

Language Development and Social Intelligibility in Children with Autism Spectrum Disorder: A Comparison of Teletherapy and In-Clinic Interventions in Delhi

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Abstract

Autism Spectrum Disorder (ASD) is often associated with difficulties in language development and social communication. The present study compared the effectiveness of synchronous teletherapy and traditional in-clinic intervention in improving language development and social intelligibility among children with ASD aged 3–5 years. A total of 50 children were divided into a teletherapy group ($n = 25$) and an in-clinic intervention group ($n = 25$). Both groups received speech-language intervention of 5 sessions/week for 12 weeks.

Language outcomes were assessed using the Assessment of Language Development (ALD), social intelligibility was measured using the Intelligibility in Context Scale (ICS), and parental satisfaction with teletherapy was evaluated using the Telehealth Usability Questionnaire (TUQ). Statistical analysis included descriptive statistics, paired-samples t -tests, and independent-samples t -tests.

The findings revealed significant improvements in receptive and expressive language abilities in both groups following intervention. However, the in-clinic group demonstrated greater gains in language development and significantly higher social intelligibility scores than the teletherapy group. Parents reported high satisfaction with teletherapy, indicating that it was a convenient and acceptable mode of service delivery.

The study concludes that both teletherapy and in-clinic intervention are effective in supporting language development in children with ASD. However, in-clinic intervention demonstrated superior outcomes, while teletherapy remained a feasible alternative for families with limited access to in-person services. Speech-language pathologists (SLPs) play a crucial role in the assessment and intervention of communication difficulties in children with ASD. They evaluate receptive and expressive language skills,

speech intelligibility, social communication, and pragmatic language abilities to identify individual strengths and needs. Based on assessment findings, SLPs develop and implement individualized, evidence-based intervention programs to enhance language development, improve social interaction, and promote functional communication. In both teletherapy and in-clinic settings, SLPs provide structured intervention, monitor progress, and modify treatment goals according to the child's performance. They also collaborate with parents, caregivers, educators, and other professionals to facilitate the generalization of communication skills across daily environments. Through parent counseling and training, SLPs empower families to support communication development beyond therapy sessions, thereby improving participation, social engagement, and overall quality of life in children with ASD.

Keywords: Autism Spectrum Disorder, teletherapy, in-clinic intervention, language development, social intelligibility

1. Introduction

Autism Spectrum Disorder (ASD) is a lifelong neurodevelopmental condition that affects how a child communicates, learns, and responds to the social world. One of the most common areas of difficulty in ASD is language development. Some children may have very limited spoken language, while others may speak fluently but find it difficult to use language appropriately in social situations (American Psychiatric Association [APA], 2013). Because of this wide variation, early intervention must look beyond vocabulary and sentence formation and also consider how a child uses language in daily interaction.

A major part of communication in ASD is social intelligibility, which refers to how clearly a child is understood by others in natural social settings. This includes the use of eye contact, tone, turn-taking, and socially meaningful language. Pragmatic language skills are often especially important in ASD because they affect a child's ability to connect with peers, participate in conversation, and express needs effectively (Sadeghi et al., 2023). When pragmatic language is weak, children may struggle with peer relationships and may become socially isolated. For this reason, improving both language and social communication is an important goal of early therapy.

Early childhood is a particularly important period for intervention because the brain is highly adaptable during these years. Timely therapy can support better long-term outcomes in communication and learning (Christakis, 2009). At the same time, access to therapy is not always easy. Families may face barriers such as long travel time, waiting lists, cost, work pressure, and routine disruption (Kaur, 2022). These practical difficulties have encouraged the use of teletherapy as an alternative service delivery model. Teletherapy allows children to receive intervention in their home environment and can make therapy more accessible for families who find regular clinic visits difficult (Sharma et al., 2022).

Although teletherapy offers convenience, in-clinic intervention remains the traditional and widely used mode of speech-language therapy. In the clinic, the clinician can provide direct face-to-face support, structured activities, physical prompts, and immediate correction. This setting may be especially helpful for children who need more intensive interaction and environmental control. At the same time, teletherapy places the clinician in a different role, where guidance is delivered through a screen, and parents often become active partners in the intervention process. This makes the clinician's role in teletherapy more

collaborative, with greater emphasis on parent coaching, session planning, and adapting activities to the home context (Mishra & Patel, 2024). Therefore, it is important to compare teletherapy and in-clinic speech therapy not only in terms of language outcomes but also in terms of social communication and practical feasibility.

The SLP's are integral members of the multidisciplinary team involved in the management of children with ASD. The primary responsibility of the SLP is to assess communication abilities and identify deficits in language, speech, and social interaction that may affect a child's daily functioning. Following assessment, the SLP formulates individualized intervention goals and employs evidence-based techniques to facilitate the development of receptive language, expressive language, social communication, and intelligibility skills. In addition to direct therapy, SLPs guide parents and caregivers in implementing communication strategies within natural environments, thereby enhancing carryover of therapeutic gains. Whether services are delivered through teletherapy or in-clinic intervention, the SLP continuously evaluates treatment outcomes and adapts intervention approaches to meet the evolving needs of the child, ultimately promoting effective communication and greater participation in social and academic activities.

2. Western studies

Johnson et al. (2010) compared speech-language therapy delivered through telemedicine with conventional face-to-face intervention. The findings demonstrated that children receiving teletherapy achieved outcomes comparable to those receiving traditional intervention. Parents also reported positive experiences with the teletherapy model.

Baharav and Reiser (2010) investigated the use of telepractice for parent training in children with ASD. The study found that telepractice was effective in supporting communication intervention and resulted in high levels of parental satisfaction. The authors concluded that teletherapy could serve as a practical alternative to traditional face-to-face services while maintaining treatment effectiveness.

Boisvert et al. (2012) conducted a systematic review examining telepractice in the assessment and treatment of individuals with ASD. The review concluded that teletherapy showed promising outcomes for communication intervention and increased access to services for families who faced geographical barriers. However, the authors emphasized the need for additional research using standardized procedures and larger samples.

Ingersoll et al. (2015) examined parent engagement in a telehealth-based parent-mediated intervention program for children with ASD. The study reported high parent participation and satisfaction, supporting the use of telehealth to extend intervention into the home environment.

Hao et al. (2021) conducted a pilot study comparing teletherapy and in-person therapy for children with ASD. Their findings showed that both modes of intervention supported parent-mediated treatment and improved communication outcomes, suggesting that teletherapy can be a practical alternative to face-to-face therapy.

Gentile et al. (2022) studied a parent-mediated telehealth program for children with ASD and found that

telehealth could support early intervention when families are guided to carry out therapy at home. The study strengthens the view that telepractice can improve access to services while still promoting meaningful child and parent outcomes.

3. Indian studies

Rahman et al. (2016) carried out a randomized controlled trial in India and Pakistan on a parent-mediated intervention for children with ASD. The study found that the intervention was feasible and acceptable in South Asia, which supports the value of family-centered intervention models in low-resource settings.

Sikka et al. (2023) studied parents' perspectives on teletherapy for children with speech and language delay in India during the COVID-19 lockdown. The authors reported that many parents viewed teletherapy positively and considered it helpful, accessible, and motivating, although some families still preferred in-person contact for future treatment.

Mohan et al. (2023) investigated the reliability of oral language and emergent literacy tele-assessment in autistic children. Their study found a high level of agreement between in-person and tele-assessment modes, showing that telepractice can be a reliable option for assessing language skills in children with ASD.

Rao et al. (2025) explored the experiences of speech-language pathologists using telepractice for children with ASD in India. The study highlighted practical factors, clinicians' views, and child-related issues that influence the use of telepractice, showing that teletherapy remains an emerging area in India and warrants further research.

4. Need for study:

The ages between 3-5 years are considered a crucial period for language development among autistic individuals, but environmental factors in urban centers, such as Delhi, pose obstacles to effective intervention. Despite the effectiveness of traditional speech-language treatment in clinics, logistical challenges in India's metropolitan areas make it difficult for clinicians to reach clients on time, leading to fatigue that impairs their ability to work effectively and may reduce family participation. Although teletherapy became inevitable during the pandemic, the scientific community needs more studies in the Indian context to compare the effects of teletherapy with the efficacy of face-to-face treatment sessions. It is crucial to examine the concept of "functional" communication, as clinical success in the confines of the room may not equate to functional success in the real world, especially in a bilingual environment (Hindi-English).

5. Methodology

Aim of study:

The present study aimed to compare the effectiveness of teletherapy and traditional in-clinic intervention in improving language development and social intelligibility among children with ASD aged 3–5 years. Additionally, the study sought to evaluate parental satisfaction with teletherapy and examine its feasibility

as an alternative mode of speech-language service delivery.

Participants

A total of 50 children with ASD participated in the study. Participants were divided into two groups: Group A (Teletherapy; n = 25) and Group B (Traditional In-Clinic Intervention; n = 25). The sample consisted of 25 boys and 25 girls recruited from speech and language intervention centers in Delhi/NCR.

Inclusion Criteria

Participants were required to meet the following criteria:

Clinical Diagnosis: Children must have a confirmed clinical diagnosis of ASD established using recognized diagnostic measures such as the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), Childhood Autism Rating Scale (CARS), or Autism Diagnostic Observation Schedule (ADOS).

Age Range: Children must be between 3.0 and 5.0 years of age at the time of enrollment.

Access to Technology: For participation in the teletherapy group, families must have access to a stable high-speed internet connection and an appropriate digital device, such as a laptop or tablet.

Language Background: Children must reside in Delhi/NCR and be exposed to Hindi, English, or bilingual Hindi-English communication in their home environment.

Exclusion Criteria

Participants meeting any of the following criteria will be excluded from the study:

Co-occurring Conditions: Children with significant hearing impairment, visual impairment, neurological disorders (e.g., cerebral palsy), or other conditions that may substantially affect communication development.

Concurrent Intervention: Children currently receiving any additional speech-language therapy or structured intervention targeting communication skills during the study period.

Severe Behavioral Difficulties: Children who are unable to attend to a therapist or computer screen for a minimum of 20–30 minutes, even with parental support, will be excluded from participation.

6. Tests Used

The following standardized and validated instruments were used to assess language development, social intelligibility, and parental satisfaction in the present study:

The ALD was used to evaluate receptive and expressive language abilities in children aged 3–5 years. The test provides an estimate of a child's language age and assesses various aspects of language comprehension and expression.

The ICS is a parent-report measure consisting of seven items that assess a child's social intelligibility. The scale evaluates how well the child is understood by different communication partners in everyday situations.

The TUQ was administered to parents of children in the teletherapy group. The questionnaire assesses parental satisfaction and perceptions regarding the usability, effectiveness, quality, and convenience of teletherapy services.

Procedure

The study was conducted in three phases: baseline assessment, intervention, and post-intervention assessment.

Baseline Assessment (Pre-Test)

Following participant recruitment, eligibility was determined according to the established inclusion and exclusion criteria. Written informed consent was obtained from parents or legal guardians before data collection. Baseline language abilities were assessed using the ALD, administered by a qualified speech-language pathologist. Social intelligibility was evaluated using the ICS, completed by parents or primary caregivers.

Intervention Phase

The intervention was carried out over a period of 12 weeks, with participants in both groups receiving five therapy sessions per week, each lasting 45 minutes. Intervention targets were individualized based on each child's communication profile while maintaining comparable therapeutic objectives across groups, including the development of receptive and expressive language skills, vocabulary acquisition, sentence formulation, and functional communication.

Participants in Group A (Teletherapy) received intervention through real-time videoconferencing platforms. Therapy activities incorporated digital resources and structured parent involvement to facilitate engagement and support communication practice within the home environment.

Participants in Group B (In-Clinic Intervention) attended face-to-face therapy sessions at a clinical facility in Delhi. Intervention was delivered using conventional therapeutic materials and activities designed to promote language and social communication skills.

Post-Intervention Assessment

After the 12-week intervention period, all participants underwent reassessment using the ALD and the ICS. In addition, parents of children in the teletherapy group were asked to complete the TUQ to evaluate their satisfaction with teletherapy and its usability as a service delivery model. The pre- and post-

intervention scores were compared to determine changes in language development and social intelligibility across the two intervention groups.

Evaluation Post-Assessment

At the end of the 12 weeks, both groups underwent assessment using ALD and ICS to find out the "gain score" (difference between pre- and post-test). Further, the participants of Group A were made to take the TUQ to evaluate their experiences of the online process.

7. Statistical Analysis

Statistical analysis was conducted using IBM SPSS Statistics (Version 30.0). Continuous variables were summarized using means (M) and standard deviations (SD). Paired-samples t-tests were used to assess within-group pre-to-post intervention improvements for each cohort. Independent-samples t-tests were used to compare between-group net gains and ICS scores; Welch's adjustment for degrees of freedom was applied where Levene's test indicated a violation of the homogeneity of variance assumption ($p < .05$). The TUQ scores were examined using descriptive statistics (minimum, maximum, M, SD). Statistical significance was established at $p < .05$

8. Results and Discussion

Table 1: Paired Samples Statistics for Receptive and Expressive Language Scores

		Mean	N	Std. Deviation	Std. Error Mean
Group: Clinic	Pair 1: RLA Pre	2.4800	25	.47784	.09557
	RLA Post	2.8680	25	.50143	.10029
	Pair 2: ELA Pre	2.1560	25	.42728	.08546
	ELA Post	2.5360	25	.42316	.08463
Group: Teletherapy	Pair 1: RLA Pre	2.1840	25	.40587	.08117
	RLA Post	2.4480	25	.42340	.08468
	Pair 2: ELA Pre	2.2920	25	.40200	.08040
	ELA Post	2.5480	25	.36869	.07374

Table 1 revealed receptive language and expressive language in both groups. In the clinic group, receptive language increased from 2.48 to 2.86, and expressive language increased from 2.15 to 2.53. In the teletherapy group, receptive language increased from 2.18 to 2.44, and expressive language increased from 2.29 to 2.54. These values show that both groups improved after intervention, with the clinic group showing a slightly larger increase in mean scores.

Table 2: Paired-Samples t-Test Results for Pre- and Post-Intervention Language Scores.

Group	Comparison	Mean Difference	SD	SE	95% CI Lower	95% CI Upper	t	df	p	Significance
Clinic	RLA Pre - RLA Post	-0.388	0.0781	0.01562	-0.42024	0.35576	-24.839	24	< .001	S
Clinic	ELA Pre - ELA Post	-0.38	0.0645	0.01291	-0.40664	0.35336	-29.435	24	< .001	S
Teletherapy	RLA Pre - RLA Post	-0.264	0.10755	0.02151	-0.30839	0.21961	-12.274	24	< .001	S
Teletherapy	ELA Pre - ELA Post	-0.256	0.1044	0.02088	-0.2991	-0.2129	-12.26	24	< .001	S

Table 2 found that the pre-test and post-test differences were statistically significant in both groups, with all paired-samples t-tests showing $p < .001$. Within each group. In the clinic group, the mean difference was -0.38 for receptive language and -0.38 for expressive language. In the teletherapy group, the mean difference was -0.26 for receptive language and -0.25 for expressive language. The negative sign appears because the difference was calculated as pre-test minus post-test. This means the post-test scores were higher than the pre-test scores. The t-values were large in both groups, which shows that the improvement was statistically significant.

Table 3: Compares the amount of improvement between the two groups

Variable	Group	N	Mean	Std. Deviation	Std. Error Mean
RLA Net Gain	Clinic	25	0.388	0.0781	0.01562
	Teletherapy	25	0.264	0.10755	0.02151
ELA Net Gain	Clinic	25	0.38	0.06455	0.01291
	Teletherapy	25	0.256	0.1044	0.02088

Table 3 compares the improvement observed in both groups. The receptive language: the clinic group had a net gain of 0.38, while the teletherapy group had a net gain of 0.26. For expressive language, the clinic group had a net gain of 0.38, while the teletherapy group had a net gain of 0.25. This shows that the clinic group improved more than the teletherapy group in both receptive and expressive language.

Table 4: Checks whether both groups had similar variation in their scores.

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
RLA Net Gain	Equal variances assumed	3.879	0.055	4.665	48	< .001	0.124
	Equal variances not assumed.			4.665	43.806	< .001	0.124
ELA Net Gain	Equal variances assumed	5.585	0.022	5.051	48	< .001	0.124
	Equal variances not assumed.			5.051	40.009	< .001	0.124

Table 4 revealed the variations in scores where in the receptive language net gain: the *t* value was 4.66, the mean difference was 0.12, and the *p* value was < .001. For expressive language net gain, the *t* value was 5.05, the mean difference was 0.12, and the *p* value was also < .001. These results show a statistically significant difference between the groups. The clinic group outperformed the teletherapy group in both receptive and expressive language gains.

Figure 1: Comparison of Mean Language Gains Between Clinic and Teletherapy Groups

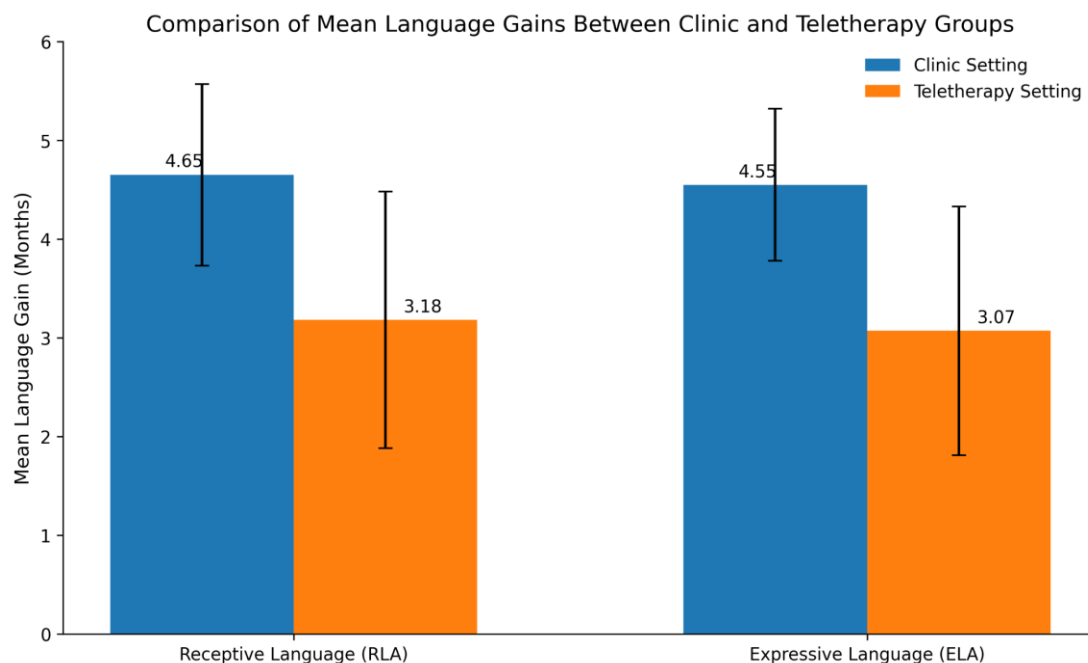


Figure 1 illustrates the comparison of mean language gains between the clinic and teletherapy groups following the 12-week intervention. The clinic group demonstrated greater improvement in both receptive language (RLA) and expressive language (ELA). The scores for (RLA) were 4.65 for the in-clinic group and 3.18 for the teletherapy group while the (ELA) scores were 4.55 for the in-clinic group and 3.07 for the teletherapy group. Although both groups showed positive language gains, children who received in-clinic intervention achieved higher mean scores, indicating that face-to-face therapy was more effective in improving language abilities. These findings are consistent with the statistical results presented in Table 4, which showed a significant difference between the two intervention groups ($p < .001$).

Table 5: Presents the comparison of ICS scores between the clinic and teletherapy groups.

Group	N	M	SD	t	df	p	95% CI
Clinic Setting	25	4.35	0.29	7.12	48	< .001	[0.48, 0.85]
Teletherapy Setting	25	3.68	0.37				

Table 5 shows the comparison of ICS scores between the two groups. The clinic group obtained a mean score of 4.35 (SD = 0.29), whereas the teletherapy group obtained a mean score of 3.68 (SD = 0.37). The independent-samples t-test revealed a statistically significant difference between the two groups, $t(48) = 7.12$, $p < .001$. These findings indicate that children who received intervention in the clinic setting demonstrated better social intelligibility and were more easily understood in everyday communication situations than children who received teletherapy. This suggests that the clinic setting may offer greater opportunities to develop effective social communication skills.

Table 6: Presents the descriptive statistics for the TUQ

Measure	N	Minimum	Maximum	M	SD
Telehealth Usability Questionnaire (TUQ)	25	4.02	5	4.63	0.25

Table 6 shows the results of the TUQ from the teletherapy group, revealing a mean score of 4.63 (SD = 0.25), with scores ranging from 4.02 to 5.00. The high mean score indicates a high level of parental satisfaction with teletherapy services. Parents generally reported positive experiences regarding the usability, accessibility, and convenience of the teletherapy platform. These findings suggest that teletherapy was well accepted by families and was considered an effective and user-friendly mode of service delivery.

The findings showed that both intervention approaches significantly improved receptive and expressive language skills after the 12-week intervention period. However, children who received in-clinic intervention demonstrated greater improvement in language development and higher social intelligibility scores than those who received teletherapy. These findings are consistent with previous studies by Grogan-Johnson et al. (2010), Boisvert et al. (2012), and Hao et al. (2021), which reported that both teletherapy and face-to-face intervention are effective in improving communication outcomes in children with ASD. The greater improvement observed in the clinic group may be due to direct clinician-child interaction, immediate feedback, and a structured therapy environment, which support better language learning.

The present findings also agree with Indian studies that reported teletherapy as a feasible and family-friendly service delivery model. Sikka et al. (2023) found that parents had positive experiences with teletherapy, while Mohan et al. (2023) and Rahman et al. (2016) highlighted its usefulness in supporting communication intervention in children with ASD. Similarly, parents in the present study reported high satisfaction with teletherapy despite the clinic group showing better language and social intelligibility outcomes. Therefore, the findings suggest that although in-clinic intervention remains the more effective approach for improving communication skills, teletherapy is a valuable alternative for families who have limited access to in-person speech-language services.

9. Summary and Conclusion

The present study compared the effectiveness of synchronous teletherapy and traditional in-clinic intervention in improving language development and social intelligibility among children with ASD aged 3–5 years. Language outcomes were assessed using the ALD, social intelligibility was measured using the ICS, and parental satisfaction with teletherapy was evaluated using the TUQ.

The findings revealed that both intervention approaches resulted in significant improvements in receptive and expressive language abilities following the 12-week intervention period. However, children who received in-clinic intervention demonstrated greater gains in language development compared to those who received teletherapy. Similarly, the clinic group obtained significantly higher ICS scores, indicating better social intelligibility and more effective communication in everyday situations.

Despite showing comparatively smaller language gains, teletherapy yielded positive outcomes and was highly accepted by parents. The high TUQ scores reflected strong satisfaction with the usability, accessibility, and convenience of teletherapy services. These findings suggest that teletherapy can serve as a valuable alternative when in-person services are not readily available.

In conclusion, both teletherapy and in-clinic intervention were effective in supporting language development in young children with ASD. However, in-clinic intervention demonstrated superior outcomes in receptive language, expressive language, and social intelligibility. Teletherapy remains a feasible and family-friendly service delivery model that can improve access to intervention, particularly for families facing geographical, logistical, or time-related barriers. The findings of the present study support the continued use of teletherapy while highlighting the greater effectiveness of direct in-clinic intervention for achieving optimal language and communication outcomes.

10. Limitations

- The sample size was relatively small ($N = 50$), which may limit the generalizability of the findings to a wider population of children with ASD.
- The study included only children aged 3–5 years from the Delhi/NCR region; therefore, the results may not be representative of children from other age groups or geographical locations.
- The intervention period was limited to 12 weeks, which may not have been sufficient to evaluate the long-term effects of teletherapy and in-clinic intervention.
- Teletherapy outcomes may have been influenced by external factors such as internet connectivity, availability of appropriate devices, and the level of parental involvement during sessions.
- The study was conducted in a bilingual Hindi-English context, and the findings may not be directly applicable to children from different linguistic backgrounds.

11. Future Recommendations

- Future studies should include larger and more diverse samples to improve the generalizability of the findings.
- Longitudinal studies with extended follow-up periods should be conducted to examine the long-term maintenance of language and communication gains.
- Randomized controlled trials should be undertaken to provide stronger evidence regarding the effectiveness of different intervention approaches.
- Future research should compare teletherapy, in-clinic intervention, and hybrid service delivery models to identify the most effective and practical approach.
- Additional outcome measures such as cost-effectiveness, caregiver burden, treatment adherence, and child engagement should be explored.

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