

Research Article:

Design and Pilot of PRISM: An Observational Checklist for Parental Shared Book Reading Strategies in Autism Spectrum Disorder

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ABSTRACT

Shared book reading (SBR) is an activity in which adults read a book together with a child and is used as an intervention activity to enhance children with Autism Spectrum Disorder (ASD)'s language skills. This is brought about by the employment of language and engagement strategies during SBR. However, there are inexperienced parents who do not employ these strategies during SBR, hence, professional guidance is needed, which can be facilitated with tools such as an observation checklist. This study aims to develop and validate an observation checklist that incorporates language and engagement strategies for assessing SBR sessions, and pilot the observation checklist using video data of parent-child SBR sessions by assessing the types and frequencies of strategies employed. The initial draft of the observation checklist, named Parental Reading Interaction Strategies Measure (PRISM) was developed based on a review of literature on SBR and language and engagement strategies. After development of the checklist items, the observation checklist was sent to a panel of eight experts to assess its content validity. Then, the checklist was piloted with two parent-child SBR session videos. Content validation results indicated that all items had an Item-Level Content Validity Index (I-CVI) of 1.0, and the checklist had a Scale-Level Content Validity Index (S-CVI) of 1.0. Pilot study results revealed that PRISM was able to capture and compare the types and frequencies of language and engagement strategies used by each parent. This data provides insights into the skills of parents of children with ASD during SBR session and has demonstrated the utility of PRISM in research, parental coaching and early language intervention.

Keywords: Shared book reading, autism spectrum disorder, observation checklist, strategies

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INTRODUCTION

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder manifested by challenges in social communication and social interaction in various contexts; exhibiting difficulties in social-emotional reciprocity, non-verbal communication and forming, sustaining and understanding relationships (American Psychiatric Association, 2022; Vogindroukas et al., 2022). Children with ASD may also exhibit restricted and repetitive behaviour, which includes repetitive or stereotyped speech production. In terms of language skills, children with ASD face challenges in using vocabulary accurately and difficulties in using language in particular social contexts appropriately. Hence, it is important that these challenges be mediated through early intervention programmes and speech-language therapy (Chu et al., 2018), through intervention activities such as shared book reading (SBR), and thus improve their ability to function at home, in school and within the community (Russa et al., 2015).

SBR is an activity in which adults read a book together with a child while incorporating one or more structured strategies to actively engage children in the text, and to enhance children's language and literacy skills (Fisher et al., 2008), such as auditory comprehension, vocabulary and expressive language skills (Boyle et al., 2019; Noble et al., 2020). These benefits are brought about by the employment of language and engagement strategies of the adult during SBR. Besides its role as an intervention activity, SBR is also a widely recommended practice in early childhood education (Pentimonti et al., 2021).

As employment of language and engagement strategies brings positive effects, it is vital that parents including those of children with ASD, employ these strategies so that their children may benefit from the SBR session carried out at home. Currently, there are groups of parents who are inexperienced and lack knowledge in employing language and engagement strategies (Olszewski & Hood, 2023). They may practice SBR with their children without employing effective strategies (Balog et al., 2024; Evans et al., 2011). Hence, professional guidance is necessary to improve these parents' SBR practices. Professional guidance can be facilitated with tools, such as an observation checklist.

An observation checklist is a vital tool for systematically capturing and evaluating parental shared book reading behaviours, particularly when working with children with ASD for a number of reasons. First, it ensures objective data collection by providing a structured framework that reduces observer bias and enhances the consistency of observations across different sessions and participants (Fix et al., 2022; Mahtani et al., 2018). For instance, when used for video coding, especially videos recorded within the child's natural routines, the checklist allows for more accurate and flexible analysis of real-life interactions. This standardisation allows for reliable comparisons and supports

the replicability of findings in both research and practice (Pentimonti et al., 2021). Second, the checklist plays a crucial role in assessing the effectiveness of interventions aimed at improving parental interaction strategies (DeBruin-Parecki, 1999). By documenting observable changes in specific behaviours such as prompting, labelling, or turn-taking, it provides measurable outcomes that reflect progress over time, thereby informing individualised support and guiding future improvements in parent-child communication and engagement.

Although there are existing observation checklists and tools such as Parent as Reader Scale (PARS) (Guinagh & Jester 1972), assessment tool for evaluating mother-infant interactions (Resnick et al., 1987), Adult-Child Interactive Reading Inventory (ACIRI) (DeBruin-Parecki, 1999) and Standardised Assessment of Book Reading (SABR) (Pentimonti et al., 2021), these observation checklists and tools have limitations in capturing parental strategies during SBR with children with ASD. For instance, unable to reflect specific strategies employed by parents, limited age range suitability and lacking of strategies that are present in current literature (DeBruin-Parecki, 1999; Guinagh & Jester, 1972; Pentimonti et al., 2021; Resnick et al., 1987). Hence, an observation checklist needs to be developed to address these limitations.

Shared Book Reading Observation Checklist and Tools

There have been a few SBR observation tools developed in the past (DeBruin-Parecki, 1999; Guinagh & Jester, 1972; Pentimonti et al., 2021; Resnick et al., 1987). Guinagh and Jester (1972) developed the Parent as Reader Scale (PARS) to evaluate mother-child interactions during SBR and to understand the mother's teaching ability, economically and in a simple manner. It consists of 10 items evaluated using a five-point rating scale, encompassing skills of child response elicitation, language use, introduction to the book, elaboration, feedback, and affective aspects. As the items in PARS are evaluated on a scale, it is unable to reflect the actual strategies employed by the parent, but gives a general impression of the parent's SBR behaviours during the session. It is more ideal to have an observation checklist that comprises of specific names of strategies, such as naming, commenting and prompts, which will aid in reflecting the specific strategies employed by the parent that take into the consideration of frequency, rather than a general impression reflecting through rating scales.

Resnick et al. (1987) developed an assessment tool for evaluating mother-infant interactions during SBR. It consists of 56 items categorised into four domains, which are, mother's body management, mother's language proficiency, mother's attention to affect, and mother's management of book. Among these items, there are positive and negative behaviours. The items are scored based on the frequency it occurs during the SBR session. A score from the mother's cumulative score will be deducted if a negative behaviour is scored. Although this assessment tool contains many items, much

emphasis is given to interactions relating to physical behaviours such as, resisting child from turning page, placing child on lap, maintaining physical contact. However, there are language strategies included such as elaboration and labelling; and engagement strategies such as acting out actions. These strategies are focused on interactions between mother and infant, and do not include interactions suitable for children with advanced language skills, who can comprehend and respond to strategies such as question prompts, relating to child's experience and providing definition of a word. Hence, this tool is limited to observing SBR interactions between mother and infant. Thus, there is a need to develop an observation checklist that includes strategies that can be employed to children within a greater age range, expanding applicability of the observation checklist to preschoolers and school-age children, increasing the population of parents that can benefit from such a checklist.

DeBruin-Parecki (1999) developed the ACIRI to help teachers to evaluate parent-child SBR interaction and to teach effective strategies to improve their child's SBR experience. The ACIRI was also developed to help parents learn of their areas of improvement, so they may facilitate their child in learning literacy skill they need for school. The ACIRI consist of 12 items, grouped into three categories, with 4 items in each group. The three groups are: Promoting interactive reading, enhancing attention to text, and using literacy strategies. The items are scored quantitatively and qualitatively. Each item will be scored on a 4-point scale of 0 to 3, with 0 indicating no evidence of the behaviour, 1 indicating that the behaviour occurs infrequently, 2 indicating some of the time, and 3 indicating most of the time. The observer's comments can be remarked in the column provided. The data obtained from ACIRI reflects the frequency of the interaction strategies generally, and engagement strategies such as inflection and dramatisation; but does not include important language strategies such as responding to child's utterance. It is essential to have an observation checklist that includes both language and engagement strategies in current literature as these strategies are important to support the language and communication needs of children with ASD (Boyle et al., 2019; Noble et al., 2020), and reflects the frequency of each individual strategy, providing more comprehensive data on parental strategies as compared to ACIRI.

Pentimonti et al. (2012) developed the SABR to provide a standard observational measure to the research and practice community, to overcome the limitations of existing SBR quality measurement tools, adult-led SBR interactions in early childhood classrooms can be evaluated by educators and literacy coaches effectively and efficiently. The SABR was extended and refined and evolved to SABR 2.2, developed by Pentimonti et al. (2021), which consists of 11 adult interaction strategies in SBR. These codes are scored according to the frequency that the strategy occurred in the SBR session. The 11 codes are categorised into three domains, namely, language-facilitated talk, literacy-related talk, meaning-related talk. Although the SABR 2.2 is rather comprehensive and psychometrically sound, there are strategies in current literature which are absent, for example, naming, relating to child's experience, prediction comments, repetition

of adult's own word or word from the book and re-enactment of actions or dialogues from the storybook. Again, these strategies are found to be effective to enhance the language development of children with ASD (Adamson et al., 2004; Ard & Beverly, 2004; Barnes & Dickinson, 2016; Barnes et al., 2016; Carpenter et al., 1998; Richter & Courage, 2017). Thus, it is critical to include these strategies in an observation checklist, especially to be used among children with ASD. Furthermore, it would be difficult to identify the specific individual types of strategies employed by the adult, or reflect the variety of strategies used, due to the way the codes of SABR 2.2 grouped or unified. For example, even if the adult only uses one strategy, which is repeating child's utterance under the code 'repeat/recast/extend', an adult can still score highly for the code, failing to reveal the limited variety of strategies used by the adult. As to that, an observation checklist that includes the strategies in current literature which are absent in SABR 2.2 will be necessary. The checklist should present all its strategies in a manner that enables individual coding of strategies, without grouping as in SABR 2.2, enabling the checklist to reflect the variety of parental strategies more effectively and specifically.

With the limitation of these existing observation checklists, it is crucial to develop and validate an observation checklist that captures SBR language and engagement strategies comprehensively and enables professionals to evaluate SBR sessions based on types and frequencies of specific language and engagement strategies employed that are specifically important to enhance language skills of children with ASD. It will allow for more accurate assessment of parental interaction behaviours by capturing specific, observable strategies used during shared book reading, rather than relying on general impressions or subjective ratings. This detailed analysis enables professionals to identify both the strengths and gaps in a parent's use of language and engagement strategies. As a result, it facilitates the delivery of targeted feedback and coaching that is tailored to each parent's current practice. Moreover, the checklist can support individualised intervention planning by helping practitioners select appropriate strategies to enhance parent-child communication. On a broader scale, it contributes to research by providing a systematic and replicable method for documenting parent-mediated language support, thereby advancing the evidence base for best practices in supporting children with ASD.

Shared Book Reading Language and Engagement Strategies

In order to develop a comprehensive observation checklist, it is essential to include common language and engagement strategies typically employed by adults, such as parents, teachers, and therapists during shared book reading (SBR) sessions. These strategies aim to promote children's language development and active engagement in the reading process. Engagement strategies refer to techniques used by adults to encourage joint attention in children, where both the adult and child focus visually on the storybook and the child interacts with both the book and the adult during SBR

(Adamson et al., 2004; Carpenter et al., 1998; Richter & Courage, 2017). In contrast, language strategies are techniques that facilitate the acquisition of language skills by promoting vocabulary development and oral language proficiency (Barnes et al., 2016; Mol et al., 2008; Hindman et al., 2019; Justice et al., 2002; Salo et al., 2019; Weadman et al., 2023). Examples include prompting, pointing, naming, commenting, repetition of words, and producing responsive statements. Although these strategies often overlap in practice, they are separated for coding purposes to ensure clarity and consistency in scoring.

Based on the literature, language strategies include prompting, pointing, naming, commenting, repetition of words, and producing responsive statements while engagement strategies include the use of inflections and dramatisations. The descriptions of these strategies are outlined as follows.

Prompts

Prompts are adult-initiated statements or questions, which are effective in eliciting children's spoken language (Justice et al., 2002), therefore promoting vocabulary development (Rowe et al., 2017) and enhancing oral language skills (Weadman et al., 2023) among children (Mol et al., 2008). Prompts employed by adults elicit responses from children, henceforth providing opportunities for the adults to expand the utterances of the children (Towson et al., 2016). This supports the verbal participation and oral language development of children.

Commenting

Commenting involves producing statements which are not questions, which do not require children to respond immediately (Barnes et al., 2016). These statements consist of providing concrete descriptions of pictures in the storybook, vocabulary definitions and explanations, synonyms of vocabularies and relating a word to the child's experience. Commenting has shown to promote receptive (Barnes & Dickinson, 2016; Barnes et al., 2016), and expressive (Ard & Beverly, 2004) vocabulary development.

Pointing

Pointing during SBR is utilised to draw the child's attention to text or illustrations and the vocabulary related to the illustrations in the storybook. Adults point to provide information or to share emotions about objects or events in the storybook (Salo et al., 2019). Pointing increases the child's attention towards print and pictures during SBR (Roy-Charland et al., 2015; Wicks et al., 2021).

Repeating a word

Repeating a word is a strategy employed by saying a word more than once in a sentence or across consecutive sentences (Horst et al., 2011; McLeod & McDade, 2011). Repetition highlights a word, helping children to remember novel vocabulary more effectively. It can be done with or without elaboration of the word, which in both cases promotes receptive vocabulary learning (O' Fallon et al., 2020).

Naming

Naming involves the adult saying the name of the object, action, place, or person present in the storybook. Naming exposes children to novel vocabulary and concepts which may not be heard or said in daily conversation (DeTemple & Snow, 2003). This greatly expands children's vocabulary repertoire (Fletcher & Reese, 2005).

Responsive statements

Responsive statements are statements or sentences said by the adult in response to the child's utterance, after the child produces an utterance. Verbal responsiveness of adults during SBR directly relates to children's vocabulary learning as the immediacy and contingency of responsive statements encourages focus of attention sharing between the adult and the child (Blewitt & Langan, 2016).

Engagement strategies

Engagement strategies are techniques utilised by adults that encourages engagement of joint attention in children, where the adult and child share visual attention on the storybook, and the child interacts with the storybook and the adult during SBR (Adamson et al., 2004; Carpenter et al., 1998; Richter & Courage, 2017).

Inflections and dramatisations

Applying inflections is an engagement strategy involving the manipulation of voice to achieve storytelling and engagement purposes. Dramatisation involves the re-enactment of scenes and dialogues in the story, by modifying voice, and using facial expressions and gestures. Employing engagement strategies of inflections and dramatizations has been found to enhance children's engagement during SBR (Moschovaki et al., 2007).

Aim

This research aims to develop and pilot a structured observation checklist that captures the types and frequencies of parental language and engagement strategies during shared book reading with children with ASD. The specific objectives are:

1. To develop an observation checklist that incorporates engagement and language strategies for assessing shared book reading sessions.
2. To determine the content validity of the observation checklist.
3. To pilot the checklist using video data of parent-child shared book reading sessions by assessing the types and frequencies of strategies employed.

METHODOLOGY

This study employed a mixed-methods instrument development and pilot validation design, involving checklist construction, expert content validation, and quantitative pilot testing with observational video data. The three phases of the instrument development and pilot validation were as follows:

Phase 1: Development of the Observation Checklist

The first phase involved the development of an initial draft of the observation checklist based on a thorough review of literature on shared book reading and evidence-based language facilitation strategies as previously discussed. The observation checklist, named the “Parental Reading Interaction Strategies Measure” (PRISM), consists of two parts as shown in the Appendix A. Part A consists of 34 items for language strategies, categorised into 11 types of strategies; while Part B consists of 6 items for engagement strategies, categorised into 2 types of strategies. For each item, the definition and an example is provided. In the same row for each item, there is a column to transcribe the utterances of which the strategies occurred in the SBR session, and a column to record the frequency of each strategy. The checklist also includes a section to record demographic information of parent and child, such as name, age, language used and ethnicity, and also the name of checklist user (assessor) and date of observation. During observation of a live or video-recorded SBR session, if employment of a language or engagement strategy by the adult is observed, the checklist user will transcribe the utterance of the adult, in which the language or engagement strategy was employed. After recording all the utterances of the strategies, the checklist user records the frequency of each strategy employed, based on the number of utterances under the said strategy.

Phase 2: Content Validation and Inter-reliability Checking

After the checklist items were developed and refined, the observation checklist was sent to a panel of eight experts for validation, for assessment of content validity, comprising of a psychologist, four speech-language therapists, two special education teachers and an early childhood teacher. Table 1 shows the years of experience of each expert respectively.

Table 1. Background of experts for content validation

Expert	Profession	Years of experience
Expert 1	Early childhood educator	11
Expert 2	Special Education teacher	18
Expert 3	Psychologist	34
Expert 4	Speech-language therapist	20
Expert 5	Speech-language therapist	22
Expert 6	Speech-language therapist	2
Expert 7	Special education teacher	9
Expert 8	Speech-language therapist	23

The experts were required to rate the relevance of each item on a 4-point Likert scale, with the rating of 'not relevant' (1), 'less relevant' (2), 'relevant' (3), or 'very relevant' (4). Experts were also asked to provide their qualitative feedback on terminology, the clarity of coding definitions, and examples. The observation checklist was emailed to the panel in the form of Microsoft Word document. The panel was given two weeks to complete the rating of the observation checklist. Once the experts have rated the items, they returned the documents with their ratings via email to the researcher. Based on these ratings, the Item-Level Content Validity Index (I-CVI) and the Scale-Level Content Validity Index (S-CVI) were calculated. Content validity is the extent to which elements of an assessment instrument are relevant to and representative of the constructs the instrument aims to measure. The content validity of the observation checklist was assessed by calculating the I-CVI. The I-CVI for each item is calculated using this formula:

$$(I - CVI) = \frac{\text{Number of experts who rated 3 or 4 for an item}}{\text{Total number of experts}}$$

Items with I-CVI scores below 0.78 were either revised or removed, according to Lynn's (1986) recommendation. The checklist was then refined to improve clarity and ensure inclusion of key strategies supported by current literature.

The S-CVI reflects the overall content validity of the entire observation checklist. It summarises the average agreement across all items rated by experts. An S-CVI of 0.90 is considered as indicating excellent content validity, demonstrating strong agreement among experts that the items in the checklist are relevant, clear, and representative of the intended construct. This threshold suggests that the instrument is suitable for use in research or practice, with minimal need for further revision.

$$(S - CVI) = \frac{I - CVI \text{ for all items}}{\text{Total number of items}}$$

In addition to the I-CVI and the S-CVI, all qualitative feedback from the experts has been carefully considered and integrated into the observation checklist. Expert 3 emphasised the importance of ensuring that the items are appropriate for the cultural context in which the checklist will be used. Expert 4 contributed additional examples of interactional strategies, highlighting the need for a more comprehensive set of strategy examples within the checklist. Expert 5 suggested that the strategies “repetition of the child’s word” and “expansion” could be combined under the broader strategy of “acknowledgement of the child’s utterance,” within the category of responsive statements. Expert 6 sought clarification on the use of “pointing to a text,” questioning whether it referred to guiding the child’s attention for eye tracking, spelling, or word recognition purposes. Finally, Expert 8 recommended adding a column for qualitative feedback to capture the child’s overall responses, interactions and behaviours, and use perceptual rating for inflections. These suggestions have all been incorporated to enhance the usability, cultural relevance and comprehensiveness of the checklist.

Phase 3: Pilot Testing Using Video-Coded Parent-Child Interactions

In the final phase, the validated observation checklist was piloted using video data from parent-child shared book reading sessions.

Participants

The checklist was piloted in a video observation of two approximately three-minute SBR sessions between two mothers and their children from Malay ethnicity. The first video is of a 39-year-old mother (M1) and her 6-year-old girl, the second one, a 47-year-old mother (M2) and her 7-year-old boy. Both children are diagnosed with ASD and speak Malay as their first language. Based on the parent’s reports, M1’s child produces sentences of 3 to 4 words, while M2’s child produces sentences of five to six words. Both mother-child pairs have prior experience of practicing SBR and were recruited from a local speech therapy centre in Kedah, Malaysia.

Materials

The stimulus material used for the SBR sessions was a Malay-language picture book titled “Nyam Nyam”, which tells a simple, engaging story about a cat searching for food. The book was selected due to its age-appropriate content as well as culturally-relevant and rich illustrations that naturally encourage both engagement and language facilitation.

Procedure

After recruitment, each participating mother was mailed the “Nyam Nyam” storybook and provided with written instructions for recording a shared book reading session with

her child. The mothers were encouraged to conduct the session in a natural manner, as they would typically read to their child at home. A mobile phone was used by the parents to record the reading sessions in a home environment. Each mother recorded a video of approximately three minutes and submitted the file to the researcher via WhatsApp.

Upon receiving the videos, the researcher (Coder 1) and a co-researcher (Coder 2) used the PRISM checklist to observe and code the strategies employed by the mothers during the session individually. Both researcher and co-researcher are certified speech-language therapists who are trained in parent-child interaction observation. Each instance of a language or engagement strategy was marked and tallied. Coding was done manually based on clearly defined criteria within the checklist. This process allowed for quantifying the types and frequencies of strategies used by each parent during the SBR session.

Data Analysis

Data analysis was descriptive in nature, aiming to assess the practicality and usefulness of the PRISM checklist. The total frequencies of each individual strategy were recorded for both videos. These frequencies were then grouped under two main categories: language strategies and engagement strategies. The occurrence of each strategy type was compared across the two sessions to identify patterns, assess clarity of checklist items, and determine whether the tool was sensitive enough to capture meaningful variations in parental behaviour. The data gathered during this pilot phase provided preliminary evidence for the checklist's usability and informed minor revisions to the coding manual and strategy definitions in preparation for broader-scale implementation in future phases of the research.

Inter-rater Reliability

Two types of inter-rater reliability were calculated. First, the percent of agreement (PoA) among two coders regarding the types of strategies used in the video. For each participant, both Coder 1 (Researcher) and Coder 2 (Co-researcher) independently identified the types of strategies used. Percent of Agreement (PoA) was calculated to determine inter-rater reliability using the formula:

$$\text{PoA} = \frac{\text{No. of strategies agreed upon} \times 100\%}{\text{Total no. of strategies identified}}$$

For the participants in this study, both coders identified the same number ($n = 5$) for the types of strategies for both videos. For example, for Participant M1, all 5 strategies identified by Coder 1 matched the strategies identified by Coder 2, resulting in a

PoA of 100%. Similarly, for Participant M2, agreement was also 100%. These results indicate perfect inter-rater agreement on the types of strategies employed. Second, inter-rater reliability for coding total frequencies were checked using SPSS, using two-way mixed-effects Intraclass Correlation Coefficient (ICC) with absolute agreement, for the coding of the language and engagement strategies from the video observation. For M1, the analysis indicated excellent reliability for single measures, where the ICC was .94 (95% CI [.71, .99], $p < .001$), while the average measure for ICC was .97, indicating a highly reliable estimate between the two coders. For M2, the analysis indicated excellent reliability for single measures, where the ICC was .88 (95% CI [.50, .98], $p < .001$), while the average measure for ICC was .93, indicating a highly reliable estimate between the two coders. The disagreement between the two coders was resolved, leading to an agreement on the final coding to be used.

RESULTS

Content Validation

All eight experts rated all items in the observation checklist as 'relevant' or 'very relevant'. All items obtained an I-CVI of 1.0. Overall, the observation checklist obtained an S-CVI of 1.0 which indicates excellent content validity and strong agreement between experts. Hence, all items are retained. However, some refinements were made based on the experts' qualitative feedback, resulting in two major amendments. The first amendment involved adding a column for qualitative feedback to capture the child's overall responses, interactions, and behaviours. Accordingly, an additional column, Part C, was created to record descriptive observations during the shared book reading session. While this section is not part of the specific language strategies being measured, it contributes to the overall quality of the session. Recording these qualitative notes provides context for how well the session is conducted and how effectively the parent facilitates engagement. Such observations help therapists understand the broader parent-child interaction and the practical impact of the strategies, beyond the frequency or clarity of specific language techniques. The second amendment addressed inflection, defined as variations in voice used for storytelling and engagement. Because frequency counts were not feasible, a perceptual rating was used. Coders rated how often and how clearly the participant used voice variations, namely word prolongation and volume control using a 5-point scale with approximate percentages: 1 = Not Observed (0%) – not used at all; 2 = Rare (1%–20%) – used once or twice; 3 = Sometimes (21%–50%) – used occasionally, noticeable but not consistent; 4 = Frequent (51%–80%) – used often, consistently noticeable; 5 = Very Frequent (81%–100%) – used very often, highly clear, engaging, and consistently applied. This scale captures both the frequency and effectiveness of voice variations during the session. After obtaining rating scores for each type of inflection strategy respectively, the average rating of both word prolongation and volume control were calculated and reported.

Pilot Study

To address the third objective, PRISM was piloted using video data from two parent-child dyads (M1 and M2). The video observations enabled assessment of both the types and frequencies of strategies employed. Table 2 shows the types and frequencies of strategies used by M1 and M2 respectively.

Table 2. Types and frequencies of strategies shown by M1 and M2

Participant	Type of strategy employed	Frequency	Number of types of strategies employed
M1	Language strategy		
	Pointing	10	5
	Responsive statements	6	
	Closed-ended question prompts	2	
	WH-question prompts	2	
	Naming	1	
	Engagement strategies		
	Inflections	*4	
	Total frequency	21	
M2	Language strategy		
	Pointing	21	5
	Completing prompts	7	
	Responsive statements	1	
	WH-question prompts	1	
	Engagement strategy		
	Inflection	*5	
	Dramatisation	13	
	Total frequency	43	

Note: * Perceptual rating

Video observations allowed for the assessment of both the types and frequencies of strategies employed by parents during SBR. Table 2 presents the types of strategies and their frequencies as coded by Coder 1. For M1, a total of five types of language strategies were observed, with a total frequency of 21. The most frequently used strategy was pointing ($n = 10$), followed by responsive statements ($n = 6$), closed-ended question prompts ($n = 2$), WH-question prompts ($n = 2$), and naming ($n = 1$). The child in the M1 dyad was very active and assertive during the SBR sessions, often

asking questions or initiating interactions by describing pictures. However, the mother typically provided brief responses and rarely expanded on the child's speech or related to child's experience. Most of the time, she read verbatim from the book text, with limited spontaneous input, and was generally less engaged, and not using dramatisations. For M2, a total of five language strategies were recorded, with a higher total frequency of 43 (*n*). Pointing was again the most frequent strategy (*n* = 21), followed by completing prompts (*n* = 7), responsive statements (*n* = 1), and WH-question prompts (*n* = 1). Engagement strategies were also observed, such as inflection (scale 5) and dramatisation (*n* = 13). The child in the M2 dyad appeared relatively passive during the SBR session and seldom initiated interaction. The parent used dramatisation and vocal inflection extensively but mostly read verbatim from the text, with limited spontaneous naming or commenting. Two-way interaction was minimal, as the mother rarely asked questions to elicit responses or assess the child's comprehension.

The comparison was made between M1 and M2 as shown in Table 3. The findings indicate that pointing was the most commonly used language strategy across both dyads, while M2 demonstrated more frequent use of engagement strategies, particularly dramatisation. The variation in frequency and types of strategies highlights differences in parental implementation of SBR practices and provides preliminary evidence that PRISM can capture both quantitative and qualitative aspects of parent-child interactions.

Table 3. Comparison of video observations scoring using PRISM

Strategy	M1	M2
Pointing	10	21
Responsive statements	6	1
Closed-ended question	2	0
WH-question prompts	2	1
Naming	1	0
Completing prompts	0	7
Inflection	Scale 4	Scale 5
Dramatisation	0	13
Subtotal	21	43

DISCUSSION

This study aimed to develop and validate an observation checklist, PRISM (Parental Reading Interaction Strategies Measure), and pilot its use in assessing parental shared

book reading interactions through video observations. The findings support all three objectives, demonstrating the potential of PRISM as a reliable and informative tool for evaluating language and engagement strategies used to assess parent–child interaction quality during SBR.

In line with the first objective which is “to develop an observation checklist that incorporates engagement and language strategies for assessing shared book reading sessions”, PRISM was developed to systematically capture both language strategies (e.g., prompts, responsive statements, pointing) and engagement strategies (e.g., inflection, dramatisation) during shared book reading as discussed in the past literatures (Barnes et al., 2016; Blewitt & Langan, 2016; Moschovaki et al., 2007; O’ Fallon, 2020; Salo et al., 2019; Weadman et al., 2023). The structured categorisation enabled detailed analysis of parental input and interaction style, contributing to a comprehensive view of how parents support children’s language development during reading sessions. In addition, a descriptive column was added to facilitate qualitative analysis, making the observation checklist more comprehensive. By combining quantitative and qualitative analyses, a more comprehensive understanding of parental language and engagement strategies can be achieved.

Addressing the second objective, the content validity of PRISM was evaluated using the I-CVI and S-CVI. All items achieved an I-CVI of 1.0 based on ratings from eight expert panel members, indicating unanimous agreement on the relevance and representativeness of each item, while PRISM as a whole had an S-CVI of 1.0, indicating excellent content validity. This result confirms that the checklist is well-grounded in expert consensus and conceptually aligned with the constructs it was intended to assess. In addition, the qualitative feedback from experts further enhanced the comprehensiveness of the checklist by addressing its cultural relevance, clarity, and completeness.

To address the third objective, PRISM was piloted using video data from two parent–child dyads (M1 and M2). The video observations enabled the assessment of both the types and frequencies of strategies employed by parents of children with ASD. The data provide insights into ways to enhance parents’ skills during SBR sessions, particularly for parents of children with ASD. The results indicate that both parents used only five types of strategies. For M1, the most frequently employed strategies were pointing and responsive statements, whereas for M2, pointing and dramatisation were predominant. These findings suggest that parents tend to employ a limited range of strategies, reflecting the restricted variety of techniques used and potentially affecting the overall quality of the SBR session. The observed differences also highlight individual variation in parental shared reading practices and support PRISM’s ability to distinguish between diverse interaction styles. The tool effectively captured both the frequency and quality of strategies, enabling the profiling of individual strengths and

areas for improvement. These results demonstrate PRISM's potential to guide parents in using more effective SBR strategies.

With this information, professionals such as special education teachers, early childhood teachers and speech-language therapists can identify parents' strength and areas that parents need improvement in terms of their employment of strategies during SBR. Professionals can acknowledge and affirm their strengths, which will increase their motivation to continue SBR practice, and suggest ways to improve, in this case for instance, increasing the variety of strategies employed during SBR (Hiemstra & Van Yperen, 2015). For example, M1 is proficient in employing the strategy of pointing, but weak in providing responsive statements, and employing other language strategies which were absent during the SBR session, such as commenting and repeating the child's word. Based on this information, professionals would identify that M1's skills such as providing responsive statements, commenting and repeating the child's word need to be improved. Similarly, for M2, it is recommended that the parent increase opportunities for two-way interaction by asking more open-ended and WH-questions, and using completion prompts to encourage the child's participation. Incorporating more responsive statements, spontaneous naming and commenting on the child's utterances can help scaffold language development. While dramatisations and vocal inflections are strengths, combining these with interactive engagement strategies may further support the child's attention, comprehension, and active involvement during the SBR sessions.

Through discussion of the observation results with the parent, professionals can also understand possible reasons that led to parents not utilising other strategies, for example it could be due to the lack of knowledge or experience (Olszewski & Hood, 2023). With this in mind, professionals can coach parents on the strategies that they are lacking through consultation, workshops or training sessions and provide explanation on the positive effect of these strategies to their child's language skills, educating them on methods to implement SBR strategies, strengthening their skills in SBR and thus enhancing the quality of the SBR session and ultimately children with ASD's language development.

CONCLUSION

The development of this observation checklist enables professionals to code language and engagement strategies employed by parents during SBR, thus evaluating their SBR practice, providing support and improving their skills during SBR. While the pilot study demonstrates that PRISM is capable of capturing both language and engagement strategies used by parents during shared book reading, several limitations should be noted. First, the validation of the instrument was based on feedback from a relatively small number of experts ($n = 8$). To strengthen the content validity and

ensure broader applicability, input from a larger and more diverse panel of experts may be required. Second, the pilot testing involved only two parent-child dyads, which limits the generalisability of the findings. A larger sample would allow for more robust assessment of the checklist's reliability, usability and sensitivity across different parent-child interactions. Therefore, while the current pilot provides useful preliminary data, caution should be exercised when interpreting results, and further validation studies with larger and more diverse samples are recommended.

CONFLICT OF INTEREST

The authors declared no potential conflict of interest.

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CONTRIBUTION OF AUTHORS

Daniel Sheng Yang Chan: Methodology, formal analysis, investigation, resources, data curation, writing-original draft preparation.

Phoon Hooi San: Writing-review and editing, visualisation, supervision, project administration, funding acquisition.

Carmen Chia-Wen Ooi: Methodology, writing – review and editing.

STATEMENT OF ARTIFICIAL INTELLIGENCE (AI) USE

AI (ChatGPT 5.0) was used in completing this manuscript to refine language, improve linguistic coherence and enhance readability. No generative content was included without human verification, and the authors bear sole responsibility for the accuracy and integrity of the work.

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APPENDIX

Video Observation Checklist (Parental Reading Interaction Strategies Measure – PRISM)

Parent's name:

Child's name:

Age of child:

Language used during SBR:

Assessor:

Date:

Ethnicity (Parent):

PART A: LANGUAGE STRATEGIES

	Type of language strategy	Examples	Frequency
I	Closed-ended questions prompts Questions with limited number of responses which require a 'yes' or 'no' answer, or a choice between specific options.		
a.	<i>Yes/no questions</i> Questions that require 'yes' or 'no' for an answer.		
i)	<i>Asking for confirmation:</i> E.g., Is that a cat?		
ii)	<i>Auxiliary verb questions (Have you/do you/is he questions):</i> Questions that start with and auxiliary verb such as 'have' and 'do' E.g., Have you seen a crocodile before?; Do you like pizza?		
b.	<i>Choice questions</i> Questions that provide two or more options to choose from as an answer. E.g., Is this a cow or a cat?; Do you like cat or dog?		
		Total (I Closed-ended question prompts)	
II	WH- question prompts Questions that start with the words 'what', 'where', 'who', 'when', 'why' and 'how'.		
a.	<i>Asking about name of action in storybook:</i>		
i)	Questions that require the child to name what a character in the storybook is doing. E.g., What is the cat doing?		
ii)	<i>Asking about name of object or noun in storybook:</i> Questions that require the child to name an entity present in the storybook. E.g., What is this?; What is in the bag?		

	Type of language strategy	Examples	Frequency
iii)	<p><i>Asking about present or future events in storybook</i></p> <p>Questions that require the child to describe present events (event in page shown to child at the moment when the question is asked) or predict future events in the storybook</p> <p>E.g., Look! What happened to monkey?; What do you think will happen next?</p>		
iv)	<p><i>Asking about purpose:</i></p> <p>Questions on function of object or reason of an action.</p> <p>E.g., What is a bottle used for?; What did he do that for?</p>		
b. i)	<p><i>Who questions</i></p> <p>Questions that require the child to name a character in the storybook.</p> <p><i>Asking about subject/a character</i></p> <p>E.g., Who is that?</p>		
ii)	<p><i>Asking about possession:</i></p> <p>Questions on ownership of an object in the storybook.</p> <p>E.g., Whose bag is this?</p>		
c.	<p><i>Where questions</i></p> <p>Questions on the location of an entity in the storybook.</p> <p>E.g., Where is the bee?</p>		
d.	<p><i>When questions</i></p> <p>Questions asking about time of an event or action, in or related to the storybook.</p> <p>E.g., When do we go to sleep?</p>		
e.	<p><i>Why questions</i></p> <p>Questions requiring the child to describe reason.</p> <p>E.g., Why is he crying?</p>		

	Type of language strategy	Examples	Frequency
f.	<i>How questions</i>		
i)	<p>Questions asking about method and quantity</p> <p><i>Asking about method:</i></p> <p>Questions asking about the way an action is done or accomplished.</p> <p>E.g. 'How did it get there?'</p>		
ii)	<p><i>Asking about quantity:</i></p> <p>Questions asking about quantitative aspects (e.g number, extent, size) of objects or concepts</p> <p>E.g., 'How many hats are there?'</p>		
		Total (II WH question prompts)	
III	<p>Completing prompts</p> <p>Questions or statements that require the child to fill-in-the-blank.</p> <p>E.g., 'Look! That's a ____.' (blank for child to fill in)</p>		
		Total (III Completing Prompts)	
IV	<p>Recall prompts</p> <p>Questions which require the child to recall and describe past events in the story.</p> <p>E.g., 'What did monkey do before he fell down?'</p>		
		Total (IV Recall Prompts)	
V	<p>Pointing</p> <p>Pointing to a text or picture in the storybook while talking about the referent (text or picture).</p> <p>E.g. Pointing to a picture of a flower in the storybook while talking about it.</p>		
		Total (V Pointing)	
VI	<p>Naming</p> <p>A statement that identifies or labels an object, noun, action or character in the story.</p>		

	Type of language strategy	Examples	Frequency
a.	<i>Objects/nouns</i> Saying the name of an entity in the storybook E.g., It's a cat!		
b.	<i>Actions</i> Saying the name of an action in the storybook. E.g., The cat is eating!		
c.	<i>Characters</i> Saying the name of a character in the storybook. E.g., That's Billy!		
		Total (VI Naming)	
VII	Commenting Statements that explain or expand the word.		
a.	<i>Elaboration of a word</i> Comments providing meaning, function and context of a word E.g., We use a knife to cut. (elaboration of word 'knife'); The caterpillar is inside the cocoon. (elaboration of the word 'cocoon')		
b.	<i>Descriptive comments</i> Comments describing objects, characters, nouns and actions with adjectives. E.g., The giraffe has long neck!		
c.	<i>Feeling comments</i> Comments describing feelings of characters in storybook. E.g., Look, the elephant is so sad.		
d.	<i>Prediction comments</i> Comments that predict what might happen next in the story E.g., The cat might find a fish next!		
		Total (VII Commenting)	

	Type of language strategy	Examples	Frequency
VIII	Repetition of words Saying the same word more than once across consecutive sentences, or within a sentence.		
a.	<i>Lexical repetition</i> Words occurring more than once, with no particular pattern of repetition, in a non-rhythmic manner. E.g., Elephant saw his friend monkey, elephant said 'Hi!', then elephant walked into the forest. (repetition of the word 'elephant')		
b.	<i>Rhythmic repetition</i> Words repeated in rhythmic manner. E.g., The elephant can walk, walk, walk, walk. (Walk, walk, walk, walk said in a rhythmic manner)		
		Total (VIII Repetition)	
IX	Responsive statements Statements said in response to or to expand child's utterance during SBR.		
a.	<i>Repetition of child's word</i> Saying a word that the child has said, in response to child's utterance. E.g., You like tulips. (in response to child saying 'I like tulips')		
b.	<i>Expansion</i> Saying a sentence that includes a word the child has said, with additional vocabulary or grammatical markers. E.g., The flowers are beautiful. (in response to child saying 'flower')		
c.	<i>Acknowledgement of child's utterance</i> Statements that recognise and validate the child's utterance. E.g., That's interesting. (in response to child saying 'the cat wears hat')		

	Type of language strategy	Examples	Frequency
d.	<p><i>Praise of child's utterance</i></p> <p>Statements that compliment or commend the child's utterance.</p> <p>E.g., Good job, that's right! (in response to child labelling a picture of a cat by saying 'cat')</p>		
		Total (VI Responsive Statements)	
X	<p>Relating to child's experience</p> <p>Statements, questions or prompts that link a scene, object, action, character or other content in the story book to child's personal real-life experience.</p>		
a.	<p><i>Statements relating to child's experience</i></p> <p>Statements that relate a scene in the storybook to the child's real-life experience.</p> <p>E.g., Billy's burger looks like the one you ate just now.</p>		
b.	<p><i>Questions asking child to relate story content to their experience</i></p> <p>Questions that relate events in the storybook to the child's real-life experience.</p> <p>E.g., Did you feel scared like Lily when you were on the plane?</p>		
c.	<p><i>Prompts for child to relate story content to their experience</i></p> <p>Statements prompting the child to describe their real-life experiences relating to the event in the storybook.</p> <p>E.g., Tell me about what you feed your cat at home. (relating to scene of cat eating food)</p>		
		Total (X Relating to child's experience)	
XI	<p>Others</p> <p>Strategies not categorised as strategies I to X</p>		
		Total (Others)	

PART B: ENGAGEMENT STRATEGIES

	Type of Engagement Strategy		
I	Inflection Varying features of voice to achieve various storytelling and engagement purposes.		
a.	<i>Word Prolongation</i> Increasing the length of the word said by increasing the duration of production of the vowel or consonant in the word. E.g., Prolong the word ‘elephant’ (eeeelephant) in ‘See, elephant.’	Rate on a scale from 1 to 5: 1 = Not Observed (0%) – Not used at all. 2 = Rare (1–20%) – Used once or twice. 3 = Sometimes (21–50%) – Used occasionally; noticeable but not consistent. 4 = Frequent (51–80%) – Used often; consistently noticeable. 5 = Very Frequent (81–100%) – Used very often; highly clear, engaging, and consistently applied.	
b.	<i>Volume control</i> Increasing or decreasing volume of a word said. E.g., He likes to eat leaves . (increase volume for the word ‘leaves’)	Rate on a scale from 1 to 5: 1 = Not Observed (0%) – Not used at all. 2 = Rare (1–20%) – Used once or twice. 3 = Sometimes (21–50%) – Used occasionally; noticeable but not consistent. 4 = Frequent (51–80%) – Used often; consistently noticeable. 5 = Very Frequent (81–100%) – Used very often; highly clear, engaging, and consistently applied.	
		Average rating (I Inflection) $([a+b]/2)$	
		Examples	Frequency
II	Dramatisation Re-enactment and imitation prompts of scenes and dialogues in the story.		
a.	<i>Action enactment</i> Acting out an action. E.g., Acting out action of a bird flying		
b.	<i>Action imitation prompts</i> Prompting the child to act out an action. E.g., Parent says to child: Show me how a bird flies.		

c.	<p><i>Sound/dialogue enactment</i></p> <p>Acting out a sound related to or dialogue from a scene in the storybook.</p> <p>E.g., Saying a sentence by a grandmother character in the story with an elderly voice.</p>		
d.	<p><i>Sound/dialogue imitation prompts</i></p> <p>Prompting the child to act out a sound related to or dialogue from a scene in the storybook.</p> <p>E.g., Parent says to child: What sound does a frog make?</p>		
		Total (II Dramatisation)	

PART C: QUALITATIVE FEEDBACK

Use this column to write additional descriptive observations about the child's responses, interaction and behaviours during shared book reading session.