms in children with DLD.

Reactive aggression was related to more communication problems (semantic problems and pragmatic problems) and more mean anger dysregulation only in children with DLD. Therefore, mediation was only tested in children with DLD. Semantic problems contributed to the prediction of reactive aggression in addition to anger dysregulation (B = .057, 95%CI [.016, .089]) and anger dysregulation did not mediate the relation between semantic problems and reactive aggression. However, the relation between pragmatic problems and reactive aggression was mediated by changes in anger dysregulation across time (B = -.119, 95%CI [-.484, -.0002). Children with DLD with lower levels of pragmatic problems had decreasing levels of anger dysregulation across time, which related to decreasing reactive aggression.

DISCUSSION

In the present study, different types of externalizing problems were examined longitudinally in children with and without DLD. Based on parent reports, children with DLD had more ODD symptoms than children without DLD, whereas no differences were found in self-reported levels of reactive and proactive aggression. Overall, the level of externalizing problems, especially proactive aggression, was low in both groups and the mean level of externalizing problems of children with and without DLD decreased as children became older. However, there was marked individual variation within both groups in the level and development across time. We aimed to explain individual differences between children with and without DLD and within children across time by examining the longitudinal relations with emotional competence and the severity of communication problems.

In line with our expectation, we found that children's emotional competence was unrelated to their level of proactive aggression, whereas emotion communication problems did explain higher levels of proactive aggression in children with and without DLD. Furthermore, we found longitudinal relations between the indices for emotional competence and the two reactive externalizing problems (ODD symptoms and reactive aggression). However, these relations were more consistent in children with DLD than in children without DLD. Moreover, our results confirmed our expectation that emotional competence mediated the relation between the severity of communication problems and reactive externalizing problems, especially in children with DLD. The findings will be discussed in more detail below.

Relations between emotional competence and externalizing problems

Emotional competence contributed to the prediction of fewer ODD symptoms in both groups. Specifically, children with increasing emotion recognition and lower or decreasing anger dysregulation across time had fewer ODD symptoms. Interestingly, the relation between anger dysregulation and ODD symptoms was stronger in children with DLD. Moreover, when anger dysregulation was controlled, the difference in ODD symptoms between children with

and without DLD was no longer significant, suggesting that the problems children with DLD experience are driven by problems in emotion regulation. Additionally, lower levels of pragmatic and emotion communication problems were related to fewer ODD symptoms, but these relations were mediated by children's emotion recognition and, in children with DLD, by their anger dysregulation. These findings are in line with our expectations that communication problems can impede the development of emotional competence resulting in more reactive externalizing problems.

In children with DLD, more anger dysregulation was also related to reactive aggression. Additionally, more severe communication problems related to more reactive aggression, which relation was partially mediated by anger dysregulation. Children with DLD with less pragmatic problems had fewer problems regulating their anger, which in turn contributed to the prediction of lower levels of reactive aggression. However, semantic problems remained significant over and above anger dysregulation. Semantic problems refer to difficulties understanding the meaning of words and sentences, and difficulties to confer meaning when children try to express themselves. Pragmatic problems are also important for the understanding of others, but refer to difficulties understanding the meaning behind the words: such as in figurative speech and in the understanding of non-verbal communication (Norbury et al., 2004). Pragmatic and semantic problems both make it difficult to understand the intentions of others, which can lead to more hostile interpretations of social situations. Hostile interpretations are in turn an important predictor of reactive aggression (Crick & Dodge, 1996). Our findings suggest that both these communication problems as well as anger dysregulation were risk factors for reactive aggression in children with DLD.

In children without DLD, no relation between emotional competence and reactive aggression was found. Although anger dysregulation is thought to be a risk factor for the development of reactive aggression, this relation is specifically found in clinical samples (De Castro et al., 2005), whereas no or weaker relations are reported in community samples (Skripkauskaite et al., 2015; Rolfh et al., 2018), which is in line with our findings. Moreover, other factors, such as negative peer interactions, seem to mediate the relation between emotion dysregulation and reactive aggression (Rolfh et al., 2017).

Level of externalizing problems

In contrast to our expectations, we did not find different levels of reactive aggression in children with and without DLD. This may be partly due to the larger age range in our study compared to the study by Timler (2008), because the older children in our study reported fewer externalizing problems. Additionally, our measure of reactive aggression focussed on physical and verbal acts of aggression while Timler (2008) also measured other reactive behaviour, such as reacting angry. These non-aggressive reactive problems were captured in the ODD symptoms' questionnaire. These ODD symptoms were higher in children with DLD than in children without DLD.

Overall, the level of externalizing problems of children with DLD was quite low. The children in our study were all diagnosed with DLD at an early age and had received special support to diminish the negative effects of DLD through speech and language therapy, special education, or school counsellors. This may have protected the development of more extreme levels of externalizing problems, as has been found in children with unrecognized language problems (Cohen et al., 1998; Gallagher, 1999; Hollo et al., 2014; Winstanley et al., 2018).

When language problems go unnoticed, similar processes as in children with DLD may contribute to the development and maintenance of externalizing problems. Communicative frustration in children may lead to more negative affect, while children at the same time gain less experience understanding, regulating, and expressing their emotions in constructive ways, contributing to more externalizing problems. Moreover, when children receive treatment for externalizing problems, it is likely that children with language difficulties will not benefit from these interventions to the same extent as children with more advanced communication skills. For instance, cognitive-behavioral therapy or group-based interventions place large demands on children's language abilities (Glickman, 2008). Recognizing these language problems, and awareness of the relation between language and externalizing problems and the mediating role of emotional competence seems crucial to help professionals recognize and treat the underlying problems causing externalizing behaviour (Chow & Wehby, 2018; Gallagher, 1998; Winstanley et al., 2018).

Limitations and future directions

Common measure variance may have influenced our results. In the analyses predicting proactive and reactive aggression we used both child and parent reports, but the analyses on ODD symptoms included only parent reports. This may have artificially inflated these relations. Although these effects are most prominent when questionnaires are similar in topic and formulation, which was not the case in our study (Podsakoff, MacKenzie, Lee, Podsakoff, 2003), future studies should try to gain information from multiple informants. This may also be beneficial to gain better understanding of the contexts in which externalizing problems appear, because the behaviour of children is likely to be dependent on the context they are in (e.g., at school or at home; Lindsay et al., 2007) and with whom they are interacting (parents, teachers, friends, or other peers).

Another limitation was that the communication problems were only measured once. Therefore, we were unable to examine the longitudinal effects of changes in the communication problems of children across time. Future studies should not only include longitudinal measures of general, pragmatic and emotion communication, but ideally start the study in younger ages, as the developments we examined already start early in life.

Concluding remarks

Although interventions for children with DLD typically focus on their language problems, our study suggests that the secondary effects of language problems in emotional competence should not be overlooked. Children use language throughout their lives to be in contact with others. These social interactions are crucial for social learning (Dunn et al., 1991; Eisenberg et al., 1993; Piaget, 1932/1965). When the development of emotional competence is delayed as a consequence of DLD, problems in emotional competence are likely to further diminish the chances for children to experience positive social interactions with others and learn from these experiences (Hart et al., 2004; Van den Bedem et al., 2019). In interventions we should ask ourselves which learning opportunities children are missing, so that we are able to focus our attention on those developments, parallel with language interventions.

Appendix A Goodness of fit (AIC and log likelihood test) of the different models

Model	Reactive aggression	Proactive aggression	ODD symptoms	Emotion recognition	Anger dysregulation
Basic means model	405.5	-566.4	450.9	1037.6	1285.5
With addition of age and control variables:					
1. Age	396.9**	-579.3***	439.5***	1036.8	1261.3***
2. Gender	394.8*	-580.4	440.5	1038.7	1261.8
3. SES	396.8	-577.3	441.5	1036.3	12.61.3
Controlling for PIQ:					
Best model without children with missing PIQ:	Model 2: 375.6	Model 1: -564.3	Model 1: 424.2	Model 1: 978.7	Model 1: 1217.5
4. PIQ	376.3	-569.1**	424.9	979.0	1216.5
4a. PIQ and Gender	-	-571.1*	-	-	-
5. Diagnosis * PIQ	379.7	-576.1*	425.1	978.0	1217.6
With control variables and diagnosis:					
6. Diagnosis	395.4	-572.7	436.8*	1015.1***	1260.6
7. Diagnosis*age	395.7	-572.4	437.0	1015.8	1261.8
With control variables and Emotional competence (EC), compared to:	Model 2	Model 4a	Model 6		
8. Emotion recognition	393.8	-569.5	403.0***		
9. Diagnosis x emotion recognition	395.0	-566.6	401.4		
10. Anger dysregulation	375.3***	-573.8*	162.8***		
11. Diagnosis x anger dysregulation	367.8**	-574.8	158.9*		
With control variables and emotion communication problems (CAM):					
Best model, without children with missing CAM data:	Model 2: 346.2	Model 4a: -564.2	Model 6: 379.8	Model 6: 923.0	Model 1: 1149.4
12. CAM	340.1**	-574.2***	353.7***	871.2***	1122.5***
13. Diagnosis x CAM	342.2	-573.4	354.0	872.8	1124.0
With control variables and CCC: general communication score (GCS), or pragmatics:					
Best model, without children with missing CCC data:	Model 2: 355.8	Model 4a: -522.0	Model 6: 371.9	Model 6: 874.4	Model 1: 1118.0
14. GCS	354.6	-523.5	369.0*	847.9***	1111.9**
15. Diagnosis x GCS	348.5**	-526.2*	369.4	848.8	1115.7
16. Pragmatics	354.3	-522.6	358.5***	831.8***	1106.5***
17. Diagnosis x pragmatics	350.8*	-525.9*	359.4	832.1	1109.0
With control variables, EC and CAM:					
Best model with EC, without children with missing CAM:	Model 10: 325.4	-	Model 11: 135.8	-	-
19. CAM	325.3	-	135.7	-	-

20. Diagnosis x CAM	326.9	-	135.2	-	-
With control variables, EC and CCC:					
Best model with EC, without children with missing CCC:	Model 10 DLD only: 202.7	-	Model 11: 123.08	-	-
21. Semantic problems	197.7**	-	-	-	-
23. Pragmatic problems	200.9	-	122.5	-	-
24. Diagnosis x pragmatics	-	-	123.8	-	-

Note. **p* < .05, ***p* < .01, ****p* < .001; For some models a better model fit was found, whereas the added predictor was not significant after bootstrapping. This was the case for: reactive aggression: positive relation with pragmatic problems in children with DLD, but not in children without DLD (model 15), and positive contribution of CAM in addition to ACS*diagnosis (model 16); proactive aggression: negative relation with PIQ in children without DLD, but not in children with DLD (model 5) and positive relation with mean anger dysregulation in both groups (model 10); ODD symptoms: a positive relation with GCS in both groups (model 12).

Appendix B Pearson's correlations between all variables with in the upper right corner the correlations for all children together and in the bottom left corner the correlations separately for the two groups (children without DLD/ children with DLD.

	1	2	3	4	5	6	7	8	9	10	11
1. Reactive	1	.56***	.33***	-.17**	.27***	-.11	-.04	.03	.10	.10	.19**
2. Proactive	**.43*****/.65*****	1	.25***	-.07	.12	-.16*	-.13*	-.01	.16*	.14*	.22**
3. ODD	**.01/.54*****	01/.32**	1	-.30***	-.27***	-.17**	-.05	-.01	.21**	.28***	.36***
4. ER	-.14/-.17	-.05/-.03	-26***/-.38***	1	-.34***	.13*	.19**	.10	-.42***	-.47***	-.52***
5. Anger dysreg.	**13/.40*****	-.01/.15	**67*****/.79*****	-.28***/-.40***	1	-.16*	-.07	.09	.17*	.23**	.32***
6. Age	-.03/-15*	-.08/-.19	-.12/-.16	.06/.18	-.11/-.17	1		.03	.01	-.01	-.03
7. PIQ	-.00/-.02	**-.20*/.09**	.10/-.11	-.01/.21*	.04/-.19	**-.27**/ .05**	1	.11	-.41***	-.36***	-.24**
8. SES	.02/.06	.07/.06	.01/-.02	-.03/.20*	.08/.09	-.27**/-.05	.05/-.09	1	-.27***	-.28***	-.26***
9. GCS	**-.07/.30****	-.05/. 14	.09/.25*	-.32***/ -41***	.13/.14	.09/-.13	**-.20*/.12**	.00/-.05	1	.96***	.52***
10. Pragmatic	**-.03/.26***	-.06/.12	.23**/.31**	-.39***/-.50***	.23**/.21*	-.00/-.07	-.09/.04	.04/-.19	.91***/.88***	1	.56***
11. CAM	.09/.22*	.06/.12	.25**/.43***	-.37***/-.55***	.36***/.35**	-.02/.03	.06/-.13	-.08/-.25*	.14/.32**	.20*/ .41***	1

Note. *p<.05, **p < .01; ***p < .001; Relations in children with and without DLD were significantly different (bold) for reactive aggression with proactive aggression: Z = -2.41*, ODD: Z = -4.55***; anger dysregulation: Z = -2.24*; general communication problems z = -2.67**; and pragmatic problems: Z = -2.08*. Additionally, differences were found for the relations between proactive aggression and ODD: Z = -2.46*; ODD and anger dysregulation: Z = -2.00*; PIQ and age: Z * - 2.46*; PIQ and proactive aggression: Z = 2.20*; and PIQ and general communication problems: z = -2.28*.

“Sometimes I want to tell teachers what exactly I have and what I find difficult, but they often just don't listen. Then they say: "You are a normal student. You are in school like everyone else." So I sometimes feel inferior. Some teachers know, but they see me as a happy girl skipping around at school, but they don't know what exactly is bothering me or if I'm angry, what exactly happens to me. And because I sometimes don't understand things they say, I sometimes have to think about it longer. If I don't understand something, they want to explain it to me, but sometimes I still don't understand it and then they say, "Oh, come on, you just have to pay attention." I am a girl who then often talks back to teachers.

7

General Discussion.

Children and adolescents with Developmental Language Disorder (DLD) are at increased risk for the development of psychosocial problems compared to their peers without DLD (Durkin & Conti-Ramsden, 2010; Yew & O'Kearney, 2013). There is much individual variation within the group of children with DLD regarding their level and development of psychosocial problems (Beitchman et al., 1996; Conti-Ramsden et al., 2018; Lindsay & Dockrell, 2012; St Clair, Pickles, Durkin, & Conti-Ramsden, 2011). However, there is no systematic relationship between the severity of children's communication problems and their psychosocial problems (Charman et al., 2015; St. Clair et al., 2011; Sullivan et al., 2016; Wadman et al., 2011). Therefore, we aimed to examine the extent to which emotional competence might explain these individual differences in psychosocial problems.

Emotional competence refers to the ability to recognise, understand, regulate, and express emotions adaptively in social interactions (Denham, Caverly, & Schmidt, 2002; Saarni, 1999). Emotional competence is gained through social interactions, in which language plays an important role (Brinton & Fujiki, 2011; Dunn, Brown, & Beardsell, 1991; Eisenberg, Sadovsky, Spinrad, 2003; Rieffe, Dirks, Van Vlerken, & Veiga, 2016; Saarni, 1999; Schaffer, 2005). Notably, the development of emotional competence is often delayed in children with DLD (Bakopoulou & Dockrell, 2016; Botting & Conti-Ramsden, 2008; Fujiki, Spackman, Brinton, & Hall, 2004). In children without DLD, problems in emotional competence are important risk factors for the development of different psychosocial problems (Gross & Jazaiere, 2014; Fernandez & Johnson, 2016; Rieffe, Oosterveld, Miers, Meerum-Terwogt, & Ly, 2008), which may also be the case in children with DLD. Therefore, we hypothesized that children with DLD had more difficulties developing their emotional competence, which in turn would contribute to the prediction of their psychosocial problems. Moreover, we expected that children who developed their emotional competence across time, would experience decreasing levels of psychosocial problems.

Problems in emotional competence may become a stronger predictor for psychosocial problems than the severity of children's communication problems, because problems in emotional competence also influence the social learning opportunities of children (Eisenberg et al., 1993). When children are less emotionally competent, they have fewer positive interactions with their social surroundings, which further diminishes their opportunities to develop their emotional competence (Banerjee et al., 2011; Fink, Begeer, Peterson, Slaughter, & De Rosnay, 2015). In this way, problems in emotional competence may start to overshadow the communication problems of children and adolescents with DLD, which would make emotional competence an important area for interventions.

In the current project, we examined; *a.* the level and development of different psychosocial problems of children between 8 and 16 years old with DLD compared to their peers without DLD; *b*. the level and development of emotional competence in children with and without DLD; *c.* the extent to which individual differences in psychosocial problems could be explained by the level and development of children's emotional competence and whether

these relations were moderated by DLD and; *d*. the extent to which emotional competence mediated the relations between the severity of children's communication problems and psychosocial functioning. We examined children between 8 and 16 years old, because during this age range, children are increasingly focussed on the relations with their peers and are especially sensitive to negative evaluations of others, which may have a strong effect on the development of psychosocial problems (Crone & Dahl, 2012; Dahl & Gunnar, 2009). Below, the findings of the different research aims will be summarized and discussed.

Level and development of psychosocial problems in children with and without DLD

The first aim was to compare the level and development of different psychosocial problems of children between 8 and 16 years old with and without DLD. Overall, we found higher levels of psychosocial problems in children with DLD compared to their peers without DLD. More specifically, we found more social problems in children with DLD such as higher levels of victimization (Chapter 2) and lower friendship quality (Chapter 3) compared to children without DLD. These social problems decreased as children became older at the same rate in children with and without DLD.

Internalizing problems were also higher in children with DLD compared to children without DLD. This was the case for social anxiety, somatic complaints (Chapter 4), and depressive symptoms (Chapter 5). The level of these three internalizing problems decreased in children with DLD as they became older. In children without DLD, social anxiety also decreased, whereas somatic complaints increased and depressive symptoms remained similar across time. However, much individual variation was found in both groups.

The level of externalizing problems of children with DLD compared to children without DLD provided mixed results. Externalizing problems include proactive behaviors such as intentional aggressive or manipulative behaviors, which children can use to gain something from others, such as social status (Crick & Dodge, 1996). These proactive externalizing problems were not elevated in children with DLD. Children with DLD did not report more proactive aggression (Chapter 6), nor did they report more bullying behavior than their peers without DLD (Chapter 2). Externalizing problems can also be reactive in nature. After perceived provocation or goal-thwarting, children can react aggressively to vent their anger or to get back at someone. However, children may also react in non-aggressive manners, such as with anger out-bursts or through oppositional behavior (Crick & Dodge, 1996). Children with DLD did not report higher levels of reactive aggression compared to children without DLD (Chapter 6), but the parents of children with DLD did report higher levels of Oppositional Deviant Disorder (ODD) symptoms, that is non-aggressive reactive externalizing problems (Chapter 6). The level of the different proactive and reactive externalizing problems decreased as children became older in children with and without DLD.

In the current project, we focussed on the different psychosocial problems of children with DLD to gain better understanding of specific problems children do and do not experience.

Our results mirror previous findings, where the mean level of psychosocial problems of children with DLD were generally elevated compared to children without DLD (Durkin & Conti-Ramsden, 2010; Yew & O'Kearney, 2013). The social and internalizing problems of children with DLD were consistently higher compared to children without DLD, whereas of the externalizing problems only the reactive non-aggressive problems, as reported by parents, were elevated. Please note that the children with DLD in our study were diagnosed at an early age. Therefore, they received extra support and special interventions form an early age. For instance, they received speech and language therapy and attended special education, or received specialised support within their mainstream schools. In spite of these special interventions, children still developed more psychosocial problems than children without DLD. However, these interventions may have prevented the development of more severe psychosocial problems. When DLD is not recognized, this may sharply increase the risks for psychosocial problems, including proactive and reactive externalizing problems (Cohen et al., 1998; Winstanley et al., 2018). A recent review found that 80 percent of the children with severe psychosocial problems, also had significant language problems. However, these language problems went unnoticed (Hollo, Wehby, Oliver, 2014). The negative impact of language problems on the development of problems in emotional competence and related psychosocial problems may in these cases be more severe.

The different psychosocial problems were most salient in younger children, whereas the level of psychosocial problems decreased in children with DLD as they became older. However, just as in previous studies, there was much individual variation (Beitchman et al., 1996; Conti-Ramsden et al., 2018). These findings suggest that children with DLD are at risk for the development of psychosocial problems. However, a simple explanation where DLD directly causes psychosocial problems, does not account for the variation within the group of children with DLD (Hart, Fujiki, Brinton, & Hart, 2004). Therefore, it is important to examine factors contributing to the development of psychosocial problems in individual children, such as their emotional competence.

Emotional competence in children with and without DLD.

The second aim was to examine the level and development of emotional competence in children with and without DLD. We examined whether children were able to recognise and understand their own and others' emotions and whether children were able to regulate and communicate their emotions.

As expected, we found that children with DLD had more problems with emotional competence, but only in the more complex elements of emotional competence. Children with DLD did not report more difficulties understanding the causes of their own basic emotions (Chapter 2 and 4), and they were less aware of the bodily symptoms of their emotions which is often found to be more adaptive (Chapter 4). However, children with DLD reported higher levels of anger, sadness, and fear (Chapter 2). Children with and without DLD reported similar

levels of approach emotion regulation strategies (solving a problem or asking social-support), whereas children with DLD reported more cognitive avoiding strategies (distracting oneself or trivializing a problem). No differences were found between children with and without DLD in maladaptive emotion regulation strategies such as worrying about a problem or externalizing behavior to vent anger (Chapter 4) and their parents reported that they had similar anger dysregulation problems (Chapter 6). Parents reported that children with DLD had more difficulties distinguishing and communicating about their own emotions (Chapter 4 and 6). As children with and without DLD became older their emotional competence improved. Older children in both groups reported higher levels of emotion understanding, more approach emotion regulation strategies, lower levels of worry, and their parents reported lower levels of anger dysregulation. Children with DLD also reported decreasing levels of anger, sadness, and fear as they became older, whereas emotion communication problems were unrelated to children's age in both groups.

In relation to others' emotions, more difficulties were found. Children with DLD reported similar abilities to feel the emotions of others (affective empathy; Chapter 3), but parents reported that they had more difficulties in recognising the emotions of others than children without DLD (Chapter 6). Additionally, the ability to understand the causes of the emotions of others (cognitive empathy) and the motivation to act prosocial in reaction to the emotions of others was lower in children with DLD compared to children without DLD (Chapter 3). As children with and without DLD became older, emotion recognition, affective empathy, cognitive empathy, and prosocial motivation increased.

Overall, these findings suggest that children with DLD develop their emotional competence, but experience marked difficulties regulating and communicating their emotions and understanding and acting on the emotions of others. Higher levels of negative emotions were present, although children with DLD did use similar emotion regulation strategies as children without DLD. This may reflect that the strategies used are less effective for children with DLD. For instance, in order to effectively solve an argument with a friend, children need to understand the intention of the friend, choose a good strategy to reach mutual agreement and communicate this adaptively. When children lack these important emotional, social, and communicative competencies, their problem-solving attempt will be less effective and not result in lower levels of negative emotions. Alternatively, the emotion regulation strategies of children with DLD may also be less effective if they do not fit the situation. Some situations are beyond a child's control. In those cases, avoidant strategies are more effective to regulate negative affect. However, when a problem can be solved, it may be less effective on the long run to avoid the situation resulting in more negative affect (Joormann & Stanton 2016). Finally, the higher levels of negative affect of children with DLD may also be the result of more negative experiences, due to miscommunication and social difficulties, which problems may not be easily solved. Therefore, children with DLD may have more negative emotions to begin with, which makes it difficult to regulate their emotions to acceptable levels.

Children with DLD also experienced difficulties understanding and responding to the emotions of others. These findings are in line with previous studies, which show a delay in perspective taking abilities and lower levels of prosocial behavior in children with DLD compared to their peers without DLD (Bakopoulou & Dockrell, 2016; Conti-Ramsden et al., 2018; Nilsson & Jensen de López, 2016). Although the understanding of other's emotions was problematic in children with DLD, the understanding of their own emotions was similar to their peers without DLD. However, we only measured the understanding of basic emotions, which typically develops before the age of 4 (Pons, Harris & De Rosnay, 2004; Westby & Robinson, 2014). Therefore, more complex or subtle emotion understanding abilities may still be problematic in children with DLD.

Importantly, the level of emotional competence increased as children with and without DLD became older. Children reported increasing levels of emotion understanding of their own and other's emotions as they became older, as well as better emotion regulation which reflects the ongoing development of emotional competence during (early) adolescence. The first years of life are important to gain basic emotional competencies, but during childhood and adolescence children have to develop more sophisticated skills in an increasingly more complex social world (Hughes, 2016; Pons, Harris & De Rosnay, 2004). During (early) adolescence, children spend much time with their peer group (Hartup & Stevens, 1999). Interactions with peers potentially provide many learning opportunities to gain insight in one's own and other's emotions and emotion communication (Eisenberg et al., 2006; Schaffer, 2005). This was confirmed in Chapter 3, in which we not only examined the extent to which empathy contributed to the prediction of friendship quality, but also the extent to which friendship quality contributed to the prediction of empathy development in turn. We found that positive friendship features had a positive impact on the development of affective empathy, cognitive empathy, and prosocial motivation. Although children with DLD had lower levels of cognitive empathy and prosocial motivation at baseline, the positive effect of friendship quality was similar in children with and without DLD. These findings suggest that positive interactions with peers enable children to gain better emotional competence as they become older. This outcome is in line with previous studies in children without DLD, which showed that children with reciprocated friendships gained better emotional competence as they became older (Von Salisch, 2018; Von Salisch, Zeman, Luepschen, & Kanevski, 2014).

In summary, our findings suggest that the development of emotional competence is delayed in children with DLD, but that children with DLD can develop their emotional competence when they have more positive learning opportunities. The development of emotional competence can, in turn, help children to improve their social relations and diminish internalizing and externalizing problems, which will be discussed below.

The relation between emotional competence and psychosocial problems across time

The third aim of this project was to explain individual differences in psychosocial problems of children with and without DLD. We examined the extent to which the level and development of emotional competence related to decreasing levels of psychosocial problems across time. Additionally, we examined whether these longitudinal relations were moderated by DLD.

In the different chapters, we consistently found that emotional competence contributed to the prediction of the different psychosocial problems in children with and without DLD. Children with higher levels of emotional competence experienced less psychosocial problems. Specifically, better emotion understanding was related to lower levels of victimization, bullying behavior (Chapter 2), social anxiety, and somatic complaints (Chapter 4). Lower awareness of the bodily symptoms of emotions (reflecting an outward focus on the causes of emotions) related to lower levels of social anxiety and somatic complaints (Chapter 4). Emotion dysregulation was related to more victimization, bullying (Chapter 2), and reactive externalizing problems (Chapter 6). More adaptive emotion regulation strategies were related to lower levels of depressive symptoms, whereas maladaptive strategies were related to more depressive symptoms (Chapter 5). Fewer problems with emotion communication were related to lower levels of somatic complaints, ODD symptoms, and proactive aggression in both groups and in children with DLD also to lower levels of reactive aggression (Chapter 6). Finally, empathy was related to more friendship quality (Chapter 3) and better emotion recognition in others related to lower levels of reactive externalizing problems (Chapter 6).

Moreover, in most studies we also found that increases in the level of emotional competence of a child across time related to decreasing levels of psychosocial problems. Increasing levels of emotion understanding across time related to decreasing levels of bullying (Chapter 2), social anxiety and somatic complaints (Chapter 4). Decreasing awareness of bodily symptoms across time related to decreasing social anxiety, but only in children with DLD (Chapter 4). Decreasing levels of sadness and fear across time were related to decreasing victimization, while decreases in anger across time were related to decreasing bullying (Chapter 2). Decreasing anger dysregulation problems across time were related to decreasing ODD symptoms, and in children with DLD also to decreasing reactive aggression (Chapter 6). Increases in cognitive avoidant emotion regulation strategies and decreases of worrying across time were related to decreasing depressive symptoms (Chapter 4). Increases in emotion recognition across time related to decreasing ODD symptoms and in children with DLD to decreasing reactive aggression (Chapter 6). Finally, increasing levels of affective empathy, cognitive empathy and prosocial motivation across time within children related to increasing positive friendship features (Chapter 3). These findings reflect the positive effect of growth in emotional competence in diminishing psychosocial problems in children and adolescents with and without DLD.

The positive effect of emotional competence protecting against psychosocial problems may be stronger in children with DLD than in children without DLD. As described above, some of the relations between emotional competence and psychosocial problems were only present in children with DLD. Additionally, some of the described relations were stronger in children with DLD compared to children without DLD. For instance, more emotion understanding was a stronger predictor for lower levels of victimization in children with DLD than in children without DLD (Chapter 2). More awareness of bodily symptoms of emotions was more strongly related to higher levels of somatic complaints in children with DLD compared to children without DLD (Chapter 4). Finally, anger dysregulation related more strongly to more ODD symptoms in children with DLD than in children without DLD. These findings indicate that emotional competence has a marked effect on the development of children with DLD, requiring special attention during their development. The practical implications of these findings will be discussed at the end of this chapter.

Emotional competence as mediator

The final aim of this research project was to examine the relative effect of the severity of children's communication problems of children with DLD and their emotional competence on the level of psychosocial problems. We expected that the level of emotional competence would mediate the relations between the severity of the communication problems of children with DLD and their psychosocial problems (Figure 1). As described above, the indices for emotional competence were related to the level of psychosocial problems (relation *b* in Figure 1). Below we summarise the findings on the relations between the severity of communication problems with emotional competence (relation *a*) and with psychosocial problems (relation *c*), and with psychosocial problems after emotional competence was taken into account (relation c'). If the relation between the severity of communication problems and psychosocial problems diminishes when emotional competence is taken into account, this indicates the emotional competence serves as a mediator in the relation.

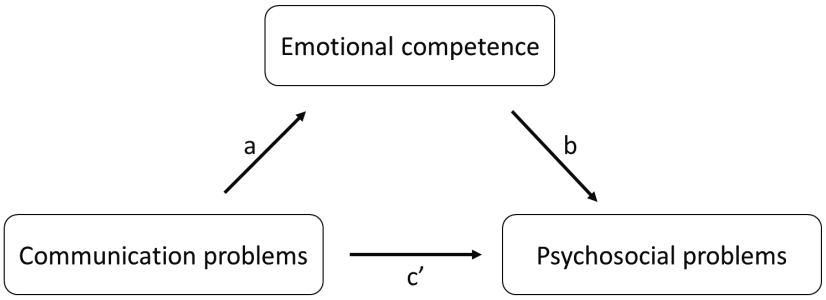


Figure 1. Emotional competence as a mediator of the relation between the severity of communication problems of children with DLD and their psychosocial problems.

We examined the extent to which the severity of the communication problems of children with DLD were related to their emotional competence. More speech problems related to less emotion understanding, and semantic and coherence problems were related to less emotion understanding and unawareness of bodily symptoms. Additionally, more pragmatic problems were related to more problems distinguishing and communicating about emotions (Chapter 4). Speech problems also related to more sadness, and semantic, coherence, and pragmatic problems related to more sadness and fear. All communication problems (speech, syntactic, semantic, coherence and pragmatic problems) were related to higher levels of anger (Chapter 2). However, the communication problems of children with DLD were unrelated to anger dysregulation as reported by the parents, although syntactic and pragmatic problems approached significance (Chapter 6). Additionally, children with more communication problems reported more maladaptive emotion regulation strategies. Semantic problems related to more worry and semantic and pragmatic problems related to more externalizing strategies. In contrast, the communication problems were unrelated to approach and avoidant emotion regulation strategies (Chapter 4). There were also no relations between communication problems and the three aspects of empathy (Chapter 3), whereas only pragmatic problems related to the recognition of other's emotions (Chapter 6).

Communication, emotional competence, and social problems: a vicious circle

Next, the mediating role of emotional competence in the relation between communication problems of children with DLD and their social problems will be described and discussed. The severity of the communication problems of children with DLD were related to more social problems. Children with DLD who had more problems in speech, semantics, coherence, or pragmatics reported more victimization and, with the exception of speech problems, also more bullying (Chapter 2). However, when the different communication problems were examined together, only pragmatic problems were related to victimization. Additionally, the relations between communication problems and bullying were not significant when victimization was controlled, suggesting that children with DLD who have more communication problems are more often victimized or are bully-victims, who are being victimized but also show bullying behavior. Speech, semantic, and pragmatic problems were also related to more negative friendship features. When examined separately, pragmatic and semantic problems were more strongly related to negative friendship features, but when the scales were combined, none of them reached significance. The severity of the communication problems was unrelated to positive friendship features (Chapter 3). Overall, the severity of language problems of children with DLD were related to their negative peer interactions; the pragmatic problems and in some studies also the semantic problems contributed to more negative peer relations.

Next, we examined whether emotional competence mediated the relation between the severity of the communication problems and negative social peer relations (victimization and

negative friendship features). However, no mediation was found. The severity of communication problems remained significant in addition to the emotional competence of children. Specifically, pragmatic problems remained related to more victimization in addition to emotion understanding and the level of negative emotions (Chapter 2). Speech, semantic, and pragmatic problems also remained related to negative friendship features in addition to empathy (which was unrelated to the severity of the communication problems; Chapter 3). Thus, these studies suggested that children with DLD who have more communication problems and/or more problems in emotional competence are at risk for negative social interactions with their peers.

In social interaction, children have to integrate different types of information to interact well with others. For instance, in order to react adaptively to a joke, a child first has to understand the linguistic information. Second, the child has to decide whether the comment was serious or not by taking the other's perspective, while combining this information with emotional information of the face, the tone of voice, the context and past experiences with the person. Third, the child has to decide whether the joke was fun or not, regulate their emotions and think of a good response. Finally, the child has to act out the response or verbally react. This is a complex interplay of different linguistic, pragmatic, cognitive and emotional competencies which enable children to understand social interactions and react adaptively.

Of the different communication problems, pragmatics and semantics were most salient for negative peer interactions. Possibly, these language areas are necessary to understand the intentions of others in social interactions. When children experience difficulties understanding the meaning of what others are saying, or experience problems understanding the meaning behind the words such as in jokes, figurative speech, or with sarcasm, they are more likely to misunderstand the intentions of others. Similarly, if children have difficulties recognizing and understanding others' emotions, that is when they do not correctly identify what others are feeling and why, they are also more likely to misinterpreted the intentions of others in social interactions (Crick & Dodge, 1996; De Castro, Merk, Koops, Veerman, & Bosch, 2005). Problems in intention understanding often create more hostile interpretations, which in turn causes more negative reactions to others (Crick & Dodge, 1992).

On top of these difficulties understanding the language, intentions and emotions of others, children may experience difficulties understanding and regulating their own emotions, which can further negatively affect social interactions between peers (Devine & Hughes, 2013; Eisenberg et al., 2005). Because children who are unable to regulate their emotions more often get into fights with their peers (De Castro et al., 2005; Rolfh, Holl, Kirsch, Krahé, & Elsner, 2018). Similarly, pragmatic problems make it more difficult to express the wishes and emotions in an adaptive manner, for instance to provide argumentation why a child wants something, and to build a story to convince others. Therefore, the combined effect of difficulties in (social) language and emotional competence may put children at risk of social problems.

In line with the proposed model in the introduction, we found in Chapter 3 that children who experience fewer positive interactions with their peers, had more difficulties developing their emotional competence, which in turn negatively affected their social relations. Similarly, pragmatic skills develop through social interaction with others (Bishop et al., 2017; Helland & Helland, 2017; Law, Rush, Clegg, Peters, & Roulstone, 2015; Norbury et al., 2014). As such, children who have difficulties understanding their peers (both their (social) language and their emotions) and experience problems expressing themselves in adaptive manners (also both through language and through adaptive emotion regulation and expression) can get stuck in a vicious circle where they have fewer positive social interactions, gain less sophisticated pragmatic skills and emotional competencies and therefore, experience more social problems. On the basis of these findings, we adapted the proposed model of reduced social learning in children with DLD (Figure 2). The model now reflects that both emotional competence and pragmatic language skills develop through social learning and, at the same time, are a prerequisite for positive social interactions. In addition, problems in emotional competence are a risk factor for the development of internalizing and externalizing problems, which will be discussed below.

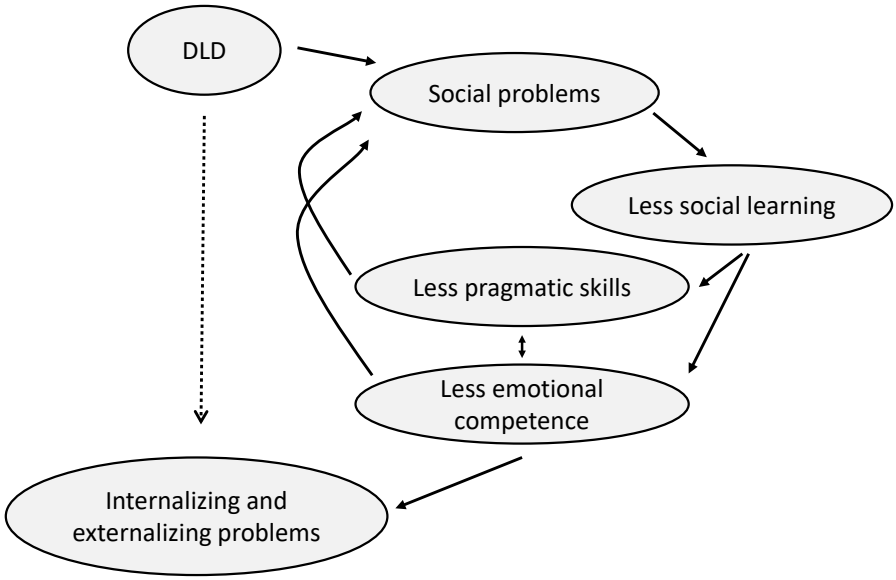


Figure 2. Reduced social learning model in children with DLD

Emotional competence as a mediator between communicative problems and internalizing and externalizing problems

Next, the mediating role of emotional competence in the relation between the severity of communication problems of children with DLD and their internalizing and externalizing

problems will be summarized and discussed. There were fewer relationships between the children's communication problems and the different internalizing and externalizing problems of children with DLD than with their social problems. Semantic problems were related to more depressive symptoms (Chapter 5), speech and pragmatic problems were related to more social anxiety, whereas the severity of the communication problems was unrelated to somatic complaints (Chapter 4). Additionally, more coherence and pragmatic problems related to more ODD symptoms and more semantic and pragmatic problems related to more reactive aggression, whereas the communication problems were unrelated to proactive aggression (Chapter 6). The relations between communication problems and internalizing or externalizing problems were inconsistent. However, when relations were present, these most often were with the children's semantic or pragmatic problems.

Emotional competence mediated the relations between children's communication problems and their internalizing and externalizing problems. Specifically, the relation between children's communication problems and social anxiety was mediated by emotion understanding and bodily unawareness of emotions (Chapter 4). The relation between semantic problems and depressive symptoms in children with DLD was mediated by maladaptive emotion regulation strategies (Chapter 5). And the relation between pragmatic communication problems and ODD symptoms was mediated by emotion recognition in both groups, and by anger dysregulation in children with DLD. However, semantic problems remained related to reactive aggression in addition to anger dysregulation (Chapter 6).

Taken together, these studies create a picture that children with more communication problems are at risk for the development of problems in emotional competence which, in turn, puts them at risk for the development of internalizing and externalizing problems (Figure 2). This mediating role of emotional competence provides further support for the theory that emotional competence is a key factor in the psychosocial development of children with DLD, which is in need of specific interventions in addition to (social) language interventions. Implications of these findings are discussed below.

Practical implications

Language is a means to an end, not an end in itself. When a child has difficulties using and developing language, support is needed for the primary problem: their language development. However, we should not forget that language is not the end in itself. We have to ask ourselves what the child is missing because of the language problems and also provide support in those developmental areas to help the child gain the necessary knowledge, skills and social relations. Because of the language problems, children may gain less (social) knowledge from their environment, experience difficulties understanding their own and other's thoughts, intentions, and emotions and experience difficulties regulating and communicating their wishes and emotions in adaptive manners. Additionally, the language problems diminish chances to learn how to understand and use language in social interactions: pragmatics. These secondary

problems in emotional and communicative competence also need special attention from an early age on in order to diminish the negative effects of the language disorder and to prevent the development of psychosocial problems. Therefore, in addition to standard language tests, difficulties in pragmatics, emotional competence and associated psychosocial problems should be part of the standard examination of children with DLD, so that we can tailor interventions to individual needs of children.

Importantly, also when the language problems of a child have decreased, these secondary problems still may need extra support. Because DLD is a developmental disorder, the severity of language problems and the degree of functional effects of these language problems may differ in different ages and contexts (Dockrell, Lindsay, Roulstone, Law, 2014). When language problems have become less salient, this does not automatically imply that the secondary problems have also decreased, because during the time that children experienced language problems, children gained less knowledge, skills and competencies, which may continue to affect their development. In this way, the problems in emotional competence may start to overshadow the language problems of children. An important implication of the current research project is that the diagnosis, and thus the right for extra support by governments, should not be primarily based on children's language abilities, especially when children are older.

The DSM-5 states that children are eligible for a diagnosis of language impairment when they have significant language problems which affect their functioning in daily life and which are not better explained by other disorders or intellectual disability (APA, 2013). However, the effects of the disorder across time on the development of a child are not taken into account. When children no longer fall within the clinical spectrum of language impairment, children can lose their right for support. In the Netherlands, a therapist can argue that a child still experiences problems because of the DLD and therefore should still receive extra support. However, there are no objective standards which indicate when a child is still eligible for support on the basis of social-emotional problems, as these problems are not seen as part of the diagnosis. When we only judge whether a child has DLD by their language problems, we act as if language is the goal in itself. If we think of language as the means to an end and consider the development of children with DLD across time, it follows that the effects of DLD on emotional competence and related psychosocial problems should be part of the diagnosis.

How can we support children with DLD and strengthen their social-emotional development? Children with DLD need better access to the social experiences in which children learn emotional competence. Conversations about emotions often involve implicit knowledge. We expect children to have understanding of the (emotion) words we are using, about causes of the emotions and about socially acceptable ways to express emotions or react to other's emotions. When children do not have the same access to this knowledge, they will have difficulty to use emotions adaptively in social interactions. Therefore, we have to help children by making the implicit knowledge explicit. For instance, my daughter (5 years old) said that

she was feeling nervous when she went to bed, an emotion I could not place at that moment. Therefore, I asked her to explain why she felt nervous and whether she actually knew what the word meant. It appeared that she was trying out the word. She had picked it up somewhere in a conversation, but did not fully understand its meaning. Because of her use of the emotion word, I was able to explain the meaning and give examples of situations where you might feel nervous. She went to bed a little wiser. This example illustrates the many ways children with DLD may miss opportunities to learn about emotions. When children have less access to conversations of other people, they have less access to this incidental learning where they pick up a new word. When they do not communicate about their emotions, they receive less feedback and knowledge about these emotions by people around them. Additionally, they receive less knowledge when they have difficulty understanding the explanations of others, or when caregivers do not elaborate on the explanation because they are scared a child will not be able to understand.

There is a growing body of intervention studies that show that we can support children without DLD to further develop their emotional competence. Interventions can improve the emotion socialization behaviors of parents and thereby improving children's emotion knowledge and decreasing their psychosocial problems (Havighurst, Wilson, Harley, Prior, & Kehoe, 2010). Additionally, when children are actively involved in conversations about people's thoughts, emotions and corresponding behavior, they show improvements in their emotion understanding and mentalizing skills (Biancoa, Leccea, & Banerjee, 2015; Ensor, Devine, Marks, & Hughes, 2014; Lecce, Bianco, Devine, Hughes, & Banerjee, 2014; Ornaghi, Brockmeier, & Grazzani, 2014). These conversations can be between a child and a caregiver (Dunn et al., 1991; Ensor et al., 2014) or between children (Brown & Dunn, 1995; Ornaghi et al., 2014). However, the content of these conversations is important. When children become aware that people can have certain thoughts and emotions, they do not automatically also interpret others' thoughts and emotions accurately (Bianco et al., 2016). Therefore, caregivers should not only label emotions, but explain causes and consequences in social interactions (Bianco et al., 2006; Clements, Rustin, & McCallum, 2000; Melot & Angeard, 2003; Yuill & Little, 2018), because the understanding of the causes and consequences of emotions provides the necessary knowledge to solve a problem, deal with a problem or to adaptively respond to the emotions of others (Eisenberg et al., 2006; Gross, 1998; 2015).

If we want to make knowledge about emotions accessible for children with DLD, it is important to label emotions, but also elaborate on thoughts, emotions and the consequences in behavior. Because children with DLD initiate less conversations (Conti-Ramsden, Hutcheson, Grove, 1995), it is more difficult to engage a child in conversations about their emotions. However, by labelling and explaining emotions of the child and of others in real life situations, children gain access to the knowledge and skills they need to understand and communicate about emotions (Brinton & Fujiki, 1999). These conversations should be in accessible language so that children with DLD are able to follow and add to the conversations. However, by making the language accessible, we should not overcompensate and only talk about simple, basic, or

concrete subjects, as has been noted in the conversations with children with DLD (Conti-Ramsden, 1990; Hammer, Tomblin, Zhang, & Weiss, 2001; Yuill & Little, 2018). In contrast, we have to discuss, elaborate, and give nuances (Brinton & Fujiki, 1999; Yuill & Little, 2018). When we let the language problems of children with DLD simplify the content of our conversations, this may withhold children to develop their emotional competence, as is illustrated in this quote of a young woman with DLD:

> *"I used to think that you can be happy, or mad, or sad. I didn´t know that you can be a little bit angry, or that you can be neutral or calm, because everyone always said: Are you angry or are you happy? You have to tell children with DLD that there are other emotions and how strong they are."* (translated from Dutch; Van den Bedem, 2018)

If we do not provide children with DLD with the same level of emotion lexicon, explanation and nuance, we cannot expect them to develop their emotional competence to the same extent as children without DLD. Therefore, parents and professionals should be aware of their own language input and make sure that they do not oversimplify their message.

Related to this issue is the complexity of the visual material we use to help children with DLD communicate about emotions. By using visual material, we can help facilitate conversations about emotional situations. However, simple visualisations of emotions such as emoticons, or pictures with stereotypical, strong emotional expressions, may lack the necessary ecological validity to help children in real life situations. In real life, emotion expressions are often subtle, quick and part of a complex social interaction (Keltner & Ekman, 2003). If we use photos with more subtle emotion expression in real life situations, or video material of social interactions, we can discuss the emotions, interpretations and behaviors of children involved in the situations in real life contexts. It may be especially effective to use video material of children themselves so that children are able to describe their own interpretations and emotions in a situation and afterwards think of the interpretations of other people involved. Moreover, videos can help to see how a child reacted, how others reacted on the child and whether this was the anticipated or desired reaction (Kern et al., 1995). This can help the child to gain insight in emotional situations, alternative interpretations of a situation and the consequences of their emotion expression.

Another important area where we can help children with DLD, is by helping them gain positive social relations through which they can improve their emotional competence, as well as pragmatic and social skills. Especially through interactions with peers, children have to learn to adept their language, emotion expressions and behavior to others, and experience what does and does not work, so they can use this knowledge in future interactions (Schaffer, 2005). Positive social interactions may be found through school, through social activities, in contact with siblings (Knott, Lewis, & Williams, 2007), or with children who also experience communication problems. Contact with peers with similar problems may be especially helpful

for children to gain confidence in social interactions and learn new communicative, emotional, and social skills which they can use in other social contexts (Isarin, 2013; Myers, Davies-Jones, Chiat, Joffe, & Botting, 2011).

As with all children, children with DLD need support from adults in order to gain the necessary competencies to be able to develop positive interactions with their peers (Schaffer, 2005). In young children, parents often are present while children play and help children express their own wishes, understand each other, take each other's perspective into consideration and solve conflicts. In older children, we increasingly expect children to do this independently. However, when children are less emotionally competent, they still may need help to develop these important skills. It seems crucial for parents and professionals working with children with DLD to be aware of problems in emotional competence and help children where necessary to develop insight in themselves and others and adaptive emotional reactions. Group based interventions may provide important opportunities to improve the communicative and emotional competence of children with DLD. In semi structured social interactions, such as playing a game together, professionals can facilitate the interactions between children. Video interaction guidance has been found effective to help professionals facilitate interactions between children (Jilink, Fukkink, & Huijbregts, 2018), so that children are able to practise and develop these important life skills in real life situations.

Limitations and future studies

The current project mainly used self-report measures. The positive effect of self-report measures is that it provides insight in the subjective experiences of children and enabled us to examine what is going on insight a child's head. Other people may to a lesser extent pick up on these internal processes or internalizing problems than children themselves (Lambie & Marcel, 2002). However, children may also over- or underestimate their own abilities or behaviors. Previous studies who did use a child and parent-report to examine the same variable, found that children and adolescents with DLD reported similar levels as their parents (Brownlie et al., 2004; St. Clair et al., 2011). This strengthens our idea that children with DLD are able to use self-report measures reliably, just as children without DLD. Even so, in future studies it would be good to use multiple measures of the same construct to be able to compare the perspective of different people and to provide information about the context that children with DLD do or do not experience certain difficulties such as in school compared to at home (Lindsay, Dockrell, & Strand, 2007).

Additionally, to further improve the measures on emotional competence, it would be good to examine children's understanding, regulating and expression of emotions in specific situations. When we are not specific about the type of situations in the questionnaires, we do not know whether children think of situations with clear or diffuse causes of emotions, strong or subtle emotions, and whether situations are changeable or not. Differentiating these

emotional situations will provide further insight into the extent to which children are able to use their emotions adaptively in diverse situations.

In order to measure the severity of the general communication and pragmatic problems, we used the Child's communication Checklist (CCC-2). Recently, the importance has been stressed of differentiating between linguistically related versus socially related pragmatic problems, which is not possible with the CCC-2 (Andrés-Roqueta & Katsos, 2017). Linguistic-pragmatic problems are strongly related to children's structural language problems. When children for instance provide too little information for others to understand a story, this may be related to their productive language problems: they have too little words available and experience problems combining words to formulate a message. However, children may also provide too little information, because they misjudge what others already know. In this case, it would reflect more social-pragmatic problems, which is related to the ability of children to take the perspective of someone else (Theory of Mind [ToM]; Andrés-Roqueta & Katsos, 2017; Wimmer & Perner, 1983).

It is likely that social-pragmatic skills are more difficult to learn for children with DLD as the development of ToM is dependent on social learning (Hughes & Leekam, 2014; Rieffe et al., 2016; Schaffer, 2005). Moreover, similar cognitive processes are at play in the development of social-pragmatic problems and emotional competence. For instance, in order to be able to understand others feelings, children have to understand that their own and others feelings may differ and take the perspective of the other child. Future studies should differentiate the linguistic- and social-pragmatic problems to gain better understanding of the pragmatic problems of children with DLD, the development of both pragmatic areas and their relative contribution to social problems in children with DLD in addition to children's emotional competence.

The CCC-2 is especially appropriate in clinical groups, whereas only the pragmatic and general communication problems score are reliable in children without DLD (Geurts et al., 2008). In children without DLD, the severity of the communication problems was often unrelated to their psychosocial problems. However, previous studies in children without DLD did find relations between the severity of communication problems and psychosocial problems, although mostly in younger age groups (Salmon, O'Kearney, Reese, & Fortune, 2016). Possibly, the CCC-2 was not sensitive enough to measure the communication problems in children without DLD. Alternatively, it could also be that in the age range of our study the relations between communication problems and psychosocial problems have become less strong. A recent review found decreasing strengths in the relation between language problems and social problems in children without DLD (Van der Wilt, Van der Veen, Van Kruistum, & Van Oers, 2019). It would be interesting to examine in future studies whether a similar process is at work in children without DLD as in children with DLD, in which pragmatic problems and problems in emotional competence start to overshadow initial language problems in relation to psychosocial problems. In children where language problems are unrecognised, it is especially

likely that language problems may cause problems in emotional competence. These problems in emotional competence and their effects on these children's behaviors may become the focus of interventions, whereas underlying problems in language remain unnoticed (Cohen et al., 1998; Hollo, Wehby, Oliver, 2014).

In the current project, we examined a large number of areas of the social-emotional development of children with and without DLD. We focussed on emotional competence as an explanatory factor, because of the importance of language in the development of emotional competence. Another area which is highly dependent on the language development of children is executive functioning (EF). EF refers to the cognitive control one can assert to thoughts, emotions, and behaviors. Examples of EF are impulse inhibition, switching between tasks, and working memory, where people can think about their experiences and plan their actions, while using knowledge from past experiences. The development of EF is closely related to children's language development (Botting et al., 2017) and children with DLD often experience problems with EF (Vissers, Koolen, Hermans, Scheper, & Knoors, 2015). EF also plays an important role in emotional competence and in turn the development of psychosocial problems (McClelland, Cameron, Wanless, & Murray, 2007). It would be interesting to further examine the emotional competence problems of children with DLD and examine whether problems in EF, or lack of social and emotional knowledge, are at the basis of problems in emotional competence. For instance, in order to adaptively react in an emotional situation, children have to inhibit their first impulses, think about possible actions to help them reach their goal, while using knowledge of past experiences in their working memory (Crick & Dodge, 1996; Gross, 2015). It could be that children experience problems regulating emotions because they are less able to withhold their first impulses, or that they have difficulty ordering their thoughts and planning their actions in their working memory. Alternatively, it could be that children lack knowledge of the consequences of their emotional displays or have incorrect expectations of the consequences of their behaviors, because of a lack of insight in other's emotions.

In conclusion

The language problems of children with DLD impede their opportunities to interact with and learn from their social environment, which often results in lower or impaired emotional competence. Problems in emotional competence have a marked effect on the development of psychosocial problems of children with DLD, which even overshadows the severity of their communication difficulties. However, when children have more emotional competence or develop their emotional competence as they become older, these psychosocial problems are likely to decrease. Positive social interactions with peers enable children with and without DLD to improve their emotional competence. Therefore, parents and professionals should be aware of the difficulties in emotional competence children with DLD and recognize how these problems may affect their behavior. It is important to acknowledge that children with (a history of) DLD who have missed opportunities to learn early in life, may continue to experience

problems later on, or again experience problems when the communicative and social demands of the environment change. Parents and professionals should help children with DLD to gain insight in their own and other's emotions and adaptive emotion communication by providing explanations, elaborations and nuances in the context of emotional experiences. Finally, children with DLD need help to find and keep likeminded friends with whom they are able to further improve these important life skills.

Do you have tips for other children with DLD?

“Just be yourself and keep at it. Then you have more confidence and often succeed. Then you have the feeling, the feeling I can do something."

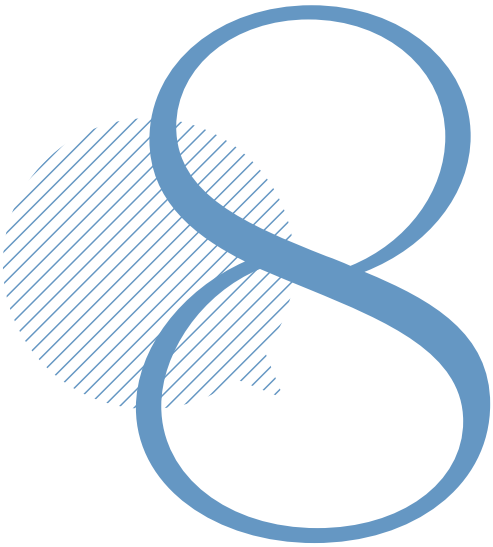
“First try to tell the friends you know well about DLD and then maybe later to others. Just take it easy.”

“Dare to overcome the shyness and then really try. First a bit easy and then more difficult."

How can we help children with DLD?

"The teacher sometimes has to show something, not always just talk about it."

“Ask questions about how they feel in certain situations. To someone who finds it difficult to talk."



Nederlandse samenvatting.

TOS, emoties en psychosociale problemen

Mensen gebruiken taal om te communiceren, te denken en te leren. Als de taalontwikkeling niet goed verloopt, belemmert dit verschillende ontwikkelingen van een kind. Ongeveer zeven procent van de kinderen heeft een Taalontwikkelingsstoornis (TOS). Deze kinderen hebben grote moeite met de ontwikkeling en het gebruik van hun eerste taal, zonder dat er een duidelijke oorzaak is voor deze taalproblemen (Norbury et al., 2016; Tomblin et al., 1997). De taalproblemen worden bijvoorbeeld niet verklaard door een intellectuele beperking, gehoorproblemen, of een autisme spectrum stoornis (APA, 2013; Bishop et al., 2017).

De taalproblemen die kinderen met TOS hebben zijn divers. Kinderen met TOS kunnen zowel moeite hebben met het begrijpen als het produceren van taal. Daarbinnen kunnen zij problemen hebben met de inhoud van taal (het lexicon en de semantiek) en de vorm van taal (fonologie, morfologie en grammatica). Kinderen ontwikkelen hun taal wel, maar door de TOS gaat dit veel moeizamer waardoor zij moeite hebben mee te komen in het gezin, op school en later in werk. Naast problemen in de inhoud en de vorm van taal ontwikkelen kinderen met TOS ook vaak problemen met het gebruik van taal in sociale interactie, de pragmatiek. Kinderen met TOS hebben bijvoorbeeld moeite om een verhaal op te bouwen, grapjes te begrijpen of hun taalgebruik aan te passen aan hun gesprekpartner (Bishop et al., 2017).

Als kinderen taalproblemen hebben, is dit ook van invloed op hun sociaal-emotionele ontwikkeling. Kinderen met TOS hebben een verhoogd risico op de ontwikkeling van psychosociale problemen. Zo hebben zij vaker sociale problemen, zoals buitensluiting en eenzaamheid (Andrés-Roqueta et al., 2016; Botting & Conti-Ramsden, 2008). Ook hebben zij meer internaliserende problemen, zoals depressieve klachten, en meer externaliserende problemen, zoals hyperactiviteit en woede-uitbarstingen. Er worden echter veel verschillen gevonden binnen de groep van kinderen met TOS, zowel in de ernst van de problemen als in de ontwikkeling over tijd (Conti-Ramsden et al., 2018; Lindsay & Dockrell, 2012; St Clair et al., 2011). Het is belangrijk beter inzicht te krijgen in factoren die hieraan bijdragen, zodat we hier op in kunnen zetten in interventies.

Het meeste onderzoek tot nu toe heeft gekeken of de taalproblemen van kinderen met TOS de psychosociale problemen kon verklaren. Dit lijkt echter niet het geval. Er worden namelijk geen of slechts zwakke relaties gevonden tussen de ernst van de taalproblemen en de ernst van de psychosociale problemen (Andrés-Roqueta et al., 2016; Beitchman et al., 1996; Botting et al., 2016; Charman et al., 2015; Conti-Ramsden et al., 2013; Hart et al., 2004; Lindsay & Dockrell, 2012; Maggio et al., 2014; Van Daal et al., 2007). Alleen pragmatiekproblemen laten vaker een samenhang zien met meer psychosociale problemen bij kinderen met TOS (Charman et al., 2015; Law et al. 2015; St. Clair et al., 2011; Sullivan et al., 2016). De taalproblemen alleen kunnen dus niet goed verklaren welke kinderen met TOS het risico lopen op psychosociale problemen. We moeten daarom andere ontwikkelingsgebieden onderzoeken, die afhankelijk zijn van de taalontwikkeling en op hun beurt van invloed zijn op de psychosociale ontwikkeling van kinderen, zoals de emotionele competentie van kinderen.

Emotionele competentie en de invloed op de psychosociale ontwikkeling

Mensen krijgen emoties als er iets gebeurt wat belangrijk is voor hen in een situatie. Door de emotie word je alert. Je richt je aandacht op de oorzaak van de emotie en het lichaam wordt geactiveerd, waardoor je kunt reageren op de situatie. Emoties zijn daarom functioneel; ze zorgen dat een persoon zijn belang veilig kan stellen of een doel na kan streven in een situatie. Emoties hebben daarbij ook een belangrijke communicatieve functie. Ze attenderen de persoon zelf én anderen erop dat er iets van belang is (Frijda, 1986; Scherer, 2000). Als je ziet dat iemand anders emotioneel wordt, geeft dit belangrijke informatie waar je rekening mee kunt houden in je gedrag. Als je ziet dat een vriend gekwetst is door een grapje, kun je bijvoorbeeld sorry zeggen of een grapje over jezelf maken om de situatie te redden.

Emoties zijn dus functioneel, maar niet elke uiting van een emotie is adaptief. Kinderen moeten leren hun emoties te reguleren en op constructieve wijze te gebruiken in sociale interacties. Dat impliceert dat zij hun eerste impulsieve reactie kunnen inhouden, eigen en andermans emoties herkennen en begrijpen waardoor de emoties worden veroorzaakt, de emoties kunnen reguleren en op gepaste wijze op eigen en andermans emoties kunnen reageren (Gross, 1998; 2015). Kinderen worden emotioneel competent in interactie met hun omgeving; het is een emotiesocialisatie proces. Door ervaringen met hun sociale omgeving krijgen kinderen inzicht in de oorzaken en gevolgen van emoties van zichzelf en anderen, leren zij over emoties te praten en de emoties op zo'n manier te uiten dat zij hun doelen kunnen behalen in sociale interacties. In dit leerproces is communicatie met anderen heel belangrijk (Dunn et al., 1991; Eisenberg et al., 2005; Saarni, 1999; Schaffer, 2005).

Door communicatieproblemen verloopt de sociale interactie bij kinderen met TOS vaak moeizamer en hebben zij minder toegang tot uitleg over emoties, intenties en gedrag (Brinton & Fujiki, 2011; Yuill & Little, 2018). Hierdoor hebben zij minder kansen om in interactie met hun omgeving emotioneel competent te worden. Uit onderzoek bij kinderen zonder TOS blijkt dat problemen in emotionele competentie een belangrijke risicofactor zijn voor het ontstaan van verschillende psychosociale problemen (Gross & Jazaiere, 2014; Fernandez & Johnson, 2016; Rieffe et al., 2008). Het is aannemelijk dat dit bij kinderen met TOS ook het geval is. Enkele studies bij kinderen met TOS vonden inderdaad dat problemen in emotieherkenning of prosociaal gedrag samenhingen met meer psychosociale problemen (Bakopoulou & Dockrell, 2016; Botting & Conti-Ramsden, 2008; Mok, Pickels, Durkin, & Conti-Ramsden, 2014).

De problemen in emotionele competentie dragen niet alleen bij aan meer psychosociale problemen, maar hebben ook een negatieve invloed op nieuwe sociale interacties. Kinderen die vaak erg boos worden, worden bijvoorbeeld sneller buitengesloten door klasgenoten. Hierdoor hebben zij minder mogelijkheden om hun emotionele competentie verder te ontwikkelen in contact met anderen (Banerjee et al., 2011; Von Salisch, & Zeman, 2017). Hierdoor kunnen kinderen in een negatieve spiraal terecht komen, waarbij problemen in emotionele competentie de taalproblemen kunnen gaan overschaduwen.

Het EmoTOS project

In dit proefschrift worden de resultaten van het EmoTOS onderzoek beschreven. Dit onderzoek is uitgevoerd om beter zicht te krijgen op de mate en de ontwikkeling van verschillende psychosociale problemen van kinderen met TOS en inzicht te krijgen in de invloed van emotionele competentie op de ontwikkeling van deze problemen.

De ontwikkeling van 114 kinderen met TOS tussen de 9 en 16 jaar is gevolgd gedurende anderhalf jaar. De kinderen met TOS zaten zowel op speciaal als op regulier onderwijs. De ontwikkeling van deze kinderen is vergeleken met een groep van 214 kinderen zonder TOS. Kinderen en hun ouders hebben op drie momenten een groot aantal vragenlijsten ingevuld over verschillende internaliserende, externaliserende en sociale problemen, de emotionele competentie en de ernst van de communicatieproblemen van de kinderen. Door deze longitudinale data bij kinderen met en zonder TOS konden we:

- De mate en ontwikkeling van verschillende psychosociale problemen bij kinderen met en zonder TOS vergelijken.
- De mate en ontwikkeling van emotionele competentie bij kinderen met en zonder TOS vergelijken.
- De samenhang tussen psychosociale problemen en (groei in) emotionele competentie onderzoeken en vergelijken of deze overeenkomt bij kinderen met en zonder TOS. Als groei in emotionele competentie samenhangt met een afname van psychosociale problemen naarmate kinderen ouder worden, is dit een belangrijke ingang voor interventies.
- Onderzoeken of de emotionele competentie de relatie tussen de ernst van de communicatieproblemen en de ernst van de psychosociale problemen medieerde (indirecte relatie).

De mate en ontwikkeling van psychosociale problemen bij kinderen met TOS

Net als in eerder onderzoek vonden we een verhoogde kans op psychosociale problemen bij kinderen met TOS in vergelijking met kinderen zonder TOS. Kinderen met TOS rapporteerden vaker dat zij gepest werden, maar er werden geen verschillen gevonden in de mate waarin kinderen met TOS zelf pesten (Hoofdstuk 2). De kwaliteit van vriendschappen van kinderen met TOS was lager in vergelijking met kinderen zonder TOS. Kinderen met TOS rapporteerden minder positieve en meer negatieve kenmerken in hun vriendschappen (Hoofdstuk 3). Kinderen met TOS rapporteerden ook meer internaliserende problemen (depressieve gevoelens, sociale angst en psychosomatische klachten; Hoofdstuk 4 en 5) dan kinderen zonder TOS. In Hoofdstuk 6 vonden we meer gedragsproblemen zoals gerapporteerd door de ouders van kinderen met TOS, maar de mate van reactieve en proactieve agressie verschilden niet. De ernst van de verschillende psychosociale problemen namen af naarmate kinderen met TOS ouder werden, al waren hier wel veel individuele verschillen. Deze variatie hebben wij geprobeerd te verklaren.

De mate en ontwikkeling van emotionele competentie bij kinderen met en zonder TOS

Zoals verwacht, vonden we meer problemen in emotionele competentie bij kinderen met TOS dan bij kinderen zonder TOS, maar alleen in de complexere elementen. Kinderen met en zonder TOS rapporteerden vergelijkbaar begrip van hun eigen basis emoties: ze begrepen goed waar hun boosheid, angst of verdriet door veroorzaakt werden en konden deze emoties goed onderscheiden van elkaar. Kinderen met TOS rapporteerden minder aandacht voor fysieke gevolgen van emoties in hun lichaam, wat volgens veel onderzoek juist adaptief is, mogelijk omdat kinderen dan meer aandacht hebben voor de oorzaak van hun emotie in de situatie (Hoofdstuk 2 en 4). Echter, kinderen met TOS rapporteerden een hogere mate van negatieve emoties (boosheid, verdriet en angst; Hoofdstuk 2), maar wel vergelijkbare emotieregulatie strategieën (Hoofdstuk 5). Ouders gaven geen verschil aan in problemen met het reguleren van boosheid, maar wel dat kinderen met TOS moeite hadden hun eigen emoties te onderscheiden en hierover te communiceren (Hoofdstuk 6). Mogelijk is het onderscheiden van meer complexe en subtiele emoties moeilijker voor kinderen met TOS, terwijl inzicht in de basisemoties wel goed is ontwikkeld op deze leeftijd.

Op het gebied van andermans emoties waren er meer problemen. Kinderen met TOS hadden meer moeite de emoties van andere te herkennen (Hoofdstuk 6). Zij konden de emoties van anderen wel invoelen (affectieve empathie), maar hadden moeite te begrijpen waar emoties bij anderen door veroorzaakt worden (cognitieve empathie) en rapporteerden een lagere motivatie om op de emoties van anderen te reageren (Hoofdstuk 3). Beide gebieden ontwikkelden zich echter wel nog door naarmate kinderen ouder werden, net als bij kinderen zonder TOS. De mate van empathie was niet gerelateerd aan de mate van de communicatieproblemen van kinderen met TOS, maar vriendschapskwaliteit droeg wel bij aan de ontwikkeling van empathie. Kinderen met meer positieve kenmerken in hun vriendschapen, zoals vertrouwen in elkaar en het delen van geheimen, ontwikkelden hun empathische vermogens naarmate zij ouder werden. Omgekeerd droeg empathie ook bij aan meer positieve kenmerken in vriendschappen. Deze relaties golden zowel voor kinderen met als voor kinderen zonder TOS. Kinderen met TOS hebben dus weliswaar een achterstand in hun empathische vermogens, maar kunnen deze vermogens verder ontwikkelen in positieve sociale relaties, net als kinderen zonder TOS.

De invloed van emotionele competentie op de psychosociale problemen

Verschillen in de mate van emotionele competentie hingen samen met de ernst van de psychosociale problemen van kinderen met en zonder TOS. Kinderen met meer emotiebegrip van hun eigen emoties rapporteerden minder vaak dat zij gepest werden en dat zij zelf andere pesten (Hoofdstuk 2) en ervaarden minder sociale angst en psychosomatische klachten (Hoofdstuk 4). Ook minder emotieregulatie problemen waren gerelateerd aan minder pesten, minder gepest worden (Hoofdstuk 2) en minder reactieve agressie (Hoofdstuk 6). Meer adaptieve emotieregulatie strategieën waren gerelateerd aan minder depressieve klachten

(Hoofdstuk 5). Minder problemen met het onderscheiden en communiceren over emoties waren gerelateerd aan minder psychosomatische klachten (Hoofdstuk 4), minder gedragsproblemen, minder proactieve agressie en, alleen in kinderen met TOS, ook aan minder reactieve agressie (Hoofdstuk 6). Empathie was gerelateerd aan minder negatieve en meer positieve vriendschapskenmerken (Hoofdstuk 3) en meer emotieherkenning was gerelateerd aan minder gedragsproblemen en reactieve agressie (Hoofdstuk 6).

Bij de meeste studies vonden we niet alleen een samenhang tussen de mate van emotionele competentie en de psychosociale problemen, maar ook dat groei in emotionele competentie samenhing met een afname van psychosociale problemen bij kinderen naarmate zij ouder werden. Ook vonden we aanwijzingen dat de relaties tussen emotionele competentie en psychosociale problemen bij kinderen met TOS van grotere invloed was dan bij kinderen zonder TOS. Dit laat zien dat het bevorderen van emotionele competentie een belangrijk onderdeel moet zijn van interventies om psychosociale problemen te beperken en voorkomen bij alle kinderen, maar zeker bij kinderen met TOS.

Emotionele competentie als mediator tussen de communicatie- en psychosociale problemen

Tot slot hebben we in elke studie gekeken naar de inter-relaties tussen de ernst van communicatieproblemen van kinderen met TOS, de emotionele competentie en de psychosociale problemen. We verwachtten geen sterke samenhang tussen de ernst van de communicatieproblemen en de psychosociale problemen, behalve op het gebied van pragmatiekproblemen. Daarnaast verwachtten we dat emotionele competentie de relaties tussen de communicatie- en psychosociale problemen zou mediëren. Dat betekent dat kinderen met meer communicatieproblemen, maar problemen in emotionele competentie zouden hebben, wat vervolgens de mate van de psychosociale problemen zou verklaren. Onze verwachtingen werden deels bevestigd.

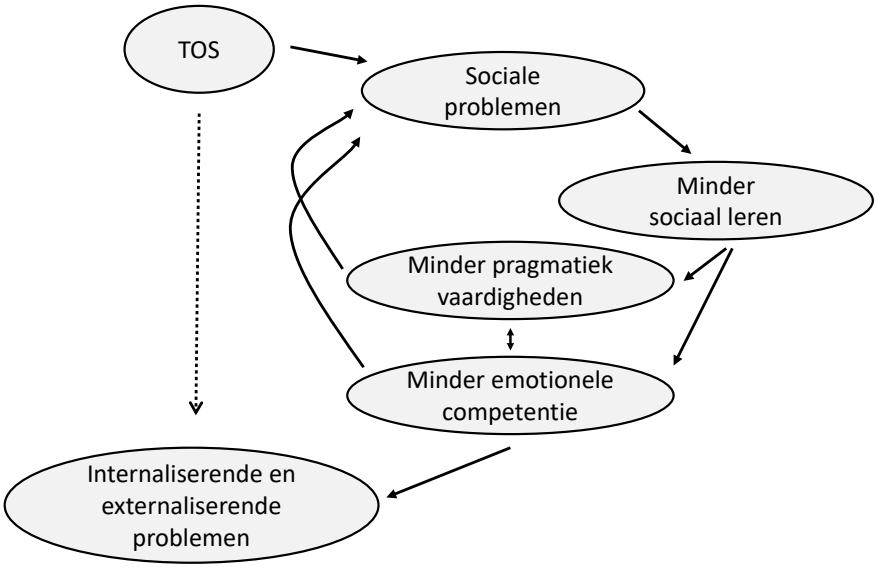
De ernst van de communicatieproblemen van kinderen met TOS hingen vaak, maar niet altijd, samen met de emotionele competentie. Problemen in vorm en inhoud van de taal waren gerelateerd aan minder emotiebegrip van de eigen emoties, terwijl alleen pragmatiekproblemen samenhingen met het onderscheiden en communiceren over emoties zoals gerapporteerd door de ouders (Hoofdstuk 4). Alle communicatieproblemen waren gerelateerd aan een hogere mate van negatieve emoties (Hoofdstuk 2), maar niet met de adaptieve emotieregulatie strategieën. Wel hingen meer semantische en pragmatische problemen samen met meer maladaptieve emotieregulatie strategieën (zorgen maken en externaliseren; Hoofdstuk 5). Daarnaast was er een relatie tussen meer pragmatiekproblemen en minder emotieherkenning bij anderen (Hoofdstuk 6), maar waren er geen relaties met empathie (Hoofdstuk 3).

De sociale problemen van kinderen met TOS hingen ook samen met een hogere mate van communicatieproblemen. Zowel gepest worden als negatieve vriendschapskenmerken (maar niet positieve vriendschapskenmerken) waren hoger bij kinderen met meer communicatieproblemen, waarbij met name pragmatiekproblemen en soms ook

semantiekproblemen van belang bleken. Deze relaties bleven aanwezig, ook naast de invloed van emotionele competentie. Dat duidt erop dat emotionele competentie geen mediator is tussen de communicatieproblemen en sociale problemen van kinderen met TOS. Zowel de communicatieve als emotionele competenties van kinderen met TOS waren gerelateerd aan minder negatieve sociale interacties.

Kinderen moeten in sociale interacties verschillende soorten informatie verwerken en combineren om te begrijpen wat er in een situatie gebeurt en om een goede reactie te bepalen. Hierbij moeten zij talige informatie verwerken, bedenken wat iemand bedoelt, de emotionele informatie van anderen en zichzelf lezen, zich inleven in de ander en bedenken hoe zij hun doel kunnen bereiken in de sitatie. Dit is een complex samenspel van communicatieve, cognitieve en emotionele vaardigheden. Zowel pragmatiekvaardigheden als emotionele competentie ontwikkelen zich in sociale interactie met anderen (Figuur 1). Zoals we in Hoofdstuk 3 vonden, beperkt een gebrek aan positieve sociale interacties de ontwikkeling van emotionele competentie, wat op zijn beurt weer een negatieve invloed heeft op sociale interacties. Het is waarschijnlijk dat bij de ontwikkeling van pragmatiekvaardigheden eenzelfde proces speelt: Kinderen met taalproblemen krijgen minder oefening in sociale interacties om hun boodschap te construeren en de communicatieve intenties van anderen te begrijpen, wat een negatief effect heeft op hun pragmatiek vaardigheden (Bishop et al., 2017; Law et al., 2015; Norbury et al., 2014). Door pragmatiekproblemen slaan kinderen vaker de plank mis in sociale interacties. Hierdoor hebben zij vervolgens weer minder positieve interacties met anderen, waar zij hun vaardigheden juist zouden kunnen verbeteren (Figuur 1).

De mediërende rol van emotionele competentie werd wel bevestigd voor de relatie tussen communicatieproblemen en de internaliserende en externaliserende gedragsproblemen van kinderen met TOS. Er waren slechts enkele relaties tussen de mate van communicatieproblemen en de internaliserende en externaliserende problemen. Semantiekproblemen waren gerelateerd aan meer depressieve symptomen (Hoofdstuk 5), spraak- en pragmatiekproblemen waren gerelateerd aan meer sociale angst klachten (Hoofdstuk 4), en semantiek-, coherentie en pragmatiekproblemen hingen samen met meer externaliserende problemen (Hoofdstuk 6). Deze relaties werden gemedieerd door emotionele competentie. Semantiekproblemen hingen bijvoorbeeld samen met meer maladaptieve emotieregulatie strategieën, wat vervolgens samenhing met meer depressieve klachten (Hoofdstuk 5). En meer pragmatiekproblemen hingen samen met meer problemen in emotieherkenning, wat op zijn beurt samenhing met meer externaliserende problemen (Hoofdstuk 6). Kinderen met TOS hebben dus meer kans op problemen in emotionele competentie wat hen een verhoogde kans geeft op internaliserende en externaliserende problemen (Figuur 1).



Figuur 1. Minder sociaal leren in kinderen met TOS

Conclusie en praktische implicaties

Taal is een middel, niet een doel op zich. In de begeleiding en behandeling van kinderen met TOS is het belangrijk niet alleen de taalproblemen aan te pakken, maar ook voor ogen te houden wat kinderen missen in hun ontwikkeling dóór de taalproblemen. Kinderen moeten daarom niet alleen gestimuleerd worden in hun talige en communicatieve vaardigheden, maar hebben al van jongs af aan hulp nodig bij het aangaan van sociale relaties en het leren door middel van sociale relaties. Ouders en professionals moeten hierbij proberen te compenseren wat kinderen met TOS missen in sociale interacties. Dit kan bijvoorbeeld door informatie over emoties, intenties en de gevolgen op gedrag expliciet te maken, zodat kinderen inzicht kunnen krijgen in de oorzaken en gevolgen van emoties. Deze informatie moet in toegankelijk taal gegeven worden, maar wel rijk en genuanceerd genoeg zijn om kinderen te ondersteunen in hun ontwikkeling (voor meer handelingsadviezen zie de brochure: *De sociaal-emotionele ontwikkeling van kinderen met TOS; problemen, oorzaken en oplossingen op:* www.kindenemotie.nl/TOS). Bij oudere kinderen met TOS is het van belang na te gaan of zij voldoende inzicht hebben in hun eigen en andermans emoties, intenties en gedrag. Als kinderen veel hebben gemist, hebben zij hier nog meer uitleg en oefening bij nodig om zich verder te kunnen ontwikkelen.

Daarnaast is het van belang te erkennen dat de talige problemen van kinderen met TOS een brede invloed hebben; op de pragmatiek, emotionele competentie en psychosociale ontwikkeling. Problemen in deze ontwikkelingsgebieden kunnen elkaar versterken, ook los van de taalproblemen. Dit betekent dat het mogelijk is dat kinderen met TOS groeien in hun taalvermogens maar dat ze wel nog de gevolgen van deze taalproblemen ondervinden in sociale relaties, emotionele competentie, pragmatiek en gedrag. Het is daarom van belang bij indicatiestellingen niet alleen naar het taalniveau te kijken, maar de bredere gevolgen van de TOS mee te wegen, zodat kinderen die zich hebben ontwikkeld in hun taalvermogen niet tussen wal en schip vallen en de juiste begeleiding blijven ontvangen.

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About the Author

Neeltje van den Bedem was born in 1983 on April 1th in Huizen, the Netherlands. After graduating from secondary school in 2001 (Sint Antoniuscollege, Gouda), she studied pedagogical sciences at Utrecht University and general linguistics with a specialisation in Dutch Sign Language at the University of Amsterdam. In 2008 she obtained a master degree at Utrecht University in Pedagogical Sciences (Cum Laude).

After her studies, Neeltje worked with children who are deaf or hard of hearing and children with DLD as a family counsellor and in communication treatment groups at Kentalis and Pento. In 2012 she returned to science, where she worked as a teacher in developmental psychology and as a junior researcher in the Focus on Emotion lab of Prof. dr. Carolien Rieffe at Leiden University. She wrote a research proposal for a PhD project in collaboration with Kentalis, which was granted by the Nuts Ohra Fund. In 2014, Neeltje started her PhD project under the supervision of Prof. dr. Carolien Rieffe (Leiden University), Prof. dr. Julie Dockrell (University College London), and dr. Petra van Alphen (Koninklijke Kentalis). The PhD project focused on risk and protective factors for the psychosocial development of children with and without DLD between the age of 9 and 16.

Since 2018, Neeltje works as a postdoctoral researcher and valorisation coordinator on a research project on bullying of NeurolabNL with Prof. dr. Berna Güroglu. Neeltje examines the content of school-wide anti-bullying programs, facilitates collaboration between science and practise and makes scientific knowledge available for the wider public. Additionally, Neeltje started as a postdoctoral researcher at Pedagogical Sciences at Leiden university on the Preventive Intervention Team (PIT) project of Prof. dr. Hanna Swaab and dr. ir. Leo de Sonneville, where she examines the effectiveness of the PIT-intervention for children with externalizing problems.

List of Publications

Van den Bedem, N. P., Dockrell, J. E., Van Alphen, & Rieffe, C. (*in revision*). Emotional competence mediates the relation between communication problems and reactive externalizing problems in children with and without Developmental Language Disorder: a longitudinal study.

Samson, A. C., Van den Bedem, N. P., Dukes, D. & Rieffe, C. (2020). Positive aspects of emotional competence in preventing internalizing symptoms in children with and without developmental language disorder: A longitudinal approach. *Journal of Autism and Developmental Disorders*. doi: 10.1007/s10803-019-04336-y

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Rieffe, C., Pieper, I., Van den Bedem, N. P., Wolthuis, K., De Vries, M. & Uilenberg, N. (2014). 'Kijk mij nou' Participatieve video met dove en slechthorende kinderen om sociaal bewustzijn te bevorderen. *Van Horen Zeggen, 55*, 10-18.

“I used to think that you can be happy, or mad, or sad. I didn't know that you can be a little bit angry, or that you can be neutral or calm, because everyone always said: Are you angry or are you happy? You have to tell children with DLD that there are other emotions and how strong they are.”