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Accent, Language, and Race: 4–6-Year-Old Children's Inferences Differ by Speaker Cue

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Three experiments examined 4- to 6-year-olds' use of potential cues to geographic background. In Experiment 1 (N = 72), 4- to 5-year-olds used a speaker's foreign accent to infer that they currently live far away, but 6-year-olds did not. In Experiment 2 (N = 72), children at all ages used accent to infer where a speaker was born. In both experiments, race played some role in children's geographic inferences. Finally, in Experiment 3 (N = 48), 6-year-olds used language to infer both where a speaker was born and where they currently live. These findings reveal critical differences across development in the ways that speaker characteristics are used as inferential cues to a speaker's geographic location and history.

Children regularly make inferences about the nonobvious properties of other people (e.g., Blake & Harris, 2009; Gelman & Heyman, 1999; Wellman & Liu, 2004). One such nonobvious property is a person's geographic background; we cannot infer that a person lives in, or originates from, the place where we happen to observe them. Yet a person's geographic background is potentially informative about their experience and knowledge. We might assume that a person born and raised in Canada will be familiar with poutine and books like *The Apprenticeship of Duddy Kravitz*; we might not make these assumptions about a person who lives in another country or even someone who has recently moved to Canada. Therefore, inferences about geographic background affect our assumptions about common knowledge and help guide our interactions with others. There are a number of external cues that could potentially influence children's geographic inferences (e.g., language, accent, race, gender), with some more reliable than others (e.g., gender is not an indicator of where someone lives). However, little work has addressed children's geographic inferences or the extent to which children rely on various cues to background.

A foreign accent is a salient indicator of a person's geographic origin, and this is reflected in adults' judgments (Derwing & Munro, 2009; Moyer, 2004). If you encounter someone speaking English with a foreign accent, you can infer that the speaker is originally from somewhere else (assuming you are in an English-speaking country). However, accent is a less reliable indicator of where a speaker currently resides. An accented speaker could reside in a foreign country, but they could also have immigrated to your country. In contrast, if you encounter someone speaking a *foreign language*, you might infer that they are not only originally from somewhere else but also live somewhere else.

This reveals a potentially interesting difference between how language and accent might be used to infer geographic background: although there are exceptions, language tends to vary across distinct geographic regions and to be shared within a region, whereas accent is more likely to vary within a geographic region. Prior work has asked about some geographic inferences that children make about speakers based on their language or accent. This study explores whether these cues are used in the same way. We should also note that although we focus on geographic background, variation in accents/dialects can also be related to other factors, like social class (Labov, 2012). However, for the purposes of this article, we consider only the information conveyed by native versus foreign accents in relation to geographic background.

Accent, Language, and Race as Cues to Geographic Background

Prior work looking at children's geographic inferences has primarily looked at *language*-based

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inferences. Young children understand that not all people speak the same language; however, previous research suggests that it is not until children are 6 years old that they infer that individuals from different cultures speak different languages (Kuczaj, 1982; Kuczaj & Harbaugh, 1982). Similarly, 6-year-olds cite language differences as being caused by nationality differences and shared language as being caused by shared nationality (Jahoda, 1961; Piaget & Weil, 1951; also see Hirschfeld & Gelman, 1997 for similar discussion). When explicitly told that an individual speaks a certain language, 6-year-olds reliably use this information to predict the individual's national group (Penny, Barrett, & Lyons, 2001). Therefore, it appears that by age six, children infer that speakers of foreign languages are from different places or cultures, and speakers of the same language are from the same place or culture. However, as most previous studies used interview techniques, which require advanced verbal abilities, it is possible that younger children might also make similar inferences.

Recently, there has also been work on children's awareness of the relation between *accent* and geographic background. Preschool-aged children recognize that two speakers with the same foreign accent live in similar places, whereas speakers with different foreign accents live in different places (Weatherhead, White, & Friedman, 2016). Children age 5 and 6 categorize speakers based on their regional dialect (Wagner, Clopper, & Pate, 2014). Likewise, in a forced choice task, 5- and 6-year-olds use accent to infer who is American, or "lives around here" (Kinzler & DeJesus, 2013). When presented with two speakers, one who shared the same native accent as the child and the other who had an unfamiliar French accent, 5- to 6-year-old children were more likely to infer that the speaker who shared their native accent was American. Furthermore, 5-year-old children have strong social preferences for speakers who share their accent, suggesting that they perceive those speakers as members of the same social group (Kinzler, Shutts, DeJesus, & Spelke, 2009).

Finally, race may also influence children's judgments of geographic and national background. Race influences American adults' judgments of whether an individual is American or foreign (e.g., Devos & Banaji, 2005). Both children and adults also view race as an indicator of social group membership, though they treat accent as a stronger indicator (Kinzler et al., 2009; Rakic, Steffens, & Mummendey, 2011). Also, 5- and-6-year-olds indicate that speakers of a foreign language are from a different racial group, wear unfamiliar garb, and live in novel-looking houses (Hirschfeld & Gelman, 1997). The fact that children make these associations could mean that they also associate other races with foreign locations. However, to our knowledge, no study has previously investigated this.

Overall, children appear to link both shared language and shared accent with shared geographic location. In addition, race has been shown to influence children's social reasoning in certain situations. However, based on the previous literature, it is not clear what reasoning processes underlie these inferences. Children could simply be making same/different judgments (i.e., this person sounds different, therefore they live somewhere else), or they could be using more nuanced reasoning. As we outline below, the contrast between accent and language is particularly interesting because, although both are speech-related cues, they may support different inferences about a speaker's geographic background.

Inferences about Past and Present Geographic Background

Inferring where someone is from relies on the ability to think about where they lived in the past. In this case, both accent and language could serve as important cues. A foreign accent is an important cue, because it signals that someone is not a native speaker of your language community and therefore probably once lived somewhere else in the past. A foreign language also serves as an important (but different) cue, because if you assume that people speak only one language (see Pitts, Onishi, & Vouloumanos, 2015, for evidence that monolingual infants make this assumption), then someone who speaks a foreign language is not likely to be from your social group or location.

However, we propose that accent and language may not contribute equally to inferences about where a speaker currently resides. If a person is speaking a foreign language, people may assume they live elsewhere (even though this assumption may not always be correct). Indeed, by the age of 6 years, children do assume this (see Barrett, 2007 for a review). However, when someone speaks in your native language, but with a foreign accent, there are conflicting cues. Although the accent suggests that they originate from a different place (and therefore may currently live in a different place), the language seems to indicate that they live in the same location as you. Therefore, although accent may be useful for inferring facts about a person's *history*, such as where the person is originally from,

it might not be as influential in inferences about the person's *current* geographic circumstances (e.g., where the person now lives). As for race, previous work suggests that it will play less of a role in these judgments than accent and language (Kinzler et al., 2009; Rakic et al., 2011).

This study is the first to directly contrast children's inferences about where a speaker currently lives and where they originate, based on the speaker properties of accent, language, and race. The conflicting nature of accent, in particular, provides a unique opportunity to determine what strategy children use when making geographic inferences. If accent is a cue to historical properties of the speaker, but not current ones, then there should be differences in the types of geographic inferences that children make on the basis of accent. That is, children should use accent to infer where a person is from but not necessarily where they live now. In contrast, children might view language as a useful cue for both types of inferences. Race might be seen as less useful for both. Such a pattern of results would suggest that when children make such geographic inferences from accent, language, and race they are not simply making same/different judgments (i.e., any difference from me maps onto a difference in geographic location) but instead selectively considering the relevance of each cue for a particular aspect of a speaker's geographic background (e.g., history vs. current location). Thus, investigating children's inferences from accents, language, and race provides a window for studying their historical inferences. More broadly, comparing cues such as accent, language, and race will inform us of any differences in the ways that children consider speaker cues during geographic inference.

Current Study

In this study, we explore 4- to 6-year-old children's accent-, race-, and language-based inferences, critically differentiating where a speaker currently lives and a speaker's place of origin. We included children from 4 to 6 years to determine if there are developmental differences in the way that children use cues to infer geographic background. For instance, we could imagine that young children might first learn to use language, accent, and race in a simple way (e.g., anyone who is different in any way lives far away) and that only older children would make more nuanced inferences (e.g., use only particular cues, and distinguish between where someone lives and where they were born).

In Experiments 1 and 2, we presented 4-, 5-, and 6-year-old children with people with varying accents and races, and asked them whether each person *lives* in "Canada" or "far away" (Experiment 1), or whether each person was *born* in "Canada" or "far away" (Experiment 2). We were particularly interested in whether children view accent as indicative of a person's place of origin and infer that someone with a foreign accent was born far away. We were also interested in whether they view accent as less indicative of where someone lives currently than where they were born; such a difference would not be expected if children rely on simple same/different reasoning, as this would lead them to make similar judgments about where a person is from and where they live now.

In Experiment 3, we asked 6-year-old children the same questions for speakers of different languages. Speakers spoke either native-accented English or a foreign language. We predicted that language would be considered a more reliable cue to where someone currently lives than foreign accent, because previous studies have suggested that children assume both that speakers are monolingual and that speakers of a foreign language live elsewhere (e.g., Barrett, 2007; Pitts et al., 2015). We predicted that children would similarly use language as an indicator of where a speaker was born.

Experiment 1

Method

Participants

We tested 72 children: 24 4-year-olds (mean = 4;7; range = 4;0–4;11; 14 female), 24 5-year-olds (mean = 5;6; range = 5;0–5;11; 12 female), and 24 6-year-olds (mean = 6;6; range = 6;0–6;11; 15 female). Three additional children (two 4-year-olds, one 5-year-old) were tested but excluded because they would not give verbal answers to the experimenter. Children in all experiments were tested in English-speaking daycares and schools in the Waterloo, Canada Region. In this region, 85% of residents are Caucasian; Chinese and South Asian are the largest visible minority groups. Additionally, 75% of residents identify English as their mother tongue, 1% report French, and 24% report a nonofficial language. Children in all experiments were Caucasian and had English designated as the primary language spoken at home. Data in all experiments were collected between February 2015 and April 2016.

Materials

Audio stimuli consisted of eight recordings produced by eight speakers, four female and four male. Half the speakers (two female and two male) spoke English with a foreign accent (foreign-accent speakers) and the other half spoke English with the native accent of the region (native-accent speakers). The foreign accents were Japanese, Mandarin, Spanish, and Serbian. The recordings were of neutral everyday sentences (e.g., "She told me that she was going to be there very soon") recorded in the lab. Visual stimuli were pictures of eight people (four female and four male). Half the speakers (two female and two male) were Caucasian (same-race speakers) and the other half were of a different ethnicity (other-race speakers). The other-race faces included individuals who were Black, Chinese, Indian, and mixed-race (part Black, part Hispanic).

The audio and visual stimuli were combined such that there were four types of speakers: (a) native-accent/same-race, (b) Foreign-accent/same-race, (c) native-accent/other-race, and (d) foreign-accent/other-race. Children saw eight individuals total, such that they saw each type of speaker twice. Audio and visual stimuli were counterbalanced such that each face appeared with a native-accent sentence for half the children and with a foreign-accent sentence for the other half. Stimuli were combined in Microsoft PowerPoint and displayed on a 13-inch laptop computer.

Procedure

Each child completed eight test trials, two of each speaker type. Stimuli were counterbalanced such that each speaker type appeared in the first trial equally across children. No audio or visual stimulus occurred more than once for each child.

Prior to beginning, the experimenter confirmed that the child knew they lived in Canada. Children were then told that they were going to see some people and hear how they talk, and they had to tell the experimenter if the person lives in Canada or if they live far away. In each trial, children heard a sentence while viewing a picture of the speaker. The picture only appeared on the screen for as long as the sentence played. Children were then asked where the speaker lives. If children did not respond, the experimenter gave the instructions again and restarted that trial. No child in any experiment needed the instructions repeated more than once.

Results

On each trial, children received a score of 1 if they indicated the speaker lived far away, and a score of 0 if they indicated the speaker lived in Canada. Thus, children had eight scores (two of each trial type).

A generalized estimating equations (GEE) binary logistic regression was run with the within-subject factors of Accent (Native vs. Foreign) and Race (Same vs. Other), and the between-subject factor of Age. This analysis revealed main effects of Accent, *Wald* $X^2(df = 1, N = 72) = 22.42$, $p < .001$, Odds Ratio (OR) = 3.06, and Race, *Wald* $X^2(1, 72) = 6.95$, $p = .008$, OR = 1.52. Thus, race and accent each had an effect independently on children's judgments, though accent influenced children's responses at higher rates. Additionally, a significant Accent × Age interaction was found, *Wald* $X^2(2, 72) = 8.62$, $p = .013$. No other main effects or interactions were significant, ps > .114 (Figure 1; see Appendix for full summary). The Accent × Age interaction resulted because although there was an effect of accent in 5-year-olds, $p < .001$, and in 6-year-olds, $p = .001$, there was no effect in 4-year-olds, $p = .385$.

For each age group we also ran one-sample Wilcoxon sign tests to determine if children's responses significantly differed from chance. To do this, we collapsed each trial type into a score of 2 (recall they received a score of 0 when they responded "Canada" and 1 when they responded "far away," and they received 2 trials of each trial type). Therefore participants could receive a score of 0, 1, or 2 for each trial type. We found that 4-year-olds indicated that the speaker lived far away at chance levels for each speaker type, ps > .166. Thus, 4-year-olds do not use accent or race as an indicator of where a speaker lives. Five-year-olds indicated that other-race/foreign-accent speakers lived far away, $z = 3.13$ $p = .002$, $r = .319$ (for calculation of r see Rosenthal, 1994), whereas other-race/native-accent and same-race/native-accent speakers lived in Canada, $z = 2.07$, $p = .039$, $r = .211$, and $z = 3.71$, $p < .001$, $r = .324$, respectively. Five-year-olds responded at chance levels for the same-race/foreign-accent speakers, $z = 1.60$, $p = .109$, $r = .163$. Therefore, 5-year-olds infer that speakers with the same accent as them live in the same place as them (regardless of race), but race affects their judgments of foreign-accent speakers—only those of a different race are judged to live somewhere far away. Six-year-olds were at chance levels for both foreign-accent conditions (other-race/foreign-accent and same-race/foreign-accent, ps > .617). In contrast,

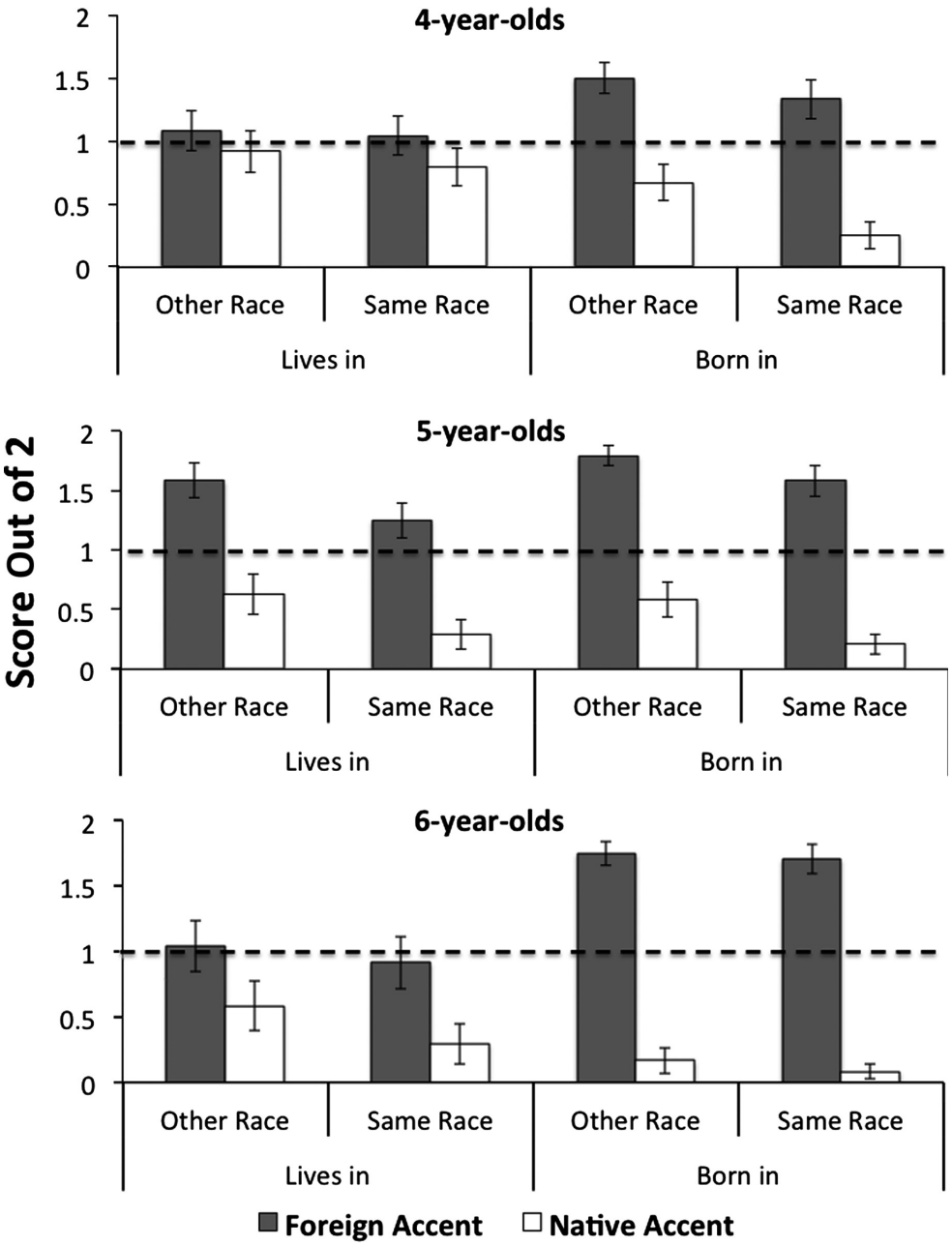

Figure 1. Results from Experiments 1 and 2, by age group, for each speaker type. Results for Experiment 1 ("Lives in") appear on the left side of the graph, and results for Experiment 2 ("Born in") appear on the right side. The *y*-axis indicates the mean score out of 2 for each trial type (higher scores indicate "Far Away" responses and lower scores indicate "Canada" responses). The *x*-axis indicates whether the speaker was an other-race or same-race speaker. Grey bars indicate scores for foreign-accent speakers; white bars indicate scores for native-accent speakers. Error bars represent standard error.

they indicated that both types of native-accent speakers lived in Canada (other-race/native-accent and same-race/native-accent, $z = 2.36$, $p = .018$, $r = .241$ and $z = 3.70$, $p < .001$, $r = .378$, respectively). Thus, 6-year-olds infer that speakers with a native accent live in Canada, but they do not infer that speakers with a foreign accent live far away. These findings demonstrate developmental change from 4- to 6-years-old in how children use accent as a cue to where someone currently lives.

Experiment 2

In Experiment 1 we demonstrated that by 5 years old, children reliably categorized a native-accented

speaker as living in Canada. However, it is not until 6 years old that children are aware that a foreign accent is uninformative about where someone lives currently—at this age, they do not infer that speakers with a foreign accent live far away. This suggests that 6-year-old children are not relying on simple same/different reasoning. In Experiment 2, we investigate whether children use accent as an indicator of a speaker's history. If children recognize that accent is more informative of speaker history, then they should more systematically use accent as an indicator of where a speaker is born.

Method

Participants

We tested a separate group of 72 children, recruited from the same population as Experiment 1: 24 4-year-olds (mean = 4;6; range = 4;0–4;11; 15 female), 24 5-year-olds (mean = 5;6; range = 5;0–5;11; 9 female), and 24 6-year-olds (mean = 6;5; range = 6;0–6;11; 12 female). Two additional children (two 4-year-olds) were tested but excluded because they would not give verbal answers to the experimenter.

Materials

The same materials were used as in Experiment 1.

Procedure

The same procedure was used as in Experiment 1 with one minor change. Children were told that they were going to see some people and hear how they talk and they had to tell the experimenter if the person was *born in* in Canada or if they were *born* far away.

Results and Discussion

On each trial, children received a score of 1 if they indicated the speaker was born far away, and a score of 0 if they indicated the speaker was born in Canada. Thus, children had eight scores out of 1, with two scores for each trial type.

A GEE binary logistic regression, with the within-subject factors of Accent (Native vs. Foreign) and Race (Same vs. Other), and the between-subject factor of Age, revealed a main effect of Accent, *Wald* $X^2(1, 72) = 106.35$, $p < .001$, OR = 9.10, and a main effect of Race, *Wald* $X^2(1, 72) = 4.06$, $p = .044$, OR = 1.47. Thus, accent exerted a stronger influence than race on children's responses. Additionally, a significant Accent × Age interaction was found, *Wald* $X^2(2, 72) = 8.44$, $p = .015$. No other interactions were significant, ps > .230 (Figure 1; see Appendix for full summary). The Accent × Age interaction resulted because children were increasingly likely to choose Canada in the native accent condition between ages four and six, $p = .004$, while they were increasingly likely to choose "far away" in the foreign accent condition between these ages, $p < .001$.

For each age group we also ran one-sample Wilcoxon sign tests to determine if children's responses significantly differed from the chance. To do this, we again collapsed by trial, so that participants could receive scores of 0, 1, or 2 in each condition. Four-, five-, and 6-year-old children all indicated that speakers with a different accent, regardless of race, were born somewhere far away, ps < .015. Additionally, they all indicated that native-accented speakers, regardless of race, were born in Canada, ps < .033. Thus, children at all ages used accent, independent of race, as an indicator of where speakers were born.

Comparison of Experiments 1 and 2

To determine if children used accent differently when inferring current location and place of origin, we compared Experiments 1 and 2. A GEE binary logistic regression, with the within-subject factors of Accent and Race and the between-subject factors of Age and Experiment revealed main effects of Accent, *Wald* $X^2(1, 144) = 120.72$ $p < .001$, OR = 7.26, Race, *Wald* $X^2(1, 144) = 9.82$, $p = .002$, OR = 1.50, and Age, *Wald* $X^2(2, 144) = 6.17$, $p = .046$. The following interactions were also significant: Experiment × Accent, *Wald* $X^2(2, 144) = 25.09$, $p < .001$, and Age × Accent, *Wald* $X^2(2, 144) = 15.92$, $p < .001$. No other main effects or interactions were significant ps > .137 (See Appendix for full summary).

Because our main interest in these analyses was in the effect of experiment, we conducted follow-up pairwise comparisons to examine the significant Experiment × Accent interaction. These tests showed that the interaction resulted because scores for native accents were higher in Experiment 1 than in Experiment 2, $p = .007$, whereas scores for foreign accents were higher in Experiment 2 than in Experiment 1, $p < .001$. Put more plainly, children were relatively more likely to judge that speakers with native accents live far away than to judge that they were born far away (note, though, that both judgments were quite rare). But children showed the opposite response pattern for speakers with

foreign accents. Children were more likely to judge that these speakers were born far away than to judge that they live far away.

Taking into consideration the one-sample tests against chance from each experiment individually, we also see that it is only at age 6 that children demonstrate a more nuanced understanding of the relation between accent and geographic background: 6-year-olds infer that native-accented speakers are both born in and currently live in Canada, and they also consistently infer that speakers with foreign accents were born far away, without inferring that these speakers live far away. Although 4- and 5-year-olds also infer that foreign-accented speakers were born elsewhere, they have less clear views about accent as a cue to where a speaker currently lives. Thus, 6 years is the only age at which children are demonstrating a more nuanced understanding of the relation between accent and geographic background.

Experiment 3

By 6 years old, children show a clear difference in their accent-based inferences about where a speaker lives and where the speaker was born. They infer that accented speakers were born far away, but do not infer that accented speakers currently live far away. This suggests that 6-year-olds are sensitive to the complex nature of accent and how it relates to where someone lives; therefore, we focus this final experiment solely on 6-year-olds. In Experiment 3, we addressed 6-year-olds' geographic inferences about language by contrasting native-accented English and foreign languages, with "lives in" and "born in" as two between-subjects conditions. We anticipated that 6-year-olds would infer that a person speaking a foreign language lives far away and was also born far away. Note that because of the weak effect of race in both experiments and previous findings comparing language and race (e.g., Kinzler et al., 2009), we did not manipulate race in this experiment.

Method

Participants

We tested a separate group of 48 6-year-old children, recruited from the same population as in Experiments 1 and 2 (mean = 6;6; range = 6;0 – 6;11; 27 female).

Materials

Audio stimuli consisted of eight recordings produced by four speakers, two female and two male. Half the speakers (one female and one male) spoke a foreign language (foreign-language speakers) and the other half spoke English with the native accent of the children (native-language speakers). The foreign languages were Cantonese, Farsi, Serbian, and Spanish. The recordings were of neutral everyday sentences (e.g., "She told me that she was going to be there very soon") recorded in the lab. Visual stimuli were pictures of four people (two female and two male). All speakers were Caucasian, as in the previous two experiments race had no effect on 6-year-olds' judgments.

The audio and visual stimuli were combined such that there were two types of speakers: (a) native-language/same-race, and (b) foreign-language/same-race. Audio and visual stimuli were counterbalanced such that each face appeared with a native-language sentence for half the children and with a foreign-language sentence for the other half. Stimuli were combined in Microsoft PowerPoint and displayed on a 13-inch laptop computer.

Procedure

The same general procedure was used as in Experiments 1 and 2. However, lives-in and born-in were collapsed into one experiment (between-subjects), and the race manipulation was eliminated. Children were randomly assigned to one of two conditions. In the lives-in condition (same procedure as Experiment 1), children were told that they were going to see some people and hear how they talk and they had to tell the experimenter if the person *lives in* Canada or if they *live* far away. In the born-in condition (same procedure as Experiment 2), children were told that they were going to see some people and hear how they talk and they had to tell the experimenter if the person was *born in* Canada or if they were *born* far away.

Results and Discussion

On each trial, children received a score of 1 when they indicated the speaker lived/was born far away, and a score of 0 each time they indicated the speaker lived/was born in Canada. Thus, children had four scores out of 1, with two scores for each trial type.

A GEE binary logistic regression, with the within-subject factor of Language (English vs.

Foreign Language) and the between-subject factor of Condition (Lives-In vs. Born-In), was run to see whether children's judgments about where the speakers live versus where they were born differed as a function of the language cue. As expected, we found a main effect of Language, *Wald* $X^2(1, 48) = 43.93$, $p < .001$, OR = 7.802. No other main effects or interactions were significant ps > .256 (Figure 2; see Appendix for full summary).

We also ran one-sample Wilcoxon sign tests to determine if children's responses significantly differed from chance. To do this, we again collapsed across trials, so that each child participant received a score of 0, 1, or 2. Children indicated that foreign-language speakers lived far away and were born far away, ps < .001. In contrast, they indicated that native-language speakers lived in Canada and were born in Canada, ps < .001.

General Discussion

How do children use accent as a cue to geographic background? Does this differ from language and race? In three experiments we addressed these questions. We found that although 4-, 5-, and 6-year-olds all used accent as an indicator of where a speaker was born, it was not until 6 years that children were sensitive to the ambiguity of accent as an indicator of where a speaker lives. At the same time, 6-year-olds treated a foreign language as a robust indicator that a speaker both is from, and lives, in a different place. The race of the speaker also influenced their geographic inferences, though not to the same degree as accent.

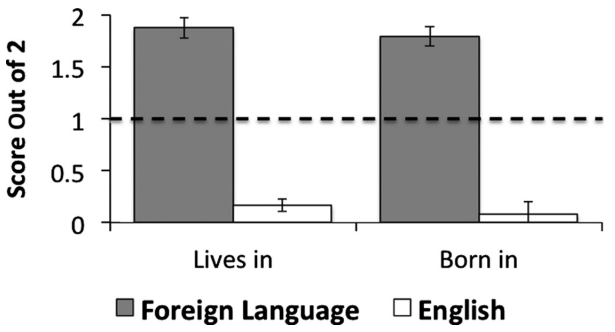

Figure 2. Results from Experiment 3. The results from the "Lives in" condition appear on the left side of the graph, and results for the "born in" condition appear on the right side. The *y*-axis indicates the mean score out of 2 for each trial type (higher scores indicate "Far Away" responses and lower scores indicate "Canada" responses). Gray bars indicate scores for Foreign Language speakers; white bars indicate scores for English speakers (with a native accent). Error bars represent standard error.

Accent

Considering first children's use of accent to make geographic inferences, Experiments 1 and 2 reveal differing developmental trajectories for children's inferences about where a person was born and where a person currently lives.

In Experiment 1, children were asked where the speaker lives. When inferring where a speaker currently lives, a foreign accent could provide conflicting cues: the foreign-ness suggests the speaker lived elsewhere in the past, but because the language is native, the speaker could live in the same place as the listener. When making this judgment, 4-year-olds were at chance for every speaker type. The fact that 4-year-olds were at chance even in conditions with native-accented speakers suggests that they were unsure what cues are relevant for inferring where a speaker currently lives. At 5 years, children used accent as a cue to current residence for both native and nonnative accents: they inferred that speakers with the same accent live in Canada and that foreign-accented speakers live far away. However, 5-year-olds may already have begun to realize that a foreign accent on its own is uninformative about where someone lives, as the effect in the foreign-accent condition was driven by their response to other-race/foreign-accent speakers (they were at chance for same-race/foreign-accent speakers). This suggests that the foreign accent alone is ambiguous for 5-year-olds, but when combined with other race, the two cues to "different" are additive, causing them to infer the speaker lives far away. Thus, although 5-year-olds may be starting to show a more nuanced understanding of accent, they are swayed by the compounding of multiple "different" cues. Finally, at 6 years old, children inferred that native-accented speakers live in Canada but did not make inferences about where foreign-accented speakers live based on their accent. Therefore, children go from not understanding how accent relates to where a speaker lives (4-year-olds), to using both native and foreign accents (at least in combination with race) as cues to residence (5-year-olds), to making inferences based on native accents only (6-year-olds). One possibility is that increasing experience with accented speakers between the ages of 5 and 6 leads to a foreign accent being weighed less heavily as a cue to where the speaker currently lives.

Interestingly, we see a much different pattern of responses in Experiment 2, in which children were asked where the speakers were born. Inferring where someone is from relies on the ability to think about where this person lived in the past. Children

in all age groups used accent as an indicator of where the speaker was born. They inferred that speakers were born in a place far away when they spoke with a foreign accent and that they were born in Canada when they spoke with a native accent. Thus, even 4-year-olds understand the historical nature of accent, and use accent on its own as an indicator of where someone was born.

Race

Children showed an overall effect of race in both Experiments 1 and 2. This is broadly consistent with previous findings that American adults use race in their judgments of who is American, and consistently rate African and Asian American individuals as being less likely to live in America than Caucasian individuals (Devos & Banaji, 2005). However, it is important to note that we did not find an increasing use of race with age, in contrast to children's increasing use of race in their social preferences: At 2.5-years-old, children do not make friendship choices based on race; however, at 5-years-old, children show clear social preferences on the basis of race (Kinzler & Spelke, 2011), and these race-based preferences persist throughout childhood (Baron & Banaji, 2006). Thus, although preschool-aged children may prefer same-race individuals, they only weakly use race as an indicator of geographic background. The latter finding aligns well with the claim that race plays less of an evolutionary role in denoting group membership than language and dialect (Cosmides, Tooby, & Kurzban, 2003). According to this evolutionary claim, although neighboring groups historically would have spoken with different dialects or languages, they likely did not look different in terms of race (Baker, 2002; Kinzler & Spelke, 2011), making race differences of little value in distinguishing members from neighboring coalitions (Cosmides et al., 2003).

Following this line of reasoning, it may be that race is viewed as a weaker indicator of *geographic* group membership than accent and language. In addition, it could be that children in our geographic region have had some experience with other race individuals (visible minorities account for 15% of the population). This experience may further reduce children's reliance on race as a cue to background.

Language

Turning to the cue of language, in Experiment 3, 6-year-old children inferred that native-accented English speakers both were born in and live in Canada, whereas speakers of a foreign language were born in and live in a place far away. Together with our other findings, this demonstrates that 6-year-olds believe language to not only be a cue to where someone comes from but also, importantly, to be a more reliable cue to where someone currently lives than accent is. Children's inferences from foreign language may seem surprising because the fact that someone speaks a foreign language does not guarantee anything about their geographic background—for example, a person heard speaking Spanish could be bilingual or could have learned it in school and might even be speaking it with an obvious accent.

However, these findings are broadly consistent with work suggesting that children associate speakers of a foreign language with foreign types of places (Barrett, 2007; Hirschfeld & Gelman, 1997) and with work showing that monolingual children's default assumption is that other speakers are monolingual (Pitts, Onishi, & Vouloumanos, 2005). Likewise, our participants might have concluded that the foreign language speakers did not know another language and were therefore from a different place. So children's inferences might differ if they were given evidence that a speaker uses two languages (rather than just one). The distributions of speakers they regularly encounter could also have shaped children's judgments. If our participants rarely encounter people who speak a foreign language, they might assume that such individuals likely live somewhere else. This is plausible because, in contrast to both race and accent, which are salient, perceptually obvious features, a second language is more of a "hidden attribute." Even when we know a person can speak another language, they will not use it to talk to us if we do not share that language.

Implications

Children did not simply make their inferences on the basis of whether the speakers were similar to, or different from, them. If children had used this type of reasoning, then the same pattern of results should have been observed in all three experiments (and for all three cues). Rather, children responded differently as a function of the specific type of geographic inference (where the speaker was born, where the speaker currently lives) and speaker cue (accent, language, race). In some ways our findings conflict with previous work: for example, one previous study shows that 4-year-olds do use accent to make "lives in" judgments when comparing two similar or different speakers (Weatherhead et al.,

2016); in the present study, 4-year-olds did not use accent as a cue to where a speaker currently lives. Importantly, however, in this study, children did not make comparisons between speakers. Instead, children made judgments about individual speakers on the basis of three salient cues—accent, language, and race. This type of task allows us to isolate which cues children consider relevant to geographic background. Thus, although younger children may infer that speakers with the same accent live in the same place (Weatherhead et al., 2016), and prefer to interact with native-accent speakers (Kinzler, Dupoux, & Spelke, 2007) or same-race speakers (Aboud, 1988; Kinzler & Spelke, 2011), when making decisions about where individuals live, they appear to be unsure about whether accent is relevant for these judgments.

Finally, our studies reveal something interesting about children's historical reasoning in relation to speaker cues. Both accent and language are indicators of speaker history. However, children consider accent more strongly in their judgments of where a speaker lived in the past than where they currently live, whereas language is used to the same extent for both. This finding is interesting in the context of other studies investigating children's historical inferences. Previous studies have shown that children consider history when reasoning about a number of abstract concepts (e.g., Cimpian & Cadena, 2010; Gelman, 1988; Gelman & Kremer, 1991; Nancekivell & Friedman, 2014). Nancekivell and Friedman (2014) demonstrate that 4- and 5-year-olds spontaneously infer history when producing explanations about ownership but not when explaining liking or object use. This suggests that children are selective in inferring history for outcomes that depend on past events. In this study, we demonstrate a similar finding with accent. Children ages 4-, 5-, and 6-years-old recognized that accent is relevant to where a speaker lived in the past and inferred that accented speakers were born in places far away. However, by 6 years, children are sensitive to the fact that accented speakers do not necessarily currently live in far away places. At the same time, 6-year-olds use language to predict both where someone lived in the past and where they currently live. This suggests that although language can be used to infer both history and present, accent is only informative about the past.

Our findings show that over development, children gain a more nuanced understanding of what cues are important for geographic inferences. Children of all ages appreciated the relevance of a speaker's accent to make inferences about their place of origin, but the use of accent to infer where a speaker currently lives showed a more nuanced trajectory, and at the age of 6, judgments about current location differed for accent and language cues. Finally, children used race as a weaker cue to both judgments. Overall, by age 6, children appear to have a better appreciation of the extent to which speaker cues can be used for different types of geographic inference.

Open Questions and Future Directions

This study welcomes many potential follow-up questions. First, we question what the role of experience is in children's judgments. The children in this study were all Caucasian and English speaking. Their experiences with foreign accent, foreign language, and other-race speakers differ substantially from children who are not Caucasian or are bilingual. For example, bilingual children have a great deal of experience with accented and foreign-language speakers. Thus, it could be that bilinguals rely more heavily on nonlanguage cues, such as race, to guide their inferences. More generally, the differing environmental experiences of children may influence what cues they think are indicative of geographic background, and the strength to which they are used.

Second, it is possible that children might make even more nuanced judgments than we examined. In the current design, children made absolute decisions about geographic background, categorizing individuals as either having a local or foreign geographic background. But children might also be capable of making more subtle decisions. For example, might they be more likely to infer that a speaker with a "heavy" accent lives farther away than a speaker with a "weak" accent? Additionally, one limitation of this study is that we only used foreign accents. Children's responses (or adults' for that matter) for regional accents may differ. Regional accents present an interesting challenge. Prior work shows that regional accents may be categorized more similarly to the native accent than foreign accents (e.g., Floccia, Butler, Girard, & Goslin, 2009), although the cues that might enable listeners to make this distinction are not clear. However, in many ways, a regional accent operates more like a foreign language than a foreign accent, in terms of geographic background. For example, in Australia, English is spoken in a particular way that is distinct from the English spoken in Canada. Thus, although Australian English is English (and may be identifiably a native variety of English), it is associated with a place that is far away, much like a foreign language. From this perspective, it may be that

children are actually likely to rate these speakers as living, or being born, far away.

Third, although we focused on children's ability to infer speakers' geographic background, our findings raise the possibility that children might use information about geographic background to make further inferences and also might use information about speakers to make other kinds of inferences. For example, knowledge of an individual's geographic background might influence children's inferences about that individual's knowledge and experiences, and might likewise affect their selective learning from that individual. Moreover, they might use information about accents to make other social inferences. For example, some properties of native accents are informative about socioeconomic status, social class, and a speaker's self-identified community (Hay & Drager, 2007). Hence, future research could investigate whether young children infer these types of social information from accent.

Concluding Remarks

In three experiments we investigated children's use of accent, language, and race to infer geographic background. We found that 4-, 5-, and 6-year-olds all use accent to infer where a speaker was born, but by 6 years of age, children cease to use foreign accent as an indication that someone currently lives far away. In contrast, 6-year-olds use language to infer both where a speaker is from and where they currently live. Race also played some role in children's geographic inferences. These findings reveal critical differences in the way that accent, language, and race are used as inferential cues.

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Appendix

Experiment 1: Test of Model Effects

Effects	*Wald* X^2	*df*	*p*
Age	4.34	2	.114
Accent	22.42	1	.000
Race	6.95	1	.008
Age * Accent	8.62	2	.013
Age * Race	1.82	2	.402
Accent * Race	.96	1	.328
Age * Accent * Race	.94	2	.625

Experiment 2: Test of Model Effects

Effects	*Wald* X^2	*df*	*p*
Age	2.94	2	.230
Accent	106.35	1	.000
Race	4.06	1	.044
Age * Accent	8.44	2	.015
Age * Race	1.48	2	.478
Accent * Race	.60	1	.440
Age * Accent * Race	.61	2	.736

Comparison of Experiment 1 & Experiment 2: Test of Model Effects

Effects	*Wald* X^2	*df*	*p*
Age	6.18	2	.046
Accent	120.72	1	.000
Race	9.82	1	.002
Experiment	1.24	1	.266
Age * Accent	15.92	2	.000
Age * Race	2.46	2	.292
Age * Experiment	1.14	2	.566
Accent * Race	1.34	1	.247
Accent * Experiment	25.09	1	.000
Race * Experiment	0.05	1	.818
Age * Accent * Race	0.06	2	.969
Age * Accent * Experiment	3.98	2	.137
Age * Race * Experiment	1.00	2	.607
Accent * Race * Experiment	0.03	1	.856
Age * Accent * Race * Experiment	1.36	2	.506

Experiment 3: Test of Model Effects

Effects	*Wald* X^2	*df*	*p*
Condition	1.29	1	.256
Language	43.93	1	.000
Condition * Language	.01	1	.908