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Neighborhood linguistic diversity predicts infants' social learning

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ABSTRACT

Infants' direct interactions with caregivers have been shown to powerfully influence social and cognitive development. In contrast, little is known about the cognitive influence of social contexts beyond the infant's immediate interactions with others, for example, the communities in which infants live. The current study addressed this issue by asking whether neighborhood linguistic diversity predicts infants' propensity to learn from diverse social partners. Data were taken from a series of experiments in which 19-month-old infants from monolingual, English-speaking homes were tested in paradigms that assessed their tendency to imitate the actions of an adult who spoke either English or Spanish. Infants who lived in more linguistically diverse neighborhoods imitated more of the Spanish speaker's actions. This relation was observed in two separate datasets and found to be independent from variation in infants' general imitative abilities, age, median family income and population density. These results provide novel evidence suggesting that infants' social learning is predicted by the diversity of the communities in which they live.

1. Introduction

Social environments powerfully shape early cognitive development. A large body of research has demonstrated that infants' immediate social interactions with parents, teachers or caregivers influence diverse cognitive achievements, including language learning (e.g., Hoff, 2003; Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002; Rowe, 2012), spatial cognition (e.g., Pruden, Levine, & Huttenlocher, 2011), theory of mind (e.g., Meins et al., 2002), number knowledge (e.g., Levine, Suriyakham, Rowe, Huttenlocher, & Gunderson, 2010), and culturally-specified practices (see Rogoff, Paradise, Mejía Arauz, Correa-Chávez, & Angelillo, 2003). In contrast, little is known about the cognitive influence of social contexts beyond the infant's immediate interactions with others. Dominant perspectives on early social cognitive development have stressed the central importance of infants' direct interactions with social partners (e.g., Carpendale & Lewis, 2004; Csibra & Gergely, 2009; Dunn, 1988; Tomasello, 1998), and consequently there has been little investigation of the influence that distal social contexts may have. Nevertheless, infants routinely experience their broader neighborhood environment, for example, at the park, on the bus, or in the supermarket. Do these experiences affect their social cognitive development? In the current study, we investigated this issue by asking whether neighborhood linguistic diversity affects infants' propensity to learn from diverse social partners.

One way in which neighborhood demographics could influence young learners is by shaping their openness to social informants. Recent findings indicate that infants and young children are discriminating social learners-they resist attending to and taking information from foreign or

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foreign-accented speakers (Buttelmann, Zmyj, Daum, & Carpenter, 2013; Howard, Henderson, Carrazza, & Woodward, in press; Howard, Henderson, & Woodward, in preparation; Kinzler, Corriveau, & Harris, 2011; Kinzler, Dupoux, & Spelke, 2007). Thus, from early in life, infants and young children appear to form expectations about the kinds of people that they should learn from and imitate. While this tendency could reflect a drive to acquire socially relevant knowledge (Henderson, Sabbagh, & Woodward, 2013), it could also restrict children's access to potentially valuable information and contribute to the development of social biases.

We recruited data from 4 prior experiments with 19-month-old infants in order to evaluate whether neighborhood diversity mitigates this learning bias in infants. The 4 experiments were drawn from two sets of studies that examined age and medium effects on infants' willingness to imitate informants who spoke their own native language (English) versus a foreign language (Spanish) (Howard et al., in press, in preparation). These studies found that infants and young children resisted foreign-speaking informants in some cases, but also found that, when presented with a live (rather than video) informant, 19-month-old infants were equally likely to imitate the actions of Spanish- and English-speaking experimenters. In the analyses presented here, we pooled data from these experiments to evaluate whether variation in neighborhood linguistic diversity predicted infants' responses to the foreign speaker. We selected infants who heard only English in their interactions with caretakers. These infants lived in neighborhoods with varying degrees of linguistic diversity. By examining the relation between neighborhood linguistic diversity and infants' propensity to imitate the foreign speaker, we were able to test whether language information available outside of the home affects infants' social learning. That is, these experiments provided the opportunity to isolate the potential effects of the social environment beyond the child's immediate interactions with caretakers and family members.

2. Method

2.1. Participants

Data were drawn from four experiments investigating 19-month-old infants' imitation of native-versus foreign-language speakers (Howard et al., in press, in preparation). Participants were full-term 19-month-old infants from English-speaking monolingual households in the Washington, D.C. and Chicago metro areas. Participant ages and demographic information are summarized in Table 1.

All participants heard a minimum of 95% English in their daily lives, and heard only English from their parents and caretakers according to parent report. The majority (70%) were reported to have *no* exposure to a language besides English. The remaining participants had received incidental exposure to languages other than English, for example from seeing a television show, meeting a family visitor, or learning a song in a music class. Parents of these children estimated that this incidental exposure accounted for an average of 2.7% of their children's language input.

Postal zip codes from parent-provided reports were used as a neighborhood proxy. Information regarding both the prevalence of all non-English languages present in the neighborhood (calculated by the proportion of neighborhood households that reported speaking non-English languages), along with the prevalence of Spanish in the child's neighborhood (calculated by the proportion of neighborhood households that reported speaking Spanish), was derived from the 2006 to 2010 *American Community Survey* (US Census Bureau, 2006–2010). Median neighborhood family income was derived from the 2010 *Census of Population and Housing* survey (US Census Bureau, 2010) (see Table 1), and population density was computed by dividing the total population by the square miles in the participant's zip code (US Census Bureau, 2010). Since all participants lived in or near diverse U.S. cities, there was significant variability in the prevalence of non-English languages present in infants' neighborhoods.

2.2. Procedure

To determine whether infants met the criteria for inclusion, parents were given a short language exposure questionnaire that asked them to list each language that the infant had heard, and to describe the nature of the infant's contact with the language, including the percent of time the language was heard and who spoke the language (e.g., parent, teacher, neighbor).

Infants were tested in either in a between-subjects or a within-subjects imitation paradigm. Data were combined according to paradigm type (between- or within-subjects), resulting in two datasets and two sets of analyses as described below. In the between-subjects paradigm (dataset 1), infants observed either an English-speaking or a Spanish-speaking experimenter perform actions on a series of novel toys (see Table 2 for a description of the toys and

Table 1
Participant and demographic information for study samples 1 and 2.

Analyses	Condition	*N*	Females	Males	Age in Mos	% "Other" Language	Median family income (per year)	Population density (people/square mile)
Between-subjects	Spanish	25	14	11	19.24 (±0.28)	20.84 (±11.65)	$89,740.16 (±$28,136.68)	4230.31 (±2328.09)
	English	25	13	12	19.11 (±0.27)	22.57 (±14.49)	$92,725.72 (±$27,336.25)	4596.96 (±2926.92)
	Total	50	27	23	19.19 (±0.28)	21.70 (±13.04)	$91,232.94 (±$27,496.22)	4413.63 (±2657.99)
Within-subjects	–	32	18	14	19.29 (±0.60)	18.67 (±14.81)	$70,780.88 (±$29,425.45)	7995.30 (±7243.76)

Note: For between-subjects analyses, planned contrasts revealed no significant differences between conditions in relation to: the percent of other languages present in the participant's neighborhood ($t(48) = .47$, $p = .57$), neighborhood median income ($t(48) = .38$, $p = .70$), or neighborhood population density ($t(48) = 1.23$, $p = .23$). In the within-subjects analyses, there were no conditions and therefore no demographic differences to examine.

Table 2
Stimulus toy sets and their associated manner and goal actions.

Stimulus toy set	Manner action	Goal action	Final goal
Head-light*	Place head on light (place elbow on light)	Push light	Light turns on
Button-box*	Place object 1 on button (place object 2 on button)	Push button	Noise sounds
Hinged-box*	Brush top of box with object (knock side of box with object)	Open box	Retrieve toy from inside box
Velcro-tube	Place velcro handle on top of tube	Shake tube	Tube makes noise
Knock-box	Knock on outside of box with fist	Open box	Retrieve toy from inside box
Elbow-box	Use elbow to open slide-box	Open box	Retrieve toy from inside box

Note: All stimulus toy sets were utilized in the between-subjects paradigm (dataset 1). Only those sets with an asterisk were utilized in the within-subjects paradigm (dataset 2). Actions in parentheses denote alternative actions created for the within-subjects design.

their associated actions). In the within-subjects paradigm (dataset 2), one English- and one Spanish-speaking experimenter were simultaneously present and demonstrated different actions on the same toy. In both paradigms, the demonstrated actions involved both an instrumental result (e.g., opening a box to retrieve a toy) and an unusual manner (e.g., first brushing the box with another object before opening it). In the within-subjects paradigm, infants saw the Spanish- and English-speaking experimenter each perform a different manner action that resulted in the same goal. For example, the Spanish-speaker might brush the box with an object before opening it, while the English-speaker might knock on the box with an object before opening it. Infants viewed either six novel toys with one associated manner action (between-subjects design, dataset 1) or three novel toys with two associated manner actions (within-subjects design, dataset 2).

In both paradigms, fluent, unaccented bilingual speakers of Spanish and English served as the experimenters, thereby allowing the same individuals to serve as demonstrators (counterbalanced across infants) in each condition. After a brief delay, infants were allowed to act on each toy. Video-recordings of the session were coded for the number of manner actions infants imitated from the Spanish and English presenters by a research assistant who was unaware of the infants' experimental condition (for detailed methods, see Howard et al., in press, in preparation). Rates of imitation are presented as the number of manner English or Spanish actions imitated out of all toy sets administered.

3. Results

Preliminary analyses confirmed that infants in these samples did not differ, overall, in their imitation of the Spanish- and English-speaking presenters (see Table 3), and that infants in the two between-subjects conditions (dataset 1) did not significantly differ in their demographic characteristics (see Table 1). Further, although infants were selected to have very little, if any, exposure to a language other than English, we confirmed that this exposure was not reliably correlated with neighborhood linguistic diversity (between-subjects analyses: $r = .23$, $N = 50$, $p = .11$, within-subjects analyses: $r = .001$, $N = 32$, $p = .99$) nor with performance on the social learning tasks (between-subjects analyses: $r = .14$, $N = 50$, $p = .35$; within-subjects analysis: English Imitation: $r = -.29$, $N = 32$, $p = .11$, Spanish Imitation: $r = .04$, $N = 32$, $p = .82$).

Analyses on dataset 1 evaluated whether neighborhood linguistic diversity predicted infants' responses in the between-subjects paradigm. An ANCOVA was run to explore the relationship between condition (between-subjects factor: English-speaker, Spanish-speaker), neighborhood linguistic diversity (covariate), and the infants' imitation scores. Condition ($F(1,46) = 4.29$, $p < .05$), but not linguistic diversity ($F(1,46) = 1.62$, $p = .20$), was a significant predictor of the (log transformed) proportion of actions imitated at test. Importantly, an interaction between condition and neighborhood linguistic diversity significantly predicted infant imitation scores ($F(1,46) = 4.02$, $p < .05$). To examine this significant interaction, follow-up regressions were conducted within each condition (English-speaking presenter and Spanish-speaking presenter), examining the effect of neighborhood linguistic diversity, neighborhood population density, median neighborhood income, and age of the child on imitation scores. Results are reported in Table 4. In the English condition, none of the demographic factors predicted imitation scores. In the Spanish condition, there was a significant effect of neighborhood linguistic diversity, and no other effects. As shown in Fig. 1a, infants who lived in more linguistically diverse neighborhoods imitated more of the Spanish speaker's actions.

A follow up analysis was conducted to evaluate whether these effects were driven by the prevalence of Spanish in the infants' neighborhood. A regression analysis evaluating the relationship between the percent of Spanish present in the neighborhood (as opposed all non-English languages), neighborhood population density, median neighborhood income, and the age of the child on infants' imitation scores in the Spanish condition revealed no significant effects (all $ps > .05$). These results suggest that

Table 3
Infant imitation scores for English- and Spanish-speaking presenters in between- and within-subjects analyses.

Analyses	Presenter language	% Imitation
Between-subjects	Spanish	51.72 (±15.46)
	English	56.68 (±18.68)
Within-subjects	Spanish	37.44 (±25.18)
	English	30.44 (±23.90)

Note: For the between-subjects analysis, an independent t-test revealed no significance between children in the English or Spanish conditions ($t(1, 48) = .71$, $p = .48$). For the within-subjects analysis, a paired t-test revealed no significant difference between English- and Spanish-speaker imitation rates ($t(1, 31) = 1.08$; $p = .29$).

Table 4
Regression analyses for dataset 1 (between-subject design) and dataset 2 (within-subjects design).

	Dataset 1 standardized β (se)		Dataset 2 standardized β (se)	
	English-speaking presenter	Spanish-speaking presenter	English-speaking presenter	Spanish-speaking presenter
Percent other languages	−.003 (.004)	.556 (.003)*	−.179 (.005)	.492 (.019)*
Age	.3421 (.136)	.092 (.095)	−.003 (.106)	.088 (.078)
Median income	−.262 (.000)	−.202 (.000)	−.312 (.000)	−.140 (.000)
Population density	−.358 (.000)	−.102 (.00)	−.054 (.000)	−.038 (.000)
R^2	.291	.316	.101	.258

* *Note*: $p < .05$.

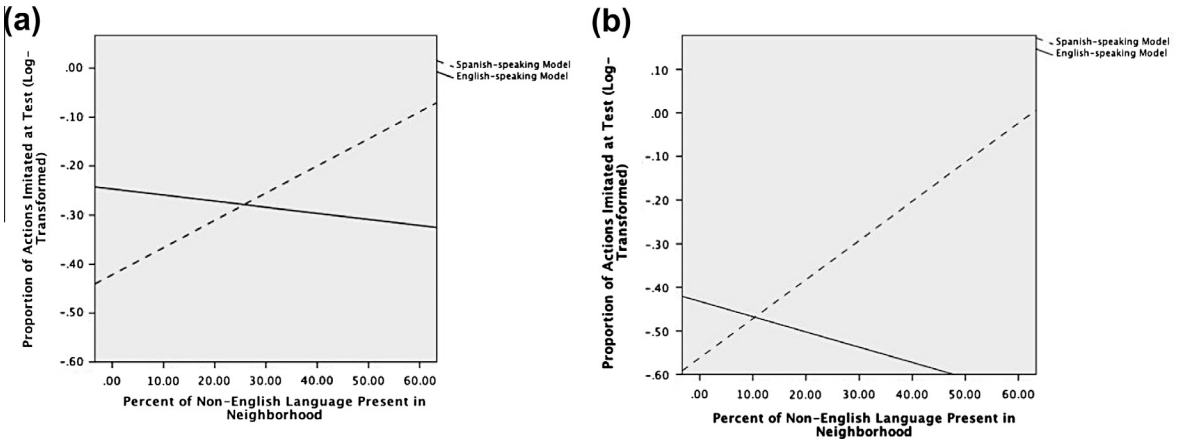

Fig. 1. (a) Dataset 1 (between-subject) relationship between neighborhood linguistic diversity and imitation of English- or Spanish-speaking model. (b) Dataset 2 (within-subject) relationship between neighborhood linguistic diversity and imitation of English- or Spanish-speaking model.

it was exposure to linguistic diversity in general, rather than exposure to Spanish per se, that predicted infants' openness to learn from the foreign speaker.

Analyses with dataset 2 revealed a similar pattern of findings in the within-subjects paradigm. Because participants received independent imitation scores for the actions of each presenter, data were analyzed in separate regressions, one for the imitation scores for the English presenter and one for the imitation scores for the Spanish presenter, examining the effect of neighborhood linguistic diversity, neighborhood population density, median neighborhood income, and age of the child. Results are presented in Table 4 and Fig. 1b. There were no significant relationships between the demographic factors and rates of imitation for the English-presented actions. For the Spanish-presented actions, there was a significant effect of neighborhood linguistic diversity and no other reliable effects. As in dataset 1, infants who lived in more linguistically diverse neighborhoods imitated more of the Spanish speaker's actions (see Fig. 1b).

As for the first dataset, a follow-up regression was conducted on dataset 2 to examine the effect of Spanish present in the neighborhood (as opposed all non-English languages), neighborhood population density, median neighborhood income, and the age of the child, on infant imitation rates in the Spanish condition, and it revealed no significant effects (all $ps > .24$). This result again suggests that it is exposure to a higher percent of any foreign language, not just Spanish in particular, that influenced infants' openness to the foreign informant.

4. Discussion

The current findings provide novel evidence demonstrating that infants' social learning is shaped by the diversity of the neighborhoods in which they live, independent of direct interactions with caretakers and family members. That is, infants' incidental exposure to linguistic diversity in neighborhood situations (such as parks, bus rides, or visits to the grocery store) influenced their propensity to learn from outgroup members. Infants who lived in more linguistically diverse neighborhoods were more likely to imitate the actions of a foreign speaker. These results seem to reflect a specific relation between exposure to foreign speakers and openness to non-native informants, rather than more general population differences in cognitive abilities: Neighborhood linguistic diversity did not predict infants' imitation of an English-speaker, and other neighborhood factors (population density and median family income) did not predict infants' imitation of the foreign-speaker or the English-speaker. Because the infants in these studies were from monolingual, English-speaking families and did not receive exposure to other languages in their regular interactions with caretakers, variations in infants' openness to the foreign informant could only reflect the influence of the social environment outside of

their direct interactions with others. Although a wealth of evidence has shown that in-home interactions with infants may vary widely depending cultural context (e.g., Fernald & Morikawa, 1993; Maynard, 2004; Richman, Miller, & LeVine, 1992), the current findings provide information specific to the distal environment independent of direct familial mediation.

One implication of these results concerns the factors that affect infants' propensity to learn from an informant. A number of studies have shown that infants and young children resist information provided by foreign or foreign-accented speakers (Buttelmann et al., 2013; Howard et al., in press, in preparation; Kinzler et al., 2011). The current findings suggest that this bias is modulated by neighborhood experience during infancy. These findings highlight a number of questions for further research. For one, although it seems likely that the observed relations reflect the effect of diverse neighborhoods on infants' learning biases, the mechanisms that drive this effect is not known. Perhaps infants learn, by seeing individuals in their neighborhoods, that speakers of varied languages are knowledgeable or competent. Alternatively, neighborhood experience may modulate infants' liking for or comfort with non-native speakers. Indeed, infants show a general social preference for native over foreign speakers, and this may drive their selective learning (Kinzler et al., 2007). Children are selective learners throughout childhood, and thus a further question is whether neighborhood diversity exerts similar effects at different points in development, or, instead, matters most early in life.

At a broader level, these findings provide clear evidence that incidental interactions with distal social contexts independent of the infant's home life affect social learning very early in life. This conclusion may seem surprising given the documented importance of direct social interactions for many aspects of infants' social learning (e.g., Csibra & Gergely, 2009; Hoff, 2003; Kuhl, Tsao, & Liu, 2003; Meins et al., 2002). However, it is consistent with evidence showing that infants are astute observers of others' actions, even when not directly engaged with them. For example, infants readily learn words by "overhearing" conversations between others in laboratory experiments (Floor & Akhtar, 2006; Gampe, Liebal, & Tomasello, 2012; Shneidman, Sootsman-Buresh, Shimpi, Knight-Schwartz, & Woodward, 2009). Moreover, in many cultural communities, infants and young children spend a great deal of time observing, and learning from, the actions of others who are not interacting with them (Chavajay & Rogoff, 1999; Gaskins, 1999; Gaskins & Paradise, 2010). These bodies of work indicate that infants are cognitive ready to glean information from the distal social world.

The current findings raise the possibility that infants may garner rich information from their contact with broader neighborhood environments. For example, infants could learn about patterns in race and ethnicity as well as patterns in linguistic behavior. As one potential case-in-point, Bar-Haim, Ziv, Lamy, and Hodes (2006) demonstrated that 3-month-old infants' "same-race" face preferences were influenced by the faces that were typical in their communities, regardless of their own race (and the race of their family members). Broader neighborhood contexts may also provide infants with information about socially and culturally specified forms of behavior, for example, in opportunities to observe how members of different social groups behave toward one another or engage in social conventions. Moreover, there may be rich social information that correlates with neighborhood linguistic diversity, such that people who speak non-English languages may provide opportunities for children to observe other cultural differences or practices. Pursuing these questions will require investigating in detail how neighborhood characteristics influence infants' opportunities for learning.

At a very broad level, our findings indicate that infant social cognitive development will best be understood by considering the differentiated ways in which social contexts can inform and influence the process of development. Indeed, research with older children has demonstrated that neighborhood factors broadly influence developmental outcomes (see Leventhal & Brooks-Gunn, 2000; Sampson, Morenoff, & Gannon-Rowley, 2002; Shonkoff & Phillips, 2000), including effects of community diversity on childhood social cognition (Killen, Rutland, & Ruck, 2011; McGlothlin & Killen, 2010). We suggest that the scientific understanding of infant social cognitive development will be enriched by integrating the insights and approaches from these bodies of work with laboratory methods for probing infants' social cognitive capacities. Such investigations will allow us to better comprehend the ways in which the social context shapes young minds.

Author note

This procedures outlined in this manuscript were approved by the first author's institutional review board and adhere to the principles found in the World Medical Association Declaration of Helsinki.

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References

Bar-Haim, Y., Ziv, T., Lamy, D., & Hodes, R. M. (2006). Nature and nurture in own-race face processing. *Psychological Science, 17*, 159–163. http://dx.doi.org/10.1111/j.1467-9280.2006.01679.x.

Buttelmann, D., Zmyj, N., Daum, M. M., & Carpenter, M. (2013). Selective imitation of in-group over out-group members in 14-month-old infants. *Child Development, 84*, 422–428. http://dx.doi.org/10.1111/j.1467-8624.2012.01860.x.

Carpendale, J., & Lewis, C. (2004). Constructing an understanding of mind: The development of children's social understanding within social interaction. *Behavioral and Brain Sciences, 27*, 79–151. http://dx.doi.org/10.1017/S0140525X04000032.

Chavajay, P., & Rogoff, B. (1999). Cultural variation in management of attention by children and their caregivers. *Developmental Psychology, 35*, 1079–1090. http://dx.doi.org/10.1037/0012-1649.35.4.1079.

Csibra, G., & Gergely, G. (2009). Natural pedagogy. *Trends in Cognitive Sciences, 13*, 148–153. http://dx.doi.org/10.1016/j.tics.2009.01.005.

Dunn, J. (1988). *The beginnings of social understanding*. Cambridge, MA, US: Harvard University Press.

Fernald, A., & Morikawa, H. (1993). Common themes and cultural variations in Japanese and American mothers' speech to infants. *Child Development, 64*, 637–656. http://dx.doi.org/10.2307/1131208.

Floor, P., & Akhtar, N. (2006). Can 18-month-old infants learn words by listening in on conversations? *Infancy, 9*, 327–339. http://dx.doi.org/10.1207/s15327078in0903_4.

Gampe, A., Liebal, K., & Tomasello, M. (2012). Eighteen-month-olds learn novel words through overhearing. *First Language, 32*, 385–397. http://dx.doi.org/10.1177/0142723711433584.

Gaskins, S. (1999). Children's daily lives in a Mayan village: A case study of culturally constructed roles and activities. In A. Goncu (Ed.), *Children's engagement in the world* (pp. 25–81). Cambridge, England: Cambridge University Press.

Gaskins, S., & Paradise, R. (2010). Learning through observation. In D. F. Lancy, J. Bock, & S. Gaskins (Eds.), *The anthropology of learning in childhood* (pp. 85–117). Lanham, MD: Alta Mira Press.

Henderson, A. M. E., Sabbagh, M. A., & Woodward, A. (2013). Preschoolers' selective learning is guided by the principle of relevance. *Cognition, 126*, 246–257. http://dx.doi.org/10.1016/j.cognition.2012.10.006.

Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. *Child Development, 74*, 1368–1378. http://dx.doi.org/10.1111/1467-8624.00612.

Howard, Henderson, Carrazza & Woodward (in press). Infants' and young children's imitation of linguistic ingroup and outgroup informants. *Child Development*.

Howard, Henderson, & Woodward (2014). Do infants prefer linguistic ingroup members over linguistic outgroup members? Manuscript in preparation.

Huttenlocher, J., Vasilyeva, M., Cymerman, E., & Levine, S. C. (2002). Language input and child syntax. *Cognitive Psychology, 45*, 337–374. http://dx.doi.org/10.1016/S0010-0285(02)00500-5.

Killen, M., Rutland, A., & Ruck, M. (2011). Promoting equity, tolerance, and justice: Policy implications. In *SRCD policy report: sharing child and youth development knowledge, 25*, 1–33. Retrieved from <http://colecivilrights.com/documents/SPR_25_4.pdf>.

Kinzler, K. D., Corriveau, K. H., & Harris, P. L. (2011). Children's selective trust in native-accented speakers. *Developmental Science, 14*, 106–111. http://dx.doi.org/10.1111/j.1467-7687.2010.00965.x.

Kinzler, K. D., Dupoux, E., & Spelke, E. S. (2007). The native language of social cognition. *Proceedings of the National Academy of Sciences, 104*, 12577–12580. http://dx.doi.org/10.1073/pnas.0705345104.

Kuhl, P. K., Tsao, F. M., & Liu, H. M. (2003). Foreign-language experience in infancy: Effects of short-term exposure and social interaction on phonetic learning. *Proceedings of the National Academy of Sciences, USA, 100*, 9096–9101. http://dx.doi.org/10.1073/pnas.1532872100.

Leventhal, T., & Brooks-Gunn, J. (2000). The neighborhoods they live in the effects of neighborhood residence of child and adolescent outcomes. *Psychological Bulletin, 126*, 309–337. doi: http://dx.doi.org/10.1037/0033-2909.126.2.309.

Levine, S. C., Suriyakham, L., Rowe, M., Huttenlocher, J., & Gunderson, E. A. (2010). What counts in the development of children's number knowledge? *Developmental Psychology, 46*, 1309–1313. http://dx.doi.org/10.1037/a0022101.

Maynard, A. E. (2004). Cultures of teaching in childhood: Formal schooling and Maya sibling teaching at home. *Cognitive Development, 19*, 517–536. http://dx.doi.org/10.1016/j.cogdev.2004.09.005.

McGlothlin, H., & Killen, M. (2010). How social experience is related to children's intergroup attitudes. *European Journal of Social Psychology, 40*, 625–634. http://dx.doi.org/10.1002/ejsp.733.

Meins, E., Fernyhough, C., Wainwright, R., Das Gupta, M., Fradely, E., & Tuckey, M. (2002). Maternal mind-mindedness and attachment security as predictors of theory of mind understanding. *Child Development, 73*, 1715–1726. http://dx.doi.org/10.1111/1467-8624.00501.

Pruden, S., Levine, S., & Huttenlocher, J. (2011). Children's spatial thinking: Does talk about the spatial world matter? *Developmental Science, 14*, 1417–1430. http://dx.doi.org/10.1111/j.1467-7687.2011.01088.x.

Richman, A. L., Miller, P. M., & LeVine, R. A. (1992). Cultural and educational variations in maternal responsiveness. *Developmental Psychology, 28*, 614–621. http://dx.doi.org/10.1037/0012-1649.28.4.614.

Rogoff, B., Paradise, R., Mejía Arauz, R., Correa-Chávez, M., & Angelillo, C. (2003). Firsthand learning through intent participation. *Annual Review of Psychology, 54*, 175–203. http://dx.doi.org/10.1146/annurev.psych.54.101601.145118.

Rowe, M. L. (2012). A longitudinal investigation of the role of quantity and quality of child-directed speech in vocabulary development. *Child Development, 83*, 1762–1774. http://dx.doi.org/10.1111/j.1467-8624.2012.01805.x.

Sampson, R. J., Morenoff, J. D., & Gannon-Rowley, T. (2002). Assessing neighborhood effects: Social processes and new directions in research. *Annual Review of Sociology, 28*, 443–478. http://dx.doi.org/10.1146/annurev.soc.28.110601.141114.

Shneidman, L., Sootsman-Buresh, J., Shimpi, P., Knight-Schwartz, J., & Woodward, A. L. (2009). Social experience, social attention, and word learning in an overhearing paradigm. *Language Learning and Development, 5*, 266–281. http://dx.doi.org/10.1080/15475440903001115.

Shonkoff, J., & Phillips, D. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Acad. Press.

Tomasello, M. (1998). *The new psychology of language: Cognitive and functional approaches to language structure*. Hillsdale, NJ: Lawrence Erlbaum.

US Census Bureau (2006–2010). *2010 American community survey 5-year estimates*. Retrieved from <http://factfinder.census.gov>.

US Census Bureau (2010). *American FactFinder: Community facts*. Retrieved from <http://factfinder.census.gov>.