Effects of Parents' Questioning and Feedback Strategies in Shared Reading on Children's Language Development

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Abstract

This study aims to compare the effects of *questioning with minimal evaluation* (PE) and *prompt-evaluate-expand-repeat* (PEER) used in dialogic reading (DR) on children's language development. This study included 119 typically developing (TD) and 107 Chinese children with autism spectrum disorder (ASD) by using a pre- and post-interactive DR intervention design. The children were randomly assigned into three groups (the PE, PEER and control groups) and were tested on language skills immediately before and after the 12-week intervention. Overall, the findings indicated that using DR prompts had positive effects on the children's receptive vocabulary, character reading and listening comprehension development. Moreover, mutual feedback with expanded responses was particularly useful to fostering expressive vocabulary and the affective aspects (i.e. reading interest) of language learning in both TD and children with ASD. These findings explain the extent to which prompt and feedback strategies contribute to language skills and affective factors (i.e. reading anxiety and reading interest) in children's language learning process.

Keywords: dialogic reading, feedback, questioning, kindergarteners, parent, reading anxiety

Introduction

Parent–child dialogic reading (DR) enhances the development of children's language ability and reading interest (Authors, 2010, 2018, 2021, 2022; Hargrave & Sénéchal, 2000; Whitehurst et al., 1988). Past studies suggested that DR enhanced readers' language ability development and downgrade the levels of negative affective factors (e.g., reading anxiety) during book reading activities (Authors, 2018; 2022). DR includes the prompt-evaluate-expand-repeat (PEER) sequence (Whitehurst et al., 1988; Zevenbergen & Whitehurst, 2003). In the PE element, the educator prompts a child to address questions connected to the storybook with evaluation feedback, whereas in the -ER element, the educator expands on the child's responses by providing additional details that may connect the stories, such as linking stories to children's lives or adding in a few more words (e.g., adjectives or a dependent clause) (Grygas Coogle et al., 2018; Whitehurst & Lonigan, 1988). PE is a critical element of PEER because it provides interactive feedback to children. The interactive communication between child-parent in reading is believed to promote children's reading in term of providing positive affective feelings (e.g., reading interest) while reducing reading anxiety (e.g., Dong et al., 2023).

Social learning theory (Bandura & Walters, 1977) suggested that more parent-child interactions (prompts and feedback) in language learning activities should result better language learning outcomes. Book-reading with feedback is essential for language learning as the feedback corrects learners' conceptual errors before they are internalised (Su & Zou, 2022; Zhu et al., 2020). In storybook reading activities, PEER contains higher levels of interactive feedback than PE between educators and learners. To compare the evaluation feedback levels in PE and PEER, the current study defines 'PE' as the prompts with minimal feedback (e.g., true, correct, incorrect, and false) presentation to children's responses during book reading activities. 'PEER' refers to the collaborative dialogue with multiple

rounds of mutual feedback. During book reading activities, parents in PEER provide multiple rounds of feedback and extend the feedback more than providing information to children. However, the impact of low and high levels of interactive feedback (e.g., simple feedback and mutual corrective feedback)—often used in parent–child book reading activities—on the latter's language ability, reading interest and reading anxiety remains unclear. In particular, the effects of PEER elements (PE vs. PEER) on children's language ability, reading interest and reading anxiety have yet to be fully investigated.

Moreover, during their language learning activities, children with autism spectrum disorder (ASD) usually face more challenges in expressive language and communication with educators than their typically developing (TD) counterparts (Grygas Coogle et al., 2018; Tenenbaum et al., 2017; Westerveld et al., 2021). For example, children with ASD have deficits in verbal communication abilities (e.g., vocabulary and word reading) during educational activities (Bean et al., 2019; Nunes et al., 2022). In turn, such insufficient language abilities negatively impact the development of the affective factors (e.g., reading anxiety and reading interest) during book reading activities (Lo & Shum, 2021; Tenenbaum et al., 2017; Westerveld et al., 2021). However, at present, the contributions of PE and PEER on children with ASD language ability development and affective factors (e.g., reading interest, reading anxiety) during book reading activities remain unclear. In other words, whether the PE or PEER have similar contribution patterns to the language ability, reading anxiety and reading interest development of TD and children with ASD has yet to be confirmed. Therefore, the current study aims to use the PE and PEER design to further compare the impacts of low and high levels of interactive feedback on the language ability, reading anxiety and reading interest development of TD and children with ASD.

Literature Review

Dialogic Reading

DR is an interactive parent–child language learning activity in which parents use appropriately scaffolded questions and respond to their children by using picture books to facilitate the latter's language development (Zevenbergen & Whitehurst, 2003). DR emphasises social and cultural interactions with the more knowledgeable properties rather than formal language properties (Authors, 2023; Zhu et al., 2020). The sociocultural perspective views DR as collaborative learning activities, including scaffolding, collaborative dialoguing, private speech and situated learning (Authors, 2023; Su & Zou, 2022). DR requires parents to ask their children questions related to the story or pictures in the books they are reading together and expand on the aspects of the story that are related to the children's lives. In addition, parents also ask questions and provide their children with additional conceptual details about the objects depicted in the book. These prompts the children to enhance their understanding of the descriptions of materials presented in their picture books (Şimşek & Erdoğan, 2021; Whitehurst & Lonigan, 1998). Furthermore, DR requires children to become active communicators instead of passive listeners (Whitehurst & Lonigan, 1998).

In line with the abovementioned strategies, parents are trained to provide appropriate story explanations and direct their children to make comments by asking questions at specified intervals, eventually allowing these children to tell the story themselves. They may include individual prompts at any time they wish when sharing a book with a child. DR implementation under the home literacy context has been suggested to facilitate the development of children's receptive language (e.g. receptive vocabulary and word reading), expressive language (Authors, 2010, 2018, 2021; Cook et al., 2023; Lever & Sénéchal, 2011). Past studies reported that DR enhances children's language abilities in

terms of their receptive vocabulary, expressive vocabulary, word reading and listening comprehension (Authors, 2018; 2023; Lever & Sénéchal, 2011; Pillinger & Vardy, 2022). In addition, past studies have shown that an intimate parent–child relationship has an impact on family educational activities (Ansari et al., 2020; Dong et al., 2022; Kiuru et al., 2020). Therefore, in the DR intervention design, the intimate parent–children relationship should be controlled.

Most questions used in the parent–child DR follows the PEER technique (Grolig et al., 2020; Whitehurst et al., 1988; Zevenbergen & Whitehurst, 2003), which involves (1) the parents prompting their children to further discuss the presented stories (P: prompt), (2) the parents providing timely and appropriate feedback to evaluate their children's responses (e.g. comments or praise words) (E: evaluate), (3) the parents asking further questions about the story to trigger the children's use of expressive words or expand the words used in the DR activities, particular for those words did not present in DR books (E: expand) and (4) educators encouraging learners to repeat the expanded contents (R: repeat). A series of questions called 'CROWD' are applied in prompts, which has been proposed in the literature to improve the efficiency of communication or discussion between parents and children by enabling the latter to efficiently describe and retell stories (Grolig et al., 2020; Simsek & Erdogan, 2015; Whitehurst et. al, 1988; Zevenbergen & Whitehurst, 2003). These questions include (1) the parents asking children to complete a sentence (C: completion); (2) the parents asking children to recall details about the story (R: recall); (3) the parents asking children some open-ended questions (O: open-ended questioning); (4) the parents asking some 'wh-' questions, including why, who, when, where and how questions (W: wh- questions); and (5) the parents asking their children to make connections between what they read in the book and their specific experiences (D: distancing). However, the impact of DR elements with low and high levels of interactive feedback (PE vs. PEER)

on children's language abilities has not yet been clarified.

Dialogic Reading and Children's Affective Factors Development

Children's learning emotions accompany with parents' book reading gained attention in academic (Authors, 2023; Cook et al., 2023). How do downgrade the reading anxiety and improve the level of reading interest has been the focus of DR research. DR presented multiple rounds of interaction between parents and children regarding the book content, which evoked the children's learning interest to engage in book reading activities. Meanwhile, prompts with encouragement feedback on time also downgrade children's reading anxiety (Authors, 2023). For example, Cook et al. (2023) suggested that DR reduces children's reading anxiety and improves the level of reading interest. However, the impact of DR elements with low and high levels of interactive feedback (PE vs. PEER) on children's affective factors (e.g., reading interest and reading anxiety) has not yet been clarified.

Dialogic Reading with Children with ASD

Past studies have reported that children with ASD enjoyed book reading less and spent less time on storybook reading activities than their TD peers (Lo & Shum, 2021; Tenenbaum et al., 2017; Westerveld et al., 2021). The challenges experienced by children with ASD in book reading activities come from the social and communicative demands of the activity. Book reading activities request learners to engage in social interactions by asking and responding to questions based on the content of the book being discussed. This requirement is a challenge for children with ASD because they are unable to establish joint attention and social reciprocity and often exhibit delays in language development. Moreover, compared with TD children, children with ASD also face challenges in

discerning others' thoughts and feelings in oral and written forms (Grygas Coogle et al., 2018; Tenenbaum et al., 2017; Westerveld et al., 2021), resulting in comprehension failure and experiences of negative affective feelings (e.g., reading anxiety) in typical book reading activities.

For young children with ASD, book reading intervention should be embedded into active engagement to create reciprocal, meaningful interactions that facilitate learning (Bean et al., 2019; Nunes et al., 2022). For this purpose, DR is a promising intervention that has produced positive language learning outcomes amongst children with ASD (Grygas Coogle et al., 2018; Mucchetti, 2013; Whalon et al., 2013). In particular, Grygas Coogle et al. (2018) reported that DR intervention enhanced the vocabulary development of ASD pre-schoolers. Mucchetti (2013) examined the effects of DR intervention on the language ability development of 4 children with ASD aged between 5 and 6 years and found that all participants in the DR group demonstrated significant improvements in their story comprehension. Meanwhile, children with ASD faced many challenges in using expressive language during communication. Ramsey et al. (2021) reported DR was an effective approach to enhance ASD children's expressive language development. Compared with PEER condition, children with ASD in PE condition were required less level of interaction between parents and children because PE created less pressure environment for children to voice out, resulting less opportunity to obtain parents' feedback. The less opportunity for children with ASD to voice out may downgrade more level of reading anxiety and obtained more reading interest, meanwhile, the development of expressive vocabulary may also be negatively impacted by PE condition. However, to date, less is known about the effects of DR on the affective factor (e.g., reading interest, reading anxiety) development of children with ASD. In addition, whether low and high levels of interactive feedback presentations have similar contribution patterns to children with ASD language abilities and affective feelings has yet to be

clarified. For this reason, the contributions of DR elements (PE vs. PEER) on children with ASD language abilities and the development of affective factors (e.g., reading anxiety and interest) warrant further examination.

The Current Study

This study aimed to compare the impacts of high and low levels of interactive feedback presentation on children's language abilities and relevant affective factor development during book reading activities. Furthermore, this work examined the partial element of PEER through typical PE on children's language abilities and affective factor development during book reading activities. Therefore, this study extends the literature by investigating the effects of DR questioning and feedback strategies on children's language ability and affective factor development. The performance of three groups (PE, PEER and control groups) was compared to address two research questions. First, do DR prompt questioning strategies with minimal feedback enhance children's language development? It is hypothesised that the PE group will demonstrate greater growth in language skills and reading interest as well as lower reading anxiety compared with the control group. Second, do greater feedback presented by parents enhance such development? It is hypothesised that the PEER group will demonstrate greater growth in language skills and reading interest, as well as lower reading anxiety compared with the PE and control groups.

Method

Participants

A total of 249 third-grade kindergarteners and their parents were recruited from the Civic

Education Service Centre of Hainan, China. These families were ranked low to middle income (earning less than 1,815 RMB per month in Hainan according to 2021 data). Amongst these children, 121 children were diagnosed with ASD syndrome by their school clinics. The team members who implemented clinical ASD syndrome diagnoses were licensed child psychiatrists. Children with ASD received their diagnosis according to the DSM-5 (American Psychiatric Association [APA], 2013). Children with ASD had a verbal Chinese receptive vocabulary test score of 20 or above to ensure an adequate level of verbal functioning for participation. Whereas 128 children were diagnosed as TD without any behavioural disorders (e.g. attention problems). All students were randomly assigned into the PE, PEER and control groups. During the intervention, 23 families dropped out from the study for various reasons (e.g. moved to another city and unqualified performance in the typical DR activities), thus leaving 226 families to complete the entire intervention and participate in the post-test. The PE group included 40 TD (22 boys, 18 girls, mean age = 5.47, SD = .31) and 36 children with ASD (18 boys, 18 girls, mean age = 5.51, SD = .27). The PEER group included 40 TD (20 boys, 20 girls, mean age = 5.49, SD = .28) and 36 children with ASD (17 boys, 19 girls, mean age = 5.55, SD = .30). Finally, the control group included 39 TD (21 boys, 18 girls, mean age = 5.53, SD = .26) and 35 children with ASD (18 boys, 17 girls, mean age = 5.52, SD = .29).

Measures

Receptive Vocabulary

This study used a Mandarin receptive vocabulary test adapted from the Chinese Receptive Vocabulary Test (Tong et al., 2017), which can be used to measure Chinese kindergarten children's receptive vocabulary (Tong et al., 2017). In this test, the children were asked to orally define a one- or

two-character word shown twice on a video recording. This test included 60 items, and each correct answer was given a score of 1. Each child can receive a maximum score of 60, and the test had a Cronbach's α of .93. The CFA results [χ^2/df = 1.07 (p = .39), CFI = .98, TLI = .97, RMSEA = .02, SRMR = .01] confirmed the good construct validity of the adapted test.

Expressive Vocabulary

This study used a Mandarin expressive vocabulary test adapted from the Expressive One-Word Picture Vocabulary Test (Martin & Brownell, 2011). The Mandarin version of the vocabulary test can be used to measure Chinese participants' expressive vocabulary across kindergarten to adulthood (Chow et al., 2018; 2021). In this test, children were asked to recite a word that matched the semantic meaning of the presented pictures. This test included 60 items, with each correct answer given a score of 1. Each participant can obtain a maximum score of 60, and the test had a Cronbach's α of .90. The CFA results [χ^2/df = 1.20 (p = .11), CFI = .99, TLI = .99, RMSEA = .01, SRMR = .01] confirmed the good construct validity of the adapted test.

Character Reading

This study used the 120-item Chinese Character Reading Test (Kim et al., 2020), which can be used to measure Chinese kindergarten children's character reading. In this test, the children were asked to read aloud each word presented by their instructor. The test stopped when they failed to read 15 items consecutively. Each correct pronunciation was given a score of 1. A child can receive a maximum score of 120, and the test had a Cronbach's α of .94.

Listening Comprehension

This study used the 20-item HSK-5 (2018) Listening Comprehension Test to examine the Chinese kindergarten children's listening comprehension ability. In this test, the instructor read aloud 15- to 20-character sentences twice and asked the children to choose one of four pictures whose semantic meaning best matched the presented sentence. The test was stopped when the students committed four consecutive errors. Each correct answer was awarded a score of 1. A child can receive a maximum score of 20, and the test had a Cronbach's α of.79.

Reading Comprehension

This study examined the reading comprehension ability of parental educators by using the 20-item Hanyushuipingkaoshi-Level 6 (HSK-6, 2018) test developed by the China Confucius Institute Headquarters Office. Here, the parent educators were given five 500-character passages, with each passage followed by four question items. The questions included one word semantic meaning inference question, one main idea question and two detailed search questions. Each correct answer was awarded a score of 1. A parent educator can receive a maximum score of 20, and the test had a Cronbach's α of .79.

Reading Interest Questionnaire

'Reading interest' refers to the degree of interest shown by kindergarten children in what is being read (Zhang & Xin, 2012). This study used the 6-item Chinese Reading Interest Scale of Zhang and Xin (2012). An example item was 'Reading books really attracts my attention'. In this test, the students rated their feelings about each item using a 4-point Likert-type scale (1 = strongly disagree to 4 =

strongly agree), with higher scores indicating a higher intrinsic interest in reading activities. The instructor read each item aloud twice, after which the children were asked to select a description that best matched their own reading interest. Each child can receive a maximum score of 24, and the scale had a Cronbach's α of .86.

Reading Anxiety Questionnaire

'Reading anxiety' refers to the relative degrees of individual negative feelings shown by kindergarten children in the process of printed text reading (Saito et al., 1999). This study translated the Foreign Language Reading Anxiety Scale (Saito et al., 1999) into Chinese (e.g. 'When you need to voice out a strange single character, what is your feeling'?). The children rated their feelings on a 5-point scale  (1 = never nervous to 5 = very nervous; each point with a corresponding smiley/nervous face), with higher scores indicating a higher intrinsic nervousness in reading activities. The instructor read each item aloud twice and then asked the children to select a description that best matched their own feelings. A child can receive a maximum score of 80 from 16 items, and the scale had a Cronbach's α of .91. The CFA results [χ^2/df = 1.01 (p = .07), CFI=.97, TLI=.97, RMSEA=.03, SRMR =.02] confirmed the good construct validity of the adapted scale.

Non-verbal Intelligence

This study used the full version of Raven's Progressive Matrices (Sections A to E) to examine kindergarten children's non-verbal intelligence (Raven et al., 1996). Each section contained 12 items, and the children were asked to select 1 out of 6–8 options that best completed the given set of pictures. Each correct answer was given a score of 1. A child can receive a maximum score of 60, and the test

had a Cronbach's α of .87.

Children and Parents Intimacy Questionnaire

In this study, we revised the Family Members Intimacy Scale (Sun, 2014) by considering the response given by the parents during the DR with their children. The scale included 16 items (e.g., 'My father/mother and I have a very close relationship'). Meanwhile, the children's feelings of intimacy were rated on a 5-point scale (1 = strongly disagree to 5 = strongly agree), with higher scores indicating a higher level of intimacy between children and their parent educator. Here, the DR instructor read each description aloud twice and asked the children to select the description that best matched their feelings of intimacy with their parent educators. Each child can receive a maximum score of 80, and the scale had a Cronbach's α of .92. The CFA results [χ^2/df = 1.12 (p = .09), CFI = .96, TLI = .97, RMSEA = .04, SRMR = .04] indicate that the revised scale can be used to examine the intimate parent–child relationship.

Procedure

Consent forms were obtained from the children and their parents. Before performing the intervention, the parents tasked to administer DR to their children were tested for their expressive vocabulary and reading comprehension and were asked to provide their demographical information (e.g. age, gender, educational background and home income). The children were also subjected to a pre-test to evaluate their receptive vocabulary, expressive vocabulary, character reading, listening comprehension, reading interest, reading anxiety and intimacy with their parents. **Table 1** presents the demographic information of the children and their parents.

To empower parents in the PE and PEER groups to smoothly implement the DR activities with their children, a research team member organised a two-hour workshop to equip these parents with the necessary knowledge and techniques during the book reading activity. For the PE group, the research team organised a CROWD prompt training to teach parents on how to use appropriate prompting techniques in the parent–child DR activities. Furthermore, sample prompts were printed on the exercise book to provide instructions to parents on how to use prompts with their children during the book reading activities. In addition, the parents in the PE group were also required to provide minimal feedback to their children's responses, such as 'OK, next question', 'Oh, wrong answer, next question', and 'Correct, the question'.

For the PEER group, the research team informed the parents about the requirements of the PEER sequence and the CROWD prompts and demonstrated how these requirements can be applied in the parent–child DR activities. Parents in this group were required to immediately present detailed feedback to their children, including comments on word pronunciation, direction of the answer, etc. After the workshop, the parents in the PE and PEER groups were required to perform the 靴子和猫 (boots and cats) book reading activity, wherein the research team members played the role of learners to confirm whether these parents learned and mastered the corresponding techniques and were able to accurately apply them in practice. Only those parents who satisfied all requirements were considered as qualified educators, whilst all other parents were asked to repeat the workshop and the 靴子和猫 (boots and cats) book reading activity.

The parent–child DR intervention lasted for 12 weeks, during which all parents were required to audio-record their DR activities to efficiently supervise them. All parents in the PE and PEER groups were required to report the titles of materials they used and the times at which they started the DR

activities. After each DR activity, the research team collected the audio recordings from the parents. Once the audio recordings were transcribed, a research team member further coded the transcripts into a database for further data analysis. The research team members then checked audio recordings to determine whether the parents in the PE and PEER groups were on the right track in terms of implementing DR every weekend throughout the 12-week DR intervention. If the PE parents did not satisfy the requirement of the CROWD prompts or if the PEER parents did not satisfy the expected PEER performance, the research member contacted these parents and informed them to receive another round of training.

In particular, we checked the audio records twice per week, and the families who did not qualify were considered 'drop out families', although we also provided them with another round training. These families' data have been recorded. The research team contacted the families in the PE, PEER and control groups via phone calls every Sunday and Wednesday to ensure that they implemented the required book reading activities smoothly to their children. After the 12-week DR intervention, the children in the PE, PEER and control groups were given a post-test using the same language, reading interest and reading anxiety measures employed in the pre-test to assess the reading activity outcomes.

Reading Materials

This study provided 12 narrative story books to all families. These books, which can be found in http://www.qbaobei.com/jiaoyu/jyzy/hb/, contained many pictures and did not heavily rely on written text, unlike those materials that have been successfully used in previous studies (Author, 2010, 2018). The research team revised the contents of these books according to the research purpose and then allocated them to the families in the PE, PEER and control groups. Prompt questions were printed on

the books given to the PE group. For the PEER group, aside from the prompts printed on the book, more tips on how to expand the conversation (e.g., enlarge the conversation scope with more related children's daily activities) were printed on the books, along with 'repeated conversation' instructional words to meet the 'repeat' requirement.

PEER Group

The parents in the PEER group were given 12 narrative story books containing the necessary hints for the prompt questions and a guideline for applying the DR technique. They strictly followed the requirements of the PEER sequence and CROWD prompts. In particular, they were required to ask the children some relevant questions and requested them to comment on the reading materials. The book reading activities were implemented twice a week, and each activity lasted for 25 minutes. The parents in this group also used the teaching and learning materials provided by the research team for the parent–child DR activities.

PE Group

Whilst the parents in the PE group were provided the same set of story books and hints for the prompt questions as the PEER group, the parents in the PE group were trained to use CROWD prompts and provide simple feedback (e.g. Yes/No or Correct/Incorrect) to children. After the parent–child dyad accomplished all prompt questions, the parents were asked to read the story again without prompts to their children for the second time to counterbalance their learning time with those in the PEER group (25 minutes).

Control Group

The parents in the control group were provided the same set of storybooks as the other two groups but were given neither the DR prompt question hints nor the technique guidelines. The parents in this group were given one story book each week and were asked to read each book twice a week (25 minutes per session). These parents were also asked to read the provided book materials as they normally would during the intervention.

Data Analysis

Preliminary statistics were collected to ensure that the baselines of the children's language development, reading interest and reading anxiety were the same across the PE, PEER and control groups. These statistics included chi-square and mixed effect tests across age, gender composition and language task performances before the intervention. At post-test, a mixed effect test was also performed to compare the teaching effects on the language and affective factor development (reading interest and reading anxiety) of children in the PE, PEER and control groups as well as to examine inter-group differences between the pre- and post-tests. To easily interpret the results, the PE group was set as the baseline to further compare the language ability, reading interest and reading anxiety development of TD and children with ASD during their DR activities. The effect sizes were measured using eta-squared (η^2), with η^2 = .01, .06 and .14 indicating small, medium and large effect sizes, respectively, following the rule of thumb for effect sizes (Cohen, 1988).

Results

Descriptive Analysis and Pre-Test Measures

Table 2 presents detailed information about the language task performance of TD and children with ASD across the PE, PEER and control groups. The results of the mixed effects and chi-square test showed that these children had similarities in terms of the following: age distribution [TD: $F(2, 116) = .35$, $p = .70$; ASD: $F(2, 104) = .21$, $p = .81$], gender composition [TD: χ^2 (2, 116) = .22, $p = .90$; ASD: χ^2 (2, 104) =.13, $p = .94$], SES composition [TD: χ^2 (2, 97) = .62, $p = .74$; ASD: $\chi^2(2, 103) = 3.21$, $p = .20$], feelings of intimacy with parent educators [TD: $F(2, 116) = .64$, $p = .53$; ASD: $F(2, 104) = .18$, $p = .84$], receptive vocabulary [TD: $F(2, 116) = .90$, $p = .41$; ASD: $F(2, 104) = 1.76$, $p = .18$], expressive vocabulary [TD: $F(2, 116) = .97$, $p = .38$; ASD: $F(2, 104) = 1.32$, $p = .27$], character reading [TD: $F(2, 116) = 1.37$, $p = .26$; ASD: $F(2, 104) = .51$, $p = .60$], listening comprehension [TD: $F(2, 116) = 1.60$, $p = .21$; ASD: $F(2, 104) = 1.28$, $p = .28$], reading interest [TD: $F(2, 116) = .10$, $p = .91$; ASD: $F(2, 104) = .03$, $p = .97$] and reading anxiety [TD: $F(2, 116) = .52$, $p = .60$; ASD: $F(2, 104) = .10$, $p = .91$] before the intervention. Furthermore, the effect sizes η^2 ranged between .002 and .027 and between .001 and .033 for the TD and children with ASD, respectively, thus indicating that a similar demographical baseline was used for these three groups of kindergarteners.

For the parental measures, the results of the mixed effects and chi-square test showed that the parental educators in the PE, PEER and control groups had similarities in the following aspects: education background composition [TD: χ^2 (2, 116) = 3.51 , $p = .74$; ASD: χ^2 (2, 104) = 3.17, $p = .53$], gender composition [TD: χ^2 (2, 116) = 1.01 , $p = .61$; ASD: χ^2 (2, 104) = 3.32, $p = .19$], age [TD: $F(2, 116) = .77$, $p = .53$; ASD: $F(2, 104) = .65$, $p = .47$], reading comprehension [TD: $F(2, 116) = .99$, $p = .91$; ASD: $F(2, 104) = .28$, $p = .28$] and expressive vocabulary [TD: $F(2, 116) = .53$, $p = .53$; ASD: $F(2, 104) = .88$, $p = .88$]. The effect sizes η^2 ranged between .001 and .012 and between .002 and .031 for the TD and children with ASD educators, respectively, thereby indicating that parent educators in

the three groups shared a similar demographical baseline. In addition, the results of the skewness and kurtosis analyses revealed that the task performance of both children and parents were within ±2, thereby indicating the absence of outliers in this study.

TD Children

The mixed effect analysis used children's non-verbal intelligence, feelings of intimacy with educators, parental reading comprehension and expressive vocabulary as control variables, and the results showed that the group (PE vs. PEER vs. control) effect was significant across the children's receptive vocabulary, expressive vocabulary, character reading, listening comprehension, reading interest and reading anxiety (*ps* < .001). Furthermore, the effect sizes η^2 ranged between .27 and .95, thereby indicating that the TD children in the PE, PEER and control groups showed different performances between the pre- and post-tests. Detailed information can be found in **Table 2**.

The results of the mixed effect analysis, which used the same control variables, revealed that after the DR intervention, the TD children in the PE group significantly outperformed those in the control group in terms of receptive vocabulary ($t = 11.34$, $p < .001$), character reading ($t = 6.04$, $p < .001$) and listening comprehension ($t = 9.48$, $p < .001$). However, the TD children in the PE and control groups showed similar performances in their expressive vocabulary ($t = .60$, $p = .65$), reading interest ($t = .04$, $p = .91$) and reading anxiety ($t = 1.80$, $p = .08$).

At the same time, the TD children in the PE and PEER groups demonstrated similar performances in terms of receptive vocabulary ($t = .43$, $p = .83$) and character reading ($t = .29$, $p = .29$). However, the TD children in the PEER group significantly outperformed those in the PE group in terms of expressive vocabulary ($t = 54.45$, $p < .001$), listening comprehension ($t = 14.10$, $p < .001$), reading interest ($t = 27.83$, $p < .001$) and reading anxiety ($t = 9.83$, $p < .001$). Detailed information can be found in **Table 3**.

Children with ASD

The mixed effect analysis used children's non-verbal intelligence, feelings of intimacy with educators, parental reading comprehension and expressive vocabulary as control variables, and the results indicated that the group (PE vs. PEER vs. control) effect was significant across children's receptive vocabulary, expressive vocabulary, character reading, listening comprehension, reading interest and reading anxiety (*ps* < .001). Furthermore, the values of effect size η^2 ranged between .23 and .60, thereby indicating that children with ASD in the PE, PEER and control groups demonstrated differences in their performances between the pre- and post-test. Detailed information can be found in **Table 2**.

The results of the mixed effect analysis, which used the same control variables, showed that after the DR intervention, the children in the PE group significantly outperformed those in the control group in terms of receptive vocabulary ($t = 10.72$, $p < .001$), expressive vocabulary ($t = 2.92$, $p < .01$), character reading ($t = 3.89$, $p < .001$), listening comprehension ($t = 13.16$, $p < .001$), reading interest ($t = 5.94$, $p < .001$) and reading anxiety ($t = 10.17$, $p < .001$).

Moreover, children in the PE and PEER groups demonstrated similar performances in terms of receptive vocabulary ($t = .14$, $p = .73$). However, the children in the PEER group significantly outperformed those in the PE group in terms of expressive vocabulary ($t = 3.37$, $p < .01$), character reading ($t = 3.28$, $p < .01$), listening comprehension ($t = 4.00$, $p < .001$), reading interest ($t = 4.84$, $p < .001$) and reading anxiety ($t = 4.04$, $p < .001$). Detailed information can be found in **Table 3**.

Discussion

This study examined the effects of various levels of feedback on TD and children with ASD

language learning using parent–child book reading activities. Specifically, we explored the impacts of patterns of PE, followed by more feedback strategies featuring the principles of 'expansion and repeat' from PEER, on the language ability and affective factor development of Chinese TD and children with ASD. The results showed that, for TD children, PEER and PE significantly enhanced their receptive vocabulary, character reading and listening comprehension development; however, only PEER enhanced the children's expressive vocabulary and reading interest whilst reducing their reading anxiety. Furthermore, for the children with ASD, PEER and PE significantly enhanced their skills in all language measures included in this study, whilst PEER outperformed PE in the expressive vocabulary, character reading, listening comprehension, reading interest and reading anxiety of children with ASD.

Impacts of the DR Elements on TD Children

The results showed that the PEER and PE groups had greater growth in receptive vocabulary and character reading compared with the control group, suggesting the importance of DR prompt strategies in enhancing receptive vocabulary and character reading. This finding is consistent with past research, which reported that prompt strategies have greater contributions to enhancing children's receptive vocabulary and character reading than typical parent–child reading activities without prompts during book reading (Sun et al., 2020; Toub et al., 2018). The present study's results also support the notion that mutual corrective feedback enhances learners' language abilities by presenting more details and explicit information, while simple feedback with only simplified indications to corresponding items resulted in poorer effects on the children. In other words, children who received mutual feedback tend to have better performances than those students with simple feedback (Leontjev, 2014).

Moreover, in the current study, PEER outperformed PE in terms of enhancing expressive

vocabulary, listening comprehension, reading interest and reading anxiety amongst the children. This result is partially consistent with previous studies, which argued that strengthened/deep communication can enhance the language abilities and affective factor development of children, because a higher level of activity engagement helped improve their learning outcomes (Hiver et al., 2021; Zhang, 2020). Better learning outcomes and high levels of interactive communication in book reading also provides more positive affective feelings in children (e.g., Dong et al., 2023), which in turn, improved their reading interest and reduced their reading anxiety. In addition, compared with those in the PE group, the majority of parents in the PEER group provided children with more opportunities to relate their life experiences to the contents of their books during parent–child communication. Previous studies have shown that students can improve their text comprehension when presented with familiar events or when they can relate their self-experiences during learning (Kaefer et al., 2015; Smith et al., 2021).

At the same time, learning with familiar background information will also improve children's reading interest and reduce their reading anxiety (e.g. Dong et al., 2023). Moreover, the DR feedback strategies not only provided more opportunities to involve new words in communication, but also provided the children in the PEER group more opportunities to broaden their vocabulary than those in the PE group. Through further interactive communication with their parents, children may gain better reading experiences due to their high levels of comprehension of the story book content and their ability to internalise their book reading knowledge into their personal schema. In turn, this process increased their reading interest and reduced their reading anxiety.

One interesting finding is that the children in the PE and control groups showed similar rates of change in their expressive vocabulary, reading interest and reading anxiety. This result is partially consistent with those of previous studies, which reported that DR enhanced children’s expressive

vocabulary (Authors, 2022). Such a result can be ascribed to the fact that the parents only provided a simple indication of whether or not their children's answers were correct. The simple indication and the minimal feedback did not motivate children's reading interest, and not reduce their anxiety level because there was no attractive or frightening feeling added to the book-reading condition (Author, 2021). Similarly, the strategy of using simple indications and providing minimal feedback did not provide more opportunities for expanding word output or broadening the scope of communication (e.g., linking topic content to children's individual life) with children (Authors, 2022). The children in the PE group did not receive any guidance at all as to where they should go or how to revise/improve the quality of their answers. However, they have fewer opportunities to use highly expressive vocabulary. Moreover, perhaps due to their relative lack of involvement during the PE intervention, their reading interest and reading anxiety did not improve compared with children in the control group. The lower gains in expressive vocabulary in the PE group could have been due to the fact that the parents did not repeat their responses (Zevenbergen et al., 2016). Meanwhile, the similarities in the performances of these children in the area of expressive vocabulary may be attributed to the fact that the intervention was too short. It is known that improving one's expressive vocabulary requires much time and practice (Author, 2021).

Impacts of DR Elements on Children with ASD

Overall, DR showed positive effects on the language learning of children with ASD. In particular, the children with ASD in the PE group outperformed those in the control group across all language and affective measures included in this study. Whilst the children with ASD faced challenges in communication, PE offers them opportunities to express their emotions and thoughts by vocalizing

their answers to the prompt questions. Past studies have shown that stimulations and opportunities to think and their provision of answers related to the story content play an important role in the language development in children with ASD (e.g. Mandak et al., 2019). In addition, their participation in the story reading process may foster their interest in reading, thus reducing their reading anxiety (Hendratno et al., 2022).

The present study found that PEER outperformed PE in the areas of expressive vocabulary, character reading, listening comprehension, reading interest and reading anxiety of children with ASD. This finding showed that feedback with expanded responses allowed the children to learn more advanced vocabularies and sentences and gave them more opportunities to practice spoken words further, which are key factors in children with ASD language learning. Notably, whilst the results are consistent across TD and children with ASD, some differential effects were also found, indicating that PE did not significantly impact the development of TD's expressive vocabulary and reading interest nor did it reduce reading anxiety.

Overall, the findings of this study indicated that DR prompts had positive effects on children's receptive vocabulary, character reading and listening comprehension development. Furthermore, feedback with expanded responses was particularly useful in fostering the expressive vocabulary and affective aspects of language learning in TD and children with ASD. Regardless of whether children with ASD received PE or PEER, during parent–child book-reading activities, children with ASD were forced to read and were given more opportunities to practice language skills, particularly their expressive vocabulary. In addition, parental feedback increased the parent–child communication level with more spoken words output. According to audio records, the majority of the parents in the present study used positive feedback to reinforce their children's reading during the book reading activities,

which presented more opportunities to increase the learning engagement level and gain more language skills during activities. Children also gained more positive feelings towards reading (e.g., increase reading interest and reduce reading anxiety) from parental encouragement during the activities. In particular, for children who received PEER, they achieved successful communication by questioning, receiving corrective feedback and recasting answers, which involved parent–child expert–novice, dominant–passive, dominant–dominant and collaborative dialogues (Su & Zou, 2022). Furthermore, to co-construct knowledge in particular social and physical environments, the children self-regulated through private speech to gain better control over language forms. In this environment, learning occurred through communication and exchange of information (Leontjev, 2014; Su & Zou, 2022). Therefore, the language skills and reading interest were increased, whilst the level of reading anxiety was reduced.

Interestingly, PE enhanced expressive vocabulary and reading interest whilst reducing reading anxiety in children with ASD only but not in TD children. The prompt questions during DR motivated children with ASD to interact with their parents and give verbal responses, which may be particularly important to children with ASD due to the communication challenges they face. However, simply asking prompt questions is not enough for achieving significant changes in expressive vocabulary and the affective factors of reading in TD children.

Limitations, Future Directions and Implications

This study has three limitations. First, the effects of parent–child DR feedback strategies were examined by inserting the -ER element into the PEER group. However, the independent effects of -ER on the language ability and the affective factor development of children were not examined. Therefore,

future studies should further categorise the level of feedback into high, medium and low levels, and then explore each level of feedback's impact on children's language ability and affective factor development. Second, this study only included kindergarteners. Previous studies have shown that DR has varied impacts on children across pre-school, kindergarten and primary school. As the DR is usually implemented on children during the emergent literacy stage, differences between logographical and alphabetical scripts have been found in printed word construction, pronunciation and grammatical knowledge (Authors, 2020, 2021). Thus, whether the current study's pattern could be generalised to other language scripts (e.g., English) requires further exploration. Finally, the current study did not test any long-term effects of the intervention programs across PE, PEER and control conditions. The contribution patterns across these three conditions on TD and children with ASD language abilities, reading interest and reading anxiety and their long-term effects should be explored in future studies.

In terms of theoretical contributions, this study demonstrated that high levels of interactive feedback significantly contributed to children's language abilities and affective factor development than low levels of interactive feedback in book reading activities. Second, this study distinguished the contribution pattern of DR elements to children's language abilities and affective factor development. Furthermore, the current study expanded the notion regarding DR's contribution to children with ASD language and affective factor development during book reading activities.

This study also presented practical contributions. First, it provided suggestions for a good book reading intervention design that can improve children's understanding of language and improve the level of positive reading experiences across the TD and children with ASD groups. Second, the current study provided more alternative choices to implement book reading activities for parents with different reading abilities for the purpose of enhancing children's target language ability or affective factor and

demonstrated the ideal length of reading times for children's education. For example, the difficulty level of implementing PE is lower than that of PEER. However, the current findings suggested that all parents, if possible, should use the PEER sequence in implementing book reading activities with their children across the TD and children with ASD groups.

Conclusion

This study demonstrated the extent to which prompt questioning and feedback strategies contribute to the language skills and affective factor language learning of TD and children with ASD. The findings also enhanced our understanding of the mechanisms of the positive effects of DR. Future interventions aiming to promote the language development of TD and children with ASD should consider the effects of these questioning and feedback strategies on different aspects of children's language skills and affective factors.

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Table 1

Demographic Information of Participants and Parents

Category			PE	PEER	Control	Comparison
TD	Children	Intimacy feeling with educator	*Mean* = 42.25, *SD* =14.39	*Mean* = 45.23, *SD* =15.17	*Mean* = 45.77, *SD* =15.17	F (2, 116)=.64, p = .53
	Parents	Age	*Mean* = 33.03, *SD* =3.12	*Mean* = 32.53, *SD* =3.93	*Mean* = 32.57, *SD* =3.56	F (2, 116)=.77, p = .47
		Gender	25 female, 15 male	21 female, 19 male	24 female, 15 male	χ^2 (2, 116)=1.01, p = .61
		Education background	11 not more than secondary degree (27.50%), 17 vocational degree school (42.50%), 12 bachelor degree (30.00%)	15 not more than secondary degree (37.50%), 15 vocational degree school (37.50%), 10 bachelor degree (25.00%)	10 not more than secondary degree (25.60%), 17 vocational degree school (43.60%), 11 bachelor degree (28.2%), 1 master degree (2.60%)	χ^2 (2, 116)=3.51, p = .74
		EV	*Mean* = 54.45, *SD* =3.23	*Mean* = 55.23, *SD* =2.80	*Mean* = 54.00, *SD* =3.44	F (2, 116)=.63, p = .53
		RC	*Mean* = 16.93, *SD* =1.35	*Mean* = 16.98, *SD* =1.56	*Mean* = 16.95, *SD* =1.38	F (2, 116)=.01, p = .99
ASD	Children	Intimacy feeling with educator	*Mean* = 42.67, *SD* =13.70	*Mean* = 43.89, *SD* =13.67	*Mean* = 42.09, *SD* =11.94	F (2, 104)=.17, p = .84
	Parents	Age	*Mean* = 33.00, *SD* =3.32	*Mean* = 33.80, *SD* =3.43	*Mean* = 33.64, *SD* =3.22	F (2, 104)=.65, p = .53
		Gender	26 female, 10 male	23 female, 13 male	16 female, 17 male	χ^2 (2, 104)=3.32, p

				= .19
Education background	15 not more than secondary degree (41.70%), 11 vocational degree school (41.70%), 10 bachelor degree (27.80%)	15 not more than secondary degree (37.50%), 15 vocational degree school (37.50%), 10 bachelor degree (25.00%)	16 not more than secondary degree (45.70%), 9 vocational degree school (25.70%), 10 bachelor degree (28.60%)	χ^2 (2, 104)=3.17, p = .53
EV	*Mean* = 54.14, *SD* =2.98	*Mean* = 54.08, *SD* =3.63	*Mean* = 54.46, *SD* =3.07	F (2, 104)=.13, p = .88
RC	*Mean* = 17.06, *SD* =1.43	*Mean* = 16.64, *SD* =1.33	*Mean* = 17.14, *SD* =1.46	F (2, 104)=1.31, p = .28

Note. EV= expressive vocabulary, RC= reading comprehension.

Table 2

Descriptive Information of TD and Children with ASD across Groups

Group		TD					ASD				
		pre-mean	pre-SD	post-mean	post-SD	PE vs. PEER vs. Control	pre-mean	pre-SD	post-mean	post-SD	PE vs. PEER vs. Control
PE	IQ	12.20	3.74				11.78	3.36			
	RV	33.10	1.30	40.32	3.34	$F(2, 116)=84.65^{***}$, $\eta^2= .59$	30.83	3.12	37.56	2.66	$F(2, 104)=31.06^{***}$, $\eta^2=.37$
	EV	20.10	.87	19.90	.78	$F(2, 116)=1216.37^{***}$, $\eta^2=.95$	16.00	3.295	19.86	6.18	$F(2, 104)=15.88^{***}$, $\eta^2=.23$
	CR	16.65	2.01	25.97	8.01	$F(2, 116)=21.67^{***}$, $\eta^2=.27$	14.50	2.962	18.75	5.56	$F(2, 104)=17.27^{***}$, $\eta^2=.25$
	LC	1.92	.86	3.87	.79	$F(2, 116)=128.77^{***}$, $\eta^2=.69$	1.25	1.20	5.00	.02	$F(2, 104)=79.13^{***}$, $\eta^2=.60$
	RI	9.07	.76	8.92	.80	$F(2, 116)=336.15^{***}$, $\eta^2=.85$	7.47	1.67	12.25	3.79	$F(2, 104)=46.39^{***}$, $\eta^2=.47$
	RAX	61.42	6.59	58.47	11.72	$F(2, 116)=40.82^{***}$, $\eta^2=.41$	64.97	5.78	43.58	9.29	$F(2, 104)=67.83^{***}$, $\eta^2=.57$
PEER	IQ	12.20	3.74				12.19	3.88			
	RV	32.93	1.61	40.55	3.53		31.03	3.01	37.69	2.68	

	EV	20.10	.78	32.05	1.38	14.92	3.31	23.94	5.15
	CR	16.00	1.60	25.68	8.30	14.56	2.77	22.53	5.90
	LC	2.15	.86	6.63	.98	1.67	1.20	6.14	1.76
	RI	9.03	.80	15.58	1.45	7.42	1.75	15.94	3.83
	RAX	61.35	8.09	38.07	6.72	64.44	5.14	35.06	7.30
Control	IQ	12.74	3.57			12.43	2.65		
	RV	33.36	1.42	32.85	1.41	29.77	2.95	30.43	2.95
	EV	19.87	.86	19.79	.77	14.83	3.59	16.09	3.91
	CR	16.33	1.63	16.85	1.50	13.91	3.12	14.09	2.71
	LC	1.82	.79	2.03	.81	1.57	1.07	1.26	1.09
	RI	9.10	.82	8.90	.85	7.37	1.73	7.40	1.77
	RAX	62.87	7.70	62.13	8.21	64.54	5.24	64.03	9.50

Note.*** $p < .001$; IQ = nonverbal intelligence, RV= receptive vocabulary, EV= expressive vocabulary, CR= character reading, LC= listening comprehension, RI=reading interest, RAX=reading anxiety; pre- = pretest, post- = posttest.

Table 3

Group Comparison

Variables	Group	TD			ASD		
		Estimate	*SE*	*t*	*Estimate*	*SE*	*t*
RV	PE vs PEER	-.28	.66	.43	-.09	.64	.14
	PE vs. Control	7.47	.69	11.34***	6.95	.65	10.72***
EV	PE vs PEER	-12.17	.22	54.45***	-4.13	1.23	3.37**
	PE vs. Control	.13	.24	.60	3.65	1.25	2.92**
CR	PE vs PEER	.43	1.52	.29	-3.87	1.17	3.28**
	PE vs. Control	9.19	1.52	6.04***	4.68	1.20	3.89***
LC	PE vs PEER	-2.74	.16	14.10***	-1.13	.28	4.00***
	PE vs. Control	1.84	.20	9.48***	3.79	.29	13.16***
RI	PE vs PEER	-6.75	.24	27.83***	-3.75	.78	4.84***
	PE vs. Control	.01	.20	.04	4.70	.79	5.94***
RAX	PE vs PEER	20.29	2.06	9.83***	8.24	2.04	4.04***
	PE vs. Control	3.71	2.07	1.80	21.16	2.08	10.17***

Note. ** $p < .01$, *** $p < .001$; IQ = nonverbal intelligence, RV= receptive vocabulary, EV= expressive vocabulary, CR= character reading, LC= listening comprehension, RI=reading interest, RAX=reading anxiety