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Language Development in Internationally-Adopted Children:

A Special Case of Early Second Language Learning

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Abstract

The French language development of children adopted (*n* = 24) from China was compared to that of control children matched for socio-economic status, sex, and age. The children were assessed at 50 months of age, on average, and 16 months later. The initial assessment revealed that the two groups did not differ with respect to socio-emotional adjustment or intellectual abilities. However, the adopted children's expressive language skills were significantly lower than those of the non-adopted children at both assessments. The receptive language skills were also significantly weaker for the adopted children at the second assessment. The results are discussed in terms of possible early age-of-acquisition effects that might affect adopted children's ability to acquire a second first language.

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In the last decade, there has been substantial interest in the language development of internationally-adopted (IA) children. Several reasons explain this interest. First, there has been a significant number of international adoptions in North America during the past 15 years (e.g., U.S. Department of State, 2005). Second, the language learning experience of IA children is an interesting natural experiment in early second language acquisition – they discontinue exposure to and acquisition of the birth language as they begin to acquire a new language or a "second first language" (De Geer, 1992). Third, there are clinical concerns that IA children are at risk for language difficulties owing to the abrupt change in language exposure they experience (Glennen & Masters, 2002); adverse pre-adoption rearing conditions, including poor physical and medical care, social deprivation, lack of intellectual and emotional stimulation (e.g., Croft et al., 2007; Mason, 2005; Meacham, 2006); and/or delayed exposure to the adopted language (Abrahamsson & Hyltenstam, 2009).

The results of research on the language learning outcomes of IA children in the short and medium term tend to differ depending on their country of origin, with children from China often demonstrating better language and other developmental outcomes than children from other regions of the world (Dalen & Rygvold, 2006; Lapointe, Gagnon-Oosterwal, Cossette, Pomerleau, & Malcuit, 2006; Tessier et al., 2005). Since the present study involves children from China, we focus on research findings for these children. In the aggregate, research on IA children from China indicates that the early acquisition of their adoptive language progresses relatively rapidly (Krakow & Roberts, 2003; Pollock, 2005) and appears to follow the same developmental pattern as that demonstrated by monolingual children (Snedeker, Geren, & Shafto, 2007). Even after a

relatively short period of exposure to the new language, a sizeable proportion of IA children from China have been found to score within the typical range on standardized tests normed on native speakers of the adoptive language (Glennen & Masters, 2005; Roberts, Pollock, Krakow, Price, et al, 2005; Tan & Yang, 2005; Scott, Roberts, & Krakow, 2008). However, there is also evidence suggesting that there might be a subgroup of approximately 20% who exhibit significant language delays/difficulties or receives speech/language therapy services (Roberts, Pollock, & Krakow, 2005; Tan, Dedrick, & Marfo, 2007). Some studies report that the younger IA children are at adoption, the better their performance at the time of assessment (Miller & Hendrie, 2000; Roberts, Pollock, Krakow, Price, et al., 2005); but, other studies have not found a link between age at adoption and language skills (e.g., Dalen & Rygvold, 2006). It has also been found that IA children who were older at the time of adoption initially made faster progress in acquiring the new language in comparison to younger children (e.g., Krakow, Tao and Roberts, 2005).

Most research on IA children has focused on the pre-school years, although a number of studies have examined the language outcomes of school-age children (see Scott, 2009, for a review). Some of these studies report that, on average, IA children tend to score in the typical range on a variety of oral and written language tests. Again, however, there is some indication of a higher incidence of academic or language-related difficulty among school-age IA children.

With respect to other developmental domains, IA children from China have generally been found to perform in the average range on measures of cognitive functioning (Lapointe et al., 2006; Scott et al., 2008), even when compared to control children matched for familial SES (Cohen et al., 2008) and to score satisfactorily on measures of socio-emotional adjustment (Dedrick, Tan, & Marfo, 2008; Tan & Marfo, 2006). In fact, Tan and Marfo, as well as Dedrick et al., found that IA children from China tended to obtain better behavioral and emotional functioning scores according to parent ratings on the Child Behavior Checklist for Ages 6-18 (CBCL/6-18) in

comparison to Achenbach and Rescorla's U.S. normative data. The children (*N* = 695) in Tan and Marfo's study were between 1.5 and 11 years of age while those (*N* = 516) in Dedrick et al.'s study were between 6 and 15.7 years of age.

IA children are usually raised in adoptive homes with higher than average socioeconomic status (SES) (Tan & Yang, 2005; Tessier et al., 2005). SES is important to consider when assessing the language outcomes of young language learners since it has been found to have significant effects on children's language learning environment and, in turn, on their language development (Hart & Risley, 1995; Hoff, 2006). Except for Cohen et al. (2008), SES has not usually been controlled for in studies of IA children. Cohen et al. compared the language outcomes of IA children, adopted between 8 and 21 months of age (*n* = 70), to those of non-adopted children (*n* = 43) who were matched for SES. The IA children were assessed initially 4 to 6 weeks post-adoption and then 6, 12, and 24 months later. The language skills of the IA children, assessed using the Expressive scale of the Pre-school Language Scale 3, were in the average range in comparison to test norms, but were significantly lower than those of the non-adopted control children. There were no between-group differences on the Receptive scale of the Pre-school Language Scale and the performance of the IA children was similar to that of the control children on tests of cognitive and motor functioning at the 24-month follow-up assessment.

The present study

The results reviewed to this point attest to IA children's resilient language learning abilities despite concerns, outlined earlier, that they might be at risk for language development post-adoption. At the same time, the use of norm-referenced assessment tools alone cannot ascertain the full extent of IA children's language learning without taking into account their post-adoption learning environment and, in particular, the enriched language learning environments associated with high levels of familial SES. Cohen et al.'s (2008) results illustrate how critical

such different comparison points can be insofar as their IA sample scored within the normal range on standardized expressive and receptive language tests, but significantly lower than SES-matched controls on an expressive language test. A number of questions arise from Cohen's et al. study which need to be addressed before the differences they report can be accepted with full confidence. First, would their findings replicate with a different group of adoptees? The present study examined the language development of children adopted from China who were being raised in monolingual French-speaking families. This is the only study, to our knowledge, to investigate the acquisition of French by IA children. Second, are the differences reported in Cohen et al. due to their adopted children's relatively short exposure to their adoptive language? At the final assessment, the IA children in Cohen's study had had 24 months exposure to English. This may be too short for IA children to reach parity with matched control children, although it is longer than is generally reported to be necessary for IA children to achieve scores in the typical range on standardized tests (Krakow & Roberts, 2003; Tan & Yang, 2005). In the present study, IA children's language abilities were assessed twice: initially 36.1 months post-adoption and a second time 51.7 months post-adoption – twice as long, on average, as Cohen's participants at their last assessment. Evidence that differences between adopted and non-adopted children persist with more exposure to the adoptive language would suggest that other factors, such as delayed age of exposure, might be involved (Hyltenstam & Abrahamsson, 2003; Thordardottir, 2008).).

The use of a longitudinal design in the present study permitted us, like Cohen et al., to examine the reliability of the IA children's performance over time, albeit a relatively short time span – 16 months. The control children in the present study were all girls, as were the IA children, thereby allowing us to control for any differences in performance due to gender, differences that might slightly favor girls but are not usually accounted for in norm-referenced test results (Bornstein & Haynes, 1998). Moreover, the comparison children included in the second

assessment were not all the same as in the first assessment permitting us to examine whether any differences that emerged at time 1 were due to the specific comparison group we had used at that time. Finally, we included measures of expressive and receptive vocabulary along with expressive and receptive language, thereby allowing us to examine the generalizability of any differences in language that might emerge from our comparisons. Measures of general cognitive ability and socio-emotional development were also administered in order to determine the general developmental status of our IA sample.

Method

Participants

Initial assessment

Twenty-four girls adopted from China (hereafter referred to as internationally-adopted (IA) children) who were between 41.5 and 56 months of age (*M* = 50.1, *SD* = 5.0) participated in the study for this initial assessment. This is consistent with the very high proportion of girls among children adopted from China in the province of Quebec. In 2000, 99.2% of children adopted from China in Quebec were girls (Lachance & Fortin, 2002). They were adopted by monolingual French-speaking families when they were between 7 and 24 months (*M* = 13.5, *SD* = 4.7) of age and were tested between 19 and 46.5 months (*M* = 36.1, *SD*= 8.4) after adoption. We included only girls in the control groups because all of the IA children were girls and, although the magnitude of differences in language development between boys and girls has been found to be rather small, girls nevertheless tend to develop faster than boys (e.g., Bornstein & Haynes, 1998; Van IJzendoorn, Juffer, & Klein Poelhuis, 2005). Only participants who had less than 25% exposure to a language other than French, based on parental responses to a *Language Background Questionnaire*, were included.

The control (CTL) group was composed of 25 girls between 41.0 and 57.0 months of age (M = 50.4, SD = 4.8) at time 1. These children were recruited from daycares in the Montreal area as well as through ads in a local newspaper. The following exclusionary criteria were applied: 1) no psychiatric or neurological problems; 2) no previous history of intellectual deficiency or language problems; 3) no premature birth; 4) no major health problems, past or present; 5) no serious motor or behavior problems; and 6) no or minimal exposure (25% of the time maximum) to a language other than French. The CTL children were matched to the IA children with respect to age (within 3 months), level of education of the parents, and family income. Analysis of variance (ANOVA) confirmed that there was no difference in age between the groups, $F(1, 47) = .28$, $p = .87$, $\eta_P^2 = .001$. Two (group: IA, CTL) x 3 (parental education: high school, college, university) way Chi-square tests were conducted to compare the mother's and father's education level, separately, for the IA and CTL children; and, likewise a 2 (group: IA, CTL) x 3 (level of income: 30 000-59 999, 60 000-89 999, 90 000 and more) way Chi-square test was conducted to compare the IA and CTL children's family incomes. The results indicated that there were no significance differences between the IA and the CTL groups in terms of educational level of the mothers, $x^2(2, N = 48) = 1.21$, $p = 0.55$, V = .16, or the fathers, $x^2(2, N = 46) = 0.57$, $p = 0.75$, V = .11, or for family income, $x^2(2, N = 43) = 2.00$, $p = 0.37$, V = .22. ANOVA indicated that there was a significant difference between groups in terms of mothers' age, $F(1, 25) = 15.12$, $p = .001$, $\eta_P^2 = .38$, and fathers' age, $F(1, 24) = 7.95$, $p = .009$, $\eta_P^2 = .25$. Adoptive mothers and fathers (M=43.5 and M=44.03, respectively) were significantly older than the control mothers and fathers (M=35.7 and M=37.25, respectively). A one-way ANOVA, with group (IA and CTL) as the independent variable, indicated that the CTL children spent significantly longer in daycare prior to the initial assessment than did the IA children, $F(1, 45) = 13.79$, $p = .001$, $\eta_P^2 = .24$. Time spent in

daycares varied from 0 to 38 months (M = 16.2, SD = 12.3) for the IA children and from 0 to 51 months (M = 30.1, SD= 13.2) for the CTL children.

Follow-up

The same twenty-four IA children participated in a follow-up assessment which took place, on average, 15.6 months (range: 12 to 18) after the initial assessment. The IA children's ages varied from 56.5 to 72.0 months (M = 65.8, SD = 5.31), and this assessment took place between 34 and 64 months (M = 51.7, SD = 8.6) after adoption. The CTL group was composed of 23 children who ranged in age from 54.0 to 74.0 (M = 65.5, SD = 6.7) years of age matched to the IA children with respect to sex, age (within a 3 month interval), and socio-economic status (i.e. level of education of the mother and father and family income). Five children from the original group participated in the follow-up assessment and the remaining 18 children were newly recruited. New CTL children were recruited so as to include children who had spent less time in daycare in order to better match the daycare experiences of the IA children. Therefore, in contrast to the results from the initial assessment, there was no significant difference in total number of months spent in daycare between the groups at the follow-up assessment, $F(1, 44) = .328$, $p = .57$, $\eta_P^2 = .01$. The time spent in daycares varied from 0 months to 60 months (M = 29.7, SD = 16.4) for the IA group (n = 24) and from 0 to 56 months (M = 32.5, SD = 17.7) for the CTL group (n = 22). ANOVA indicated that there was no significant difference between groups in terms of age, $F(1, 45) = .014$, $p = .91$, $\eta_P^2 = .00$. Chi-square tests indicated that there were no significance differences between the IA and the CTL groups in terms of education level of the mothers, $x^2(1, N = 47) = 0.90$, $p = 0.76$, V = .04, or the fathers, $x^2(2, N = 44) = 1.02$, $p = 0.60$, V = .15, or family income, $x^2(2, N = 43) = 1.21$, $p = 0.55$, V = .17. For the mothers, the minimum level of education in both groups was college; thus, there were only 2 levels for this variable: college and university, thereby reducing the

degrees of freedom in this Chi-square test from 2 to 1. A one-way ANOVA indicated that there was a difference between groups in terms of mothers' age, $F(1, 24) = 13.00$, $p = .001$, $\eta_P^2 = .35$, and fathers' age, $F(1, 23) = 5.05$, $p = .034$, $\eta_P^2 = .18$. Adoptive parents were significantly older (M for mothers=44.6, and M for fathers=45.4) than the control parents (M for mothers=37.2, and M for fathers=40.2).

Tests

Initial assessment

A *Semi-Structured Interview-Developmental Questionnaire* was administered to each parent by the first author, a licensed psychologist, or a trained research assistant. It included questions about the child's general development, health problems, and medical conditions – both before and after adoption for the IA children. It also included questions about each parent's education and occupation, combined family income, and family composition.

A French adaptation of the *Preschool Language Scale-Third Edition* (PLS-III; Zimmerman, Steiner, & Pond, 1992), developed by the Speech and Language Pathology Department of the Montreal Children's Hospital, was used to assess the children's receptive and expressive language skills. Because it was an adaptation of the English version, its psychometric properties may differ from those of the English version. The PLS-III is composed of two subscales, one that assesses auditory comprehension and the other expressive skills. Children were asked to do diverse tasks, such as answering questions, giving definitions, explaining the use of different objects, and naming pictures. Raw scores were computed by giving 1 or 0 points to each individual item of the test, allowing more variability in the scores. Standard scores were determined as per test instructions.

A French adaptation of the *Expressive One-Word Picture Vocabulary Test-Third Edition* (EOWPVT; Brownell, 2000), developed by the Speech and Language Pathology Department of

the Montreal Children's Hospital, was used to assess expressive vocabulary skills. Again, psychometric properties may differ from those of the English version. Each child was asked to name objects, actions, and concepts that were depicted graphically.

The *Échelle de vocabulaire en images Peabody* (EVIP; Dunn, Thériault-Whalen, & Dunn, 1993) was used to assess receptive vocabulary skills in French. Children were shown four pictures on a page and were asked to point to the picture that corresponded to a word spoken by the examiner. This test was normed on native French-speaking children living in Canada.

The Brief IQ Screener of the *Leiter International Performance Scale-Revised* (Roid & Miller, 1997) was used to assess nonverbal intellectual ability. This test avoids verbal instructions and responses and was designed to decrease the influence of cultural and language biases on intellectual functioning. The internal consistency coefficients for the four subtests of the Brief IQ Screener for ages 3 to 5 vary from .66 to .91. It has a reliability coefficient of .88. Results on the Brief IQ Screener differentiate different criterion groups such as typical, severely cognitively-delayed, and talented children (Roid & Miller, 1997). The correlation between the Leiter-R Brief IQ and the Wechsler Intelligence Scale for Children (WISC-III) Full Scale IQ is .85. The same correlation (i.e., .85) is obtained with the WISC-III Performance IQ. The Leiter-R Brief IQ has been used in research involving clinical populations (Glenn & Cunningham, 2005) and typically developing children (Chiles, 2007). Four subtests from the Visualization and Reasoning battery compose the Brief IQ Screener: 1) Figure Ground (FG) assesses visual scanning skills and effective search strategies: the child has to look for an object among a group of objects; 2) Figure Completion (FC) assesses the capacity to identify a "whole object" from a complex visual array: the child has to identify embedded figures within complex stimuli; 3) Sequential Order (SO) assesses the capacity to generate rules and to understand relationships between pictures or figures: the child has to organize stimuli in sequential order (i.e., by arranging triangles according to size);

and 4) Repeated Patterns (RP) assesses deductive reasoning skills and the capacity to generate rules in order to produce a sequence. The Leiter-R was administered according to standardized procedures described in the manual.

The *Vineland Social-Emotional Early Childhood Scales* (SEEC; Sparrow, Balla, & Cicchetti, 1998) was used to assess social-emotional adjustment. It contains three scales: 1) Interpersonal Relationships, 2) Play & Leisure Time, and 3) Coping Skills. Administration was adapted for the present study. Parents were given response choices instead of responding freely to ensure that scoring was standardized and objective. Responses were scored as follows: 2 points were given if parent reported that the behavior was observed often; 1 point if the behavior was observed sometimes, with partial success, if the parent did not have the opportunity to observe it, or if the parent did not know; and 0 was assigned if the behavior was never observed.

Follow-up

Three measures from the initial assessment were re-administered: the EOWPVT, the EVIP, and the Developmental Questionnaire. The French version of the Clinical Evaluation of Language Fundamentals-Revised (CELF-R; Semel, Wiig, Secord, & Sabers, 1987) was added as a measure of receptive and expressive language skills. It provides a comprehensive assessment for the identification and diagnosis of language skill deficits. The Receptive Language Index raw score was used as a measure of receptive language abilities. It includes three subtests: Linguistic Concepts, Sentence Structure, and Oral Directions. The Linguistic Concepts subtest assesses the ability to understand oral directions containing linguistic concepts such as “et” (and), “si” (if), and “soit…ou” (either…or). The Sentence Structure subtest assesses mastery of structural rules at the sentence level. The child is presented a page with four pictures and has to choose the one that corresponds to a sentence produced by the examiner (e.g., *“Le garcon est suivi par le chien.”* (*The boy is followed by the dog.*)). The Oral Directions subtest assesses the ability to interpret,

recall, and execute oral directions. For example, the child receives the following instruction: *"Touche le premier triangle" (touch the first triangle*) when presented with a sequence of figures of different shapes, sizes and colors. As well, two subtests of the Expressive Language Index were administered to each child: Formulated Sentences and Recalling Sentences. Formulated Sentences assesses the ability to formulate compound and complex sentences. The child is given a target word or phrases (e.g., *parce que* (*because*)) and has to formulate a sentence with a picture as a reference. The Recalling Sentences subtest assesses the child's ability to recall and repeat sentences of increasing length and syntactic complexity presented orally by the examiner.

Procedure

Initial assessment

Recruitment of the IA children was done in collaboration with an adoption agency in Montreal: Société Formons une Famille Inc. For the children in the CTL group, daycare directors were contacted and letters describing the research project were then sent to parents. Some parents also contacted us after they had seen an ad in a local newspaper.

Before testing began, the objectives and the procedure of the study were explained to the child and parents by the investigator and questions from the child or parents were answered by the test administrators. Parents were then asked to read and sign the consent form. The testing was conducted by the first author or one of two trained assistants, all of whom were native speakers of Quebec French. Parents were allowed to stay in the testing room , but were instructed not to give help to their child. Four sessions of approximately 90 minutes each were required to complete testing. The Language Environment Questionnaire and the Developmental Questionnaire were administered as semi-structured interviews during the first session. The order of administration of the remaining tests was counterbalanced to avoid possible bias due to order of administration. A

free play session with the child and caregiver, lasting 30 minutes, was filmed during the last session, but is not analyzed in this paper.

Follow-up

The parents of IA children who had participated in the initial assessment were contacted by telephone and asked if they would participate in a follow-up study; 100% accepted. CTL children were recruited as for the initial assessment. The children were tested in a laboratory at McGill University or in their homes. After the parents signed the consent form, the Language Environment Questionnaire and the Developmental Questionnaire were completed or updated for the participants who had taken part in the initial assessment. The child was then given the language tests. The order of administration was counterbalanced. A 30-minute free-play session with the caregiver was filmed during the last session, but this is not discussed in this article. Two sessions of approximately 1 hour each were necessary to complete the follow-up assessment.

Results

General health

According to parents' responses during the semi-structured interview conducted at the initial assessment, 75% of the IA parents considered their child's general health as excellent, 16.7% very good, and 8.3% good. For the CTL parents, 77.3% judged their child's general health as excellent and 22.7% judged it as very good. Overall, results from the interview indicated that the IA and CTL children were comparable concerning their current general health and development, with 9 instances of problems reported for the IA and 10 instances for the CTL children. However, with regards to their past medical and developmental history, the IA children, not surprisingly, were reported to have had a higher incidence of problems compared to the CTL children; specifically, the IA's parents reported 32 instances of health and developmental

problems, nearly twice the number reported by CTL's parents, 17. That the health status of the IA children was comparable to that of the CTL children at the time of the initial assessment suggests that they recovered well from any initial health problems.

Test results

One-way ANOVAs were carried out to compare the results of the IA and CTL children on the Vineland SEEC, the Leiter-R, and the language tests. A significance level of .05 was used for all significance tests. A sample size of 25 children per group is sufficient to detect a large effect (.8 SD between means) with alpha = .05 and beta = .2 (power = .8; Cohen, 1988).

Vineland SEEC: Vineland Social-Emotional Early Childhood Scales

There was no significant difference between the IA and CTL children on the total raw score for the Vineland SEEC (see Table 1). Thus, according to parental reports, the socio-emotional adjustment of IA children was comparable to that of the CTL children.

Leiter-R: Brief IQ

ANOVA of the raw scores on the Leiter-R (Brief IQ) revealed that that there was no significant difference between the IA and CLT groups (see Table 1). Similarly, there was no significant difference between the IA and CTL groups on the standardized scores of the Leiter-R, F (1, 42) = .983, p = .327, η_P^2 = .02) (see Table 4).

Language Tests

Raw language test scores. The IA children's performance on the language tests was compared to that of the CTL children using one-way ANOVA (see Table 1 for a summary of average raw scores, statistical results, and effect sizes (Partial Eta-Squared)). Separate analyses were carried out on the initial and follow-up test results. At initial testing, the IA children's performance was significantly worse on the Expression Scale of the PLS-III and on the EOWPVT compared to that of the CTL children. There were no significant differences between

the groups with respect to their performance on the Comprehension Scale of the PLS-III or the EVIP; however, the difference between groups on the Comprehension Scale was approaching significance (i.e., p =.08). At follow-up, the IA children performed significantly worse than the CTL children on the expressive language subtests of the CELF-R (Recalling Sentences and Formulated Sentences), on the Receptive Language Index of the CELF-R, and on the EOWPVT. There was no significant difference between the groups on the EVIP.

In order to examine the performance of the IA children more closely, we calculated, for the tests and subtests in which there was a significant difference between groups, the percentage of IA children who scored higher or lower than the average of the CTL children, calibrated in standard deviations (see Table 3). Between 35 and 47% of the IA children scored at least 1.25 standard deviations below the mean of the CTL group on the tests measuring general expressive language skills and expressive vocabulary at initial and follow-up testing. Regarding receptive language abilities, approximately 26% of the IA children scored at least 1.25 standard deviations below the mean of the CTL group on the Receptive Scale of the CELF-R at follow-up. To better understand the language scores of the IA group, we also calculated correlations between the language tests at follow-up (see Table 3). In order to determine if expressive and receptive vocabulary accounted for the difference between the groups on the Recalling Sentences subtest because they all inter-correlated strongly, we conducted an analysis of covariance (ANCOVA) of the Recalling Sentences scores in which we removed the influence of expressive and receptive vocabulary. The effect of group alone was significant even after controlling for the effects of expressive vocabulary (performance on the EOWPVT) and receptive vocabulary (performance on the EVIP), $F(1, 42) = 12.84$, $p = .001$, $\eta_P^2 = .23$). These results indicate that the difference between the IA and CTL children on the Recalling Sentences subtest cannot be attributed only to differences in vocabulary skills. The performance on the Recalling Sentences subtest was

significantly correlated with scores on the Receptive Language Scale of the CELF-R, suggesting that the IA children's depressed performance on the Recalling Sentences subtest may be due, in part at least, to lags in their receptive morphosyntactic skills.

Standardized language test scores. Statistical analyses were not conducted on the standardized language test results because the standardized scores provided for the tests are not based on the French version that we used. Group average standardized scores are presented here, nevertheless, but for descriptive purposes only because they are often used for clinical purposes (see Table 4). The results show that the CTL group scored in the average range on all language tests at initial and follow-up testing, except for the EVIP where they scored in the above average range at both testing times. The IA group scored in the average range on all the language measures, except for three tasks at follow-up: they scored above average on the EVIP, and they performed below average on the Recalling Sentences and the Formulated Sentences subtests of the CELF-R. The discrepancy between the IA and CTL groups is particularly important for the Recalling Sentences subtest for which the CTL children obtained a mean standard score in the average range (i.e., 9.61) compared to IA children who obtained a mean standard score of 6.26, falling below average. Although the performance of both the CTL and IA children was in the low end of the average range on the Formulated Sentences subtest, suggesting that this test is difficult for French-speaking children, the IA children had significantly more difficulty compared to the CTL group on this test which requires children to formulate grammatical sentences using prompts.

In order to better understand the language test results, correlations between scores on the language tests and diverse variables were carried out and are presented in the next section.

Relation between cognitive ability and language performance at initial testing

Pearson correlation coefficients were calculated between the Brief IQ scores and the standardized scores on the language tests for IA children and CTL children. Since the Leiter-R

was only administered at initial testing, only test scores at initial testing were analysed. Significant correlations were obtained between scores on the Brief IQ and scores on all the language tests for the CTL children, ranging from .44 to .71, whereas none of the correlations were significant for the IA children, ranging from -.10 to .20. Specifically, the following correlations were obtained between the Brief IQ and the following language tests for the CTL children: EOWPVT (n = 23; r = 0.44; p = 0.018); EVIP (n = 22; r = 0.59; p = 0.002); Expression scale of the PLS-III (n = 23; r = 0.71; p < 0.001); and Comprehension scale of the PLS-III (n = 23; r = 0.47; p = 0.011). The correlations between the Brief IQ and the language tests at follow-up are presented in Table 3 for the IA group. The correlations between the language tests in which differences between groups were found were negative or very low, varying from -.03 to .10. Therefore, nonverbal intelligence did not appear to contribute to the differences in language abilities found between the groups.

Relation between language performance at initial testing and at follow-up

Pearson correlation coefficients were calculated on the raw scores of the EOWPVT and the EVIP at initial and follow-up testing in order to verify the reliability of the IA children's performance on these tests over this time period and, thus, the utility of the initial results in predicting the children's subsequent abilities. Correlations were carried out on only these two tests because they were the only tests administered at both times. The correlations were significant for both the EOWPVT (n = 22; r = 0.68; p < 0.001) and the EVIP (n = 22; r = 0.49; p = 0.010).

Relation between past health and developmental problems and language test results

To investigate if the IA children whose performance was relatively weak on the language tests at follow-up had more health and developmental problems in the past, two groups of IA children were created on the basis of their scores on the follow-up language tests. One IA language group comprised "weak language performers"-- they had scores on at least two language tests that were 1.25 standard deviations below the average of the CTL group. The remaining

children comprised the “good language performer” group. ANOVA indicated that there was no significance difference between the weak and the good language performers in terms of the number of instances of health and developmental problems reported by their parents at initial assessment, $F(1, 21) = .032$, $p = .86$. The parents of the weak and good language performers reported, on average, 1.13 and 1.20 health and developmental problems, respectively. Thus, it does not appear that the IA children’s language development was influenced significantly by their general health.

Relation between exposure to French, age at adoption, and language test results

In order to further examine potential factors that might have influenced the language outcomes of the IA children, we correlated number of months of exposure to French and age at adoption with their language test scores at follow-up testing (see Table 3). There was a significant correlation between age at adoption and length of exposure to French ($n = 24$; $r = -0.78$; $p < 0.001$) indicating that these variables are confounded. With the current data, it was not possible to identify the unique role of each variable. Correlations were significant between the vocabulary measures (EVIP and EOWPVT) and age at adoption/length of exposure to French, varying from .36 to .48. The correlations between age at adoption/exposure to French and grammatical measures were not significant (Receptive Language Scale, Formulated Sentences subtest and Recalling Sentences subtest of the CELF-R), except for a significant correlation between age at adoption and scores on the Recalling Sentences subtest of the CELF-R ($n = 23$; $r = -0.40$; $p = 0.03$). Nonverbal IQ scores were not correlated significantly with age at adoption/exposure to French and any of the language measures.

Relation between performance on the language tests and early language development

During the initial assessment, as part of the semi-structured interview, IA parents were asked at what age their children produced their first word(s) in French. The mean length of

exposure before uttering their first words in French was 2.9 months, although parental responses revealed considerable variance among the children, ranging from a few days to 12 months. In order to examine a possible link between production of first words in French and later language performance (at follow-up), correlations were calculated between age at first words (measured in months) and scores on the language tests at follow-up. There was a significant negative correlation between age at first words in French and performance on the: EOWPVT (n = 22; r = -0.67; p < 0.001); Receptive Scale of the CELF-R (n = 22; r = -0.46; p = 0.016); EVIP (n = 22; r = -0.50; p = 0.010); Recalling Sentences subtest (n = 22; r = -0.45; p = 0.017). The correlation with the Formulated Sentences subtest (n = 22; r = -0.10; p = 0.328) was non-significant. Thus, there is some suggestion that IA children who produced their first words in French earlier did better on all the language measures at follow-up, except for the Formulated Sentences subtest.

We conducted stepwise regressions, in which the dependent variables were the language test scores found to be significantly lower for the IA children compared to the CTL at follow-up. The independent variables were age at follow-up, age at first word in French, age at adoption, and length of exposure to French. Age of first words predicted significantly the performance on the EOWPVT (R^2 = .45; beta weight of -.67; p = .001), the Recalling Sentences subtest (R^2 = .21; beta weight of -.45; p = .035), and the Receptive Language Scale of the CELF-R (R^2 = .17; beta weight of -.46; p = .032). Formulated Sentences subtest scores were not predicted by any of the variables. Age at follow-up, age at adoption and number of months of exposure to French were not retained in the model. The failure of any other variables to be retained in the model showed that despite some strong univariate correlations (see Table 3), none of the other variables added any unique information.

Discussion

The purpose of the present study was to examine IA children's language learning abilities in comparison to those of control children acquiring the same language from birth. The children in the control group were matched to the IA children on factors that have been found to favor language development (i.e., SES and being female) and are disproportionately represented among IA children from China and their adoptive families. The children were initially assessed at about 4 years of age when the IA children had been exposed to their adoptive language for 36.1 months, on average. Results indicated that the IA children scored significantly lower on tests of expressive vocabulary and general expressive language skills than the CTL children, but there were no significant differences between the two groups with respect to receptive language skills; nor were there significant differences on measures of nonverbal intellectual ability and socio-emotional adjustment. These results are consistent with Glennen (2007) who found that the expressive language abilities of children adopted from Eastern Europe were less developed than their receptive language skills when they were tested at 31.26 months of age, after 12 to 21 months of exposure to English.

Since the IA children were relatively young when tested the first time, it is possible that they had had insufficient exposure to French to catch up to their non-adopted peers and that, with more exposure, they would close the gap. Therefore, the IA children were assessed a second time, some 16 months later, after they had been exposed to French for 4 years 4 months, on average. Since our IA sample had spent significantly less time in daycare compared to the CTL children who participated in the first assessment, we recruited CTL children for the follow-up assessment who had spent the same amount of time in daycare as the IA children. This resulted in retesting some of the CTL children from the initial assessment along with some new children. This allowed us: 1) to better match the post-adoptive language learning environments of the IA children to those of the CTL group, which was important since research indicates that daycare attendance may be

positively linked to language development (e.g., Peisner-Feinberg et al., 2001); and 2) to ensure that the differences we found at the initial assessment were not an artefact of the specific comparison group we included at that time.

The results of the second assessment indicated that not only did the IA children continue to exhibit lags in expressive skills in comparison to the CTL children, they also exhibited significantly lower receptive language skills. More precisely, their performance on the Receptive Language Scale of the CELF-R, which assesses the ability to interpret oral directions and to understand sentence-level syntax, was now also significantly poorer than that of the CTL children. Thus, extended exposure to French was not sufficient to overcome the IA children's initial lags in expressive abilities in comparison to the CTL children and, to the contrary, their initial lags had expanded to include receptive language skills as well.

The IA children's results on the EOWPVT provide additional evidence that exposure alone cannot explain the differences we found. This test was administered at both the initial and follow-up assessments making it possible to examine if the IA children's initial difference in comparison to the CTL children was reduced after additional exposure to French. Although the average standardized test scores of the IA children were similar at initial and follow-up assessments, in fact, there were more than twice as many IA children with lags when compared to the CTL children at the follow-up compared to the initial assessment; at the initial assessment, approximately 13% of the IA children scored 2 standard deviations below the mean of the CTL children compared to 30% at the follow-up assessment.

The IA children's scores on the tests of receptive and expressive vocabulary at the initial assessment were significantly correlated with their scores at follow-up, suggesting that early indicators of development in the new language are good predictors of IA children's later language development. We also found that there was a significant negative correlation between the age at

which IA children produced their first words in French and their subsequent language outcomes. Thus, IA children who produced their first words in French earlier performed better on almost all of the language measures at follow-up compared to children who were older when they produced their first words in French. Caution is called for when interpreting these results because they are based on parental reports and might be biased by parents' perceptions of their children's current language abilities. It is not clear at this time whether delay in producing first words reflects individual differences in second language learning ability, pre-adoption language learning experiences, a language reserve that survived the effects of institutionalisation (Croft et al., 2007), or other pre-adoptive variables. Nevertheless, from a clinical point of view, it appears that children who produce their first words relatively soon after adoption are likely to make better progress later, at least within the next three to five years post-adoption, than IA children who produce their first words in the new language relatively late. These results suggest developmental continuity in word learning, production, and comprehension across time for the IA children and corroborate findings reported in large-scale studies of typically-developing children acquiring English or German as first languages (Fenson, Dale, Reznick, Bates, Thal & Pethick, 1994; Hohm, Jennen-Steinmetz, Schmidt & Laucht, 2007). Thus, it would appear that adoptive children's acquisition of a "second first language" replicates the pattern demonstrated by typical first language learners with respect to how their early language development predicts their later language outcomes.

The present results are consistent with studies that have compared the language skills of IA children to test norms insofar as the children in the present study performed in the typical range on almost every test. Thus, our results, along with those of other researchers, suggest that termination of first language learning and the pre-adoption experiences of IA children from China are not significant impediments to their acquisition of their second first language. However, our results

differ from most other studies insofar as they indicate that the IA children's language lagged behind children matched for age, gender and SES. Our findings are similar to those of the only other study we know of that included a control group matched for SES (Cohen et al., 2008). The discrepancy between our and Cohen's et al. results, on the one hand, and other studies, on the other hand, could be due to the use of CTL groups that were matched to the IA children on factors that have been found to be influential in language development and that are differentially distributed among IA and non-adopted children and families. As a group, the adoptive parents had more education and higher incomes compared to the general population, as has been found in other studies (e.g., Tan & Yang, 2005). Since research has shown that SES has a significant positive correlation with quality of language input as well as later language development in non-adopted children (e.g., Hoff, 2006), the use of an SES-matched control group controlled for a source of positive influence on the results of the IA children in this study and, thereby, served to equate the IA and CTL groups on this factor. As well, only girls were included in our control samples. Tests norms do not always consider gender and this could be an additional source of influence in other studies since research has shown that girls tend to develop slightly faster than boys in diverse developmental domains (e.g., Van IJzendoorn et al. 2005).

A number of pieces of evidence suggest that the differences demonstrated by the IA children are specific to language and are not global in nature. First, there were no major differences in overall health status between the IA and CTL children at the time of the initial assessment. As well, our results failed to reveal that any general health and developmental problems that the IA children experienced early on were linked to poorer language outcomes later. This finding corroborates Glennen and Masters (2002) who found that medical risk factors were not predictive of language development outcomes. Second, the level of socio-emotional adjustment of the groups was similar. Third, there was no difference between the IA and the CTL

children in terms of nonverbal intellectual abilities. This finding is consistent with Rutter, O'Connor and the English and Romanian Adoptees (ERA) Study Team's (2004) results suggesting that being raised in an institution only has a long term negative effect on intellectual development if it involves severe deprivation which was not the case for the children in our study.

The language-specific nature of the differences that are reported here are similar to those found in a meta-analysis of 62 studies of adopted and non-adopted children's IQ and school performance carried out by Van IJzendoorn et al. (2005). They found that IA children (*N* = 17 767) did not differ from non-adopted peers in terms of IQ, but their language skills as well as their school performance lagged, and they often exhibited more learning problems. Our results are also in line with other studies that have found that adopted children were in the average range on measures of intellectual functioning (Lapointe et al., 2006; Scott et al., 2008), even when compared to children from similar SES backgrounds (Cohen et al., 2008).

Our language results indicate that the IA children continued to differ from the CTL children at the follow-up assessment, that they showed differences in more areas at follow-up than initially, and that more IA children showed differences on certain tests at follow-up than initially in comparison to the CTL children. Our findings, discussed earlier, suggest that factors besides length of exposure are called for to explain the differences between the IA and CTL children's language performance. The question is: what are these other factors?

One possibility is the age difference between the IA and CTL parents - - the IA parents were significantly older than the CTL parents. It is difficult to control this variable since parents who adopt are usually older because they often try to have their own children before considering adoption and, after the decision to adopt is made, there are often substantial delays. Research on the link between parental age and language environment or outcomes is sparse and inconsistent (Brasel, 2008; Magill-Evans & Harrison, 2001).

It might also be argued that genetic factors play a role in explaining some of the differences obtained in the current study. However, the IA and CTL groups were equivalent in terms of nonverbal intelligence; and since nonverbal intelligence has a strong heritable component (Hoekstra, Bartels, & Boomsma, 2007), by inference, it seems unlikely that there were significant genetic differences between the groups. Furthermore, the main reason for which Chinese families give children up for adoption is China's strict birth planning policies (Johnson, Banghan & Liyao, 1998) rather than health concerns, as is the case in some other countries. In this regard, China provides unique circumstances for international adoption since their one-child policy significantly reduces the incidence of adoptions due to economic-, health-, abuse-, and addiction-related reasons. In short, there is little reason to believe that Chinese parents who give their child up for adoption have genetic predispositions to language delay or disorder. Thus, we assume that the chance of language delay or disorder was evenly distributed between the IA and CTL groups.

It is also possible that the differences in the IA children's language performance in comparison to the matched control groups reflect early age-of-acquisition effects. Abrahamsson and Hyltenstam (2009) present evidence suggesting that it is difficult, if not impossible, for second language learners to attain native-like levels of competence even when second language learning begins early during the preschool years. More specifically, they compared the performance of second language learners and native speakers of Swedish on a battery of demanding language competence and processing tasks. They found that even though the second language learners had all been judged impressionistically by native speakers of Swedish to sound like native speakers, based on language samples, only 1 of the participants who had begun acquiring Swedish before 5 years of age (n = 15) performed within the range demonstrated by the native speakers on all the measures of Swedish ability (see Mayberry, 1993, for similar results for

sign language learners whose exposure to sign language was delayed but occurred during the preschool years).

Of particular relevance to the present study, Thordardottir (2008) found that 4.5-5 year-old children who had acquired French and English simultaneously from birth scored as well as age- and SES-matched monolingual English- and French-speaking children on a variety of standardized language tests. The bilingual children had had approximately 50% exposure to each language. Both the bilingual and monolingual comparison groups were from families with relatively high levels of SES, with a mean of about 17 years of maternal education; this is very similar to our samples. That Thordardottir's bilingual subjects scored as well as her matched monolingual comparison groups despite less exposure to each language than the controls argues that amount of exposure alone cannot account for our results and that age of exposure might also be important to consider. We do not mean to imply that amount of exposure is insignificant since, in fact, Thordardottir also found that bilingual children in her study who had had less than 40% exposure to a language did not score as well as the control children who spoke that language monolingually.

It is also interesting in this regard that the IA children study scored significantly lower than the control children on the recalling sentences task and more than 1 standard deviation below the norm on this task. This is noteworthy because it has been found that sentence repetition tasks are highly sensitive to age of acquisition among both first and second language learners (e.g., Mayberry 1993). Performance on such tests has also been identified as a clinical marker of specific language impairment (e.g., Conti-Ramsden, Botting, & Faragher, 2001). We are not suggesting that the IA children are language impaired in the clinical sense, but rather that they appear to have difficulty with aspects of language processing in French that show age-sensitivity and are particularly difficult for children with SLI. In other words, IA children's acquisition of

French is vulnerable in the same way as some researchers have suggested is the case for other learners of French.

Clearly, the current evidence is insufficient to conclude confidently that the present results reflect early age-of-acquisition effects and that differences reported here between the IA and control children will not disappear with even more exposure to French. It would be necessary to examine the language outcomes of IA children with even longer exposure to French in order to determine the ultimate attainment of these children. In fact, we are currently planning another follow-up assessment of the same IA children now that they have been attending school for a number of years. While extended and enriched language experiences in school might serve to boost these children's language abilities, it is also possible that the increased language demands of schooling will be associated with continued and even larger differences. In our third assessment, we will also examine more specific aspects of their French language development to pinpoint the precise areas of strengths and weaknesses. In fact, in a separate analysis of the present IA children's oral narrative language skills (see Gauthier & Genesee, 2009), we have preliminary evidence that the IA children are prone to have more difficulty in the use of complement clitics, including object clitics, than native speakers. The acquisition and use of object clitics are difficult for second language learners and children with specific language impairment who are learning French (Paradis, 2004).

Limitations of this study include a small sample size. Studies involving more participants are needed in order to strengthen our findings. In addition, it would have been preferable to use language tests that had originally been standardized using native French-speaking children. However, at the time this study was conducted, such tests were not available, and we used the best alternative option available. The use of a control group allowed us to control for any possible bias due to the fact that some of the tests were adapted from English.

In closing, it is important to emphasize that the IA children in the present study performed well within the normal range of typically-developing children their age, except on two subtests administered at follow-up (i.e., the Recalling Sentences and Formulated Sentences subtests of the CELF-R). These findings support other studies that most IA children from China are functioning linguistically, and otherwise, in the normal range compared to typically-developing children of the same age. Thus, from a clinical point of view the results are not alarming. They provide useful information to professionals in helping them to know what to expect from IA children and what areas of language may be more challenging to acquire. From a theoretical perspective, the present results suggest the intriguing possibility that there may be very early age effects on language acquisition and they, thereby, provide some support for similar arguments by researchers working with different types of language learners (Abrahamsson & Hyltenstam, 2009; Mayberry, 1993).

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Table 1

Raw score test results at initial assessment and follow-up

TESTS	IA *M* (*SD*)	CTL *M* (*SD*)	df	F	Partial Eta-Squared
Vineland SEEC (initial only)	157.58 (17.90)$_b$	163.95 (15.47)$_d$	(1,43)	1.61	.04
Leiter-R: Brief IQ (initial only)	48.90 (7.33)$_d$	51.30 (9.89)$_c$	(1,42)	.82	.02
EOWPVT					
- Initial assessment	40.09 (9.38)$_c$	46.83 (8,41)$_b$	(1,45)	6.76*	.13
- Follow-up	54.52 (10.91)$_c$	62.52 (9.62)$_c$	(1,44)	6.95*	.14
EVIP					
- Initial assessment	51.30 (15.63)$_c$	56.08 (16,44)$_b$	(1,45)	1.04	.02
- Follow-up	74.48 (17.35)$_c$	79.96 (14.64)$_c$	(1,44)	1.34	.03
PLS-III (initial only)					
- Expression Scale	75.57 (12.72)$_c$	86.64 (11.21)$_a$	(1,46)	10.28**	.18
- Comprehension Scale	115.46 (9.97)$_b$	120.80 (8.68)$_a$	(1,47)	4.02	.08
CELF-R (follow-up only)					
- Formulated Sentences Subtest	11.48 (7.68)$_c$	17.00 (8.64)$_e$	(1,41)	4.92*	.11
- Recalling Sentences Subtest	28.35 (12.69)$_c$	43.30 (13.90)$_c$	(1,44)	14.52**	.25
- Receptive Language Scale	41.52 (8.47)$_c$	47.83 (10.33)$_c$	(1,44)	5.12*	.10

Note: IA = Internationally adopted children; CTL = Control children; EOWPVT = Expressive One-Word Picture Vocabulary Test-Third Edition; EVIP = Échelle de vocabulaire en images Peabody; PLS-III = The Preschool Language Scale-Third Edition; Leiter-R = Leiter International Performance Scale-Revised; Vineland SEEC: Vineland Social-Emotional Early Childhood Scales; CELF-R = Clinical Evaluation of Language Fundamentals Revised.
[a] $n = 25$. [b] $n = 24$. [c] $n = 23$. [d] $n = 21$. [e] $n = 20$.
*$p < .05$. **$p < .01$.

Table 2

Percentage of adopted children above and below the mean of control children on language tests

SD	Expression Scale (PLS-III) Time 1	EOWPVT Time 1	EOWPVT Time 2	Recalling Sentences (CELF-R) Time 2	Formulated Sentences (CELF-R) Time 2	Receptive Language Scale (CELF-R) Time 2
+2	0	0	0	0	0	0
+1.25	0	0	0	0	0	0
+1	0	4.3	0	0	3.3	0
0	56.5	56.5	52.2	65.2	52.2	65.2
-1	0	4.3	0	0	3.3	8.7
-1.25	13.0	21.7	17.4	17.4	39.1	21.7
-2	30.4	13.04	30.4	17.4	0	4.3

Note: PLS-III = The Preschool Language Scale-Third Edition; EOWPVT = Expressive One-Word Picture Vocabulary Test-Third Edition; CELF-R = Clinical Evaluation of Language Fundamentals Revised.

Table 3

Correlations between age at adoption, length of exposure to French and outcome variables for adopted children at follow-up (except for Leiter-R obtained at initial study)

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. Age at adoption	__	-.78**	-.43*	-.44*	-.32	-.40*	-.20	-.01
2. Exposure to French		__	.36*	.48*	.32	.23	.11	.17
3. EVIP			__	.55**	.73**	.77**	.18	.20
4. EOWPVT				__	.65**	.60**	-.15	-.03
5. Receptive Language Scale (CELF-R)					__	.80**	.22	.06
6. Recalling Sentences (CELF-R)						__	.28	.10
7. Formulated Sentences (CELF-R)							__	-.03
8. Leiter-R (initial assess.)								__

Note: EVIP = Échelle de vocabulaire en images Peabody; EOWPVT = Expressive One-Word Picture Vocabulary Test-Third Edition; CELF-R = Clinical Evaluation of Language Fundamentals Revised.
*$p < .05$. **$p < .01$.

Table 4

Standardized test score results at initial assessment and follow-up

TESTS	IA M (SD)	CTL M (SD)
Leiter-R: Brief IQ (initial only)	115.76 (12.71)[e]	120.22 (16.62)[c]
EOWPVT		
- Initial assessment	94.52 (10.69)[c]	103.71 (10.44)[b]
- Follow-up	96.87 (11.03)[c]	106.35 (12.29)[c]
EVIP		
- Initial assessment	111.48 (15.52)[c]	117.08 (17.64)[b]
- Follow-up	119.22 (17.32)[c]	124.91 (13.79)[c]
PLS-III (initial only)		
- Expression Scale	100.78 (18.79)[c]	112 (17.11)[a]
- Comprehension Scale	106.25 (16.57)[b]	110.72 (17.19)[a]
CELF-R (follow-up only)		
- Formulated Sentences subtest	6.91 (1.62)[c]	7.80 (2.53)[f]
- Recalling Sentences subtest	6.26 (2.44)[c]	9.61 (3.41)[c]
- Receptive Language scale	102.43 (12.15)[c]	112.39 (17.37)[c]

Note: IA = Internationally adopted children; CTL = Control children; EOWPVT = Expressive One-Word Picture Vocabulary Test-Third Edition; EVIP = Échelle de vocabulaire en images Peabody; PLS-III = The Preschool Language Scale-Third Edition; CELF-R = Clinical Evaluation of Language Fundamentals Revised. For the Receptive Language Scale of the CELF-R, the Expression and Comprehension scale of the PLS-III, and for the EVIP, standard scores were assigned a mean of 100 and a standard deviation of 15. For the EOWPVT, standard scores were assigned a mean of 100 and a standard deviation of 10. For the subtests of the CELF-R (Recalling Sentences and Formulated Sentences), standard scores were assigned a mean of 10 and a standard deviation of 3.
[a] n = 25. [b] n = 24. [c] n = 23. [d] n = 22. [e] n = 21. [f] n = 20.