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The Influence of Foreign Language Experiences on Children's Language Development: A Review and Suggestions for Future Research*

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1. Introduction

There is abundant evidence that bilingual experiences affect children's cognitive and linguistic development, such as executive functioning, attention, perception, perspective-taking skills or novel word learning (Akhtar & Menjivar, 2012; Barac & Bialystok, 2012; Bialystok, 2001; Bialystok & Martin, 2004; Cummins, 1978; Kaushanskaya, Gross, & Buac, 2014; Kovács & Mehler, 2009; Poepsel & Weiss, 2016; Warmington, Kandru-Pothineni, & Hitch, 2018; Werker, Byers-Heinlein, & Fennell, 2009). Even mere exposure to linguistic diversity, not necessarily being immersed in a bilingual environment, can influence children's language and communicative development (Akhtar, Menjivar, Hoicka, & Sabbagh, 2012; Fan, Liberman, Keysar, & Kinzler, 2015; Liberman, Woodward, Keysar, & Kinzler, 2017; Menjivar & Akhtar, 2017).

Foreign language education is gaining popularity worldwide, and new technologies allow easier access to multiple languages in various contexts. For these reasons, monolingual children are more likely to be exposed to multiple languages than ever before. It is thus the right time to conduct a systematic review of how children interpret foreign languages and whether there are effects of children's foreign language

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experience on this understanding. The present article will, therefore, review extant research about children's foreign language understanding, primarily focusing on whether and how exposure to foreign languages affects the way young children identify the referents of novel words, and then discuss future avenues of research.

2. Development of Foreign Language Understanding

From a very early age, children can tell the difference between their native language and a foreign language. Infants cannot speak or write about their knowledge as adults do, but their ability to distinguish such differences appears through their systematically different behaviors toward native and foreign language speakers (Byers-Heinlein, Burns, & Werker, 2010; Hoicka & Akhtar, 2011; Kinzler, Dupoux, & Spelke, 2007; Moon, Cooper, & Fifer, 1993; Shutts, Kinzler, McKee, & Spelke, 2009). For example, when tested on their preference for their mother tongue (English) versus a foreign language (Tagalog), newborn infants (0–5 days old) who heard only English in the mother's womb showed a preference for their native tongue than a foreign language (Byers-Heinlein et al., 2010). In a preferential-looking experiment, 6-month-old infants who were from monolingual English families looked reliably longer at a person who previously spoke to them in English than a person who spoke to them in Spanish (Kinzler et al., 2007). When asked whom they would like to have as their friend between a native and foreign language speaker, preschool children were more willing to befriend a native language speaker (Kinzler et al., 2007). Such findings suggest that the ability to distinguish a native and foreign language is already present early in development.

To acquire communicative competence in more than 2 languages, children must not only distinguish one language from the other but also understand that different languages are distinct communicative systems. In other words, children must have an understanding that native language speakers and foreign language speakers do not share the same knowledge of words, unless the speakers are known to use more than one language. Do young children have such understanding?

One way to answer this question is to assess how children interpret the meaning of novel words used by native and foreign language speakers. More specifically, this can be explored in the context of mutual exclusivity. *Mutual exclusivity* refers to the tendency to assume one-to-one mappings between labels and referents, and this assumption has been regarded as a word-learning constraint that children readily rely on when they infer the meaning of unfamiliar words (Golinkoff, Mervis, & Hirsh-Pasek, 1994; Markman, 1990; Markman & Wachtel, 1988; Merriman & Bowman, 1989). Mutual exclusivity assumption guides children to expect that a novel label would refer to a novel object rather than a familiar object (Clark, 1988; Diesendruck, 2005; Diesendruck & Markson, 2001). The use of mutual exclusivity when inferring the meaning of a novel label has been demonstrated by extensive evidence from infants to adults (Diesendruck & Markson, 2001; Halberda, 2003; Halberda, 2006; Kalashnikova, Mattock, & Monaghan, 2016; Mather & Plunkett, 2011; Markman & Wachtel, 1988; Markman, Wasow, & Hansen, 2003).

There are certain conditions under which the use of this assumption should be suspended. For example, when the two words fall into different hierarchical levels (e.g., dog/animal), or are used from different perspectives (e.g., mom/wife), we should suspend this assumption and link two words to one referent. The assumption should also be suspended when interpreting two different labels for an object that are from different languages. Young children know when to and when not to use mutual exclusivity assumption. In a seminal study by Au and Glusman (1990), 3- to 5-year-old English-speaking children were tested by two experimenters: one was an English speaker and the other was a bilingual speaker who spoke both English and Spanish. The English experimenter taught children the English label 'mido' for a toy. Then, the Spanish–English bilingual experimenter asked children in English to find the referent of a novel label 'theri', which she described as a Spanish word. When asked this question, half the children chose the animals to which a novel English label had been applied, and the other half chose the unlabeled animals. This suggested that 3- to 5-year-old monolingual children did not apply mutual

exclusivity when they interpreted the meaning of a novel label from a foreign language. Such preschool children's ability to suspend mutual exclusivity toward foreign words has been verified in many subsequent studies (e.g., Afshordi, Sullivan, & Markson, 2018; Haryu, 1998).

However, evidence from younger children suggests a bit different result. In Byers-Heinlein, Chen, and Xu (2014), 2-year-old monolingual children participated in a mutual-exclusivity task in which native (English) and foreign (Mandarin) language speakers and three novel toys (A, B, C) were involved. First, the English speaker taught children a novel label, 'fep', for a novel toy (A). When the English speaker asked the children to find a referent of a novel label, 'wug', in the presence of the 'fep' (A) and another novel toy (B), 24-month-olds chose the unnamed toy (B) rather than the 'fep' (A), suggesting that they used mutual exclusivity assumption when they disambiguated the reference of the novel word spoken by the native language speaker.

In the trials with a Mandarin speaker, children were asked to find the referent of a novel Mandarin label 'kuò' in the presence of the 'fep' (A) and the third novel toy (C). If toddlers understood that speakers of a foreign language do not share knowledge of their native language words, they should assume that the Mandarin speaker will not know what 'fep' is, and therefore not apply mutual exclusivity when choosing the referent of a novel Mandarin word. When asked to find a referent of a Mandarin novel word, however, monolingual children again applied mutual exclusivity assumption and chose the unnamed toy (C) rather than the 'fep' (A). This result suggests that monolingual 24-month-old children assume that language object labels would be shared across different languages.

How can we account for the discrepancy between Byers-Heinlein et al. (2014) and previous research with older children (e.g., Au & Glusman, 1990)? It is possible that younger children (2-year-olds) and older children have different recognition of the nature of foreign languages. However, there is evidence that 2-year-old children with higher vocabulary are sensitive to the boundaries between different languages. For example, when monolingual English-speaking 2-year-olds were taught object labels by a Dutch speaker, only the

children with larger vocabularies learned novel Dutch words, and did not assume that another speaker of English would have the knowledge of those Dutch words (Koenig & Woodward, 2012). Thus, it is not clear whether there is a developmental change in this understanding during early childhood. Future research should further explore monolingual children's reasoning about foreign language words and investigate what factors contribute to this understanding.

3. The Influences of Language Experiences on Foreign Word Understanding

Foreign language experience may enable monolingual children to reflect on the difference between their own language and foreign languages and to build up an understanding that different language conventions exist across languages. This metalinguistic knowledge may consequently enhance novel word learning by reducing potential failures when assuming the meaning of a novel word and the intention of a speaker (e.g., Akhtar et al., 2012; Cromdal, 1999; Davidson & Tell, 2005; Liberman et al., 2017). Little is known about the type of foreign language exposure that facilitates foreign word learning, however. Below, we will review research on how variation in the amount and type of foreign language exposure leads to individual differences in learning foreign words.

3.1. The Effects of the Amount of Foreign Language Exposure

Most research on the effect of the amount of exposure to non-native languages in children's foreign word understanding has focused on the role of bilingualism. Additionally, rather than identifying the effects of the amount of foreign language experience as a continuous variable, most of the research has dichotomized children into one of two categories (monolingual vs. bilingual) and highlighted the advantage of bilingualism.

In everyday life, bilingual children encounter many situations where multiple labels are overlapped for one referent. This may make it easier

for bilingual children to accept two labels for a single referent, and as a consequence, bilingual children may have a fundamentally different understanding about the nature of languages compared to children from a monolingual environment. Indeed, evidence suggests that bilingualism supports children's insights into the nature of language. Compared to monolingual children, bilingual children understand better that the relationship between labels and referents is arbitrary, and they are more flexible when learning novel word meanings (Bialystok & Barac, 2012; Byers-Heinlein & Werker, 2009; Cummins, 1987; Davidson & Tell, 2005; Rosenblum & Pinker, 1983).

Bilingual children also show a somewhat different use of strategies when they learn novel words compared to monolingual children (Brojde, Ahmed, & Colunga, 2012; Buac, Tauzin-Larche, Weisberg, & Kaushanskaya, 2018; Byers-Heinlein, 2017; Byers-Heinlein & Werker, 2009; Houston-Price, Caloghiris, & Raviglione, 2010; Kalashnikova, Oliveri, & Mattock, 2018; Yow, Li, Lam, Gliga, Chong, Kwek, & Broekman, 2017). For example, Byers-Heinlein and Werker (2009) tested whether 17- to 18-month-old infants from three different language backgrounds (English monolingual, bilingual, trilingual) show different usage of mutual exclusivity when they infer the referent of a novel label from their native language. In a preferential-looking paradigm (e.g., Fernald, Pinto, Swingley, Weinberg & McRoberts, 1998), the infants were shown a familiar object and a novel object on each side of a big screen, and they heard sentences with a novel label (e.g., 'Look at the nil'). If infants use mutual exclusivity assumption, they will look significantly longer at the novel object upon hearing a novel label. The results indicated that monolinguals showed strong use of mutual exclusivity, while bilinguals showed marginal use, and trilinguals showed no use. A similar study from Houston-Price, Caloghiris, and Raviglione (2010) also adds the finding that bilingual infants' use of mutual exclusivity is not as strong as that of monolingual infants of the same age.

Early linguistic experience with multiple languages not only diminishes the use of mutual exclusivity but shapes children's word-learning strategies more systematically. For instance, Kandhadai,

Hall, and Werker (2017) found that bilingual children are more likely to accept a second label for an object as its category name, while the same-aged monolingual children are likely to accept a second label as a name that refers to the salient property of an object.

Bilingual children's word-learning strategies toward foreign language words are also systematically different from monolingual children's. Bilingual 24-month-olds can suspend mutual exclusivity assumption toward a label from a foreign language, while they apply this assumption toward a novel label from their native language (Byers-Heinlein et al., 2014). Such results contrast with the results from same-aged monolingual children who rigidly apply mutual exclusivity assumption toward both novel labels from a native and foreign language. Therefore, bilingual toddlers have a better understanding of the concept that knowledge of object labels is not shared across different languages. Experience with more than one language appears to promote children's understanding that non-native speakers do not share the same language system as themselves.

Recently, several studies have begun to investigate whether mere exposure to non-native languages, which leads to little fluency in a second language, has as many influences on children's language learning as much of the research on bilingual children indicates.

Akhtar et al. (2012) highlighted the advanced word learning ability of children who are exposed to a second language. Participants were 3- to 4-year-old children in monolingual (English), bilingual, or exposed (i.e., exposed to a non-native language regularly but not fluent in it) groups. Children watched a video of two speakers of different languages: one was an English speaker, and the other was a speaker of an artificial language called Nordish. First, the two speakers labeled familiar objects in their own languages. Next, they labeled novel objects with novel words. After watching the labeling videos, children were asked, "What do you call this in Nordish?" Among the three groups, only the exposed children were able to learn the Nordish labels. Neither the bilingual nor monolingual children could correctly answer this question. These findings imply that even limited but regular exposure to a second language can enhance children's ability to

understand that multiple conventional systems exist.

The advantages of the exposed group over the bilingual group in Akhtar et al. (2012) is not robust (Menjivar & Akhtar, 2017) but exposure to more than one language, whether it is considered as bilingual experience or mere exposure, has been consistently found to be beneficial for language development.

In Menjivar and Akhtar (2017), 4-year-old children were categorized as one of three groups, based on their parents' report: monolingual, bilingual, or exposed. All children from the three groups were able to learn novel words from an artificial language when the task demands were low. However, when the task became difficult, bilinguals showed better learning of the novel words than monolingual children, and exposed children's performance was located between the two groups. This suggests that bilingual children's word-learning advantage begins from preschool years, raising the possibility that exposed children can also have superior abilities in foreign word learning.

Rojo and Echols (2018) have shown the influence of foreign language exposure on children's willingness to accept lexical overlap across languages by analyzing the amount of exposure as a continuous variable for the first time. Typically, considerable heterogeneity exists in children categorized as bilingual or exposed, so it may be ideal to measure the amount of linguistic exposure on a continuous spectrum. In Rojo and Echols (2018), 4- to 6-year-old English-speaking monolingual children who varied in their amount of exposure to a non-native language were tested. They watched a video in which two speakers—an English speaker and a Spanish speaker—took turns labeling an object at a time. After watching familiarization videos in which the speakers labeled three familiar objects, the children received two test trials. In each test trial, a novel object was presented, and the English speaker labeled it with a novel English word (e.g., "Rompet"), while the Spanish speaker labeled it with a novel Spanish word (e.g., "Chisa"). Then, the children were asked whether they would endorse only one label or both of the two labels (e.g., "Which do you think is the right name for this toy? Rompet? Chisa? Or are both OK? Chisa?

Rompet? Or are both OK?"). The results showed that children with greater exposure to foreign languages were more likely to endorse both English and Spanish labels than less exposed children.

The above findings demonstrate that even if children have little fluency in a second language, mere exposure to multiple languages can enhance preschoolers' understanding and learning of foreign languages.

3.2. Then Effects of the Type of Foreign Language Exposure

Some types of language experience are more effective than others in facilitating children's language learning. In particular, language learning through social interaction is more beneficial (Goldstein, King, & West, 2003; Hakuno, Omori, Yamamoto, & Minagawa, 2017; Sage & Baldwin, 2010; Kuhl, 2007; Verga & Kotz, 2013; Yusa, Kim, Koizumi, Sugiura, & Kawashima, 2017). Children learn languages significantly better from a live person than from an equivalent video source, and this phenomenon is called "video deficit" (Krcmar, Grela, & Lin, 2007; Myers, LeWitt, Gallo, & Maselli, 2017; Roseberry, Hirsh-Pasek, & Golinkoff, 2014; Troseth & DeLoache, 1998).

In Kuhl, Tsao, and Liu's (2003) pioneering study, short-term exposure to a foreign language by a live social interaction could help infants maintain their phonetic discrimination ability toward non-native speech sounds. Nine-month-old infants from English-speaking households were exposed to Mandarin Chinese in three different ways: via audio-visual display, audio-only recordings, or live speakers. After 4 weeks of 12 exposure sessions, infant's phonemic learning was tested with a behavioral measure—conditioned head-turn procedure. In this procedure, infants were taught to turn their heads when they recognized a change in sounds. Thus, if they could detect contrasting phonetic features in Mandarin, they would make a head-turn when they heard different Mandarin phonemes. The infants were able to discriminate two different Mandarin phonemes only when they were exposed to Mandarin Chinese by a live speaker, but not when the exposure was presented via audio-visual display or

audio-only recordings. Kuhl et al.'s (2003) results imply that social interaction is critical in preventing declines in infants' abilities to discriminate foreign sounds.

However, there is an alternative interpretation of Kuhl et al.'s (2003) results: the lack of social contingency, not the lack of live interpersonal interaction, in audio-visual and audio-only conditions might have hindered children from attending to foreign sound contrasts. Because new technology provides the intermediate area where social contingency can be maintained even when a person is not actually present physically, there has been growing evidence that shows that "video deficit" disappears under certain conditions (e.g., Lytle, Garcia-Sierra, & Kuhl, 2018; Roseberry, Hirsh-Pasek, Parish-Morris, & Golinkoff, 2009). These findings suggest that it is the lack of social interaction that drives the problem of "video deficit," rather than the screen itself.

For example, video chatting can provide socially contingent interaction while it is still presented onscreen. In Roseberry et al. (2014), 2-year-old children were assigned to one of three conditions: live interaction condition, video chat condition, or yoked video condition. The three conditions were equal in that children were trained in each of the novel verbs by watching an experimenter performing the referent action while labeling the action with the novel verb, but they differed in the ways the experimenter interacted with the children. In the live interaction condition, an experimenter interacted with the child face to face; in the video chat condition, an experimenter from another room interacted with the child via Skype; in the yoked video chat condition, a pre-recorded video of an experimenter was presented, so the children were exposed to the exact same content without social contingency. Children who were trained through both video chats and live interactions could learn novel verbs, but not those who were trained through yoked video. These findings suggest that socially contingent interactions provide a powerful motivation for word learning.

More recently, researchers have begun to examine the importance of the social nature of contextual factors in learning, such as the presence

of social partners (e.g., Lytle, Garcia-Sierra, & Kuhl, 2018; Troseth, Strouse, Verdine, & Saylor, 2018). Lytle, Garcia-Sierra, and Kuhl (2018) found that 9-month-old infants' phonemic learning from a screen could be enhanced in the presence of a peer in comparison to learning alone. Infants were assigned to one of two conditions: individual exposure condition or paired-exposure condition. The difference between the two conditions was in the absence or presence of a peer participating in the study together: infants in the individual exposure condition participated alone in the study, while infants in the paired-exposure condition participated in the study with another infant. Infants in both groups were exposed to a video of a Mandarin speaker for about 20 minutes per visit, during 12 visits over 4 weeks. A 20-s video clip was played whenever the infants touched the screen. The results showed that infants learned a phoneme of a foreign language better when learning took place in the presence of a peer as opposed to in isolation. Thus, the mere presence of social partners can enhance children's language learning even when they are learning from a screen.

Are there specific sources of exposure in social contexts that facilitate foreign language learning? To our knowledge, only one study has investigated the effects of different sources of foreign language exposure in social contexts on children's acceptance of foreign labels. Rojo and Echols (2018) compared the effects of exposure from different sources (extended family, teacher, siblings, parents, peers, and babysitter/nanny) and found that only exposure to a foreign language from parents was a reliable predictor for children's willingness to accept foreign labels. As this study does not yet provide a full explanation about the underlying mechanism of this phenomenon, however, our knowledge in this area is still limited.

4. Future Directions

While the existing body of knowledge on children's foreign language understanding and the factors affecting children's understanding and learning of foreign languages is growing, there are

still remaining issues that require further research.

(1) What is the full developmental trajectory of children's foreign word understanding?

Previous findings have yielded mixed results as to when children first come to have a robust understanding that different languages constitute distinct but still valid conventional systems. For example, while 3- to 5-year-old English-speaking monolingual children from the study of Au and Glusman (1990) could suspend using mutual exclusivity assumption when interpreting a novel word from a foreign language, the results from Byers-Heinlein et al. (2014) demonstrated that monolingual 2-year-old children do not have such ability. In their study, English-speaking 2-year-olds still applied mutual exclusivity assumption when inferring the meaning of a novel word from a foreign language, Mandarin. From these contrasting findings, we can assume that there might be a developmental difference between toddlers (2-year-olds) and older children (3- to 5-year-olds) in the usage of word learning strategies for a foreign word. However, such age differences in the previous findings might be due to some methodological differences. For instance, the children in Byers-Heinlein et al. (2014) were exposed to a foreign language in a very naturalistic way, while the children in Au and Glusman (1990) were not: the children in Byers-Heinlein et al. (2014) were tested by a monolingual Mandarin-speaking experimenter, who always spoke to them in Mandarin. However, in Au and Glusman (1990), children's understanding about foreign language (Spanish) words was assessed by an experimenter who asked them questions in English. Future research should explore the developmental trajectory of foreign word understanding by testing children at both younger and older ages during preschool years in the same paradigm.

(2) Would foreign language exposure through nonsocial media influence children's word learning?

We have little knowledge of the effects of foreign language experience in linguistically homogeneous environments at the society level. Children from these environments have some opportunity to be exposed to foreign languages, but only in limited ways. For instance, most Korean children live in linguistically homogeneous communities with few opportunities to encounter native foreign language speakers in daily life. Instead, they are exposed to a foreign language (usually English) typically through media or very minimal social interactions with a foreign language speaker in formal educational settings. Future research is needed to determine whether minimal exposure to a foreign language in a linguistically homogeneous environment like Korea affects children's language learning. Investigating children from a monolingual environment will complement the extant studies that are done mostly from linguistically diverse contexts.

(3) Can we dissociate the advantages of exposure and fluency?

Many participants who were categorized as "exposed children" in previous studies were actually able to speak or understand the second language to some degree. This leaves the possibility of confounding the effects of exposure to a non-native language with fluency in using a second language. Therefore, research on children from a monolingual environment will provide a richer understanding of children's language learning by dissociating the advantages of exposure and fluency.

(4) What is the range of experiences that facilitate children's foreign word learning?

We need to investigate whether there are some individual differences in understanding and learning of foreign languages as a function of the type of exposed foreign languages. Previous studies have shown that social contingency is the key to novel word learning by allowing heightened attention and motivation. Even in language learning environments involving non-live interpersonal interactions, the socially contingent nature of touch screens or video game can facilitate children's

word learning (Kirkorian, Choi, & Pempek, 2016; Lim & Holt, 2011; O'Doherty, Troseth, Shimpi, Goldenberg, Akhtar, & Saylor, 2011). Not much research has attempted to collect data on the different types or sources of foreign language exposure that children experience. Collecting more data in detail on how (e.g., via interpersonal interaction vs. media) children are exposed to a foreign language, and identifying its relationship with foreign word understanding and learning, will provide richer information on what kind of foreign language exposure facilitates foreign language learning.

These future directions can possibly be the starting point for filling the gaps in knowledge regarding children's foreign word understanding and ultimately explain the mechanisms underlying foreign language learning. Furthermore, it is expected that understanding the mechanism enabling foreign language learning may help us develop effective methods to teach children foreign languages.

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Abstract

외국어에 대한 노출 경험이 아동의 언어 발달에 미치는 영향에 대한 연구 동향 개관 및 제언

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전 세계적으로 외국어 교육이 확장되고 기술이 발전함에 따라 다양한 경로를 통해 여러 언어에 대한 접근이 가능해진 요즘, 단일 언어 사용 아동들은 그 어느 때보다 다양한 언어에 노출될 가능성이 높아졌다. 이 논문은 아동들에게 제공되는 외국어 노출이 아동의 외국어 이해 및 학습에 미치는 영향에 대해 지금까지 이루어진 선행 연구들을 포괄적으로 검토하는 것을 목적으로 한다.

이 논문에서는 아동의 외국어 이해에 영향을 미치는 외국어 노출 경험을 크게 두 가지 측면, 즉, 외국어 노출의 양과, 외국어 노출의 방법으로 분류하여, 각각의 요인이 어떤 방식으로 아동의 외국어 학습에 영향을 미치는지 살펴보았다. 또한, 선행 연구에 대한 체계적인 검토에서 발생하는 중요한 질문들에 대하여 추후 연구 방향을 제언한다. 제안된 연구들은 궁극적으로 외국어 학습의 기초가 되는 메커니즘을 설명하며 효과적인 외국어 학습 방법을 개발하는 데 도움이 될 것으로 기대된다.

Keywords: language acquisition, foreign language understanding, foreign language exposure, children

핵 심 어: 언어 습득, 외국어 이해, 외국어 노출, 아동

Abstract

The Influence of Foreign Language Experiences on Children's Language Development: A Review and Suggestions for Future Research

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Monolingual children are more likely to be exposed to multiple languages than ever before as foreign language education is gaining popularity around the world and new technologies make it easier to access multiple languages. The purpose of this paper is to provide a comprehensive review of previous studies on the effects of foreign language exposure on children's understanding and learning of foreign languages.

In this review, the experiences of foreign language exposure that affect children's understanding of foreign languages are categorized into two major aspects, namely, the amount of foreign language exposure and the types of foreign language exposure. We reviewed how each factor influences children's language learning. In addition, we suggest the direction of future research on important questions arising from the systematic review of previous studies. Suggestions for future research will ultimately explain the underlying mechanisms of foreign language learning and are expected to help develop effective foreign language learning methods.

Keywords: language acquisition, foreign language understanding, foreign language exposure, children

핵 심 어: 언어 습득, 외국어 이해, 외국어 노출, 아동