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Pragmatic Language Use and Parent–Child Interaction Among Children at Risk for Developmental Language Disorder and Typically Developing Peers

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ABSTRACT

Background: Pragmatic language skills, which enable children to use language effectively for social communication, develop rapidly during early childhood and are closely intertwined with parent–child interaction patterns. Children at risk for developmental language disorder (rDLD) often exhibit early difficulties not only in structural language abilities but also in pragmatic language use and social interaction, which may adversely affect their social–emotional development. Although parent–child interaction is recognized as a critical environmental factor shaping early language and communication outcomes, studies simultaneously examining pragmatic language use and parent–child interaction in young children at risk for DLD, particularly within the Turkish context, remain limited.

Aims: The aim of this study was to compare pragmatic language use and parent–child interaction behaviours in Turkish children with rDLD and typically developing children, and to examine the relationships among these variables.

Methods: This cross-sectional comparative study included a total of 54 children aged 24–48 months (27 rDLD, 27 typically developing) and their parents. Pragmatic language use was assessed using the parent-report Language Use Inventory–Turkish (LUI-Turkish). Parent–child interaction behaviours were observed during structured free-play sessions using the Maternal Behaviour Rating Scale (MBRS) and the Child Behaviour Rating Scale (CBRS). Independent samples *t*-tests were used for between-group comparisons, and Pearson correlation analyses were conducted to examine associations among variables.

Results: The LUI-Turkish results indicated that the rDLD group demonstrated significantly lower performance than the typically developing group in early verbal communication and word use, long sentence production and complex pragmatic language use, as well as in the total score ($p < 0.001$). Parental responsiveness and emotional expressiveness were higher in the typically developing group ($p < 0.01$), whereas directive parental behaviours were significantly more frequent in the rDLD group ($p = 0.011–0.033$). Typically developing children showed higher performance on attention, initiation, and total scores on the CBRS ($p < 0.001$). Correlation analyses revealed significant positive associations among TEDIL verbal language, LUI-Turkish total, and CBRS total scores, and showed that parental responsiveness and emotional expressiveness were associated with these variables ($p < 0.05$).

Note: This study was completed within the scope of the first author's Master's Thesis at the Cappadocia University.

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Conclusions: The findings indicate that pragmatic language difficulties in children at risk for DLD are closely associated with parental interaction styles and child interaction behaviours. Early assessment and intervention processes should address pragmatic language, parental behaviours, and child interaction skills within a holistic framework.

WHAT THIS PAPER ADDS

What is already known on this subject

- Children with developmental language disorder (DLD) or at risk for developmental language disorder (rDLD) frequently experience difficulties in pragmatic language use and social interaction from early childhood. Parent–child interaction, particularly parental responsiveness and directiveness, is known to influence early language development; however, pragmatic language and interactional behaviours have often been examined separately. Evidence integrating these domains in young children at risk for DLD, especially in the Turkish context, remains limited.

What this paper adds to existing knowledge

- This study demonstrates that Turkish children with rDLD show marked difficulties in pragmatic language use alongside distinct parent–child interaction patterns characterized by lower parental responsiveness and higher directiveness. It further reveals strong associations among pragmatic language abilities, child interaction behaviours, and parental interaction styles, highlighting their interrelated nature during the 24–48-month period. These findings support a multidimensional view of rDLD that extends beyond structural language impairment.

What are the potential or actual clinical implications of this work?

- The findings underscore the importance of incorporating pragmatic language assessment and direct observation of parent–child interaction into early identification processes for rDLD. Early intervention programs may benefit from adopting family-centred, interaction-based approaches that target both children's pragmatic communication skills and parental interaction strategies.

1 | Introduction

Children's cognitive development, social abilities, and emotional development depend heavily on their language skills, which develop during early childhood (Finders et al. 2023). Language functions as a communication tool, enabling people to exchange information, and it also serves as a learning tool, facilitating learning through social interactions (Levickis et al. 2022; O'Neill 2014). Within this framework, pragmatic language abilities are considered the essential element for early communication growth because children must learn how to use language effectively for communication (Alduais et al. 2022). Pragmatic language skills encompass several core areas of communication, such as responding appropriately in conversations, maintaining topics, initiating new and relevant topics, managing turn-taking, requesting clarification, and adapting language to the needs of a communication partner (Socher et al. 2019).

Developmental Language Disorder (DLD) is a neurodevelopmental condition characterized by persistent difficulties in receptive and/or expressive language abilities that cannot be explained by hearing impairment, global developmental delay, autism spectrum disorder, or any other known biomedical condition (Bishop et al. 2017; McGregor et al. 2023). With an estimated prevalence of approximately 7.5% in the general population, DLD is among the most common developmental disorders observed in the preschool years (Norbury et al. 2016). Because the early signs of DLD are often subtle and easily overlooked, diagnosis may be delayed, which in turn negatively affects children's linguistic as well as social–emotional development (Valade et al. 2023).

Risk for DLD (rDLD) refers to cases in which children exhibit marked difficulties in receptive and/or expressive language relative to their peers, where these delays fall below developmental expectations and cannot be attributed to another medical condition (Yılmaz Çiftçi and Tunçer 2024). Children with DLD or rDLD may begin to show early differences in areas such as vocabulary, morphosyntax, syntactic complexity, and especially pragmatic language skills (Owens and Farinella 2024; Yılmaz and Oğuz 2025). Moreover, compared to their typically developing peers, children at risk for DLD often display greater social–emotional difficulties and more frequent problem behaviours (Dilbaz-Gürsoy and Özcebe 2025).

Research suggests that pragmatic development in children with DLD and those showing early language delay or risk profiles (rDLD) is shaped by both structural language limitations and broader social-communicative demands (Andres-Roqueta and Katsos 2020). Pragmatic language refers to the effective and appropriate use of language in interaction with others and includes a range of socially embedded abilities such as initiating and maintaining conversations, managing and shifting topics, producing contingent responses, repairing communication breakdowns, and coordinating verbal and non-verbal communicative behaviours (O'Neill 2014; Andreou et al. 2024). A growing body of evidence indicates that children with DLD and related language difficulties experience significant pragmatic challenges, including difficulties in using language appropriately in context, matching linguistic forms to communicative functions, and sustaining coherent discourse (Osman et al. 2011; van Balkom et al. 2010; Wong et al. Sep 2022). More specifically, children with

DLD and related language difficulties may show weaknesses in turn-taking, topic initiation and topic maintenance, as well as difficulties responding appropriately within conversational exchanges and maintaining effective interaction (Osman et al. 2011; van Balkom et al. 2010). Such pragmatic constraints may also affect children's peer interactions, particularly during play, by limiting their ability to access ongoing play, sustain reciprocal exchanges, and participate effectively in socially shared activities, which may in turn reduce opportunities for social involvement, social learning, and the development of social competence (van Balkom et al. 2010; Lloyd-Esenkaya et al. 2020).

Parent-child interaction is also one of the key environmental factors that plays a decisive role in early language development (Safwat and Sheikhan 2014). Research indicates that children develop their language abilities and pragmatic communication skills when parents respond to their messages in sensitive, timely, and contextually appropriate to children's communicative bids (Di Sante et al. 2020; Levickis et al. 2023). Several studies have demonstrated that parents of typically developing children tend to use more follow-in, responsive, and topic-sustaining forms of talk during interactions, whereas parents of children with DLD or rDLD often display a more directive style characterized by reduced contingency and lower levels of reciprocal engagement (Blom et al. 2023; Levickis et al. 2018; Vigil et al. 2005).

Nevertheless, both the international literature and studies conducted in the Turkish context indicate that research simultaneously examining the pragmatic language skills of children with rDLD and the nature of parent-child interaction remains limited. International studies often investigate parental responsiveness and pragmatic language abilities separately; far fewer studies evaluate these two domains holistically within the same sample, specifically during early childhood and with a focus on DLD risk (e.g., Osman et al. 2011; Vigil et al. 2005). Recent Turkish studies highlight that children with DLD or rDLD experience multidimensional difficulties in pragmatic and social-emotional domains, underscoring the need for early, multi-component assessment approaches (Yılmaz and Oğuz 2025; Dilbaz-Gürsoy and Özcebe 2025), and emphasize that parent-child interaction is a critical contextual variable in these developmental processes.

Examining the relationships among pragmatic language use, parent-child interaction, and general language abilities in children at risk for DLD, particularly during the critical period of 24–48 months, holds significant potential for informing culturally grounded early identification and intervention efforts. The present study aims to compare children aged 24–48 months who are at risk for DLD with their typically developing peers in terms of pragmatic language use and parent-child interaction, and to investigate the relationships among these variables.

2 | Methods

2.1 | Study Design

A comparative correlational research design was employed in this study. Prior to data collection, ethical approval was obtained from the Cappadocia University Non-Interventional Clinical Research Ethics Committee (Approval date: 3 October 2024; Decision

no: 24.17; Document no: E-64577500-050.99-87298). All stages of the study were conducted in accordance with the most recent principles of the Declaration of Helsinki and within established ethical guidelines.

2.2 | Participants

The study sample consisted of children aged 24–48 months who were at rDLD and typically developing children, along with their parents. Participants were recruited as parent-child dyads from daycare centres, kindergartens, and special education and rehabilitation centres in the province of Kayseri, Türkiye. Most data from both the typically developing and rDLD groups were collected in daycare centres and kindergartens. A subset of participants in the rDLD group were recruited from special education and rehabilitation centres; these children had completed the centres' reporting/evaluation process but had not yet initiated speech and language therapy at the time of data collection. Participation was entirely voluntary, and informed consent was obtained from all families and children who agreed to take part. The research team received all required authorization from the Ministry of National Education, together with the Ministry of Family and Social Services, before starting their data collection process. The parents received verbal information about the research goals, boundaries, and methods before they provided both verbal and written consent for participation.

The research included children who were 24–48 months old, and their parents served as their main caregivers, while all families spoke Turkish as their native language. Children needed to score below 90 on the Test of Early Language Development—Third Edition, Turkish Version (TEDIL) verbal performance test to join the rDLD group while showing no signs of cognitive, motor or sensory disabilities. The TEDIL verbal performance score needed to be 90 or higher for typical development, while participants had to show no signs of cognitive, motor, sensory, or additional developmental impairments. Children were excluded if they had previously received speech and language therapy, if a language other than Turkish was the primary language spoken at home, or if their primary caregiver was not a parent.

The power analysis used G*Power version 3.1.9.7 to perform an independent samples *t*-test for evaluating differences between two separate groups. The study used $d = 0.75$ as its effect size, which falls within the medium-to-large range, while setting $\alpha = 0.10$ for significance and 90% for statistical power ($1 - \beta = 0.90$). The research needed at least 24 participants for each group to meet the established parameters. The research included 54 children who were divided into two groups of 27 participants each to reduce the risk of losing any samples. The researchers used TEDIL scores to determine group membership because they identified two groups of children who were either at risk for DLD or developed normally. Accordingly, data were collected from 27 children who showed DLD risk factors and 27 typically developing children, along with their parents.

2.3 | Data Collection Instruments

2.3.1 | Demographic Information Form

The form served to obtain demographic data about participants including their age and sex and their parents' educational

background and their home language usage and their family financial situation.

2.3.2 | Test of Early Language Development—Third Edition, Turkish Version (TEDIL)

The Test of Early Language Development—Third Edition (TELD-3), developed by Hresko et al. to assess receptive and expressive language abilities, was adapted into Turkish through validity, reliability, and standardization studies conducted by Topbaş and Güven, and was introduced into the literature as the Test of Early Language Development—Third Edition, Turkish Version (TEDIL) (Hresko et al. 1999; Topbaş and Güven 2011). The adaptation involved children between 2;0 and 7;11 years old who resided in various regions of Türkiye while coming from different socioeconomic backgrounds (Topbaş and Güven 2011). The TEDIL evaluates children's language abilities by testing their ability to receive and express language through two distinct subscales. The assessment tool generates three standardized composite scores, which measure receptive language, expressive language and total verbal language ability to perform a complete assessment of early language skills (Topbaş and Güven 2011).

2.3.3 | Language Use Inventory–Turkish (LUI-Turkish)

The Language Use Inventory (LUI) represents a parent-based assessment tool which O'Neill developed to evaluate children's pragmatic language abilities through capturing how language is used for communicative purposes in everyday social interactions (O'Neill 2009). The LUI-Turkish functions as the Turkish version of this assessment tool. The LUI-Turkish underwent validation through İyigün who performed cultural adaptation and psychometric testing which established its effectiveness for Turkish children between 18 and 48 months to assess their pragmatic language skills (İyigün 2021).

The inventory contains 173 items which are divided into three main sections and 14 subdomains. Section 1 (Subdomains A and B) examines early gesture use (gestures used for requesting and drawing attention); however, scores from this section are not included in the total score. Section 2 (Subdomains C, D, and E) evaluates early verbal communication skills and word types expressed through single- and two-word utterances; however, the subdomain assessing the child's first three words (C) and the open-ended subdomain related to interests (E) are not included in scoring. The primary evaluative component of the inventory is Section 3, which comprises nine subdomains assessing long sentence production and complex pragmatic language use, including directing attention, commenting on events and objects, requesting information, directing others' actions, humour, and participation in conversation. The open-ended subdomain (L), which assesses preferred topics of conversation, is also excluded from the total score. Responses of “yes,” “sometimes,” and “often” are scored as 1 point, while all other responses are scored as 0 points, yielding a maximum possible total score of 154 (İyigün 2021).

2.3.4 | MBRS and CBRS

The Maternal Behaviour Rating Scale (MBRS; Mahoney) and the Child Behaviour Rating Scale (CBRS; Mahoney & Wheeden)

served to evaluate how parents interact with their children (Mahoney 2008; Mahoney and Wheeden 1999). The Turkish validity and reliability studies of both instruments were performed by Diken et al. (2009). The assessment process involves trained professionals who evaluate parent–child interactions through 15-min free-play sessions. The scoring system for these instruments uses a 5-point Likert-type rating system. The MBRS consists of 12 parental behaviour items grouped into three domains: Responsivity (sensitivity, responsiveness, effectiveness, and inventiveness), Affect (acceptance, enjoyment, emotional expressiveness, warmth, and use of verbal praise), and Directiveness (achievement orientation, directiveness, and interaction pace) (Diken et al. 2009). The CBRS is divided into two domains and includes seven interactional child behaviours: Attention (level of attention to activity, persistence, engagement, and collaboration in activities) and Initiation (initiating of activity, joint attention, and emotional status during the activities). Both the CBRS and the MBRS are rated on five-point Likert-type scales. CBRS items are scored from 1 (very low) to 5 (very high), whereas MBRS behaviours are scored from 1 (low) to 5 (high). Higher scores are expected for the Responsivity and Affect domains of the MBRS, whereas optimal performance for the three interactional behaviours within the Directiveness domain is reflected by mid-range ratings (Diken et al. 2009).

2.4 | Data Collection Procedure

Data collection was conducted between January and April 2025 in daycare centres, kindergartens, and special education and rehabilitation centres in the province of Kayseri, Türkiye. All data were collected by a speech and language therapist with four years of clinical experience in paediatric speech and language therapy. The researcher holds practitioner certifications for the administration of the TEDIL, the MBRS and the CBRS. In addition, the researcher received formal training in the administration of the LUI-Turkish from one of the experts involved in its Turkish adaptation. All assessments were conducted in quiet environments free from distracting stimuli.

During the data collection process, the TEDIL was first administered to determine the children's language development levels. Subsequently, as the LUI-Turkish is a parent-report measure, parents were provided with detailed instructions regarding the purpose of the inventory and how to respond to its items. The researcher stayed in the room during inventory completion but avoided giving any instructions which could affect parent reactions.

The MBRS and CBRS assessment of parent–child interaction took place after parents finished the TEDIL and LUI-Turkish. The assessment rooms were arranged to allow naturalistic observation of parent–child interactions, with adequate space for free movement and developmentally appropriate toys. The researchers used identical toys for all parent–child interactions which included building blocks and pretend-play materials and dolls and kitchen utensils and toy vehicles and toy animals and picture books. The parents received instructions before the session to interact with their children through their normal home activities. The researchers monitored parent–child interactions through 15-min sessions which were observed without any interruption to their

TABLE 1 | Distribution of participants' demographic characteristics by group.

Variable	Categories	Typically developing (N)	rDLD (N)	Total (N)	χ^2	<i>p</i>
Sex	Girl	8	6	14	0.386	0.535
	Boy	19	21	40		
Maternal education	High school	1	5	6	3.419	0.181
	Associate degree	3	4	7		
	Bachelor's degree	23	18	41		
Paternal education	High school	0	4	4	4.525	0.104
	Associate degree	2	1	3		
	Bachelor's degree	25	22	47		
Socioeconomic status	Middle	9	13	22	1.371	0.504
	High	16	13	29		
	Very high	2	1	3		

Abbreviations: rDLD = at risk for developmental language disorder; *N* = number of participants; χ^2 = chi-square test statistic.

natural behaviours. All parent–child play interaction sessions were conducted with the mother. The 15-min free-play sessions were scored live by a single trained rater and were not video-recorded.

2.5 | Data Analysis

All statistical analyses were conducted using SPSS version 27.0. The analysis of data distribution properties began with skewness and kurtosis coefficient assessments. Both the children with rDLD and the typically developing children showed values that met standard criteria. The ± 3 criterion, as suggested by Newell and Hancock, indicates that the variables follow a normal distribution pattern (Newell and Hancock 1984). The researchers determined that the data were appropriate for parametric statistical methods, so they used parametric tests to analyse between-group differences. The research used descriptive statistics to present data through frequency distributions and percentage calculations, and it also showed mean values, standard deviations, median scores, and the lowest and highest measurement points. Independent samples *t*-tests were used to evaluate the differences between the two groups. The *t*-test effect sizes were evaluated through Cohen's *d*, which uses the following criteria to interpret results: small effects occur at 0.20, while moderate effects reach 0.50, and large effects start at 0.80 and above. Pearson correlation coefficients were used to analyse variable relationships, which were further displayed through a heat map. The magnitude of correlations was interpreted according to Cohen's guidelines, with *r* values of 0.10–0.29 indicating small, 0.30–0.49 moderate, and 0.50 or above large associations (Cohen 1988). Statistical significance was set at $p < 0.05$ for all analyses.

3 | Results

As shown in Table 1, children in the typically developing group and those in the rDLD group demonstrated similar distributions in terms of sex, maternal and paternal education levels, and socioeconomic status. Chi-square analyses indicated that

there were no statistically significant differences between the two groups for any of these demographic variables ($p > 0.05$), suggesting that the groups were demographically comparable. The mean age of children in the typically developing group was approximately 40.67 months (± 5.62), while the mean age of children in the rDLD group was approximately 40.00 months (± 5.37). In addition, none of the participating children were exposed to a second language other than Turkish in the home environment.

As shown in Table 2, independent samples *t*-test results indicated statistically significant differences between the rDLD group and the typically developing group across all TEDIL subscales. For receptive language scores, typically developing children ($M = 117.00$, $SD = 10.46$) scored significantly higher than children in the rDLD group ($M = 86.22$, $SD = 6.69$), $t(44.21) = 12.88$, $p < 0.001$, $d = 3.35$. Similarly, for expressive language abilities, the mean scores of the typically developing group ($M = 111.04$, $SD = 9.63$) were significantly higher than those of the rDLD group ($M = 77.89$, $SD = 6.50$), $t(45.61) = 14.82$, $p < 0.001$, $d = 3.63$. With respect to overall verbal language performance, typically developing children ($M = 115.92$, $SD = 11.18$) also obtained substantially higher scores than children in the rDLD group ($M = 78.11$, $SD = 6.74$), $t(40.75) = 14.84$, $p < 0.001$, $d = 3.55$. The consistently large effect sizes across all subscales indicate substantial differences between the two groups.

As shown in Table 3, parents of typically developing children scored significantly higher than parents in the rDLD group on the Responsivity and Affect subdomains of the MBRS ($p < 0.05$). The associated effect sizes ranged from moderate to large ($d = 0.60$ – 1.28), indicating meaningful group differences. In contrast, scores on the Directiveness subdomain were significantly higher in the rDLD group compared to the typically developing group ($p < 0.05$). No statistically significant difference was observed between the groups for the interaction pace subcomponent ($p > 0.05$).

Table 4 shows that typically developing children obtained significantly higher scores than children in the rDLD group on

TABLE 2 | Comparison of TEDIL subscale scores between the rDLD and typically developing groups.

Variable	Typically developing ($M \pm SD$)	rDLD ($M \pm SD$)	t (df)	p	Cohen's d
Receptive language	117.00 $\pm$ 10.46	86.22 $\pm$ 6.69	12.88 (44.21)	<0.001*	3.35
Expressive language	111.04 $\pm$ 9.63	77.89 $\pm$ 6.50	14.82 (45.61)	<0.001*	3.63
Verbal performance	115.92 $\pm$ 11.18	78.11 $\pm$ 6.74	14.84 (40.75)	<0.001*	3.55

Abbreviations: rDLD = at risk for developmental language disorder; M = mean; SD = standard deviation; df = degrees of freedom; Cohen's d = effect size. * p < 0.05.

TABLE 3 | Comparison of MBRS subscale scores between the rDLD and typically developing groups.

MBRS	Typically developing ($M \pm SD$)	rDLD ($M \pm SD$)	t (df)	p	Cohen's d
Responsivity					
Sensitivity ($_$ /5)	4.07 $\pm$ 0.83	3.44 $\pm$ 0.75	2.93 (52)	0.005*	0.78
Responsiveness ($_$ /5)	3.93 $\pm$ 0.83	3.30 $\pm$ 0.78	2.88 (52)	0.006*	0.77
Effectiveness ($_$ /5)	3.67 $\pm$ 0.88	2.44 $\pm$ 0.97	4.85 (52)	<0.001*	1.28
Inventiveness ($_$ /5)	3.30 $\pm$ 0.99	2.33 $\pm$ 1.11	3.36 (52)	0.001*	0.93
Responsivity total ($_$ /20)	14.96 $\pm$ 3.32	11.48 $\pm$ 3.42	3.79 (52)	<0.001*	1.03
Affect					
Acceptance ($_$ /5)	4.19 $\pm$ 0.74	3.30 $\pm$ 0.72	4.48 (52)	<0.001*	1.12
Enjoyment ($_$ /5)	3.93 $\pm$ 1.04	3.11 $\pm$ 0.75	3.31 (52)	0.002*	0.89
Use of verbal praise ($_$ /5)	3.44 $\pm$ 1.05	2.81 $\pm$ 0.79	2.49 (52)	0.016*	0.65
Warmth ($_$ /5)	3.67 $\pm$ 1.04	3.00 $\pm$ 0.88	2.55 (52)	0.014*	0.70
Emotional expressiveness ($_$ /5)	3.56 $\pm$ 1.05	2.59 $\pm$ 0.93	3.57 (52)	0.001*	0.96
Affect total ($_$ /25)	18.78 $\pm$ 4.73	14.85 $\pm$ 3.73	3.39 (52)	0.001*	0.94
Directiveness					
Achievement orientation ($_$ /5)	3.19 $\pm$ 0.62	3.70 $\pm$ 0.87	-2.52 (52)	0.015*	0.66
Directiveness ($_$ /5)	3.11 $\pm$ 0.58	3.63 $\pm$ 0.84	-2.65 (46.12)	0.011*	0.69
Interaction pace ($_$ /5)	2.81 $\pm$ 0.56	2.96 $\pm$ 0.81	-0.78 (52)	0.437	—
Directiveness total ($_$ /15)	9.11 $\pm$ 1.55	10.30 $\pm$ 2.33	-2.20 (45.24)	0.033*	0.60

Notes: All single items are scored from 1 to 5. Possible total score ranges are as follows: Responsivity Total = 4–20, Affect Total = 5–25, and Directiveness Total = 3–15. Effect sizes were not reported for non-significant comparisons.

Abbreviations: MBRS = Maternal Behaviour Rating Scale; rDLD = at risk for developmental language disorder; M = mean; SD = standard deviation; df = degrees of freedom; Cohen's d = effect size. * p < 0.05.

the Attention domain of the CBRS (for all subitems, p < 0.001; d = 1.51–1.97). Within the Initiation domain, significant group differences were also observed for the subitems initiation, joint attention, and emotional status, with higher scores in the typically developing group (p < 0.001; d = 1.62–1.94). Overall, the CBRS total score was significantly higher in the typically developing group (p < 0.001; d = 2.02), indicating that differences in social attention and initiation behaviours between the groups were associated with large effect sizes.

According to Table 5, typically developing children scored significantly higher than children in the rDLD group across most LUI-Turkish subdomains (p < 0.05). In particular, large effect sizes were observed for domains related to types of words used, longer sentence production, and complex pragmatic language use

(d = 0.70–2.37). In contrast, children in the rDLD group obtained significantly higher scores in the early gesture use subdomains (p < 0.05). The LUI-Turkish total score was also significantly higher in the typically developing group (p < 0.001; d = 1.88), indicating pronounced differences in overall pragmatic language performance between the two groups.

Figure 1 illustrates the relationships among children's language abilities (TEDIL), pragmatic language use (LUI-Turkish), and parent and child interaction behaviours (MBRS and CBRS). Strong and statistically significant positive correlations were observed between TEDIL subscales and the verbal communication, longer sentence, and total scores of the LUI-Turkish (p < 0.01). The CBRS total score was also highly correlated with both TEDIL and LUI-Turkish measures (p < 0.01), indicating close

TABLE 4 | Comparison of CBRS subscale scores between the rDLD and typically developing groups.

CBRS	Typically developing ($M \pm SD$)	rDLD ($M \pm SD$)	t (df)	p	Cohen's d
Attention					
Attention (/_/5)	4.56 $\pm$ 0.58	3.59 $\pm$ 0.64	5.83 (52)	<0.001*	1.51
Persistence (/_/5)	4.48 $\pm$ 0.64	3.26 $\pm$ 0.71	6.62 (52)	<0.001*	1.70
Engagement (/_/5)	4.48 $\pm$ 0.64	3.11 $\pm$ 0.75	7.20 (52)	<0.001*	1.86
Collaboration (/_/5)	4.41 $\pm$ 0.69	3.00 $\pm$ 0.73	7.24 (52)	<0.001*	1.89
Attention total (/_/20)	17.93 $\pm$ 2.48	12.96 $\pm$ 2.61	7.17 (52)	<0.001*	1.97
Initiation					
Initiation (/_/5)	4.63 $\pm$ 0.57	3.48 $\pm$ 0.80	6.08 (52)	<0.001*	1.62
Joint attention (/_/5)	4.44 $\pm$ 0.64	3.19 $\pm$ 0.74	6.71 (52)	<0.001*	1.78
Emotional status (/_/5)	4.37 $\pm$ 0.57	3.11 $\pm$ 0.70	7.29 (52)	<0.001*	1.94
Initiation total (/_/15)	13.44 $\pm$ 1.63	9.78 $\pm$ 2.01	7.38 (52)	<0.001*	2.00
CBRS total score (/_/35)	31.37 $\pm$ 4.06	22.74 $\pm$ 4.45	7.44 (52)	<0.001*	2.02

Notes: All single items are scored from 1 to 5. Possible total score ranges are as follows: Attention Total = 4–20, Initiation Total = 3–15, and CBRS Total Score = 7–35.

Abbreviations: CBRS = Child Behaviour Rating Scale; rDLD = at risk for developmental language disorder; M = mean; SD = standard deviation; t = t -test statistic; df = degrees of freedom; Cohen's d = effect size. * p < 0.05.

TABLE 5 | Comparison of LUI-Turkish subscale scores between the rDLD and Typically developing groups.

LUI-Turkish	Typically developing ($M \pm SD$)	rDLD ($M \pm SD$)	t (df)	p	Cohen's d
Gestures					
A-Asking for something (/_/11)	5.33 $\pm$ 2.65	8.85 $\pm$ 2.01	−5.50 (52)	<0.001*	1.48
B-Getting someone to notice something (/_/2)	1.56 $\pm$ 0.58	1.85 $\pm$ 0.36	−2.26 (43.71)	0.029*	0.61
A and B total score (/_/13)	6.89 $\pm$ 2.99	10.70 $\pm$ 2.22	−5.33 (52)	<0.001*	1.42
Words					
C-Types of words (/_/20)	19.96 $\pm$ 0.19	18.15 $\pm$ 2.66	3.54 (26.27)	0.002*	1.00
D-Requests for help (/_/7)	6.93 $\pm$ 0.27	6.67 $\pm$ 0.68	1.85 (33.84)	0.074	—
C and D total score (/_/27)	26.89 $\pm$ 0.42	24.81 $\pm$ 3.19	3.35 (26.92)	0.002*	0.98
Longer sentences					
F-Getting someone to notice something (/_/6)	5.81 $\pm$ 0.40	4.96 $\pm$ 1.06	3.93 (33.17)	<0.001*	1.08
G-Questions/comments—things (/_/9)	9.00 $\pm$ 0.00	6.56 $\pm$ 2.56	4.96 (26.00)	<0.001*	1.33
H-Questions/comments—self/others (/_/36)	34.67 $\pm$ 1.14	21.63 $\pm$ 8.25	8.14 (27.00)	<0.001*	2.13
I-Talk in activities with others (/_/14)	12.52 $\pm$ 1.12	9.59 $\pm$ 3.46	4.18 (31.42)	<0.001*	1.06
J-Teasing/sense of humour (/_/5)	3.11 $\pm$ 1.09	2.37 $\pm$ 1.01	2.60 (52)	0.012*	0.70
K-Interest in words and language (/_/12)	10.00 $\pm$ 1.49	8.15 $\pm$ 2.49	3.31 (52)	0.002*	0.88
M-Adapting conversation to others (/_/15)	13.26 $\pm$ 1.63	9.59 $\pm$ 3.95	4.45 (34.60)	<0.001*	1.12
N-Building longer sentences and stories (/_/30)	25.89 $\pm$ 3.09	12.67 $\pm$ 7.09	8.89 (35.56)	<0.001*	2.37
FGHIJKMN total score (/_/127)	114.26 $\pm$ 7.01	75.52 $\pm$ 26.86	7.25 (29.53)	<0.001*	1.94
LUI-Turkish total score (/_/154)	141.15 $\pm$ 7.11	100.33 $\pm$ 29.35	7.02 (29.04)	<0.001*	1.88

Notes: The LUI-Turkish Total Score (/_/154) excludes the Gestures (A-B) subdimension. Effect sizes were not reported for non-significant comparisons.

Abbreviations: LUI-Turkish = Language Use Inventory–Turkish; rDLD = at risk for developmental language disorder. * p < 0.05.

associations between children's language abilities, pragmatic language use, and interactional behaviours. Furthermore, the MBRS Responsivity and Affect domains showed positive relationships with children's language abilities and pragmatic communication skills (p < 0.05 and p < 0.01). The Directiveness measure displayed

weak and, in some cases, negative relationships with most language variables and pragmatic and interactional measures. The heatmap shows that children's language skills and pragmatic abilities link closely to their parents' interaction styles and their own interaction behaviours.

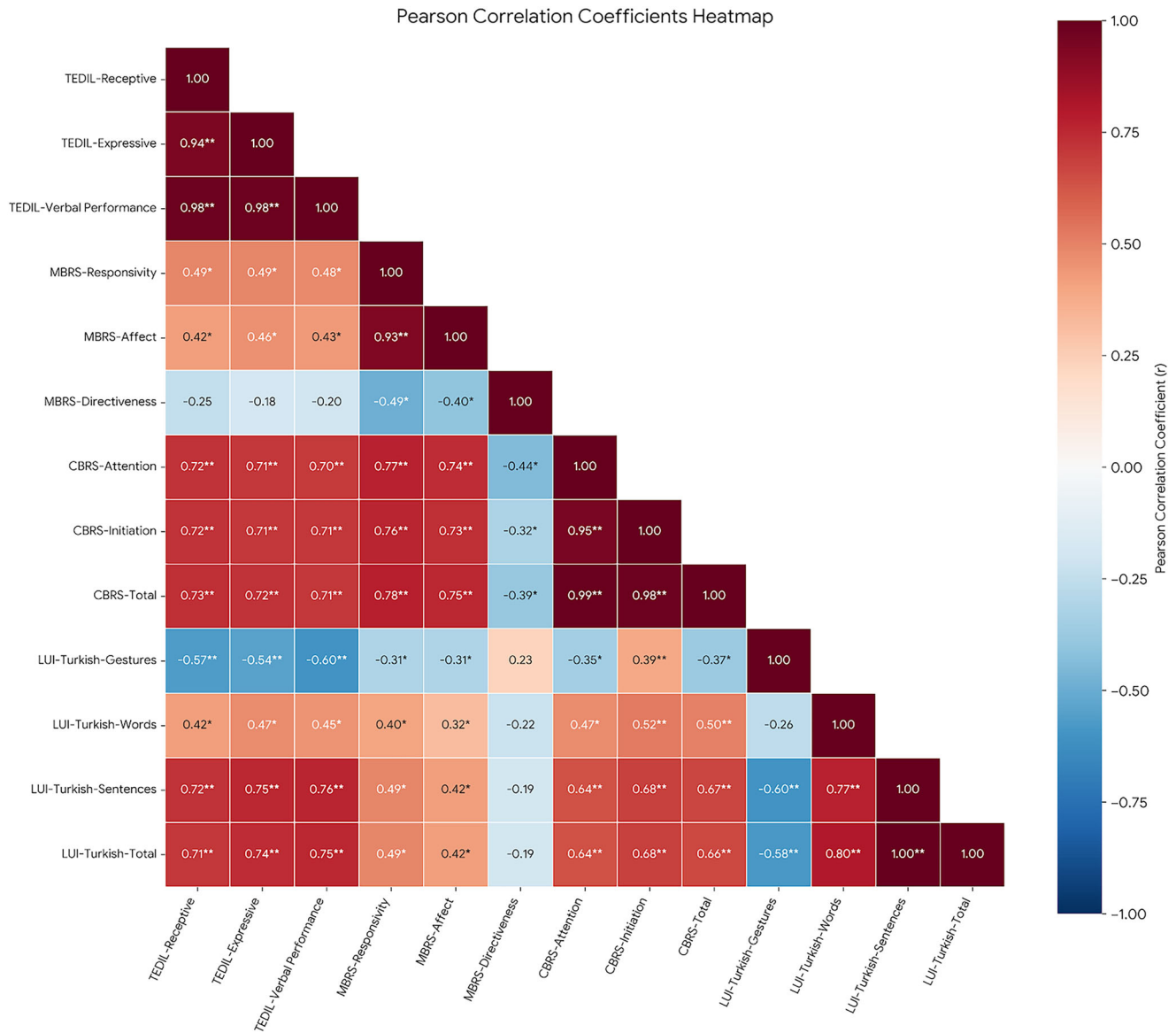


FIGURE 1 | Heatmap of Pearson correlation coefficients among TEDIL, MBRS, CBRS, and LUI-Turkish variables.

4 | Discussion

This study examined pragmatic language abilities, parent-child interaction behaviours, and social interaction skills in children with rDLD compared with typically developing peers. The findings showed that children in the rDLD group obtained substantially lower scores than those of typically developing children in every language assessment, but they showed marked difficulties when dealing with pragmatic language and social interaction tasks. The study produced findings which support earlier studies showing that children who develop language disorders face two types of challenges, which include structural language deficits and severe social communication impairments during their early development (Andres-Roqueta and Katsos 2020; Osman et al. 2011; van Balkom et al. 2010).

The LUI-Turkish results showed that children with rDLD demonstrated significant language challenges when they needed to cre-

ate longer sentences and when they had to use language for joint attention and information exchange, commenting, and social communication. These findings are consistent with theoretical frameworks suggesting that pragmatic language use in children with rDLD is compromised by the combined effects of limitations in both linguistic and social-cognitive systems (Andres-Roqueta and Katsos 2020). The rDLD group showed better results in their early gesture development, which supports the theory that these children use gestures as their main communication tool because they struggle with verbal expression. Research shows that children who have limited spoken communication skills use gestures more frequently as a way to replace their restricted spoken language (Rombouts et al. 2023; Valle et al. 2021).

When parental behaviours were examined, parents who had children with typical development used more sensitive, responsive and emotionally supportive interaction methods. Research

evidence shows that parental sensitivity creates conditions which help children develop their language abilities (Levickis et al. 2023; Madigan et al. 2019). In contrast, parents in the rDLD group exhibited a more directive and structured interaction style. Similarly, previous research has reported that parents interacting with children with DLD tend to adopt a more directive and controlling communication style, which may reduce reciprocity and limit the interactional opportunities available for pragmatic development (van Balkom et al. 2010; Hammer et al. 2001). The present study supports this perspective by demonstrating that directive parental behaviours are negatively associated with children's linguistic and pragmatic performance.

The CBRS findings further indicate that children in the rDLD group experience pronounced difficulties in core components of social interaction, including attention, joint attention, and initiation. This observed pattern suggests that pragmatic language problems stem from more than language structure because they closely relate to social-cognitive processes and interactional behaviours. Indeed, prior research has shown that children at risk for language disorder may exhibit social-behavioural difficulties that can emerge independently of language performance; however, these domains are characterized by bidirectional and reciprocal influences across the course of development (Forrest et al. 2020).

Our findings demonstrate strong positive associations among language abilities, pragmatic language use, and both parental and child interaction behaviours. These results confirm that children's linguistic and pragmatic skills are shaped not only by their intrinsic developmental capacities but are also closely linked to parents' responsive communication styles and children's levels of social-behavioural engagement. The research results demonstrate that early intervention programs need to include parent education together with interaction-based methods which respond to children's needs.

This study has several limitations. First, the data were collected from a single geographic location, which may limit the generalizability of the findings. Second, although the LUI-Turkish provided ecologically relevant information, its parent-report format may be vulnerable to reporting bias and measurement error. Third, parent-child interaction was evaluated during a structured 15-min free-play session, which offers a standardized observational context but may not fully reflect interaction patterns across natural daily routines. In addition, the sessions were scored live by a single trained rater and were not video-recorded, which limits the possibility of independent rescoring and may increase the risk of rater-related bias. Future research needs to study how pragmatic abilities relate to nonlinguistic cognitive processes, including executive functions and theory of mind development, and how parental interaction affects children's pragmatic language skills through intervention studies. The current research study demonstrates that children who face the risk of developing DLD need to undergo early and regular evaluation of their language abilities. It also highlights the importance of evaluating social-interactional competencies and developing family-centred, culturally adapted intervention approaches.

5 | Conclusions

The findings indicate that children at risk for DLD demonstrate significant differences in their language abilities, pragmatic communication, social interaction skills, and parent-child interaction behaviours when compared to their typically developing peers. These results suggest that rDLD should not be conceptualized solely as a linguistic difficulty, but rather as a developmental risk profile associated with multidimensional processes, including parent-child interaction and pragmatic language use. The assessment process for children who show risk factors for DLD needs to move past traditional language structure tests to include tests of pragmatic language and direct observations of parent-child interactions and social interaction patterns. In particular, the strong associations between parental responsiveness, children's social attention and initiation behaviours, and language and pragmatic skills highlight the importance of family-centred interventions and social-pragmatic targets in early childhood.

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Ethics Statement

Ethical approval was obtained from the Cappadocia University Non-Interventional Clinical Research Ethics Committee (Approval Date: 3 October 2024; Decision No: 24.17; Document No: E-64577500-050.99-87298).

Consent

In the present study, the parents provided both verbal and written informed consent for participation.

Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability Statement

Data supporting the findings of this study are available from the corresponding author [NYB] on request.

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