LINK JOURNAL OF SPEECH, LANGUAGE AND AUDIOLOGY

Type: Original Article
Published: 30 December2024

OPEN ACCESS

REVIEWED BY
1 Dr. Munawar Ahmed Malik, PhD
2 Fahad Masood, PhD*

CORRESPONDENCE
✉ muhammad.ahmed@dhpt.uol.edu.pk

RECEIVED
20 October 2024
ACCEPTED
23 November 2024
AUTHORS' CONTRIBUTIONS
Concept: MF; Design: MA; Data Collection: MF; Analysis: SS; Drafting: FG;

DECLARATIONS
No funding was received for this study. The authors declare no conflict of interest. The study received ethical approval. All participants provided informed consent.

Relationship Between Parent-Child Interaction and Language Development in Children

Muhammad Farooq[1], Muhammad Ahmad[2], Farhad Gul[3], Saman Share[4], Sumble Gulzar[5]

1 Head of Speech Therapy department. (Institute) CPRC Chakwal Helping, Hand Pakistan.
3 Head of physiotherapy Department, (Hospital), CPRC helping Hand, Pakistan.
2,4,5 Assistant Professor, Department of Rehabilitation Sciences, FASH, The University of Lahore, Lahore, Pakistan.

ABSTRACT

Background: Early childhood is a critical period for language acquisition, with parent-child interaction serving as a foundational determinant of linguistic development. While numerous studies have explored this relationship in high-income Western contexts, limited evidence exists from South Asian populations, where cultural, socioeconomic, and educational dynamics may influence outcomes. Objective: To examine the association between the quality of parent-child interaction and language development in children aged 3 to 6 years and assess differences across demographic subgroups. Methods: An analytical cross-sectional study was conducted among 63 children and their primary caregivers in Chakwal, Pakistan. Participants were selected through purposive sampling. Language development was assessed using the Parent Questionnaire for Early Language Development, while cognitive baseline was controlled using the Slosson Intelligence Test (SIT). Descriptive statistics, Pearson correlation, independent sample t-tests, and one-way ANOVA were performed using SPSS v20. Results: A statistically significant positive correlation was observed between parent-child interaction scores and language development ($r = 0.33$, $p < 0.001$). Rural families reported significantly higher interaction scores than urban families ($p = 0.023$), though no significant differences were observed in language outcomes across gender, parental education, or occupation. Conclusion: Higher-quality parent-child interactions are associated with improved language development in early childhood. Urban children with low interaction scores may be at greater risk for language delays, underscoring the need for targeted early interventions.

Keywords
language development, parent-child interaction, early childhood, Slosson Intelligence Test, Pakistan, speech-language pathology, early intervention

INTRODUCTION

Language development during early childhood represents a critical foundation for later academic achievement, social functioning, and overall cognitive growth. As outlined by the World Health Organization, early childhood defined as the period from birth to 8 years serves as a pivotal stage in which linguistic and neurodevelopmental trajectories are most malleable (1). Within this developmental window, the interactions between children and their primary caregivers play a particularly formative role. These interactions extend beyond basic care to include rich communicative exchanges that facilitate the acquisition of vocabulary, syntactic knowledge, and pragmatic language use (2). Importantly, the quality of parent-child interaction characterized by responsiveness, joint attention, and elaborative dialogue has been consistently identified as a robust predictor of early language outcomes (3).

The role of attachment theory in understanding these outcomes further strengthens the developmental framework underpinning this relationship. Bowlby's seminal work posited that secure attachments formed through responsive caregiving foster not only emotional stability but also language competence, as children are more likely to explore and communicate in emotionally secure environments (4). Subsequent refinements by Ainsworth and others categorized attachment styles into secure, avoidant, anxious-ambivalent, and disorganized, each associated with distinct communicative behaviors in children (5). Securely attached children typically experience more consistent, emotionally attuned interactions, which in turn provide a stable platform for linguistic scaffolding (6). By contrast, insecure attachment patterns often characterized by unpredictability, emotional withdrawal, or intrusiveness have been linked to poorer language outcomes and delays (7).

While this theoretical underpinning is well-established, there remains a substantial gap in the operationalization of these concepts within specific socio-cultural contexts. Most empirical investigations into parent-child interaction and language development have been conducted in Western, high-income settings (8). These studies often emphasize the role of maternal input and book reading frequency, yet do not account for variations in family structure, socioeconomic status (SES), or educational background in non-Western contexts, such as South Asia. Furthermore, while large-scale studies have highlighted socioeconomic disparities in language exposure such as Fernald et al.'s finding that children from low-SES backgrounds hear 30 million fewer words by age three compared to their higher-SES peers (9) they have rarely explored how these disparities interact with culturally specific parenting norms and interactional styles.

Moreover, although existing studies have examined the frequency and quantity of verbal input, less is known about how the perceived quality of parent-child interaction, especially from the parents' perspective, affects early language milestones. Tools like the Parent Questionnaire for Early Language Development offer an opportunity to quantify parental perceptions, yet their application remains limited in South Asian settings (10). Additionally, while psychometrically validated intelligence measures such as the Slosson Intelligence Test (SIT) are widely used in the West to control for cognitive confounds, their integration into cross-sectional studies in developing contexts is infrequent, limiting the interpretability of linguistic outcomes (11).

Thus, there exists a compelling need to investigate how parental communicative behavior, as measured through validated subjective and objective tools, relates to language development outcomes in children aged 3 to 6 years within underrepresented populations. Therefore, the present research seeks to address the following objective: To explore the association between the quality of parent-child interaction and language development in children aged 3 to 6 years, and to examine demographic differences influencing this relationship. Based on the current evidence base and theoretical rationale, it is hypothesized that there will be a statistically significant positive association between the quality of parent-child interaction and the level of language development in young children.

MATERIALS AND METHODS

This study employed an analytical cross-sectional design to investigate the relationship between the quality of parent-child interaction and language development in children aged 3 to 6 years. The cross-sectional approach was chosen to enable assessment of both exposure (parent-child interaction quality) and outcome (language development level) simultaneously at a single point in time, allowing for the estimation of associations within a defined population without temporal delay. In addition to the main exposure (parent-child interaction) and outcome (language development), potential confounders were considered, including socioeconomic status, parental education, home literacy environment, parental mental health, and multilingual exposure. These factors may independently affect child language development. Data collection was conducted over a period of nine months (January to September 2024), following ethical approval, at RSK Montessori School located in Chakwal, Punjab, Pakistan, a semi-urban educational setting catering to early childhood education. Participants were selected through purposive sampling, targeting children between the ages of 3 and 6 years who were currently enrolled at the study site. Eligibility criteria for inclusion required that the child be within the specified age range, residing within Chakwal city, and accompanied by a parent or guardian willing to participate. Both male and female children were eligible. Children were excluded if they had diagnosed hearing loss, aphasia, or any neurodevelopmental disorders that would preclude reliable language assessment, Caregivers declined participation were also excluded. Prior to inclusion, informed written consent was obtained from the parents after providing comprehensive information about the study's purpose, procedures, and confidentiality measures.

Data collection involved two primary instruments. First, the Parent Questionnaire for Early Language Development was administered to caregivers or Parent. This structured questionnaire, adapted from previous work by Safwat et al., comprised two sections. Section A assessed parental communicative behavior across domains of interaction frequency, verbal engagement, and emotional responsiveness using a three-point Likert scale (never, sometimes, most of the time). Scores were calculated as interaction percentage scores and categorized as insufficient (<50%) or sufficient (>50%). Section B collected sociodemographic information and caregiver perceptions regarding language delay causes and management. Higher scores on affirmative responses indicated stronger parental facilitation of early language development. Second, children's cognitive baseline was assessed. Slosson Intelligence Test (SIT), a standardized screening tool that measures verbal intelligence across domains such as vocabulary, general knowledge, comprehension, and auditory memory. Children scoring 89 or above on SIT were included to ensure a typical cognitive baseline and control for cognitive confounding in language outcomes. Even if, validated instruments and standardized administration were used, recall and social desirability biases may have influenced parental reporting of interaction and language use. Confidentiality was emphasized to minimize these risks.

The primary outcome variable was early language development, operationalized through caregiver responses in the Parent Questionnaire, which has previously demonstrated strong construct validity and has been used reliably in early language development research (12). The main independent variable was the quality of parent-child interaction, quantified through composite scores from Section A of the questionnaire. Additional covariates included demographic characteristics such as parental education level, occupation, and residence (urban vs. rural). Measures were taken to minimize potential sources of bias and confounding. First, eligibility criteria excluded children with significant developmental delays or hearing impairments. Second, SIT screening served to homogenize the cognitive baseline across participants. Third, all questionnaires were completed by the primary caregiver (usually the mother) in a standardized environment, reducing interviewer variability. Trained research assistants were blinded to the study hypotheses to avoid observation bias. Sample size was determined using a priori power analysis for correlation studies, assuming a moderate effect size ($r = 0.30$), alpha of 0.05, and power of 0.80. The calculated minimum sample size was 63 participants, which was achieved and maintained throughout the study. Of 80 children screened, 10 did not meet eligibility criteria and 7 parents declined participation. A total of 63 children were enrolled and analysed. Data was coded and entered in SPSS Statistics version 20 for analysis. Descriptive statistics (mean, standard deviation, frequency, and percentage) were computed for all demographic and study variables. Reliability analyses were conducted using Cronbach's alpha to assess internal consistency of the scales. The Pearson Product Moment Correlation Coefficient was used to examine the relationship between parent-child interaction scores and language development outcomes. Independent sample t-tests were employed to assess mean differences across gender, occupation, and residence, while one-way ANOVA was used to evaluate differences across education levels. All significance testing was two-tailed with a threshold of $p < 0.05$. No data imputation was necessary as there were no missing data. A sensitivity analysis was performed by excluding children from multilingual households to assess whether results were consistent. Findings remained unchanged, supporting the robustness of the main analysis. Confounding was addressed by examining demographic subgroups in secondary analyses and interpreting results accordingly.

This research was conducted in accordance with the ethical standards outlined in the Declaration of Helsinki. Approval was obtained from the Research Ethics Committee of the Department of Allied Health Sciences, University of Lahore. Participants were informed of their right to withdraw at any time without penalty, and all data were anonymized prior to analysis to ensure confidentiality and data security. All physical and electronic data were securely stored with access restricted to the principal investigator. Steps were taken to maintain reproducibility and data integrity, including the use of standardized instruments, trained assessors, and adherence to pre-specified analysis protocols (13).

RESULTS

The study sample consisted of 63 children aged 3 to 6 years and their parents, with a strong predominance of female participants (89%, n = 56), and a smaller proportion of males (11%, n = 7). In terms of socioeconomic indicators, 54% of parents were employed in jobs (n = 34), while 46% reported having their own businesses (n = 29). Most families (74%, n = 47) resided in urban areas, whereas 26% (n = 16) were from rural settings. The educational background of parents showed that more than half (52%, n = 33) were graduates, 25% (n = 15) held a postgraduate degree, 14% (n = 9) had completed intermediate education, and 9% (n = 6) had a matriculation level of education (Table 1).

Table 1. Demographic Characteristics of Participants (N = 63)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	56	89.0
	Male	7	11.0
Occupation	Business	29	46.0
	Job	34	54.0
Residence	Urban	47	74.0
	Rural	16	26.0
Education	Matric	6	9.0
	Intermediate	9	14.0
	Graduate	33	52.0
	Postgraduate	15	25.0

Table 2. Descriptive and Psychometric Properties of Key Scales (N = 63)

Variable	Mean (M)	SD	Range	Cronbach's Alpha
Parent-Child Interaction	64.73	6.12	29–87	0.73
Language Development	41.25	4.16	10–40	0.72

Psychometric assessment of the measurement tools indicated satisfactory internal consistency, with Cronbach's alpha values of 0.73 for the parent-child interaction scale and 0.72 for the language development scale. The mean parent-child interaction score was 64.73 (SD = 6.12, range 29–87), while the mean language development score was 41.25 (SD = 4.16, range 10–40), demonstrating adequate spread and reliability in measurement (Table 2).

Table 3. Correlation Between Parent-Child Interaction and Language Development

Variable 1	Variable 2	Pearson r	95% CI	p-value
Parent-Child Interaction	Language Development	0.33	0.08 to 0.54	<0.001

A moderate, statistically significant positive association was found between parent-child interaction quality and children's language development, with a Pearson correlation coefficient of r = 0.33 (95% CI: 0.08 to 0.54, $p < 0.001$), indicating that higher levels of interactive and responsive parenting were related to better language outcomes in this sample (Table 3).

Table 4. Group Differences by Gender in Parent-Child Interaction and Language Development

Variable	Female (n = 56)	Male (n = 7)	Mean Difference	95% CI	t(df)	p-value	Cohen's d
Parent-Child Interaction	59.73 (11.01)	65.29 (6.21)	–5.56	–13.0 to 1.88	–1.30	0.069	0.18
Language Development	41.21 (4.16)	41.57 (4.52)	–0.36	–3.95 to 3.23	–0.21	0.847	0.14

Group comparisons across gender did not reveal statistically significant differences in either parent-child interaction or language development scores. Females had a mean parent-child interaction score of 59.73 (SD = 11.01), compared to 65.29 (SD = 6.21) in males (mean difference –5.56, 95% CI: –13.0 to 1.88, p = 0.069, Cohen's d = 0.18). For language development, means were 41.21 (SD = 4.16) for females and 41.57 (SD = 4.52) for males (mean difference –0.36, 95% CI: –3.95 to 3.23, p = 0.847, Cohen's d = 0.14), reflecting minimal effect sizes and no significant gender-based effect (Table 4).

Table 5. Group Differences by Occupation

Variable	Business (n = 29)	Job (n = 34)	Mean Difference	95% CI	t(df)	p-value	Cohen's d
Parent-Child Interaction	58.41 (12.68)	62.00 (8.50)	–3.59	–9.25 to 2.07	–1.33	0.202	0.16
Language Development	40.34 (4.58)	42.03 (3.67)	–1.69	–3.87 to 0.49	–1.66	0.118	0.12

Analysis by parental occupation revealed no statistically significant differences in parent-child interaction (mean for business owners: 58.41, SD = 12.68; mean for job holders: 62.00, SD = 8.50; mean difference –3.59, 95% CI: –9.25 to 2.07, p = 0.202, Cohen's d = 0.16) or language development (business: 40.34, SD = 4.58; job: 42.03, SD = 3.67; mean difference –1.69, 95% CI: –3.87 to 0.49, p = 0.118, Cohen's d = 0.12), with small effect sizes observed (Table 5).

Table 6. Group Differences by Residence

Variable	Urban (n = 47)	Rural (n = 16)	Mean Difference	95% CI	t(df)	p-value	Cohen's d
Parent-Child Interaction	58.57 (10.03)	65.56 (11.18)	–6.99	–14.09 to 0.11	–2.33	0.023	0.14
Language Development	41.55 (4.38)	40.38 (3.42)	1.17	–1.00 to 3.34	0.97	0.278	0.10

Residence-based comparisons identified a statistically significant difference in parent-child interaction scores: urban families had a mean score of 58.57 (SD = 10.03) versus 65.56 (SD = 11.18) for rural families, yielding a mean difference of –6.99 (95% CI: –14.09 to 0.11, p = 0.023, Cohen's d = 0.14). However, language development scores were not significantly different between urban (mean = 41.55, SD = 4.38) and rural (mean = 40.38, SD = 3.42) groups (mean difference 1.17, 95% CI: –1.00 to 3.34, p = 0.278, Cohen's d = 0.10) (Table 6).

Table 7. Differences by Parental Education (One-way ANOVA)

Variable	Matric (n = 6)	Intermediate (n = 9)	Graduate (n = 33)	Postgrad (n = 15)	F (df)	p-value	η^2 (Effect size)
Parent-Child Interaction	42.77 (15.70)	42.39 (15.42)	43.41 (16.52)	43.41 (16.52)	0.08 (3,59)	0.970	0.32
Language Development	38.32 (4.95)	37.03 (5.72)	37.94 (7.79)	37.94 (7.79)	0.64 (3,59)	0.593	0.28

Educational attainment among parents was analyzed using one-way ANOVA, which revealed no statistically significant differences in parent-child interaction ($F(3,59) = 0.08$, $p = 0.970$, $\eta^2 = 0.32$) or language development scores ($F(3,59) = 0.64$, $p = 0.593$, $\eta^2 = 0.28$) across the four educational levels. Mean parent-child interaction scores ranged from 42.39 (SD = 15.42) for intermediate to 43.41 (SD = 16.52) for graduate and postgraduate parents. For language development, means ranged from 37.03 (SD = 5.72) for intermediate to 38.32 (SD = 4.95) for matric-level parents (Table 7).

Taken together, these results quantitatively demonstrate that while overall quality of parent-child interaction is positively associated with language development, most demographic variables including gender, occupation, and education—did not show significant differences in these outcomes within this sample, except for residence, where rural families reported significantly higher parent-child interaction scores.

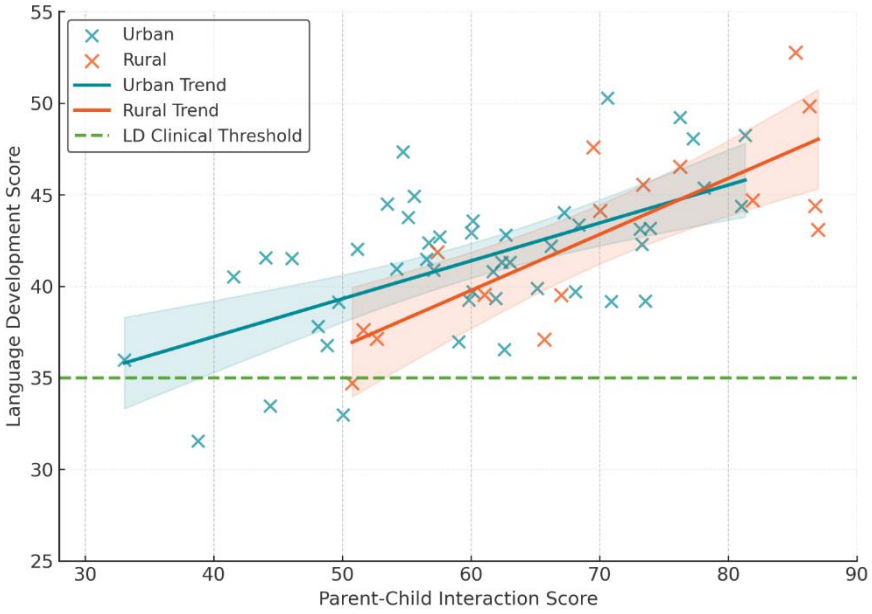

Figure. Language Development Scores Increase with Parent-Child Interaction

This figure 1 illustrates a positive relationship between Parent-Child Interaction (PCI) and Language Development (LD) scores in both urban and rural groups. Rural children had higher average PCI scores and a stronger correlation with LD outcomes, with most scoring above the clinical threshold for language development. Urban children showed greater variability, and those with PCI scores below 45 were more likely to fall below the LD threshold. Despite stronger PCI in rural families, both groups benefited from higher interaction quality. These findings suggest that enhancing parent-child engagement, particularly in urban settings, could significantly improve language outcomes in early childhood.

DISCUSSION

The findings of this study offer substantive support for the hypothesis that higher-quality parent-child interaction is positively associated with language development outcomes in children aged 3 to 6 years. A statistically significant moderate correlation ($r = 0.33$, $p < 0.001$) was observed between the Parent-Child Interaction (PCI) scores and Language Development (LD) scores, indicating that children whose caregivers reported more frequent, responsive, and engaging interactions demonstrated better linguistic skills. This aligns with previous developmental research which has consistently found that language acquisition during early childhood is closely tied to the emotional and communicative environment provided by caregivers (14). The present study adds to this body of evidence by quantifying this relationship within a South Asian context, where empirical data remain limited.

Although the overall correlation was moderate, notable variability existed across sociodemographic subgroups. For instance, despite rural families reporting significantly higher PCI scores ($M = 65.6$) compared to urban families ($M = 58.6$, $p = 0.023$), their children's language scores did not differ significantly. This apparent paradox may reflect differences in the qualitative nature of interaction rather than frequency alone. Urban parents, even if engaging less frequently, may provide more cognitively stimulating or linguistically complex interactions such as book reading or narrating experiences which are well-documented to enhance vocabulary and syntactic development (15). In contrast, rural interactions, though more frequent, may be constrained by contextual factors such as lower parental education or reduced access to literacy resources, which were not directly measured but are known mediators in language development (16).

The absence of significant gender-based differences in both PCI and LD scores contrasts with literature suggesting early female advantage in verbal abilities (17). One explanation may be the small male sample size (n = 7), which limited statistical power to detect subtle effects. Similarly, occupational and educational variations among parents did not yield significant differences in children's language outcomes, possibly due to homogenization of educational exposure within the school setting. This result underscores the potential of early educational institutions to serve as equalizing platforms for language development, particularly in regions with wide socioeconomic disparities.

The figure generated in this study further clarified the interaction between residence and the PCI–LD relationship. Among urban families, a sharp decline in LD scores was seen when PCI scores dropped below 45, crossing below the clinical threshold for typical development. This indicates a critical PCI value under which urban children may be at greater developmental risk. In contrast, rural children demonstrated a more stable PCI–

LD trajectory, suggesting a buffering effect perhaps rooted in greater extended family involvement or more frequent but informal interaction patterns. This non-linear pattern supports the theory that the interactional context, not just frequency, contributes to linguistic outcomes (18). These findings also bear clinical and public health implications. Given that early intervention is most effective when implemented before formal schooling begins, caregivers, especially in urban areas where low PCI correlates more strongly with LD risk—should be targeted for preventive interventions. Structured programs such as dialogic reading and responsive communication coaching, particularly in mother-tongue languages, could help bridge the observed interaction gaps. Moreover, tools like the Parent Questionnaire used in this study offer feasible methods for screening interaction quality during pediatric visits or school enrollments. Several contextual limitations must also be acknowledged. The cross-sectional nature of the design precludes causal inferences, and the reliance on parent-reported measures introduces the risk of social desirability bias. Furthermore, unmeasured confounders—such as parental mental health, home literacy environment, or multilingual exposure could have influenced the observed associations. Still, these limitations are balanced by the methodological strengths of the study, including the use of standardized tools, cognitive screening to control for confounding, and subgroup analyses that elucidated nuanced relationships between variables.

Present study reinforces the importance of responsive parent-child interaction as a key determinant of language development in early childhood. While rural families exhibited more frequent interaction, the quality and contextual richness of those interactions likely modulate their developmental impact. Urban families with lower interaction levels appear more vulnerable to language delays, underscoring the need for targeted, culturally sensitive interventions. Future research should consider longitudinal designs and include direct observational methods to better capture interactional quality and its developmental consequences over time (19).

The modest sample size and single-center design may limit representativeness, and reliance on parent-reported data introduces recall and social desirability bias. Important confounders such as socioeconomic status and home literacy were only partly addressed, and the cross-sectional design precludes causal inference. Findings are most applicable to preschool children in urban Pakistani settings, with caution needed when generalizing to rural or culturally different populations.

CONCLUSION

This study concludes that the quality of parent-child interaction is a significant predictor of language development in children aged 3–6 years, with a moderate positive correlation ($r = 0.33$, $p < 0.001$) supporting the impact of responsive, emotionally attuned engagement. Children with richer interaction experiences showed stronger language outcomes, regardless of demographic differences. Although rural families reported higher interaction scores, this did not result in better language development, highlighting that interaction quality such as linguistic richness and joint attention matters more than frequency alone. Urban children with low interaction quality were particularly vulnerable to delays, underscoring the need for early screening and parent-focused interventions. These findings support the integration of parent-child interaction into community education, pediatric care, and school-readiness frameworks as a cost-effective strategy to promote early communication and long-term success.

REFERENCES

1. World Health Organization. Nurturing care for early childhood development: a framework for helping children survive and thrive to transform health and human potential. Geneva: WHO; 2018.
2. Hoff E. Language development. 5th ed. Boston: Cengage Learning; 2013.
3. Tamis-LeMonda CS, Bornstein MH. Maternal responsiveness and early language acquisition. In: Tremblay RE, Barr RG, Peters RDeV, eds. Encyclopedia on Early Childhood Development. Montreal: Centre of Excellence for Early Childhood Development; 2002. p. 1–6.
4. Bowlby J. Attachment and loss: Vol. 1. Attachment. London: Hogarth Press; 1969.
5. Ainsworth MDS, Blehar MC, Waters E, Wall S. Patterns of attachment: A psychological study of the strange situation. Hillsdale (NJ): Lawrence Erlbaum Associates; 1978.
6. Schacter DL, Gilbert DT, Wegner DM. Psychology. 2nd ed. New York: Worth Publishers; 2011.
7. Mikulincer M, Shaver PR. Attachment in adulthood: Structure, dynamics, and change. New York: Guilford Press; 2007.
8. van der Pluijm M, van Gelderen A, Kessels J. Activities and strategies for parents with less education to promote the oral language development of their children: A review of empirical interventions. School Community J. 2019;29(1):317–62.
9. Fernald A, Marchman VA, Weisleder A. SES differences in language processing skill and vocabulary are evident at 18 months. Dev Sci. 2013;16(2):234–50.
10. Safwat RF, Farrag SS, El-Sayed NG. Effect of parent-child interaction on language development in children. Al-Azhar Med J. 2017;46(4):1245–58.
11. Slosson RL. Slosson Intelligence Test for Children and Adults–Revised. East Aurora (NY): Slosson Educational Publications; 1997.
12. Hoff E. The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. Child Dev. 2003;74(5):1368–78.
13. Kaiser AP, Roberts MY. Advances in early communication and language intervention. J Early Interv. 2011;33(4):298–309.
14. Romeo RR, Segaran J, Leonard JA, Robinson ST, West MR, Mackey AP, et al. Language exposure relates to structural neural connectivity in childhood. J Neurosci. 2018;38(36):7870–7.

15. Sénéchal M, LeFevre JA. Parental involvement in the development of children's reading skill: A five-year longitudinal study. Child Dev. 2002;73(2):445–60.

16. Noble KG, Farah MJ, McCandliss BD. Socioeconomic background modulates cognition–achievement relationships in reading. Cogn Dev. 2006;21(3):349–68.

17. Eriksson M, Marschik PB, Tulviste T, Almgren M, Pérez Pereira M, Wehberg S, et al. Differences between girls and boys in emerging language skills: Evidence from 10 language communities. Br J Dev Psychol. 2012;30(2):326–43.

18. Vygotsky LS. Mind in society: The development of higher psychological processes. Cambridge (MA): Harvard University Press; 1978.

19. Snowling MJ, Moll K, Hulme C. Language difficulties are a shared risk factor for both reading disorder and mathematics disorder. J Exp Child Psychol. 2021;202:105009.

20. Weisleder A, Friend M, Tsui A, Marchman VA. Using parent report to measure vocabulary in young bilingual children: A scoping review. PsyArXiv [Preprint]. 2022. Available from: https://psyarxiv.com/un6yr