

## Oral and Written Language Development of Children Adopted From China

Kathleen A. Scott

*Temple University, Philadelphia*

Jenny A. Roberts

*Hofstra University, Hempstead, NY*

Rena Krakow

*Temple University, Philadelphia*

**Purpose:** The sharp increase in the number of international adoptions in the United States has prompted a heightened interest in the language development of internationally adopted children. Although recent studies have investigated the early language development of adoptees, little is known about the school-age language and literacy skills of internationally adopted children. The focus of this study was the oral and written language skills of school-age adoptees from China.

**Method:** The participants were 24 children between the ages of 7;0 (years;months) and 8;8. Oral and written language skills were assessed using standardized measures and a narrative retell task.

**Results:** As a group, the majority of children exhibited scores in the average to above average range for all oral and written standardized language

measures. Narrative analysis indicated that an increase in the number of grammatical errors was moderately correlated with lower reading comprehension scores. Age at adoption was negatively correlated with several measures, including a narrative measure of grammatical errors per T-unit.

**Conclusion:** These findings provide an encouraging outlook on the oral and written language outcomes of internationally adopted children from China through the early elementary grades. Moreover, these findings support earlier research that speaks to the resiliency and robustness of language acquisition abilities in children.

**Key Words:** reading impairment, language impairment, school-age children, international adoption, literacy

The sharp increase in the number of international adoptions in the United States has prompted a heightened interest in the language development of internationally adopted children (Glennen & Bright, 2005; Roberts, Pollock, Krakow, et al., 2005; U.S. Department of State, 2006). In the past 10 years, the number of children adopted internationally from China into the United States has risen dramatically (U.S. Department of State, 2006). In fact, international adoptions from China have increased to the extent that they currently represent the largest number of adoptions from a single country into the United States (U.S. Department of State, 2006).

Internationally adopted children are typically exposed to the language of their native country only for the period of time prior to adoption, and a new second language is introduced postadoption. Thus, adoptees do not experience what is described as the usual monolingual or bilingual

acquisition of language. The development of internationally adopted children's language skills is presumably dependent on their age at the time of adoption, the language exposure that they encounter in the home postadoption, and individual variability in language learning (De Geer, 1992; Glennen, 2002; Roberts, Pollock, Krakow, et al., 2005). It can also depend on the child's preadoption experiences (e.g., Serbin, 1997).

Preadoption experiences of internationally adopted children vary widely. This can be true within the same sending countries, across sending countries, and at various time periods. For example, orphanage conditions in China have arguably changed for the better over the past decade. Other countries, such as Korea, have reported that, for certain time periods, children were placed in foster care situations prior to adoption. Recently, countries such as Romania have made concerted efforts to reduce the time children spend in

institutional facilities and to increase the number of children placed in foster care situations (Johnson, Banghan, & Liyao, 1998; Rojewski & Rojewski, 2001; Tessler, Gamache, & Liu, 1999; Zeanah et al., 2003).

In addition to adapting to such dramatic changes in their living situations, the children must also negotiate a change from the language of their birth country to the language of their postadoption home. The language switch that internationally adopted children typically encounter is abrupt and carries with it simultaneous cultural and social changes. Internationally adopted children have been referred to as “second first language learners” (De Geer, 1992; Roberts, Pollock, & Krakow, 2005; Roberts, Pollock, Krakow, et al., 2005) because of the sudden shift in language that the children experience. They typically leave behind the language of the sending country and acquire the language of their adoptive home. The term acknowledges that acquisition of the children’s first language is interrupted, and subsequently the first language is largely abandoned and a new language is introduced.

Investigations into the language development of internationally adopted children have focused on how children negotiate this language shift. To date, data obtained from hundreds of children across a number of studies have established that the vast majority of children adopted from China fare quite well in the early acquisition of a second first language (Geren, Snedeker, & Ax, 2005; Roberts, Krakow, & Pollock, 2003; Roberts, Pollock, & Krakow, 2005; Roberts, Pollock, Krakow, et al., 2005; Tan & Yang, 2005). Although a relatively small number of children in these studies experienced difficulty in the language acquisition process, the majority of internationally adopted children from China presented with preschool language skills that were at or above the average range for monolingual children, after a sufficient period of exposure to their new language (Pollock, Price, & Fulmer, 2003; Roberts, Pollock, Krakow, et al., 2005). Even with the cultural and linguistic changes that internationally adopted children undergo during the first years of life, the “robustness of the language system” clearly emerges for the majority of the adoptees (Roberts, Pollock, Krakow, et al., 2005, p. 93).

Much less is known about the later language and literacy skills of internationally adopted children. Many researchers who have studied school-age children have focused on issues of adjustment, self-concepts, and behavior problems (e.g., Hoksbergen, ter Laak, van Dijkum, Rijk, & Stoutjesdijk, 2003). Others have used measures of intelligence as outcome measures (e.g., Morison & Ellwood, 2000). Several of the studies have examined the academic skills of internationally adopted children by exploring the child, parent, or teacher perceptions of a student’s “school performance” (e.g., Maughan, Collishaw, & Pickles, 1998). Consequently, much of what is known about school-age internationally adopted children is about their social and overall academic adjustment and not specifically their language and literacy skills.

Several researchers have suggested that a framework for understanding language acquisition of the internationally adopted child can be found in the BICS/CALP proposal made by Cummins in 1984 (Gindis, 1998; Glennen, 2002; Hough, 2000; Meese, 2002). Cummins’s proposal refers to

early communication competence as basic interpersonal communication skills (BICS) and later communication skills as cognitive academic language proficiency (CALP). These language skills perform the functions of everyday communication and are practiced within richly context-embedded routines as *communication language fluency* (Cummins, 1984). In Cummins’s view, such language skills are required to conduct basic conversations and simple speech acts. He proposed that language learners require 2 to 3 years’ exposure to a second language before BICS are adequately acquired. CALP refers to the ability to use language as a tool. It is defined as the context-reduced academic or “school language” that children must acquire to be not only competent but also proficient in a language (Cummins, 1984; Gindis, 1998). Examples of such context-reduced language include narratives, lectures, and complex directives. Cummins’s proposal maintains that 5 to 7 years of exposure to a second language are necessary to reach this sophisticated level of language ability defined as CALP (Collier, 1987; Cummins, 1984). Thus, BICS will be acquired after 2 to 3 years’ exposure to a second language, but sophisticated and complex language abilities will require at least 5 years’ exposure to the new language. Questions remain, however, about whether this bilingual framework will hold true for children who are switching languages early in life, as is the case for internationally adopted children.

Similar to Cummins’s proposal, Dalen and her colleagues (Dalen, 1995; Dalen & Saetersdal, 1987; Rygvold, 1999; Saetersdal & Dalen, 1991) have suggested that this shift from using language for “social” purposes, during the toddler and preschool years, to using language for “academic” purposes during the school-age years will present problems for internationally adopted children. In her research, Dalen (1995) used survey data to compare the school achievements of internationally adopted children with those of native-born Scandinavian children. Dalen concluded that internationally adopted children experienced considerably more difficulty than native-born children with school-related language than they did with everyday conversational language (Dalen, 1995).

An earlier series of studies by Dalen and Saetersdal (Dalen & Saetersdal, 1987; Saetersdal & Dalen, 1991) followed Vietnamese children who were adopted by Norwegian families in the late 1960s and early 1970s. Using surveys, the researchers found that, despite the reported “good” social adjustment and “rapid” language learning that the adoptees showed initially, many experienced significant language problems at school age. The researchers concluded that parents and teachers were overestimating the early language achievements of the children. Additionally, they proposed that, as the language demands of the classroom increased, the children’s language skills were not sufficiently developed to meet the higher level abstract language demands that academics required (Saetersdal & Dalen, 1991).

In a recent survey study, however, Dalen compared two groups of internationally adopted children, one from Korea and one from Colombia, with a group of Norwegian-born children (Dalen, 2001). She concluded that, as a group, adopted children performed no differently than their nonadopted peers on day-to-day language skills. Group differences were found,

however, as a function of country of origin. The Korean-born children performed slightly better than the Norwegian-born children, and the Colombian-born children performed more poorly than either the native-born Norwegian children or the Korean-born children (Dalen, 2001).

In the United States, Glennen and Bright (2005) followed 46 school-age children who were adopted from Eastern Europe prior to age 30 months. The children ranged in age from 6 to 9 years at the time of the study. Surveys were used to collect information regarding current academic placement, including special education services and diagnoses of the children. Two survey instruments completed by parents and teachers, the Children's Communication Checklist—Second Edition (CCC-2; Bishop, 2003) and the Social Skills Rating System (Gresham, 1990), were used to collect data on the social, academic, and communication skills of the children. Approximately 27% of adoptees were receiving speech-language services, and nearly 16% were receiving reading services. Past and current diagnoses indicated that just over 47% had current or past diagnoses of speech/language delay/disorder. Additionally, the researchers reported that the internationally adopted students in the study demonstrated a relative weakness in pragmatic and higher level language skills based on the two CCC-2 subtests that examined those aspects of language development.

Wickes and Slate (1996) investigated the verbal self-concepts of 174 Korean-born internationally adopted participants ranging in age from 17 to 39 years. Participants completed the standardized Self-Description Questionnaire—III (SDQ-III; Marsh, 1987). The questionnaire contained 136 items, divided into 13 self-concept areas. Verbal self-concept was one subscore. The reported mean score in verbal self-concept was within 1 *SD* of the SDQ-III reported norms (Wickes & Slate, 1996). Although much caution is needed in generalizing the findings of this study, the results suggest that perhaps not all internationally adopted children struggle with language skills later in life.

In summary, relatively little is known about how internationally adopted children perform on the more linguistically demanding oral and written language tasks that they encounter during the school years. Moreover, existing studies in the literature are limited to those that investigated language development of children from a variety of countries, but *not* China. It is widely acknowledged that quality of care, length of exposure to institutionalized living, and general health at the time of adoption vary from country to country (Gunnar, Bruce, & Grotevant, 2000; Johnson et al., 1998; L. C. Miller & Hendrie, 2000; Rutter & The English and Romanian Adoptees Study Team, 1998; Tessler et al., 1999). Furthermore, researchers who have investigated language development in adoptees from China have provided sufficient evidence that internationally adopted children of preschool age acquire more than just “conversational language skills” in that the children's language abilities are well within the norm on standardized assessments that measure broad aspects of language development (Krakow & Roberts, 2003; Roberts et al., 2003; Roberts, Pollock, & Krakow, 2005; Roberts, Pollock, Krakow, et al., 2005). Nevertheless, existing studies, although few in number, have indicated that the language skills of school-age internationally adopted

children from some countries falter as linguistic demands increase during the early academic years.

Another reason for investigating the school-age language development of internationally adopted children has to do with methodological issues in previous studies. Among the issues are a reliance on survey data collected from parents and teachers to draw conclusions about how the children were progressing in their language and literacy skills (Dalen, 1995, 2001; Glennen & Bright, 2005). In addition, several of these studies have failed to provide sufficient information regarding the language outcome measures used (Dalen, 1995, 2001; Dalen & Saetersdal, 1987). In studies using standardized survey instruments (Glennen & Bright, 2005; Wickes & Slate, 1996), researchers did not comprehensively examine language skill development on an individual basis. Finally, despite the large numbers of children coming from China, there are no research studies that have examined these children's school-age language skills. Thus, it remains unclear whether internationally adopted children from China are able to sustain these early language abilities and go on to acquire the higher level language skills necessary for the ongoing development of oral and written language.

Several researchers have specifically examined the relationship between age at the time of adoption and language development of internationally adopted children from China. The findings indicate that age at the time of adoption is negatively correlated with later preschool language outcomes (Roberts, Pollock, Krakow, et al., 2005; Tan & Yang, 2005). Nonetheless, there is conflicting evidence as to whether this relationship persists into later school-age language outcomes. For example, some researchers have reported that there is a negative relationship between age of adoption and later language skills (Dalen, 1995; Groze & Ileana, 1996). These studies have indicated that the older a child is at adoption, the greater the difficulty encountered in school-age language. Likewise, several studies have found correlations between age of adoption and later cognitive development (Morison & Ellwood, 2000; Rutter & The English and Romanian Adoptees Study Team, 1998).

In contrast, several studies have indicated that age of adoption does not predict later language performance of the school-age child, indicating that over time, the relationship between age at time of adoption and language outcome seen with younger children may not continue to hold (Dalen, 2001; Dalen & Rygvold, 2006; Kvitte Andresen, 1992). Hence, at this time, the relationship between age of adoption and later school-age language and literacy skills is yet to be determined. It remains unclear how persistent the effects of the preadoption experience and subsequent age of adoption are for children in the postadoption years.

In summary, the notion that school-age internationally adopted children will present with oral and written language difficulties is not adequately supported by the literature, nor has it been examined specifically for adoptees from China. The present study was designed to address the following questions: (a) Do school-age internationally adopted children experience language difficulties, as evidenced by weak oral and written language skills when compared with their non-adopted monolingual peers as measured on standardized instruments? (b) Does age at the time of adoption relate to

subsequent oral and written language skills in internationally adopted children?

## Method

### Participant Characteristics

Data were collected on the children using two parent report questionnaires. The first questionnaire provided parent and child information such as parental levels of education, the child's age at adoption, and the child's developmental history. The second questionnaire supplied information regarding any additional academic instruction the child might have received, over and above regular classroom instruction.

Table 1 summarizes the participant characteristics and the family characteristics. The participants were 24 school-age children between the ages of 7;0 (years;months) and 8;8 ( $M = 7.6$  years,  $SD = 5.71$  months). The participants' characteristics revealed a profile that is typical of children adopted from China. All were females born in China and adopted by American parents. Age at the time of adoption ranged from 6 to 24 months ( $M = 12.9$ ,  $SD = 3.41$ ). In this study, 2 of the children were biological siblings (twins); all other participants were unrelated so far as we know and from different adoptive families.

Children were recruited for the study using one of two methods. Some had taken part in prior research as participants in longitudinal studies of the language development of children adopted from China (Krakow & Roberts, 2003; Pollock et al., 2003; Roberts et al., 2003; Roberts, Pollock, Krakow, et al., 2005). From this original group, 15 out of the 16 families whose children were of school age agreed to participate in the current study.

The remaining 9 families had not participated in prior research. These participants were recruited through the use of e-mail lists to which the adoptive parents subscribed, direct mailings through an adoption agency, and parent referrals generated by word of mouth. All 24 of the participants were from the greater Philadelphia region, extending across the two states of Pennsylvania and New Jersey. *T* tests indicated that there were no significant differences ( $p < .05$ ) between the two groups (prior participants and new participants) for the standardized measures, age at adoption and chronological age. There were also no differences for standardized measures or age of adoption across grade levels. Hence, all of the participants were combined in all of the analyses.

Parent report indicated that 5 children had received early intervention services as young children and that 3 of these 5 children had mild to moderate developmental delays significant enough to warrant early intervention services beyond 12 months postadoption. Despite the evidenced delays, parents stated that these latter 3 children were making slow but steady developmental progress prior to school entry. None of the children in the study had known neurological delays, hearing impairments, or visual impairments.

Because the study was designed to determine language and literacy outcomes at school age, and little is currently known regarding such skills in internationally adopted children, participation in the study was not constrained by parent or teacher concern about the child's academic progress or

**TABLE 1. Participant and family characteristics.**

Characteristic	<i>n</i>	%
Grade		
Completed first	20	83.3
Completed second	4	16.7
Age at adoption (months) <sup>a</sup>		
<12	6	25.0
12–17	16	66.7
17–24	2	8.3
Educational concerns		
Early intervention services	5	20.8
Diagnosed ADHD <sup>b</sup>	1	4.1
Educational services		
Special education services <sup>c</sup>	3	12.5
Additional classroom/outside support	10	41.6
No additional support/no special education	11	45.8
Parent characteristics		
Age of mother (years) <sup>d</sup>		
31–40	1	4.3
41–50+	22	95.6
Age of father (years) <sup>d</sup>		
31–40	4	20.0
41–50+	16	80.0
Education level		
Mother		
Some college	3	13.0
College graduate	3	13.0
Graduate/professional	17	73.9
Father		
High school/some college	4	20.0
College graduate	6	30.0
Graduate/professional	10	50.0
Heads of household		
Two-parent	19	79.2
Single (female)	5	20.8

<sup>a</sup>Age at the time of adoption calculated in whole months, rounded up at 15+ days.

<sup>b</sup>This participant was diagnosed at age 5 with attention deficit/hyperactivity disorder (ADHD). This participant was not receiving any medical, educational, or therapeutic support for the condition at the time of participation in the study.

<sup>c</sup>Identified as eligible for special education services under the Individuals with Disabilities Education Improvement Act of 2004 (IDEA) within the eligibility category of Speech and Language Impairment. All 3 children were receiving services for minor articulation difficulties.

<sup>d</sup>Age at the time of the study.

the child's current enrollment in additional academic services. For the 14 children reported to be receiving additional academic support but not identified as needing special education services, the classroom teacher typically delivered these in-school services. The amount of service, as well as the service delivery mode, varied widely among the children. Patterns of service delivery included small-group pullout sessions, small-group classroom sessions, individualized tutoring, and summer school programs. Four of these children had been formally referred to the local school district for special education services due to parental concerns regarding academic difficulties. At the time of testing, all 4 were in the process of being assessed for special education services through their local education agency.

## Oral and Written Language Measures

Measures of both oral and written language were collected using a battery of standardized tests and a narrative language sample. In an effort to reduce test fatigue in the participants, subtests from full-scale instruments were selected. Subtests were selected based on reliability of the individual subtest, construct that the subtest measured, and length of administration. Thus, oral language skills were examined using two subtests from the Clinical Evaluation of Language Fundamentals, Fourth Edition (CELF-4; Semel, Wiig, & Secord, 2003). The Concepts and Following Directions subtest is a receptive language measure that requires children to follow spoken directions that increase in linguistic complexity and length. The Formulated Sentences subtest examines a child's ability to formulate and express syntactically and semantically correct utterances. Both measures were combined to create a CELF-4 *language composite score*. The Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999) was administered. A CTOPP *phonological processing composite* was created from the subtests of Elision, Segmenting Words, Digit Repetition, Nonword Repetition, Rapid Letter Naming, and Rapid Number Naming. These two composite scores (CELF-4 language composite and CTOPP phonological processing composite) were created by averaging the subtests scores and following a conversion formula. The conversion formula allowed for all measures to be reported based on a mean of 100 and a standard deviation of 15 (Wagner et al., 1999).

Oral language skills were also assessed through the use of a narrative measure. Prior studies have established the validity of using narrative measures to distinguish between children with and without language learning difficulties (e.g., Scott & Windsor, 2000). The oral narrative analysis investigated the components of fluency, productivity, lexical diversity, grammatical complexity, and grammatical error. In this study, each child was asked to retell a narrative story when provided with a wordless picture book. The Bilingual Language and Literacy Project English story script and elicitation protocol were used to collect the retelling of the story *Frog, Where Are You?* (Mayer, 1969). (For a complete description of the task, including the story script, please see J. F. Miller & Chapman, 2005.) The oral narrative task was audio- and/or videotaped, and subsequently transcribed using Systematic Analysis of Language Transcripts software (SALT; J. F. Miller & Chapman, 2005).

Narratives were first segmented by T-units, defined as a main clause and all attached subordinate clauses (Hughes, McGillivray, & Schmidek, 1997). Next, mazes were coded for each T-unit that the participant produced. Mazes were defined as any verbal disruptions that did not constitute or contribute to a unit (Hughes et al., 1997). The measure *mazes per T-units* was used to examine fluency (Hughes et al., 1997). Researchers have reported lexical diversity using total number of different words per 100 words (e.g., Scott & Windsor, 2000). Because 9 of the children did not use a minimum of 100 words, the total *number of different words* that the participants produced during the narrative task was used in the analysis. Grammatical complexity was coded in two ways, *words per T-unit* and *clauses per T-unit* (Hughes et al., 1997; Scott & Windsor, 2000). Prior research has shown that children

with language learning difficulties present with a higher number of grammatical errors than do children without language learning difficulties (Scott & Windsor, 2000; Windsor, Scott, & Street, 2000). Research also supports investigating grammaticality at the unit level (Gillam & Johnston, 1992). T-units were first coded in one of two ways, as being grammatically correct or containing one (or more) grammatical error(s). Next, *grammatical errors per T-unit* were calculated. To calculate this value, total errors were divided by the total number of T-units produced to determine the grammatical errors per T-unit. Finally, the number of *total T-units* and *total number of words* provided the two measures of productivity.

The battery of written language measures included six subtests that measure key reading skills. The Reading and Spelling subtests of the Wide Range Achievement Test 3 (WRAT3; Wilkinson, 1993) were administered to provide information on single word reading and spelling skills. Single word reading efficiency for both real and nonwords was examined through the Test of Word Reading Efficiency (TOWRE; Torgesen, Wagner, & Rashotte, 1999). To examine reading comprehension, the Passage Comprehension subtest from the Woodcock Diagnostic Reading Battery (WDRB) was administered, and to examine pseudoword reading skills, the Word Attack subtest was administered (Woodcock, 1997). Although several of the subtests investigated decoding skills, the task requirements themselves differ. The WRAT3 examines decoding in single real words and the WDRB Word Attack in nonwords, and the TOWRE examines both real words and nonwords but reflects an additional component of efficiency.

The Differential Ability Scales (DAS; Elliot, 1990) nonverbal composite was constructed from the subtests of Sequential and Quantitative Reasoning and Matrices, and provided a measure of nonverbal cognitive skills. The two subtests yielded the composite measure of nonverbal cognitive skills preferred by the test authors and one that provided a high level of reliability.

Two participants did not receive the CELF-4 subtests, narrative task, TOWRE, and the DAS subtests. One participant did not receive the WDRB subtests. These participants were tested before the final protocol was in place.

## Procedure

Children were assessed at a location most convenient to the family, either in the child's home or at the university clinic. The assessments took place in a single appointment, and assessment time ranged from 2½ hr to 3 hr. Breaks were incorporated into the sessions as needed. All children were assessed in the summer prior to their fall grade placement or within the first 6 weeks of the new school year. The first and second authors, who are licensed, certified speech-language pathologists, conducted all assessments.

## Reliability

Internal consistency reliability of .80 or higher was reported for the standardized measures (Elliott, 1990; Semel et al., 2003; Torgesen et al., 1999; Wagner et al., 1999; Woodcock, 1997). For the narrative measure, 15% of the tapes (four tapes) were transcribed a second time into SALT files to

establish intrarater reliability. Mean agreement was calculated for (a) segmentation (97.5% agreement, with a range of 92%–100%) and (b) grammaticality (99.5% agreement, with a range of 98%–100%).

## Results

Means, standard deviations, ranges of scores, and effect sizes for the sample are provided in Table 2 for all the standardized measures. As a group, the children exhibited scores in the average range for all oral and written standardized language measures, based on the published data of the tests' normative samples.

An analysis of the group-level performance identified 2 children within the total sample that were low performers. Low performers were defined using the traditional "cut-score" of  $-1.25$  SDs below the mean on two or more of the measures (McCauley, 2001; Tomblin et al., 1997). One low performer had below average scores on the CELF-4 oral language composite and the DAS nonverbal composite. The second low performer had below average scores on the TOWRE and the WRAT3 Reading subtest.

The first research question focused on determining whether internationally adopted children were experiencing difficulties in oral and written language skills when compared with their nonadopted monolingual peers, as reflected by performance on standardized measures. For each measure, a single sample  $t$  test compared the mean scores of the internationally adopted children with the mean scores reported for the normative sample on the standardized measures. Each of the eight comparisons was conducted at an alpha level of .006 (.05/8; i.e., a Bonferroni correction was applied due to multiple  $t$  tests). The difference was not significant for the CELF-4 oral language composite,  $t(21) = 1.13$ , the CTOPP phonological processing composite,  $t(23) = -2.08$ , the TOWRE composite,  $t(21) = .92$ , WDRB Word Attack,  $t(22) = 2.35$ , WRAT3 Reading,  $t(23) = 1.70$ , WRAT3 Spelling,  $t(23) = 2.22$ , or the DAS nonverbal composite,  $t(21) = 1.76$ . Thus, the mean standard score for the internationally adopted children did not differ significantly from the published data of the normative sample on these measures. A significant difference

was found, however, for the WDRB Passage Comprehension subtest,  $t(22) = 4.30$ ,  $p < .001$  (two-tailed), confidence interval = 1.12–17.99 (99.9%). Interestingly, the internationally adopted children's mean score of 109.56 ( $SD = 10.66$ ) was significantly higher than the average reported for the normative sample ( $M = 100$ ,  $SD = 15$ ).

The narrative retell task was analyzed across five components (fluency, lexical diversity, productivity, grammatical complexity, and grammatical error) to yield seven measures: mazes per T-unit, total number of different words, words per T-unit, clauses per T-unit, grammatical errors per T-unit, total T-units, and total number of words. A summary of these results is presented in Table 3. A Pearson correlation coefficient was calculated for the relationship between the narrative measures and the oral and written language measures, and the false discovery rate (FDR) was applied to adjust  $p$  values (Benjamini & Hochberg, 1995). The method resulted in a reduction of the alpha from .05 to .035. A moderate negative relationship was found between the WDRB Passage Comprehension scores and grammatical error,  $r(22) = -.685$ ,  $p < .001$ . Children who scored lower on the WDRB Passage Comprehension subtest tended to have more grammatical errors.

The second research question investigated the relationship between age at the time of adoption and oral and written language skills. Table 4 provides the correlations between age at the time of adoption, the narrative measure, and the standardized oral and written language measures. The  $p$  values reported in Table 4 are the adjusted  $p$  values after applying the FDR correction. Pearson correlation coefficients were calculated for the relationships between age at the time of adoption and the oral and written language measures. Moderate negative correlations were found between age at the time of adoption and the oral language composite,  $r(22) = -.467$ ,  $p < .028$ , the TOWRE composite,  $r(22) = -.450$ ,  $p < .035$ , WDRB Passage Comprehension,  $r(23) = -.593$ ,  $p < .003$ , and WDRB Word Attack,  $r(23) = -.487$ ,  $p < .019$ . Children adopted at older ages tended to have lower scores on the oral language composite measure and the written language measures of the WDRB Passage Comprehension, the WDRB Word Attack, and the TOWRE. A moderate

**TABLE 2.** Means, standard deviations, ranges,  $p$  values, effect sizes, and interpretations for the standardized measures.

Measure	<i>M</i>	<i>SD</i>	Range	<i>p</i> value*	Cohen's <i>d</i>	Interpretation
CELF-4 lang comp	101.47	12.97	72–125	<.599	.105	Small
CTOPP phono process comp	97.25	6.46	82–109	<.048	-.238	Small
TOWRE	103.09	15.63	69–142	<.364	.202	Small
WDRB Pass Comp	109.56	10.66	88–126	<.001	.735	Large
WDRB Word Attack	107.56	15.41	84–145	<.028	.497	Medium
WRAT3 Reading	104.54	13.02	80–128	<.101	.323	Medium
WRAT3 Spelling	105.12	11.28	85–139	<.036	.386	Medium
DAS Nonverbal Comp	105.86	15.56	78–144	<.092	.383	Medium

*Note.* CELF-4 lang comp = Clinical Evaluation of Language Fundamentals, Fourth Edition subtests of Concepts and Following Directions and Formulated Sentences; CTOPP phono process comp = Comprehensive Test of Phonological Processing subtests of Elision, Segmenting Words, Digit Memory, Nonword Repetition, Rapid Letter Naming, and Rapid Number Naming; TOWRE = Test of Word Reading Efficiency; WDRB = Woodcock Diagnostic Reading Battery; WRAT3 = Wide Range Achievement Test 3; DAS Nonverbal Comp = Differential Ability Scales Nonverbal Composite.

\*Uncorrected  $p$  value.

**TABLE 3. Narrative summary of means and standard deviations.**

Measure	<i>M</i>	<i>SD</i>
Mazes per T-unit	0.24	0.12
Number of different words	105.35	18.65
Words per T-unit	7.83	1.63
Clauses per T-unit	1.20	0.12
Grammatical errors per T-unit	0.11	0.06
Total T-units	38.39	5.90
Total words	301.83	78.27

*Note.* *n* = 23.

positive relationship was found between age at the time of adoption and grammatical error,  $r(23) = .467, p < .025$ . Children who had more grammatical errors tended to be adopted at older ages.

### Discussion

This project examined the oral and written language skills of school-age children adopted from China. Overall, the majority of participants fell at or above the average range of performance on the standardized measures of oral and written language as compared to the published data on the normative sample. Two of the participants, however, presented with low scoring profiles, and a high number of the participants were actively receiving some type of additional academic assistance. Although age at the time of adoption appeared to be moderately correlated with several of the oral and written language measures, this was not found to be true across all of the measures. In what follows, we present our results in relation to the two research questions motivating this study, and we review our findings within the context of the available literature.

#### *Do School-Age Internationally Adopted Children Experience Oral and Written Language Difficulties as Compared With Their Nonadopted Monolingual Peers?*

The overall strong performance of the school-age adoptees on the standardized measures is consistent with studies that

examined the language outcomes of preschool internationally adopted children using standardized measures (Pollock & Price, 2005; Roberts et al., 2003; Roberts, Pollock, Krakow, et al., 2005; Tan & Yang, 2005). Roberts and her colleagues (2005) reported that the majority of children fell at or above the age-expected range on standardized measures of oral language after approximately 2 or more years' exposure to a new language. Likewise, Tan and Yang (2005) found that vocabulary size and phrase length of internationally adopted children from China surpassed the normative sample by the time the adoptees had reached 30 to 35 months of age.

The current study, however, fails to support the results that Saetersdal and Dalen (1991) presented earlier, nor is it in agreement with a study by Dalen (1995). Both previous studies indicated that the language skills of internationally adopted children faltered as they reached school age, and suggested that parents and teachers might have misjudged the rapid gains that children made in the early stages of their language acquisition. Conversely, the current study suggests that the early language gains made by many of the internationally adopted children (indeed the majority in this study) provide the necessary language foundation that permits later, higher level oral and written language skills, key components for academic success. Thus, the present results indicate that later cognitive and academic language skills do not necessarily remain "at risk" for this group of children.

The children in this study who produced more grammatically correct narratives tended to have higher reading comprehension scores. Although the link between narrative discourse and reading has been investigated in numerous studies, far fewer investigations into the specific relationship between grammaticality in narrative discourse and reading comprehension can be found in the literature. In the few studies available that have examined the link between narrative production and reading comprehension, researchers have found the two to be significantly correlated. For example, Griffin, Hemphill, Camp, and Wolf (2004) investigated the narrative abilities of preschool children and found that aspects of oral narrative productions in preschoolers were correlated with later reading comprehension.

Although studies have not yet fully explored the link between narrative production and reading comprehension

**TABLE 4. Correlations between age at time of adoption, narrative measure, and standardized test outcomes.**

Measure	CELF-4 Language Comp	CTOPP Phono Process Comp	Gram errors per T-unit	TOWRE	WDRB Pass Comp	WDRB Word Attack	WRAT3 Reading	WRAT3 Spelling	DAS Nonverbal Comp
CTOPP Phono Process Comp	.715***								
Gram errors per T-unit	-.428*	-.425							
TOWRE	.576**	.475*	-.329						
WDRB Pass Comp	.626**	.641**	-.685***	.667**					
WDRB Word Attack	.628**	.595**	-.384	.821***	.772***				
WRAT3 Reading	.481*	.599**	-.319	.888***	.610**	.785***			
WRAT3 Spelling	.499*	.661***	-.281	.702***	.662**	.763***	.798***		
DAS Nonverbal Comp	.539**	.682***	-.262	.464*	.441*	.570*	.603**	.706***	
Age adopt	-.467*	-.218	.467*	-.450*	-.593**	-.487*	-.334	-.300	-.115

*Note.* Gram errors per T-unit = grammatical errors per T-unit; Age adopt = age at the time of adoption (in months).

\*\*\*Adjusted  $p < .001$  (2-tailed). \*\*Adjusted  $p < .01$  (2-tailed). \*Adjusted  $p < .05$  (2-tailed).

skills, the connection between grammatical error and specific language impairment has been widely investigated (e.g., Leonard, 1998), and a few studies have investigated this aspect of oral language in narrative tasks (e.g., Scott & Windsor, 2000). Scott and Windsor (2000) examined the narrative productions of 60 school-age children. They found that grammatical error distinguished participants with language learning disabilities from their peers. There is clear indication that, in the present study, the number of errors that children produced in the course of narrative tasks was related to their overall oral language skills as well as their reading comprehension skills, as we might expect.

The majority of the participants in this study scored at or above the average range for the normative sample, although 2 participants had at least two scores that fell 1.25 *SDs* below the mean on standardized measures. These two low scorers were receiving additional classroom help and private tutoring. The parents and teachers of both of these children were concerned about the children's overall language and literacy skill development. At the time of participation in the study, neither was receiving special education services, but both were referred and in the process of being evaluated for such services. The individual profiles of the children do not support a hypothesis that their difficulties arose simply due to the increased decontextualized nature of the language demands. Rather, the profiles suggested specific language learning disabilities that are not likely to resolve with increased exposure to the new language.

Researchers have voiced concerns regarding the potential under- or overidentification of internationally adopted children receiving special education services (Brodzinsky & Steiger, 1991; Glennen, 2002; Glennen & Bright, 2005; Serbin, 1997). The results of this study identified three groups of children with respect to their academic programming: (a) those receiving no additional academic services or special education eligibility identified (11 children), (b) those receiving additional academic assistance with no special educational eligibility identified (10 children), and (c) those eligible for and receiving special education services (3 children). Because all of the children who were identified for special education were receiving services only for minor articulation difficulties (and not language impairments), it is not surprising that all of the children identified for special education presented with scores in the average ranges on the standardized measures.

Given the distinction between additional academic assistance and special education eligibility, the results of the current study need to be interpreted cautiously with respect to the Glennen and Bright (2005) study. Recall that Glennen and Bright followed a cohort of Eastern European internationally adopted children and found that high percentages (27.3%) of the children were receiving speech-language services. Although in the present study there was a high percentage of children receiving "additional classroom help," as reported in the parent questionnaire, the number of participants qualifying for special education services (12.5%) was still well below the 27% reported in the Glennen and Bright (2005) sample. Additionally, in the present study, the 3 children receiving special education were not receiving any

additional academic help and were receiving services for only minor articulation errors.

One explanation for this discrepancy is that the majority of the participants in the current study were evaluated at the end of the first grade. In the Glennen and Bright (2005) study, parents reported increases in identification of disorders as children progressed through the early school years. If the participants of this study who were referred for special education services (4 children) are all found to be eligible for services, it would bring the total number of children qualifying for special education services that participated in the current study to 7 children, or 29%, a number that is in close agreement with the Glennen and Bright findings and considerably higher than the published averages for states in which the participants reside (State of New Jersey, 2005; State of Pennsylvania, 2005).

Overall, these findings indicate that, although it is important to identify the number of internationally adopted children who receive special education services in the schools, the type (eligibility category under which they receive special education and/or related services) and extent of special services must be considered. Given the possibility that more of the study's participants will be identified for special education, continued close monitoring of several of the participants is warranted to determine if, as a group, the special education needs of these internationally adopted children increase over time.

### ***Does Age at the Time of Adoption Relate to Oral and Written Language Skills in School-Age Internationally Adopted Children?***

The findings of this study indicate that age at the time of adoption continues to be moderately and negatively correlated not only with oral language outcomes but also with written language outcomes in school-age children. Why might age at the time of adoption have some effects on later language development? Prior research has indicated that the longer a child spends living in an institutional setting, the greater the likelihood of general health, medical, and developmental problems after adoption (L. C. Miller & Hendrie, 2000; Morison, Ames, & Chisholm, 1995; Rutter & The English and Romanian Adoptees Study Team, 1998). Additionally, for children adopted internationally, the older a child is at the time of adoption, the less exposure the child has to a new language postadoption. These two aspects, however, are extremely difficult to investigate independently in children who are adopted internationally from China (Roberts, Pollock, Krakow, et al., 2005; U.S. Department of State, 2006). Nevertheless, internationally adopted children experience multiple factors that place them at high risk for language delays. These risk factors can vary considerably depending upon the country of origin for the adoptees. With these additive risk components in their developmental histories, it is not surprising that age at the time of adoption is negatively correlated with later oral and written outcomes.

Although the current study found age of adoption to be related to oral and written language outcomes, it is important to recall that, as a group, these internationally adopted children demonstrated oral and written language skills that are in



age-expected ranges. A partial explanation for the positive outcomes and their relationship to age of adoption may be that adoption itself offers children an environment that encourages such outcomes. Several researchers have proposed that adoption acts as a protective factor in the overall development of internationally adopted children (Gunnar et al., 2000; Stams, Juffer, Rispen, & Hoksbergen, 2000). Adoption provides the child with a stimulating, secure, and encouraging home environment, and this in turn is reflected in the positive long-term academic outcomes of adoptees (e.g., Stams et al., 2000).

### Limitations of the Study

There are two limitations specific to this study: sample selection and generalizability. Sample bias is a problem in international adoption research, particularly research that occurs within the United States, in that the country does not maintain national registries of internationally adopted children. Therefore, recruitment procedures for studies conducted in the United States tend to be quite similar across the studies. U.S. researchers typically recruit participants from adoption agencies, e-mail lists that families subscribe to, and parents' groups such as Families with Children from China (n.d.; Krakow & Roberts, 2003; Roberts, Pollock, Krakow, et al., 2005; Tan & Yang, 2005). The participants of this study were recruited in the same manner.

As to generalizability, although the overwhelming number of children adopted from China are female, this is not true for internationally adopted children from other sending countries where the proportion of males to females is less uneven or where males outnumber females. Moreover, it should also be noted that the preadoption experiences of internationally adopted children might vary considerably. Thus, care should be taken in generalizing the results of this study across various populations of internationally adopted children.

### Summary

Although there were only 24 children who participated in this study, this is the only published study that we are aware of that has examined the oral and written language skills of school-age adoptees using standardized measures and narrative samples. The study adds to the growing number of studies of the language development of internationally adopted children, by using a direct assessment method and standardized measures to determine oral and written language skills in children (Pollock, 2005; Pollock & Price, 2005; Roberts et al., 2003; Roberts, Pollock, & Krakow, 2005; Roberts, Pollock, Krakow, et al., 2005) and extending what is known about the language development of preschool-age internationally adopted children into the early primary grades. As such, it begins to fill a gap in the literature, providing a better understanding of how school-age internationally adopted children negotiate the increasingly complex demands of later language and literacy.

We are encouraged by the results of this study and the related work on younger children. Prior research indicates that the majority of internationally adopted children from

China acquire age-appropriate language skills postadoption during the toddler and preschool years. The results of this project indicate that many internationally adopted children from China will also acquire the language and early literacy skills that are necessary to succeed in school. We do, however, make this statement with a guarded optimism. Until such positive results are replicated in additional and larger studies, we strongly caution educators to view each internationally adopted child individually. Although many children are expected to develop oral and written language skills that are age-appropriate, some children will indeed struggle in these areas. Future research that investigates language and literacy skills, by examining specific variables and their impact on later language outcomes, is vital. In this manner, we will be able to determine why some internationally adopted children fare well and others do not, and, we hope, to determine how best to intervene, when necessary.

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Contact author: Kathleen A. Scott, who is now at Hofstra University, 108 Davison Hall, Hempstead, NY 11549-1100.  
E-mail: [kathleen.scott@hofstra.edu](mailto:kathleen.scott@hofstra.edu).

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