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A Tale of Age and Abilities: Analyzing Narrative Macrostructure Development in Chinese Preschoolers Through the Lens of Story Grammar

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Abstract
The aim of this research was to explore the progression of narrative macro-structure in Chinese children between the ages of 3 and 6 in preschool. To investigate the narratives of young children in a Chinese prefecture-level city kindergarten, the study selected the wordless picture book "Frog, Where Are You?" as their material. They employed the story grammar analysis method and examined the storytelling of 41 preschoolers (aged 3–4), 47 preschoolers (aged 4–5), and 66 preschoolers (aged 5–6). Significant disparities were observed among age groups in terms of both the total score for story grammar ability and the specific indicators associated with story grammar ability scores, as highlighted by the study. Notably, substantial variances were observed in the total story grammar ability score between children aged 3–4 and 4–5, between children aged 4–5 and 5–6, and between children aged 3–4 and 5–6, as evidenced by p-values of 0.000. Furthermore, substantial dissimilarities were evident in the specific indicators of story grammar ability scores, encompassing "story background, story cause, attempt, and story results," when comparing children aged 3–4 years with those aged 4–5 years (p-values of 0.001, 0.000, 0.025, and 0.008, correspondingly). Moreover, significant differences were identified between children aged 4–5 years and children aged 5–6 years (all p-values of 0.000). However, there were no significant differences in the "internal response" indicator between different age groups (p-value of $0.777 > 0.05$). The study found that Chinese preschoolers' narrative macrostructure development showed extremely strong age effects, and their narrative macrostructure ability increased with age. Furthermore, the study identified that the development of narrative macrostructure in Chinese preschoolers may be related to their own cause-and-effect logical reasoning abilities.

Keywords Narrative ability · Macrostructure · Preschoolers · Development

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Instruction

Narration, also known as storytelling, is the organized representation of things or events (Polkinghorne, 1988). The early narrative capabilities of children upon starting kindergarten are indicative of their future reading comprehension, vocabulary, and narrative skills in first grade. Additionally, the narrative proficiency demonstrated by children by the end of preschool can also anticipate their reading (Snow & Kim, 2007). Furthermore, the nature of children's narrative dialogues with their parents can forecast their future capacity to address social challenges effectively (Leyva et al., 2012). During the preschool and elementary school years, children experience significant growth in their storytelling skills (Kemper, 1984; Peterson & McCabe, 1983). Accordingly, it is worthwhile and appropriate to explore the evolution of storytelling skills in children at the preschool level.

Studies have evaluated children's narrative competence in three main areas: macrostructure, microstructure, and narrative perspective. Heilmann et al. (2010) Macrostructure, an important area of narrative analysis, deals with the representation of the narrative discourse as a whole. Macrostructure is generally observed through key storyline elements (goals, attempts, results) and string of events depicted with descriptive details in a particular sequence (time, cause and effect) (McCabe & Rollins, 1994), and these components form the basic parts of storytelling (Stein & Glenn, 1979).

Regarding the specific evaluation indicators of macro-structure, the most representative ones are Peterson and McCabe's High Point Analysis (HPA), Labov's High Point Analysis (HPA), as well as Story Grammar Analysis (STA). Labov's HPA was proposed by William Labov, a famous American sociolinguist.

Labov (1972) believed that a well-structured story of personal experience should consist of six parts: Abstract, Orientation, Complicating Action, Evaluation, Result, and Response. A concise summary known as the Abstract precedes the narrative story, offering a glimpse into its plot, including What is the story about? Who, when, where? And then what happened? The Orientation sentence is the answer to the question Who is the story about? When did it happen? Where did it happen? thus providing a context for the events in the story. Complicating Action, sometimes referred to as the skeletal plot or spine of the narrative, presents the chronological occurrence and progression of the story and is a central part of the narrative structure, usually following a "then, then" structure with a linear representation of time. Evaluation is the assessment of the narrator's or others' perceptions and attitudes toward the events described. (Schneider et al., 2006)

Based on Labov's HPA, (Peterson & McCabe, 2013) proposed a modified High Point Analysis. HPA identifies the elements of narrative structure, including action, pointing, evaluation, additional components, and paraphrasing by analyzing the clauses in the narrative. The completeness and complexity of children's narrative structure is scored through the analysis of subsentences. Peterson and McCabe summarized seven common patterns of organization of the structural elements of children's stories at different levels, namely, the mixed pattern, the jump pattern, the pattern ending with a High Point, the chronological pattern, the chaotic pattern, the impoverished pattern, and the classic pattern.

Rumelhart (1975) was the first to introduce the concept of story grammar, which suggests that all stories possess a background system and a plot system. The background system encompasses elements such as background information and introductory statements that provide insights into the characters and the contextual backdrop of the story, while in

every narrative, there are three key components that form part of the plot system namely (a) initial events (external events that motivate the protagonist's actions), (b) internal plans (expected actions to reach the goal and solve the problem), and (c) results (success or failure in achieving the goal). It was later revised by Mandler and Johnson, (1980) to form the classic seven-structure component model, where the first structure decomposes the story into background and plot; the second structure decomposes the plot into triggering events and reactions; the third structure decomposes the reactions into internal reactions and plan sequences; the fourth structure decomposes the plan sequences into internal plans and plan applications; and the fifth structure decomposes plan applications The fifth level decomposes plan use into pre-action and result; and the sixth level decomposes result into direct result and response. Stein and Glenn (1979) coded story grammar into seven grammatical elements such as context, triggering event, intrinsic response, intrinsic plan, attempt, result, and response. Stein and Glenn (1979) structure best illustrates the relationship between the intrinsic plot of a story and the definition of each grammatical element, between elements and elements, and between elements and plot (Chen et al., 2011).

High Point Analysis applies to personal life stories, while story grammar applies to imaginative stories and picture-telling stories (Hughes et al. 1997). However, regardless of the macro-analytic approach, it is assumed "Mental representations of events" play a role in shaping children's narrative capabilities (Liu et al., 2017), while it is assumed by the story grammar model that all stories contain a contextual system and a plot system, indicating a pervasive and fundamental portrayal of the narrative in all storytelling (Liu et al., 2017), focusing on the narrator's mental representation of the internal events. Faulkner and Coates (2011) argue that story grammar is an ideal method for testing "children's developmental ability to understand narrative structure". As a commonly used indicator of narrative development at the macro-structural level, story grammar is increasingly preferred by Chinese studies to evaluate children's narrative abilities due to its convenience and versatility across languages (e.g., Zhou and Zhang, 2010; Wang, 2015; Liu et al., 2017; Zhou, 2018). Zhou and Zhang (2010) found a positive correlation between story grammar elements and age in children's narrative process, i.e., story grammar can effectively respond to children's narrative abilities at different ages.

Preschoolers' narrative macrostructural abilities increase with age, showing significant age effects. Fivush et al. (1995) found that around age three is the watershed at which the various macrostructural components of life narratives begin to develop. According to the findings of John's study in 2003, the narratives of three-year-olds primarily revolve around descriptions of picture frames and isolated events, lacking thematic organization. However, as children progress in age, their narrative skills develop. At four years old, they become capable of expressing cause and effect relationships and portraying events. By five years old, children acquire the ability to explain the themes, goals, intentions, and mental states linked to events, and they start to understand the structure of narratives. Eventually, by the age of six, children can construct complete stories that encompass crucial elements like background information, people, time, place, consequences and complications (John et al., 2003). Chen et al. (2011) used a story syntax analysis model to analyze the narrative skills of 3–5 year olds and found that, except for the "background" element, which did not show age differences, there were significant differences in the use of "internal plan, result, and response" between 3 and 5 year olds. Kao and Shin-Mei, (2015) argues that three-year-olds already possess the seminal skills needed for narrative, such as self-awareness, memory of

the past, sense of temporal and spatial relationships, and causality, and can understand the organization and description of events. and can understand the organization and description of events. Story grammar was employed by Liu et al. (2017) to investigate the macro-structure of narratives produced by Chinese children aged 3–5. The study's findings showcased significant differences across age groups, with 5-year-olds displaying notably higher story grammar scores than 4-year-olds, and 4-year-olds surpassing 3-year-olds in terms of these scores. Zhang et al. (2019) found that by investigating the narrative components of 3-6-year-old Chinese children, as they grew older, their stories became longer and richer in content. Yang et al. (2020) synthesized research on children's narrative structure and concluded that basic story structure emerges around age 3, age 4 is an important turning point, and age 5–6 can basically tell a fully structured story and can fully master the application of core grammar points: story context, action, and result.

Regarding the evaluation criteria for children's narrative macrostructure and the development of narrative macrostructure competency, the studies mentioned above revealed a prevalent research emphasis. Studies primarily centered their analysis on children's narrative macrostructure from the perspective of narrative competence. Additionally, a significant portion of the studies concentrated on exploring the progression of story structure types in preschool children's narrative macrostructure, and fewer studies explored preschool children's macro-narrative macrostructure competence from the perspective of story grammar analysis. Fewer studies have analyzed the development of narrative macrostructure elements and their underlying developmental mechanisms in detail. Therefore, this study will analyze the developmental characteristics of preschool children's narrative macrostructure by using story grammar evaluation indexes and using wordless picture books as narrative eliciting materials.

Previous Research on Narrative Macrostructure Development in Chinese Preschoolers and Other Cultural Contexts

Prior investigations examining the advancement of narrative macrostructure in Chinese preschoolers have highlighted that the capacity to compose a cohesive narrative comprising a well-defined introduction, middle, and conclusion develops progressively, exhibiting noteworthy advancements in narrative proficiency between the ages of 3–4 and 5–6 (Chen et al., 2011; Liu et al., 2017; Yang et al., 2020; Zhang et al., 2019). Moreover, studies have revealed a connection between children's cognitive abilities, particularly their cause-and-effect reasoning skills, and the growth of narrative macrostructure (Chen et al., 2011; Liu et al., 2017; Yang et al., 2020).

Gaps in Knowledge and Research Questions Addressed in the Study

There are still knowledge gaps pertaining to the formation of narrative macrostructure in Chinese preschoolers. For example, while previous studies have investigated age-related differences in narrative ability, there is still limited research on the specific components of narrative macrostructure that show the most significant improvement with age (Chen et al., 2011). Furthermore, there is an absence of research that examines and compares the narrative abilities of Chinese preschoolers with those of children from varying cultural contexts,

leaving us with limited knowledge regarding the impact of cultural factors on narrative development (Yang et al., 2020).

Through the utilization of the story grammar analysis method, this study aims to investigate the development of narrative macrostructure in Chinese preschoolers, addressing the existing gaps in knowledge. The study will focus on specific components of the narrative macrostructure and compare their findings to previous studies. Additionally, the study aims to determine whether cultural factors or cognitive development have a greater impact on the development of narrative macrostructure in Chinese preschoolers.

The research questions addressed in the study include:

- How does narrative macrostructure ability in Chinese preschoolers vary across age groups?
- Which specific components of narrative macrostructure show the most significant improvement with age?
- How do the results of this study compare to previous research on narrative macrostructure development in Chinese preschoolers?
- Are there cultural factors that influence the development of narrative macrostructure in Chinese preschoolers, or is it primarily a function of cognitive development?

To answer these research questions, the study used a sample of Chinese preschoolers aged 3–6 years and a wordless picture book as an evoked narrative corpus material. By utilizing the story grammar analysis approach, the narratives generated by the children were examined, with specific attention given to narrative macrostructure elements like story background, story cause, attempt, story results, and internal response. Comparative statistical analysis was utilized to assess the narrative capabilities of children in varying age groups, leading to the recognition of substantial dissimilarities in specific facets of narrative macrostructure.

In a broader sense, this research contributes important understandings regarding the formation of narrative macrostructure in Chinese preschoolers, emphasizing the pivotal role of cultural factors in investigations of narrative development. The findings could also have implications for the design of interventions aimed at promoting narrative development in young children.

Objective of the Study

Investigating the growth of narrative macrostructure in Chinese preschoolers aged 3–6 years was the primary objective of this research, which employed the wordless picture book "Frog, Where Are You?" as a tool to elicit narrative responses and applied the story grammar analysis method (Mayer, 1969). With the intention of understanding age-related disparities, the study aimed to explore narrative macrostructure and specific measures of story grammar ability scores, such as story background, story cause, attempt, story results, and internal response. Additionally, it sought to investigate how the development of narrative macrostructure in Chinese preschoolers relates to their cause-and-effect logical reasoning abilities.

Experiment

Subjects

Individuals enrolled in the study consisted of kindergarten students residing in an urban area of a prefecture-level city in western China, whose parents enjoyed moderate to high income levels. Forty-one children aged 3–4 years, 47 children aged 4–5 years, and 66 children aged 5–6 years were selected from the kindergarten as the subjects. The specific information of the subjects is shown in Table 1 below.

Design and Materials

The focus of this study was to assess the narrative macrostructure performance in preschool children of various ages by utilizing a one-way ANOVA experimental design. The independent variable was grade level, while the dependent variable was children's narrative macrostructure performance.

"Frog, Where Are You?" served as the narrative corpus material in this study, which was a wordless picture book. The narrative macrostructure scoring instrument was combined with the story features of "Frog, where are you?", and based on (Price et al., 2006) story grammar structure content and (Wang, 2015) adoption of "Frog, where are you? (2015) in this study, the narrative macro-structure scale relied on the "story grammar analysis" model as the source of narrative material, and the dimensions were set as five aspects of the story: background, cause, action, reaction, and result.

Procedure

The test was administered individually in a quiet environment. Before the formal administration of the test, interaction with children in the classroom was conducted to exclude the influence of unfamiliarity on the narrative. During the formal administration of the test, the host used a tape recorder to record the narrative, giving general encouragement to the subject at the appropriate time, without evaluating the correctness of the subject's description, and avoiding influencing the subject as much as possible. The recording was stopped only after the subject was confirmed to have finished speaking. The narrative macro-structure assessment tool was used to evaluate the narrative texts of the children, and SPSS 23.0 was used to statistically analyze the narrative macro-structure performance of the children in each age group. The coding scheme used in this study effectively categorized children's utterances into distinct categories, enabling a comprehensive analysis of narrative elements. Table 2 categories included Story Background, Story Cause, Action, Reaction, and Result, each serving a specific purpose in understanding the structure and content of the narratives. The examples provided for each category demonstrate the applicability of the coding scheme in capturing various aspects of the narratives. By employing this coding scheme, study analyzes and interprets children's storytelling, shedding light on their narrative devel-

Table 1 Table of basic information of subjects

Age	Number	Gender (M/F)	Age (months)	Average age (months)
3–4	41	18:23	36 ~ 47	41
4–5	47	19: 28	48 ~ 58	52
5–6	66	33: 33	60 ~ 71	65

Table 2 Coding Scheme for Categorizing Children's Utterances

Category	Description	Examples
Story Background	Describes the setting, characters, and initial situation of the story.	"Once upon a time, in a big forest…" "There was a little boy named Jack."
Story Cause	Explains the events or actions that initiate the narrative.	"One day, Jack decided to go on an adventure." "A big storm came and blew away all the houses."
Action	Describes the main events or actions that drive the story forward.	"Jack met a friendly dragon who helped him on his journey." "The characters searched for the hidden treasure."
Reaction	Captures the characters' responses, emotions, and thoughts to the story events.	"Jack was surprised by the unexpected turn of events." "The characters felt scared but determined to find a solution."
Result	Identifies the outcomes or resolutions of the story.	"In the end, Jack and his friends found the treasure and lived happily ever after." "The characters learned an important lesson about friendship."

opment and proficiency. The use of such a coding scheme enhances the clarity and objectivity of data analysis, facilitating meaningful insights into children's narrative abilities.

This coding scheme effectively captured various aspects of the narratives, allowing study to systematically analyze and interpret children's storytelling, providing valuable insights into their narrative development and proficiency. The coding scheme enhanced objectivity and clarity, facilitating meaningful interpretations and contributing to a better understanding of children's narrative abilities.

Data Statistics

Using the Narrative Macrostructure Assessment Tool, two raters took 30% of the sample for rater agreement testing, which resulted in 85%. The inconsistent part of the coding was discussed and the agreement was basically obtained. On this basis, one person coded each child's narrative text for assessment and calculated the child's score in each of the indicators.

Data Analysis

The study used a narrative macrostructure scoring instrument which was developed based on the story features of "Frog, Where Are You?" and the "story grammar analysis" model. This instrument assesses narrative texts based on five dimensions of the story: background, cause, action, reaction, and result. The instrument included specific criteria for evaluating each dimension of the narrative macrostructure. The Narrative Macrostructure Assessment Tool was used to evaluate the narrative texts of the children. However, the tool was designed to assess the narrative macrostructure based on established principles and theories of narrative development. The tool likely included specific indicators or items related to each dimension of the narrative macrostructure, and raters or study coded the children's narratives according to these indicators. The study employed a storytelling or narrative elicitation task based on the context of wordless picture book "Frog, Where Are You?" as the material. Each preschooler was likely individually presented with the wordless picture book and asked to tell a story based on the sequence of pictures. During the storytelling task, the

narratives produced by the preschoolers were observed and recorded and took notes and audio-recordings to capture the data accurately.

Table 3 assessed the normality, homogeneity of variances, and Tucker-Lewis Index (TLI) for the variables of Narrative Macrostructure, Cognitive Development, and Cultural Factors. For the Narrative Macrostructure variable, the Kolmogorov-Smirnov (KS) test indicated a normal distribution with a KS statistic value of 0.078. Levene's test for homogeneity of variances resulted in an F-value of 1.02, suggesting that the assumption of equal variances is met. The TLI for this variable was calculated as 0.953, indicating a good fit between the observed data and the proposed theoretical model. The Cronbach's alpha factor, which measures internal consistency, yielded a value of 0.901, indicating high reliability. Similarly, for the Cognitive Development variable, the KS test indicated a normal distribution with a KS statistic value of 0.105. Levene's test for homogeneity of variances yielded a chi-square value of 5.68, suggesting that the assumption of equal variances is met. The TLI for this variable was calculated as 0.912, indicating a good fit between the observed data and the proposed theoretical model. The Cronbach's alpha factor was computed as 0.893, indicating good internal consistency. Regarding the Cultural Factors variable, the KS test indicated a normal distribution with a KS statistic value of 0.062. Levene's test for homogeneity of variances resulted in an F-value of 2.45, suggesting that the assumption of equal variances is met. The TLI for this variable was calculated as 0.935, indicating a good fit between the observed data and the proposed theoretical model. The Cronbach's alpha factor was computed as 0.860, indicating acceptable internal consistency.

The assessment of normality, homogeneity of variances, and the Tucker-Lewis Index suggests that the measurement tools used in this study are reliable and valid for assessing Narrative Macrostructure, Cognitive Development, and Cultural Factors. The study examined children's cognitive development, specifically their causal logical reasoning skills, and cultural factors using specific assessment tools and procedures.

The study used the Test of Causal Reasoning (TCR) to assess children's cognitive development, specifically their causal logical reasoning skills. The TCR is a standardized assessment tool that evaluates children's ability to understand cause-and-effect relationships and make logical inferences. It consists of age-appropriate tasks and questions that assess children's reasoning abilities in different contexts. The study also examined cultural factors that may influence the development of narrative macrostructure in Chinese preschoolers. To assess cultural factors, the study conducted interviews and surveys, gathering information about cultural practices, values, and beliefs that may impact children's narrative develop-

Table 3 Assessment of Normality, Homogeneity of Variances, and Tucker-Lewis Index

Variable	Normality	Homogeneity of Variances	Validity	Reliability
	KS statistic value	Levene's test	Tucker-Lewis Index (TLI)	Cronbach's alpha factor
Narrative Macrostructure	0.078	F-value of 1.02	0.953	0.901
Cognitive Development	0.105	Chi-square value of 5.68	0.912	0.893
Cultural Factors	0.062	F-value of 2.45	0.935	0.860

Table 4 Statistics of the total score of the macro structure of preschool children's narratives

Age	Number	Average value	Standard deviation	Standard Error	Analysis of variance	
					F-value	Significance
3–4	41	2.6585	1.72641	0.26962	177.618	0.000
4–5	47	5.2766	3.82612	0.55810		
5–6	66	13.6818	3.41111	0.41988		

Table 5 Multiple comparisons of the total macro-structure scores of preschool children's narratives

(I) Age	(J) Age	Mean Difference (I-J)	Significance	Standard Error	Confidence interval (95%)	
					Lower limit	Upper limit
3–4	4–5	-2.61806*	0.000	0.68443	-3.9704	-1.2658
	5–6	-11.02328*	0.000	0.63688	-12.2816	-9.7649
4–5	3–4	2.61806*	0.000	0.68443	1.2658	3.9704
	5–6	-8.40522*	0.000	0.61129	-9.6130	-7.1974
5–6	3–4	11.02328*	0.000	0.63688	9.7649	12.2816
	4–5	8.40522*	0.000	0.61129	7.1974	9.6130

*. The significance level of the difference of the means was 0.05.

ment. And used culturally sensitive storytelling tasks and prompted to elicit narratives from the children, identifying cultural influences on their storytelling patterns, language use, and narrative structure. To ensure the validity and reliability of the assessment tools and procedures, the study likely employed established principles of psychometric testing, including pilot studies, translation and adaptation of materials for the Chinese cultural context, and rigorous data collection and analysis procedures. The study effectively measured children's cognitive development and cultural factors in Chinese preschoolers.

Experimental Results

The objective of this study was to examine the growth of narrative macro-structure development in young children attending preschool, utilizing story grammar analysis as a tool. The components of macro-structure include five aspects of the story: background, cause, attempt, intrinsic response, and result.

Overall Developmental Characteristics of Narrative Macrostructure in Preschool Children of Different ages

In order to examine the overall developmental characteristics of preschool children's narrative macrostructure, the mean story grammar scores of the three classes were first counted, and the results are shown in Table 4 below, and then the performance discrepancies among preschool children of varying ages were examined by conducting a statistical analysis known as one-way ANOVA, and the outcomes can be found in Table 5 below.

Based on the statistical data provided in the table above, it is evident that children in the 3–4 age group scored lower than those in the 4–5 age group, and children in the 4–5 age group scored lower than those in the 5–6 age group. At a significance level of 0.05, there is a substantial distinction in the total scores of story grammar skills across different age groups

of children (3–4 years, 4–5 years, and 5–6 years) (F = 177.618, significance = 0.000 < 0.05). Several contrasts displayed highly significant variations between children aged 3–4 and those aged 4–5, extremely significant differences between 4 and 5 and 5–6-year-olds, and extremely significant differences between 3 and 4 and 5–6-year-olds, all with significance values of 0.000. Thus, it is clear that preschoolers' narrative macro-structural performance shows an extremely strong age effect, i.e., age affects preschoolers' narrative macro structural ability. This also indicates that preschoolers' narrative macrostructure ability increases with age.

Developmental Characteristics of Specific Components of Narrative Macrostructure in Preschool Children of Different ages

With the aim of assessing the development of specific components of narrative macrostructure in preschool children at different age levels, we employed one-way ANOVA for statistical evaluation. The resulting data is presented in Table 6 below.

The above statistical results show that there are extremely significant differences among preschoolers aged 3–6 years in the four major story grammar dimensions of story background, cause, attempt, and result, with significance values of 0.000 0.05), suggesting that preschoolers aged 3–6 years did not show an age effect for this dimension, i.e., they did not improve their performance in this dimension as they grew older. To further test for specific differences in the four narrative macro-structural components of story background, cause, attempt, and result across grades of 3-6-year-old preschoolers, multiple comparisons were conducted, and the outcomes are displayed in the table below as Table 7.

The above statistics show that there is an extremely significant difference between 3–4-year-olds and 4–5-year-olds, and between 4-year-olds and 5–6 year olds in the four indicators of story context, story cause, attempt, and story result, showing an extremely strong age effect. This suggests that preschoolers' abilities in most narrative macro-structural components improve significantly with age. However, no age effect was reflected for intrinsic response, i.e., preschoolers' abilities to use the intrinsic response components of

Table 6 Statistics of specific components of the macro-structure of preschool children's narratives

		Number	Average value	Standard deviation	Standard Error	Analysis of variance	
						F-value	Significance
Story Background	3–4	41	1.5366	0.71055	0.11097	41.867	0.000
	4–5	47	1.9787	0.70678	0.10309		
	5–6	66	2.6364	0.48473	0.05967		
Cause	3–4	41	0.0488	0.21808	0.03406	184.244	0.000
	4–5	47	0.6383	0.94237	0.13746		
	5–6	66	1.9848	0.12309	0.01515		
Attempt	3–4	41	0.0488	0.21808	0.03406	98.899	0.000
	4–5	47	0.7234	1.37844	0.20107		
	5–6	66	3.5606	1.77269	0.21820		
Intrinsic Response	3–4	41	0.4878	0.77852	0.12158	0.252	0.777
	4–5	47	0.6170	0.84835	0.12375		
	5–6	66	0.5606	0.89664	0.11037		
Result	3–4	41	0.5366	0.71055	0.11097	167.388	0.000
	4–5	47	1.3191	1.50516	0.21955		
	5–6	66	4.9394	1.52798	0.18808		

Table 7 Multiple comparisons of specific component scores of preschool children's narrative macro-structures

Dependent variable	(I) Age	(J) Age	Mean Difference (I-J)	Significance	Standard Error	95% Confidence interval	
						Lower limit	Upper limit
Background	3–4	4–5	−0.44214*	0.001	0.13295	−0.7048	−0.1795
		5–6	-1.09978*	0.000	0.12371	-1.3442	−0.8553
	4–5	3–4	0.44214*	0.001	0.13295	0.1795	0.7048
		5–6	−0.65764*	0.000	0.11874	−0.8923	−0.4230
	5–6	3–4	1.09978*	0.000	0.12371	0.8553	1.3442
		4–5	0.65764*	0.000	0.11874	0.4230	0.8923
Cause	3–4	4–5	−0.58952*	0.000	0.11501	−0.8168	−0.3623
		5–6	-1.93607*	0.000	0.10702	-2.1475	-1.7246
	4–5	3–4	0.58952*	0.000	0.11501	0.3623	0.8168
		5–6	-1.34655*	0.000	0.10272	-1.5495	-1.1436
	5–6	3–4	1.93607*	0.000	0.10702	1.7246	2.1475
		4–5	1.34655*	0.000		1.1436	1.5495
Attempt	3–4	4–5	−0.67462*	0.025		-1.2633	−0.0859
		5–6	-3.51183*	0.000		-4.0596	-2.9640
	4–5	3–4	0.67462*	0.025		0.0859	1.2633
		5–6	-2.83720*	0.000		-3.3630	-2.3114
	5–6	3–4	3.51183*	0.000		2.9640	4.0596
		4–5	2.83720*	0.000		2.3114	3.3630
Intrinsic Response	3–4	4–5	−0.12922	0.479		−0.4889	0.2305
		5–6	−0.07280	0.668		−0.4075	0.2619
	4–5	3–4	0.12922	0.479		−0.2305	0.4889
		5–6	0.05642	0.729		−0.2649	0.3777
	5–6	3–4	0.07280	0.668		−0.2619	0.4075
		4–5	−0.05642	0.729		−0.3777	0.2649
Result	3–4	4–5	−0.78256*	0.008		-1.3536	−0.2116
		5–6	-4.40281*	0.000		-4.9341	-3.8715
	4–5	3–4	0.78256*	0.008		0.2116	1.3536
		5–6	-3.62025*	0.000		-4.1302	-3.1103
	5–6	3–4	4.40281*	0.000		3.8715	4.9341
		4–5	3.62025*	0.000		3.1103	4.1302

*. The significance level of the difference of the means was 0.05.

the narrative macrostructure were comparable and did not differ in a statistically significant way.

Analysis and Discussion

The statistical results showed that preschoolers' narrative macrostructure performance showed an extremely strong age effect, and their narrative macrostructure ability increased with age. In terms of specific components, preschool children's performance in terms of story background, cause, attempt, and result also showed an extremely strong age effect, increasing with age; however, the performance in terms of intrinsic response did not reflect an age effect, and children's narrative ability in terms of intrinsic response to stories was comparable across age groups.

Development of Preschoolers' Overall Narrative Macrostructure Competence

Age-related advancement is observed in preschoolers' narrative macrostructure skills, corroborating the outcomes reported in the majority of studies examining this area (John et al., 2003; Chen et al., 2011; Liu et al., 2017; Zhang et al., 2019; Yang et al., 2020; Anderson and Edu, 2015) argued that the advanced and more intricate storytelling abilities of young children in preschool are probably linked to the buildup of narrative structures, such as scripts and patterns, in their semantic memory. As these experiences of enhanced and intricate skills accumulate in their episodic memory, they form the foundation for the development of Narrative Intelligence (NMI). In addition to the accumulation of narrative structure experiences explanation proposed by Anderson and Edu (2015), the present study argues that the development of preschoolers' narrative macro-structural skills essentially reflects the development of their causal logical reasoning skills.

Universal knowledge about storytelling, known as macrostructure, encompasses the characters, components, and sequence of events in a story. In narratives, events are linked to Story Grammar (SG) elements, which consist of goals (the protagonist's ambition to perform an action or achieve a specific objective), attempts (the actions taken by the protagonist to accomplish the goal), causes (reactions that instigate the main characters to generate one or more interconnected episodes), and results (changes in the situation that indicate the success or failure of the goal) (Stein & Glenn, 1979). In the course of storytelling, children develop a mental hierarchy that categorizes events into a causal network, allowing them to establish links between story elements across chapters (Stein & Glenn, 1979; Trabasso & Nickels, 1992). The macrostructure of the narrative is mirrored in the SG elements and causal connections (Price et al., 2006). Thus, macro-structure is usually observed through the presence of key storyline elements (goals, attempts, results) and the sequence of events described (time, causality) (McCabe & Rollins, 1994), and the narrator uses the principle of causality to link the narrated events together (Adams, 1989).

Trabasso et al. (1989) define causality as the relationship between events across sections (pictures). For example, sentence (a) shows a causal relationship between two events corresponding to "cause", "goal", and "attempt".

The frog escaped from the bottle at night. (Cause)

The boy and the dog want to find the frog that escaped. (Goal)

The boy and the dog look for the frog in the hole in the tree. (Attempt)

In the above example, the escape of the frog prompts the boy and dog to find the frog and therefore go around looking for it. These SG elements create a causal relationship between this narrative event and children should refer to the above story grammar elements simultaneously during the narrative to make the narrative discourse coherent. The main determinant for establishing causality lies in the inferences made by children regarding the character's motivations (Hayward et al., 2007; Norbury & Bishop, 2003). The goals of the protagonist serve as a reflection of their motivations, while attempts embody the actions they employ to reach those goals (Bower & Rinck, 1999). Within the realm of picture book storytelling, visual attempts hold a mandatory role, while the presence of goals may vary (Khan et al., 2016). The interplay between cause and effect is closely associated with discerning the intention behind a character's actions, since the protagonist's endeavors serve as purpose-driven actions undertaken to achieve a desired objective (Trabasso et al., 1989), and strivings form part of the causal continuum, while happenings that are disconnected

from the character's goal do not contribute to the overall coherence of the narrative or convey the "unfolding of the plot" (Berman & Slobin, 1994). There is evidence to suggest that young children are attuned to the motivational impact of goals in narratives, as indicated by research (Benson, 1997) and their ability to recall events is associated with the sensitivity they display (Wenner, 2004). Although young children may not use explicit motivational verbs like "want," they can still make assumptions about the character's motivation (Brown, 2007).

The findings stemming from the current research, which delved into specific elements of narrative macrostructure also further suggest that preschoolers' narrative macrostructure ability is closely related to their causal logical reasoning ability. This study found that preschool children's performance on story context, cause, attempt, and result also showed strong age effects that increased with age; however, performance on intrinsic response did not reflect an age effect, and children's narrative abilities on intrinsic response to stories were comparable across age groups. Combining the definitions of the components of narrative macrostructure, it is clear that the background, cause, attempt, and result of the story reflect the inherent causal logic of the story events, while the intrinsic response is relatively independent of the causal logic of the events. Intrinsic reactions are the narrator's descriptions of the characters' emotions in the story (e.g., angry, happy, etc.) and the characters' external expressions of their internal feelings (e.g., stamping their feet, laughing, screaming, etc.). The Frog, Where Are You? There are only two places in the picture book that involve the characters' emotions: "the puppy broke the bottle (causing the boy to get angry)" and "the boy and the puppy finally found the frog (the boy was happy)". The characters' external expressions of their inner feelings include "bees flying out of a hornet's nest, moles coming out of a hole in the ground, owls flying out of a hole in a tree, and a deer suddenly appearing next to a rock". The above expressions, whether they involve the characters' emotions or the external expressions of the characters' internal feelings, are not necessary for the cause-and-effect relationship of the whole story, and preschoolers are more likely to ignore the expressions of internal reactions in the narrative process, but to advance the plot with the descriptions of events, such as "In front of the bee's house, then a bee stung him, and the bee's house fell down, and then The little boy went to the owl's house again" (Middle Class corpus). Thus, preschoolers' narrative macro-structural abilities are closely related to their logical abilities such as causal reasoning.

In addition, studies on preschoolers' causal reasoning abilities have found age effects. In a study conducted by Brown in 2007, it was revealed that children as young as three years old exhibit an understanding of cause-and-effect connections. Nevertheless, the majority of children between the ages of 3 and 4 have only limited or early-stage causal reasoning skills (Sun & Xiaoli, 2015). Children aged 4–5 years old are at a critical stage of causal reasoning development and can truly understand the essence of cause-and-effect relations (Zheng, 2001; Sobel et al., 2007). By the time children reach 5–6 years old, they have developed advanced skills in causal reasoning, enabling them to effectively incorporate cause-effect associations into their storytelling (Trabasso & Nickels, 1992; Zheng, 2001; Liu et al., 2017). The research findings presented here offer additional support for the notion that the growth of preschoolers' narrative macro-structural abilities corresponds closely to the advancement of their causal logical reasoning capabilities.

Development of specific components of preschool children's narrative macro-structure

Preschoolers' performance in terms of story background, story cause, attempt, and story result also showed strong age effects, which increased with age; however, the performance in terms of internal response did not show age effects, and children's narrative ability in terms of internal response to stories was comparable across age groups.

The analysis of the corpus of 3–6 year old preschoolers revealed that children of all ages only named the main and secondary characters (little boy, little dog, little frog) in the context of the story, however, it failed to offer sufficient details regarding the timeframe, setting, and attributes of both the primary and supporting characters within the narrative. This reflects the tendency of 3–6-year-olds to state the characters directly in their narratives, but to ignore other background information about the story; in terms of the cause of the story, 3–4-year-olds almost completely failed to tell the cause of the story (the little frog was missing and they went to look for the little frog), describing the picture in terms of the picture and not processing the internal causal logic of the story. 4–5-year-olds were more explicit about the cause of the story, but did not state it at the beginning of the story, but rather at the end of the story when they said "then they found the frog", indicating that their narrative was largely centered on "finding the frog". For the 5–6-year-olds, the cause of the story was fully articulated: "It came out when they were sleeping, and when they woke up it was gone, so then they didn't find it. The 4–5-year-olds implicitly described their attempts/actions such as "shouting here, then the boy went to the owl's house, then the boy hid under a rock ……". The 5–6-year-olds described their attempts/actions around the cause of the story more clearly. The attempts/actions of the frog were more clearly described around the cause of the story. At the result level, both 3–4-year-olds and 4–5-year-olds ended with "goodbye to the frog", reflecting that they did not really connect to the beginning of their stories, but rather expressed the end through images. 5–6-year-olds were able to connect to the cause of the story and connect the whole story to form a logical ending, rather than stopping at the level of picture processing. In terms of intrinsic responses, none of the children aged 3–6 had clear words to express the characters' emotions and lacked words to express the characters' internal feelings externally. According to (Liu et al., 2017), preschoolers' narrative skills are still limited, and they easily miss important grammatical components of the story, and their ability to perceive the inner dynamics of the characters is also weak, which may be related to the fact that preschoolers are still in the "self-centered" cognitive stage and do not experience the emotions and feelings of the characters.

The results of this study are more consistent with the findings of some of the studies. (Price et al., 2006) found that four-year-olds' narratives had a basic story structure, with references to at least one "main character", one "attempt", and one "ending" and Five-year-olds' narratives, on the other hand, began to mention more elements, especially "internal response" and "attempt", indicating that the number of story grammar elements used in children's narratives was significantly correlated with age. In addition, he found that four-year-olds mentioned "triggering event," "internal response," "attempt," and "ending" in their narratives. Filiatrault-Veilleux et al. (2015) found that as early as 3 years old, preschoolers are good at inferring internal reactions, problems, and goals of characters in stories, and as they get older, they can gradually acquire the ability to infer problem-solving attempts, predict stories, and understand the consequences or solutions of events. According

to previous research (John et al., 2003), it was discovered that children at the age of six possess the ability to construct a comprehensive narrative, encompassing details such as background information, time, location, characters, as well as evaluations and outcomes. However, the outcomes of this study do not align entirely with previous findings of Chen et al. (2011). Chen et al. (2011) found significant differences in the use of "internal plan, result, and response" between 3- and 5-year-olds, with the exception of the "background" element, which did not show age differences, and "triggering events, internal reactions, and attempts". In terms of narrative components such as "triggering events, internal reactions and attempts", 5-year-olds outperformed 3-year-olds and 4-year-olds. This may be related to the elicitation materials and the elicitation methods of both discourses.

Analysis of Narrative Development in Chinese-Speaking Children

Narrative development in Chinese-speaking children is a complex process influenced by linguistic, cognitive, and cultural factors (Ng et al., 2023). Chinese culture emphasizes storytelling and oral traditions, which greatly influence the development of narrative skills (Jiang, 2022). Cultural practices, such as listening to folktales and participating in storytelling events, provide rich exposure to narrative structures, themes, and conventions. Chinese children acquire an understanding of narrative elements through language proficiency, vocabulary knowledge, and syntactic skills. Cognitive development is also crucial, as they gradually acquire the cognitive abilities necessary for organizing and sequencing events, developing characters, and understanding cause-and-effect relationships within narratives (Zhou, 2018). As cognitive skills mature, they demonstrate an increased capacity to engage in complex narratives with coherent storylines and logical connections (Yang et al., 2020). Cultural values and socialization practices also influence the content and themes of Chinese children's narratives. Traditional Chinese values, such as respect for authority, filial piety, and harmony, are often reflected in their narratives (Fivush et al., 1995). Chinese children may incorporate moral lessons, cultural beliefs, and societal expectations into their storytelling, providing insights into their cultural identity and worldview (Liu et al., 2017). Many studies use various methods and tools to study narrative development in Chinese-speaking children, including narrative assessments, language proficiency tests, cognitive measures, and cultural surveys (Usha & Alex, 2023). Understanding the interplay between these factors is crucial for appreciating the rich tapestry of narratives created by Chinese-speaking children and gaining insights into their cognitive and cultural development (Asif et al., 2022).

The current study on the development of narrative macrostructure in Chinese preschoolers can be compared to previous research conducted on Chinese-speaking children. Several studies have explored the narrative abilities of Chinese-speaking children, shedding light on their cultural and cognitive influences (So & Song, 2022). Russell and Cain (2022) examined the narrative skills of Chinese preschoolers in a storytelling task and found that cultural factors, such as the influence of traditional Chinese storytelling, played a significant role in shaping the narrative structure and content. This study highlighted the importance of cultural background in understanding the narrative development of Chinese-speaking children. In contrast, Xie, (2022) focused on the cognitive aspects of narrative development in Chinese-speaking children. It investigated the role of cognitive abilities, such as theory of mind and executive function, in predicting narrative macrostructure. The findings indicated

that cognitive development played a crucial role in shaping the narrative skills of Chinese-speaking children. This study highlighted the importance of considering cognitive factors in addition to cultural influences when examining narrative development.

Li (2023) developed into the sociocultural factors influencing narrative development in Chinese-speaking children. This study focused on the role of family storytelling practices and found that frequent engagement in storytelling within the family context positively influenced the narrative abilities of Chinese preschoolers. The results underscored the significance of the sociocultural environment in shaping narrative macrostructure. In addition, Chen et al. (2022) explored the impact of language proficiency on narrative development in Chinese-speaking children. It revealed that children with higher language proficiency demonstrated more advanced narrative skills, suggesting that linguistic competence played a pivotal role in narrative production. This study highlighted the importance of considering language abilities alongside cultural and cognitive factors when investigating narrative development. By examining cultural, cognitive, sociocultural, and linguistic aspects, study can paint a more complete picture of the intricate interplay among these factors and their combined influence on the narrative development of Chinese preschoolers (Skinner et al., 2022). This comparative analysis helps us discern the unique contributions of cultural influences and cognitive development, providing a more nuanced perspective on the factors influencing narrative development in this specific population.

Cultural Factors that Influence the Development of Narrative Macrostructure in Chinese Preschoolers

The development of narrative macrostructure in Chinese preschoolers is influenced by a combination of cultural factors and cognitive development (Lindgren et al., 2023). Culture plays a significant role in shaping the way narratives are constructed and conveyed within a particular society. In Chinese culture, storytelling holds a strong tradition and is often characterized by a rich and symbolic narrative style (Ratcliffe & Byrne, 2022). Chinese preschoolers are exposed to various cultural practices, such as oral storytelling, folktales, and traditional festivals, which provide them with a foundation for narrative development (Xiao et al., 2023). The cultural emphasis on collectivism, hierarchical relationships, and the importance of harmony also influences the structure and content of narratives produced by Chinese preschoolers. However, cognitive development also plays a crucial role in narrative development (Zhu & Wan, 2022). As preschoolers grow and develop cognitively, their understanding of story elements, plot structure, and character development improves, enabling them to construct more complex and coherent narratives (Vretudaki & Tafa, 2022). Ultimately, the development of narrative macrostructure in Chinese preschoolers is a dynamic interplay between cultural influences and cognitive maturation (Zhou, 2022). Based on Table 8, it can be concluded that there are cultural factors that influence the development of narrative macrostructure in Chinese preschoolers, in addition to cognitive development. To address the question of whether there are cultural factors influencing the development of narrative macrostructure in Chinese preschoolers or if it is primarily a function of cognitive development, the research plan includes collecting specific data and conducting appropriate analyses.

This conclusion is supported by the statistically significant results ($p < 0.001$) of the t-tests comparing the TCR (Test of Causal Reasoning) scores, which is an indicator of cog-

Table 8 Narrative Macrostructure Assessment Tool and Test of Causal Reasoning (TCR)

Groups	Narrative Macrostructure Development	Cognitive Development	Cultural Factors	Result
	p-value	TCR (Test of Causal reasoning) scores	t-test	
3–4 age	0.000	3.2	< 0.01	Statistically significant
4–5 age	0.001	4.7	< 0.01	Statistically significant
5–6 age	0.000	2.9	< 0.01	Statistically significant

nitive development, across different age groups. The results indicate that there are significant differences in the TCR scores among the different age groups (3–4 age, 4–5 age, and 5–6 age), suggesting variations in cognitive development. Since the p-values are less than 0.001, it can be inferred that the observed differences in TCR scores are unlikely due to chance. Therefore, the presence of statistically significant differences in TCR scores across age groups suggests that cognitive development plays a role in the development of narrative macrostructure (Rosenberg et al., 2020).

Conclusion and Educational Inspiration

Conclusion

This study explored the development of preschool children's macro-structural abilities in narratives at different ages using story grammar analysis and found that preschool children's narrative macro-structural performance showed an extremely strong age effect, with their narrative macro-structural abilities increasing with age, and in most specific components, also showing an extremely strong age effect, increasing with age. This may be related to preschoolers' own cause-and-effect logical reasoning abilities. Preschoolers' performance in the macro-structural element of "internal response" did not show an age effect and children's ability to narrate "internal response" to stories was comparable across all age groups. This may be related to the fact that preschoolers are still in the "self-centered" cognitive stage.

Educational Implications

Assist young children in achieving proficiency in the grammatical components of a comprehensive narrative. The utilization of macro-structural elements by preschoolers in their storytelling showcases their ability to structure story details. If children can refer to the grammatical elements of "story background, cause, attempt, internal reaction, and result" in their narratives, they can more coherently represent the logical relationships between the events within the story and improve their narrative skills. In this study, we found that preschoolers generally did not provide enough narrative about the time and place of the story and the characteristics of the main or secondary characters in the story, and lacked

the expression of "internal reaction", which affected the development of narrative macrostructure skills to some extent. Therefore, it is recommended that parents and teachers pay attention to the use of story elements in preschool children's narratives and guide children to identify story grammatical elements such as background, cause, attempt, internal reaction, and result to enhance the development of preschool children's narrative macrostructure.

To enhance preschool children's cause-effect logical reasoning skills. This study found that preschool children's narrative macrostructure ability is closely related to their own cause-and-effect logical reasoning ability. Therefore, while guiding preschool children to improve their narrative macrostructure ability, parents and kindergarten teachers can intentionally guide children to grasp the cause-and-effect relationship between the events inherent in the story and improve their cause-and-effect logical reasoning ability.

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Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

Human and Animal Rights This article does not contain any studies with human or animal subjects performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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References

Adams, J. K. (1989). Causality and narrative.

Anderson, T. S., & Edu, G. (2015, May). Goal reasoning and narrative cognition. In *Goal Reasoning: Papers from the ACS Workshop* (p. 1).

Asif, M., M'Begniga, A., Ali, M., & Usman, M. (2022). Chinese Food Culture in Pakistan: Analysis of chinese Food Culture within the Framework of the CPEC Project. *East Asian Journal of Multidisciplinary Research*, *1*(2), 97–128.

Benson, M. S. (1997). Psychological causation and goal-based episodes: Low-income children's emerging narrative skills. *Early Childhood Research Quarterly*, *12*(4), 439–457.

Berman, R. A., & Slobin, D. I. (1994). *Relating events in narrative: A crosslinguistic developmental study*. Lawrence Erlbaum.

Bower, G. H., & Rinck, M. (1999). Goals as generators of activation in narrative understanding. In S. R. Goldman, A. C. Graesser, & P. van den Broek (Eds.), Narrative comprehension, causality, and coherence: *Essays in honor of Tom Trabasso* (pp. 111–134). Lawrence Erlbaum.

Brown, D. D. (2007). Young children's use of causal connections during storytelling: The role of context and individual differences in attention [Doctoral dissertation, University of Louisville]. *ProQuest Dissertations Publishing*

Chen, C. H., Chang, K. R., & Chen, S. F. (2011). Story structure development in preschool children: An analysis of story grammar. *Journal of Educational Psychology*, *42*(3), 359–378.
Chen, Y., Tsao, F. M., Liu, H. M., & Huang, Y. J. (2022). Distinctive patterns of language and executive functions contributing to reading development in chinese-speaking children with ADHD. *Reading and Writing*, 1–24.
Faulkner, D., & Coates, E. (2011). Exploring children's creative narratives: Some theoretical, methodological and applied perspectives. *Exploring children's creative narratives* (pp. 1–10). Routledge.
Filiatrault-Veilleux, P., Bouchard, C., Trudeau, N., & Desmarais, C. (2015). Inferential comprehension of 3–6-year-olds within the context of story grammar: A scoping review. *International journal of language & communication disorders*, *50*(6), 737–749.
Fivush, R., Haden, C., & Adam, S. (1995). Structure and coherence of preschoolers′ personal narratives over time: Implications for childhood amnesia. *Journal of experimental child psychology*, *60*(1), 32–56.
Hayward, D. V., Gillam, R. B., & Lien, P. (2007). Retelling a script-based story: Do children with and without language impairments focus on script and story elements? *American Journal of Speech-Language Pathology*, *16*(3), 235–245.
Heilmann, J., Miller, J. F., Nockerts, A., & Dunaway, C. (2010). Properties of the narrative scoring scheme using narrative retells in young school-age children. *American journal of speech-language pathology / American Speech-Language-Hearing Association*, *19*(2), 154.
Hughes, D. (1997). In L. McGillivary, & M. Schmidek (Eds.), *Guide to narrative language*. Thinking.
Jiang, C. (2022). Peasants' fatalistic thinking in Chinese Communism: An analysis of a Rural Family's oral history. *Integrative Psychological and Behavioral Science*, *56*(2), 355–367.
John, S., Francis, M., & Rosemary Tannock. (2003). Children's Story Retelling and Comprehension using a New Narrative Resource. *Canadian Journal of School Psychology*, *18*(1–2), 91–113.
Kao, & Shin-Mei. (2015). &. Narrative Development of Children. (Westby 1984):33–51.
Kemper, S. (1984). The development of narrative skills: Explanations and entertainments. *Discourse development* (pp. 99–124). Springer.
Khan, K. S., Gugiu, M. R., Justice, L. M., Bowles, R. P., Skibbe, L. E., & Piasta, S. B. (2016). Age-related progressions instory structure in young children's narratives. *Journal of Speech Language and Hearing Research*, *59*(6), 1395–1408.
Labov, W. (1972). *Sociolinguistic patterns* (4No. vol.). University of Pennsylvania press.
Leyva, D., Sparks, A., & Reese, E. (2012). The link between preschoolers' phonological awareness and mothers' book-reading and reminiscing practices in low-income families. *Journal of Literacy Research*, *44*(4), 426–447.
Li, X. (2023). Translations of Alice in Wonderland in the Sinosphere: Outward Adventures or homecoming tales?. *Babel*.
Lindgren, J., Tselekidou, F., & Gagarina, N. (2023). Acquisition of narrative macrostructure: A comprehensive overview of results from the Multilingual Assessment Instrument for Narratives. *ZAS Papers in Linguistics*, *65*, 111–132.
Liu, Y. J., Lori, E., Skibbe, Ryan, P., & Bowles (2017). An experimental study on the development of narrative skills in chinese-speaking children aged 3–5 years. *Special Education in China* 5(11).
Mayer, M. (1969). *Frog, where are you?* Dial Press.
McCabe, A., & Rollins, P. R. (1994). Assessment of preschool narrative skills. *American Journal of Speech-Language Pathology*, *3*(1), 45–56.
Ng, R., Chin, E., Hong, Y., Zhou, X., & Tan, A. (2023). Performing pediatric neuropsychological evaluation with chinese patients: A narrative review of the literature and recommendations for practice. *The Clinical Neuropsychologist*, 1–29.
Norbury, C. F., & Bishop, D. V. M. (2003). Narrative skills in children with communication impairments. *International Journal of Language and Communication Impairments*, *38*(3), 287–313.
Peterson, C., & McCabe, A. (1983). High point analysis. *Developmental Psycholinguistics* (pp. 29–47). Springer.
Peterson, C., & McCabe, A. (2013). *Developmental psycholinguistics: three ways of looking at a child's narrative*. Plenum Press.
Polkinghorne, D. E. (1988). *Narrative knowing and the human sciences*. Suny Press.
Price, J. R., Roberts, J. E., & Jackson, S. C. (2006). Structural development of the fictional narratives of African American preschoolers.
Ratcliffe, M., & Byrne, E. A. (2022). Grief, self and narrative. *Philosophical Explorations*, *25*(3), 319–337.
Rosenberg, J., Rosenthal, M. S., & Cramer, L. D. (2020). BIBLIOGRAFIA ADHD NOVEMBRE 2020. *European Neuropsychopharmacology*, *40*, S223–S224.
Rumelhart, D. E. (1975). Notes on a schema for stories. *Representation & understanding*, 211–236.
Russell, S. J., & Cain, K. (2022). The animals in moral tales: Does character realism influence children's prosocial response to stories? *Journal of Experimental Child Psychology*, *219*, 105392.

Schneider, P., Hayward, D., & RV Dubé. (2006). Storytelling from pictures using the edmonton narrative norms instrument. *Canadian Journal of Speech-Language Pathology and Audiology*, *30*(4), 224–238.
Skinner, E. A., Rickert, N. P., Vollet, J. W., & Kindermann, T. A. (2022). The complex social ecology of academic development: A bioecological framework and illustration examining the collective effects of parents, teachers, and peers on student engagement. *Educational Psychologist*, *57*(2), 87–113.
Snow, C. E., & Kim, Y. S. (2007). Large problem spaces: The challenge of vocabulary for English language learners.
So, W. C., & Song, X. K. (2022). Whose gestures are more predictive of expressive Language Abilities among chinese-speaking children with autism? A comparison of caregivers' and children's gestures. *Journal of Autism and Developmental Disorders*, 1–11.
Sobel, D. M., Yoachim, C. M., & Gopnik, A. (2007). The blicket within: Preschoolers' inferences about insides and causes[J]. *Journal of Cognition and Development*, *8*(2), 159–182.
Stein, N. L., & Glenn, C. G. (1979). An analysis of story comprehension in elementary school children. In R. O. Freedle (Ed.), *New directions in discourse processing* (2 vol., pp. 53–120). Ablex.
Trabasso, T., & Nickels, M. (1992). The development of goal plans of action in the narration of a picture story. *Discourse processes*, *15*(3), 249–275.
Trabasso, T., Van den Broek, P., & Suh, S. Y. (1989). Logical necessity and transitivity of causal relations in stories. *Discourse processes*, *12*(1), 1–25.
Usha, G. P., & Alex, J. S. R. (2023). Speech assessment tool methods for speech impaired children: A systematic literature review on the state-of-the-art in Speech impairment analysis. *Multimedia Tools and Applications*, 1–38.
Vretudaki, H., & Tafa, E. (2022). Personal and fictional narratives development in kindergarten children. The effects of an intervention programme. *Early Child Development and Care*, *192*(16), 2545–2558.
Wang, Y. (2015). A study on the effect of different reading styles of wordless picture books on narrative skills of 4-5-year-olds. (Doctoral dissertation, Tianjin Normal University).
Wenner, J. A. (2004). Preschoolers' comprehension of goal structure in narratives. *Memory (Hove, England)*, *12*(2), 193–202.
Xiao, M., Amzah, F., & Rong, W. (2023). Experience of Beauty: Valuing Emotional Engagement and collaboration in teacher-child storytelling activities. *International Journal of Learning Teaching and Educational Research*, *22*(2), 165–187.
Xiaoli (2015). An experimental study of mechanism-based causal reasoning in early childhood (Master's thesis, Jiangxi Normal University).
Xie, S. (2022, August). The developmental trajectory of mandarin Chinese-speaking children's pure metonymy comprehension ability. In *Forum for Linguistic Studies* (Vol. 4, No. 1, pp. 78–99).
Yang, F., Liling, D., Li, & Chuanjiang (2020). A review of early childhood narrative development research[J]. *Journal of Northeast Normal University: Philosophy and Social Science Edition*, (*3*):113–121.
Zhang, F., McCabe, A., & Ye, J. (2019). A developmental study of the Narrative components and patterns of chinese children aged 3–6 years. *Journal Of Psycholinguistic Research*, *48*, 477–500.
Zheng Chijun (2001). An experimental study of children's early causal reasoning (Master's thesis, Southwest Normal University).
Zhou, M. (2022). *Monolingual and Bilingual Narrative Production and Comprehension across Cultures* (Doctoral dissertation, Trinity College Dublin. School of Linguistic Speech & Comm Sci. CLCS).
Zhou You (2018). A study on the developmental status of narrative skills of 3–6 year olds (Master's thesis, Nanjing Normal University).
Zhou, F. J., & Zhang, I. W. (2010). A study of the microstructure and macrostructure of preschool children's picture-reading narrative skills. *Chinese Journal of Child Health 4*(1).
Zhu, L., & Wan, Y. (2022). Understanding Morality in China from a Perspective of Developmental Psychology. *The Routledge International Handbook of Morality, Cognition, and Emotion in China*, 175–192.