Language acquisition is both universal and variable. That is, all normal children in normal environments learn to talk, but they do so at different rates with the result that children of the same age vary in the language skills they command. Studies of North American and European samples find clear evidence that some of the variability in the rate of language development is attributable to differences in the environmental support for language development that children receive (Gathercole & Hoff, 2007; Hoff, 2006a; 2006b). Variability in the rate of vocabulary development is associated with variability in the amount of speech children hear, in the number of different words they hear, and in the informativeness of the contexts in which new vocabulary items are presented (Hoff & Naigles, 2002; Naigles & Hoff-Ginsberg, 1998; Pan, Rowe, Singer, & Snow, 2005; Weizman & Snow, 2001). Variability in children's rates of grammatical development is associated with variability in the complexity of the speech they hear (Hoff-Ginsberg, 1986; Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002).

The degree to which children's environments have the characteristics that are supportive of language development is a function of many factors. Culture and socioeconomic status are two well-documented sources of influence (Bradley & Corwyn, 2005). Culture affects children's language experience at least in part because cultures hold different beliefs about the role of adults in children's language development and about the appropriateness of talking to prelinguistic children. In some cultures, adults do not talk to children, and there is some evidence that the onset of language is later in these cultures (Hoff, 2006a). Socioeconomic status (SES) affects children's language experience, at least in part, because adults from different social strata have different characteristic ways of using language that shape their language use with their children. One study of mothers in the US found that high SES mothers talked more, used longer sentences, and used a richer vocabulary, both in talk to another adult and in talk to their children than mid SES mothers (Hoff-Ginsberg, 1991). As a result, the children of the high SES mothers developed language at a faster rate than the children of the mid SES mothers (Hoff, 2003a).

It is also clear that some of the variability in rates of language development arises from internal sources. Children's rates of language development are, to a degree, heritable (e.g., Stromswold, 2001) and predictable from individual differences observable in infancy. As an example of the latter, speech perception skills measured at 6 months and social cognitive development measured between 9 and 15 months predict later language skills (Carpenter, Nagell, & Tomasello, 1998; Tsao, Liu, & Kuhl, 2004). Gender, too, predicts language development. The differences are small and not always observed, but when a gender-related difference is found, girls are consistently more advanced than boys. This finding could reflect differential treatment of girls and boys, as some evidence suggests that parents may talk more to girls than to boys and to be more responsive to talk from girls than from boys (Leaper, 2002). Findings of gender differences in language development might also reflect caregivers' differential perception of boys' and girls' competence, because the findings for children under 3 years
come from parent report instruments (Berglund, Eriksson, & Westerlund, 2005; Fenson, Dale, Reznick, Bates, Thal & Pethick, 1994; Galsworthy, Dionne, Dale, & Plomin, 2000). On the other hand, girls have been found to develop vocabulary at a more rapid pace even when the effect of input is statistically controlled (Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991), and girls have been found to outperform boys in laboratory language learning tasks (Katz, Baker, & MacNamara, 1974; Naigles, 1996). These later findings suggest that gender effects are an example of internal influences on language development.

China provides an interesting environment in which to study external and internal influences on language development. The Chinese place more emphasis on the role of external influences in development than do the more-studied North Americans (Stevenson & Stigler, 1992), and Chinese parents characteristically do more teaching of their children, including preschool children, than do North American parents. Indigenous descriptions of Chinese parenting make use of the term chiao shun, which roughly corresponds to the notion of “training” (Chao, 1994). Consistent with this view of parenting as centrally including training, Chinese parents in the US have been found to interact with their preschool children in more formal and didactic ways than European American parents and to serve the function of teachers and academic coaches more than the function of playmates (Huntsinger, Jose, Liaw, & Ching, 1997; Parmar, Harkness, & Super, 2004). Particularly with respect to language development, Erbaugh (1992) reports that it is typical for adults in China to actively coach children as young as two years in the socially-important mastery of surnames, given names, and kinship terms for themselves and for their relatives; that a frequent style of conversing with young children is a quiz style in which adults ask children questions with a correct answer in mind and pursue questioning until the expected answer is produced; and that children are expected to memorize and recite poems and stories verbatim. Another feature of adult-child language interaction in China is the use of picture cards for vocabulary building. Cards with pictures of common objects are commercially produced, widely-available, and commonly used.

It is also the case that variability exists within China in how parents talk to their children and that some of this variability is associated with education level: more educated parents (“intellectuals”) talk to their children differently than do less educated parents (“workers”). In particular, parents with higher levels of education have been found to talk to their children more than do parents with less education, and the talk more educated parents address to their children more frequently serves the function of eliciting conversation. In contrast, less educated parents talk less to their children, and their speech more frequently serves the function of directing the child’s behavior (Hoff, Laursen, & Tardif, 2002; Tardif, 1993).

The present study is an investigation of sources of variability in the language development of young children in China. The data were collected as part of a larger investigation undertaken with the goals of identifying factors in children’s families that are supportive of language development and of developing an instrument for diagnosing children with significant language delay. The focus of the present study is on the relation of paternal education level, caregivers’ self-reported use of language teaching practices, and child gender to children’s language development. Effects of paternal education were of interest because SES has been found to be associated with parent-child interaction styles across cultures, including China, and because in North American samples family SES is also a reliable predictor of differences children’s language development. The present study sought to replicate the findings that SES, language interaction, and language development are related in a sample of Chinese caregivers and children. The use of language teaching practices was of interest because it provided the opportunity for cross-cultural replication of the observation made in many Western samples, that apart from SES-related differences, there are differences among caregivers in the language experiences they provide children and that children’s language development varies as a result. Gender was of interest because the existing literature suggests this is a biologically based influence on language development, but alternative explanations have also been proposed. Examining the effect of gender across cultures provides a test of the biological explanation.

Paternal education was chosen as a rough indicator of family socioeconomic status (SES). SES is not a frequently used measure in China, but there is a suggestion in Tardif (1993), that something like SES may affect the nature of caregiver-child interaction. Paternal education was chosen as the index of SES because in China, income does not differentiate as it does in the US, and because in the present sample were not well-differentiated in terms of occupation either. In contrast, the sample did vary in levels of paternal and maternal education. Paternal education was judged to be a better indicator of family status than maternal education because in China, women essentially join their husband’s family when they marry.

The measure of caregiver practices in talking to children consisted of interview questions that asked caregivers to indicate whether or not they employed 6 different practices in order to teach their children to speak. The questionnaire was designed by the Shanghai research team that conducted the study. Thus, the measure of language practices was emic in that it arose from the culture in which the study was conducted and was designed for use in only that culture (Berry, 1969; Pike, 1967).

Method

Participants

The children whose language experience and development were the subject of study were 331 boys and 277 girls from two communities of the Pudong area in Shanghai, China, which were selected as representing the average socioeconomic level of the region. The children were approximately equally distributed across the age range from 24 to 47 months. The mean age of the children was 35.24 months \( (SD = 5.86) \). All of the children were healthy, full-term children without auditory disability, low birth weight, medical complications, or neurological disorder. Data were collected from an additional 51 participants who were excluded from analysis because the children were either premature, had medical complications associated with delivery, or had a diagnosed cognitive deficit. Data were also collected from 54 participants who were excluded from analysis because they lived at home only on the weekends or less. These participants were excluded from analysis in order to maximize the extent to
which the caregivers’ reports of their own language practices would reflect the children’s environments. All the children were acquiring Putongua, also known as Mandarin. Two hundred fifty-seven (42%) also heard one or more additional dialects of Chinese in their home, but this variable was not significantly associated with either language outcome measure.

Among the fathers, 40% (n = 245) had some education beyond the high school; 21% had bachelors or more advanced degrees. Sixty-nine percent of fathers (n = 363) had no more than the equivalent of a high school education; 19% had less than a high school education. Among the mothers, 33% had some education beyond high school; 12% had bachelors or more advanced degrees. Sixty-seven percent of mothers had no more than a high school education; 25% had less than the equivalent of a high school degree. In 80% of the households, mothers and fathers were in the same education category.

Among these children who lived with a parent and did not board at school during the week, the modal living pattern was for the child to live with both parents and to be cared for during the day by a grandparent, although a grandparent more frequently was the caregiver in the more educated families and a parent was more frequently the daytime caregiver in the less educated families. To be specific, in families in which the father had more than a high school education, a grandparent was the daytime caregiver for 56% of the children and a parent was the daytime caregiver for 19% of the children. In families in which the father had a high school education or less, a grandparent was the daytime caregiver for 43% of the children and a parent was the caregiver for 35% of the children. Other relatives, nannies, and others provided daytime care to approximately 25% of the children in more educated families and to 23% of the children in less educated families. Only two sets of parents were divorced.

Materials and procedure

A caregiver of each child provided the data in an interview conducted individually in hospitals of the local communities or in groups in the kindergartens of the local communities. Participants were identified through lists of all children maintained by community hospitals. Caregivers of children younger than preschool age were interviewed when they brought the child to the hospital for a regularly scheduled immunization. Those interviews were conducted by child health care workers in the hospital. Caregivers of preschool children were interviewed in the child's school by a teacher who was responsible for child health. The caregiver/respondents in the full sample included 171 grandparents, 531 parents, 2 other relatives, and 9 nannies. The interview required approximately 30 to 45 minutes to complete.

The interview consisted of questions about the mother’s pregnancy and delivery, about the child’s general health and development, about the family social environment (for example, pregnancy and delivery, about the child’s general health and development) and demographic information, including parents’ education. One question asked caregivers to report on the ways in which they speak to the child. Caregivers were asked for a yes or no response to each of the following options: (1) induce the child to conduct conversation, (2) repeat and extend the child’s language, (3) teach by picture cards, (4) tell stories, (5) teach the child to imitate words, and (6) seldom teach the child how to speak. These questions presuppose that the respondent shares the view that language can be taught to children. In China, that is a shared assumption.

In addition, the caregivers reported on the child’s expressive language using a checklist. The vocabulary measure included 245 frequently used words, drawn from 16 semantic categories (e.g., animals, vehicles, food, clothing). The grammar measure included 8 frequently used auxiliaries (e.g., 迪, zhe, guo) and 14 utterance structures (e.g., noun + verb, adjective + verb, verb + adjective + noun, noun + negative + verb). This instrument has been demonstrated to be developmentally sensitive; both the vocabulary and grammar measures are positively related to age and correlated with caregivers’ reports of children’s expressive language difficulty based on data from this sample (Zhang, Jin, Shen, & Zhang, 2002; Zhang, Jin, Shen, & Zhang, 2006a). Data from an independent sample of 206 children between 13 and 24 months showed that the measures were sensitive to effects of language intervention in children with language delay (Zhang, Jin, Shen, & Zhang, 2006b).

Predictor variables

The variables tested as predictors of children’s language development were paternal education level, caregiver reported use or nonuse of each “language teaching” practice asked about in the interview, and child gender. Paternal education, measured on a 6-point scale, was significantly related to family income, measured on a 5-point scale (r[608] = .50, p < .001, to paternal occupation, measured on a 5 point scale, (r[608] = .44, and to maternal education (r[608] = .71, p < .001). Thus, this measure arguably indexes something like socioeconomic status. Because the distinction between a high school level of education and higher education divides the sample into meaningful groups of sufficiently equivalent size for statistical analysis, paternal education was operationally defined as a 2-category variable: high school education or less and more than a high school education.

Language outcome measures

The language inventory yielded two outcome measures: a count of the number of words on the checklist that the child produced and a count of the number of grammatical forms and structures on the checklist that the child produced. Each of these measures was significantly correlated with child age (r[608] = .41 and .46 respectively, p < .001) indicating that these measures are developmentally sensitive. Norms for these measures were not available, therefore each of these measures was transformed into a z-score, based on the distribution of scores within the sample of 608, and analyses of the relation of predictor variables to these z-scores were conducted removing the variance attributable to age.

Results

Bivariate relations between paternal education, language teaching practices, and child gender as predictors and child language development as outcome

Paternal education. Differences associated with paternal education were assessed using separate oneway ANCOVAs for the measures of vocabulary and grammar, removing the variance attributable to age. There was a significant association between paternal education and children’s vocabulary and a
marginal association between paternal education and children’s level of grammatical development. Children whose fathers had more than a high school education had larger vocabularies than children whose fathers had a high school education or less. Table 1 presents the $n$ and mean $z$-score for vocabulary and grammar for both groups, the value of $F$, the significance of the $F$-test, and partial eta squared as a measure of effect size for each comparison.

Language teaching practices. The language teaching practices included in the questionnaire are listed in Table 2 with their frequencies of reported use. Eliciting conversation and telling stories were the most frequently reported practices; repeating extending child speech, using picture cards, and eliciting imitation were less frequently reported; only 15 caregivers in the sample reported seldom teaching the child to speak.

Table 1
The relation of paternal education to children’s vocabulary and grammatical development

<table>
<thead>
<tr>
<th></th>
<th>≤ ≤ High school</th>
<th>&gt; High school</th>
<th>F</th>
<th>p</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$z$-score</td>
<td>-.086 (.048)</td>
<td>.127 (.058)</td>
<td>7.92</td>
<td>.005</td>
<td>.013</td>
</tr>
<tr>
<td>Grammar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$z$-score</td>
<td>-.051 (.047)</td>
<td>.076 (.057)</td>
<td>2.98</td>
<td>.085</td>
<td>.005</td>
</tr>
</tbody>
</table>

* Means after removing the variance attributable to age.

Table 2
Percent of caregivers who reported using each language teaching practice

<table>
<thead>
<tr>
<th>Teaching practice</th>
<th>Uses</th>
<th>Does not use</th>
<th>F</th>
<th>p</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eliciting conversation</td>
<td>.096</td>
<td>-.122</td>
<td>8.62</td>
<td>.000</td>
<td>.014</td>
</tr>
<tr>
<td>Repeating and extending child speech</td>
<td>.173</td>
<td>-.026</td>
<td>2.87</td>
<td>.09</td>
<td>.005</td>
</tr>
<tr>
<td>Using picture cards</td>
<td>.180</td>
<td>-.073</td>
<td>9.51</td>
<td>.002</td>
<td>.015</td>
</tr>
<tr>
<td>Telling stories</td>
<td>.166</td>
<td>-.144</td>
<td>17.83</td>
<td>.000</td>
<td>.029</td>
</tr>
<tr>
<td>Eliciting imitation</td>
<td>-.279</td>
<td>.059</td>
<td>11.87</td>
<td>.001</td>
<td>.019</td>
</tr>
<tr>
<td>Seldom teaches</td>
<td>-.747</td>
<td>.019</td>
<td>10.37</td>
<td>.001</td>
<td>.017</td>
</tr>
</tbody>
</table>

* Means after removing the variance attributable to age.

Table 3
Caregivers’ use of language teaching practices and their association to children’s vocabulary and grammatical development

<table>
<thead>
<tr>
<th>Teaching practice</th>
<th>Vocabulary z-scores: Mean and (SE)</th>
<th>Grammar z-scores: Mean and (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses</td>
<td>Does not use</td>
<td>Uses</td>
</tr>
<tr>
<td>Eliciting conversation</td>
<td>.096 (.049)</td>
<td>-.122 (.056)</td>
</tr>
<tr>
<td>Repeating and extending child speech</td>
<td>.173 (.109)</td>
<td>-.026 (.039)</td>
</tr>
<tr>
<td>Using picture cards</td>
<td>.180 (.069)</td>
<td>-.073 (.044)</td>
</tr>
<tr>
<td>Telling stories</td>
<td>.166 (.054)</td>
<td>-.144 (.050)</td>
</tr>
<tr>
<td>Eliciting imitation</td>
<td>-.279 (.089)</td>
<td>.059 (.041)</td>
</tr>
<tr>
<td>Seldom teaches</td>
<td>-.747 (.235)</td>
<td>.019 (.037)</td>
</tr>
</tbody>
</table>

* Means after removing the variance attributable to age.
Table 1  
The relation of child gender to vocabulary and grammatical development

<table>
<thead>
<tr>
<th>Variable</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary z-score</td>
<td>Mean = -.088 (SE = .050)</td>
<td>Mean = .106 (SE = .055)</td>
</tr>
<tr>
<td>Grammar z-score</td>
<td>Mean = -.108 (SE = .049)</td>
<td>Mean = .129 (SE = .053)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.069</td>
<td>.006</td>
<td>.402</td>
</tr>
<tr>
<td>Paternal education level</td>
<td>.156</td>
<td>.073</td>
<td>.077</td>
</tr>
<tr>
<td>Caregivers' teaching practices</td>
<td>.254</td>
<td>.037</td>
<td>.244</td>
</tr>
<tr>
<td>Gender</td>
<td>-.160</td>
<td>.072</td>
<td>-.080</td>
</tr>
</tbody>
</table>

* Means after removing the variance attributable to age.

Discussion

This study investigated the degree to which external and internal variables explained individual differences in language development among Chinese children acquiring Mandarin as their first language. Evidence for both sources of influence was found. The indices of external influence, paternal education level and caregivers’ self-reported use of language teaching practices, together accounted for 7.2% of the variance in vocabulary and 3.7% of the variance in grammatical development. The index of internal influence, gender, accounted for .6% of the variance in vocabulary and 1.1% of the variance in grammatical development.

The findings of the present study replicate in a different language and a different culture several findings that have proved robust in the literature on children’s language development in North American and Western Europe.

(1) Adults in higher SES homes (with SES indexed in this study by paternal education level) provide language experience to children that is more supportive of language...
Vocabulary development is more sensitive to environmental influences than is grammatical development (Arriaga, 1998; Hoff-Ginsberg, 1998; Hoff, 2006c). In the present study, the amount of variance accounted for by the environmental variables was greater for vocabulary development than for grammatical development. There is also the suggestion in these findings that internal factors play a greater role in accounting for variance in grammatical development. The size of the gender effect was greater for grammatical development than for vocabulary. It is also likely that the effect of age is in part a biologically-based effect, as age indexes maturational status. In this sample, age accounted for more of the variance in grammatical development than in vocabulary.

Limitations and future directions

The cross-sectional nature of the data restricted analyses to concurrent relations between language experience and language development. Parental education precedes children’s language development, and thus is likely to be a cause rather than a consequence. In contrast, the relations observed between language teaching practices and language development could reflect either direction of causality. Although our interpretation that differences in experience cause differences in the rate of development has support in a great deal of other research, the finding in this study could reflect caregivers’ accommodations to the children’s level of language development.

Another limitation of this study is that the measure of children’s language experience was narrow and indirect. One likely consequence of this is that the present study underestimated the size of the environmental effects on language development. In the present data, caregivers’ reported use of language teaching practices accounted for only 6% of the variance in vocabulary development, and 3% of the variance in grammatical development. Studies conducted in the US that have directly measured properties of mothers’ interactions with their children have found that these measures of children’s language experience account for over 30% of the variance in language outcomes (Hoff, 2003a; Hart & Risley, 1995). The narrow and indirect nature of the measures of caregiver–child interaction also means that it is difficult to interpret some of the relations that appear in the data. For example, given the evidence in the literature that children’s language development benefits from linguistically rich and interactively contingent conversation (Hoff, 2006a), it is surprising – at least to Westerners—that the use of picture cards is positively related to both vocabulary and grammatical development. It would be of interest and might serve to reconcile this finding with the literature to study the nature of the interactions caregivers and children have with these picture cards. To North American sensibilities, the use of picture cards evokes images of soulless drill. It may be, to the contrary, that picture cards elicit syntactically rich and informative talk between Chinese caregivers and children, much as picture book reading has been documented to do in the North American literature (Sénéchal, Ouellette, & Rodney, 2006).

Conclusion

In addition to the specific findings regarding sources of variation in children’s language development, the present study offers evidence regarding a broader question: Is language development the same across cultures and languages? The current findings suggest the following answer: From a distance language development looks different in different cultures. Adults’ beliefs about development differ, their manner of interacting with children differs, and, of course, the language that children acquire differs. A closer look at the predictors and processes of language development, however, suggest it is much the same wherever it occurs. Children vary in their rates of language development, and some of that variability has to do with variability in the language experiences their families provide. Both variability in the rate of language development and variability in the nature of language experience are systematically related to parental education, with children of more educated parents experiencing more language-supporting
environments and acquiring language more rapidly. But differences in experiences not withstanding, girls are more precocious language learners than boys, and vocabulary development is more susceptible to environmental influence than is grammatical development, revealing a biological pacing of language development as well.

References


