Accent Cues Credibility: Children Preferentially Imitate
and Trust Native-Accented Speakers

THESIS

Presented in Partial Fulfillment of the Requirements for the Degree Master of Arts in the
Graduate School of The Ohio State University

By
Kristin Leigh Rohrbeck
Graduate Program in Psychology
The Ohio State University
2010

Master's Examination Committee:
Laura Wagner, Advisor
Susan Johnson
Russell Fazio
Abstract

Children’s preferences for native speakers of their native language over foreign-accented speakers have been documented across a variety of different situations. Two experiments were used to test whether five- to six-year-old children (N=98) and adults (N=68) show the native-speaker preference when learning non-functional behaviors, a type of cultural information. In experiment 1, children imitated native-speakers’ non-functional behaviors more than foreign-accented speakers’ non-functional behaviors, but adults did not show any imitative preference. Experiment 2 tested whether children’s performance in Experiment 1 was due to a belief that native speakers are more credible sources of cultural information. Results from experiment 2 showed that children preferentially imitated non-functional behaviors of a credible native speaker but not a credible foreign-accented speaker. Adults imitated the non-functional behaviors of whichever speaker used explicit credibility cues. Results from both experiments suggest that, for children, native accent signals speaker credibility, but maybe not for adults.
This document is dedicated to Mikel and my mom.
Acknowledgments

I wish to thank my committee for all of their thoughtful suggestions and guidance throughout the course of this project. I want to include a special thanks to Laura Wagner because she supported me and my ideas when I needed it most.

I would also like to thank Elaine Aldana for dedicating her time and honor’s thesis to my research. Furthermore, I am grateful to Sarah Bibyk, Mariana Vega-Mendoza, Suzanne van Horn, and Emily Dorrian for lending their vocal and acting talents to my videos.

I thank the Lacqueys discussion group and the faculty and students in from all areas of OSU’s psychology department for helping me think through complex ideas and pushing me to add clarity and clarification where needed.
Vita

February 21, 1986 .............................................. Born, Detroit, Michigan

2007 ................................................................. B.A Psychology, University of Michigan

2008-2009 ........................................................ University Fellow

2009 to present .................................................. Graduate Research Assistant, Department of

Psychology, The Ohio State University

Fields of Study

Major Field: Psychology
Table of Contents

Accent Cues Credibility: Children Preferentially Imitate and Trust Native-Accented Speakers

THESIS ..................................................................................... 1

Abstract .................................................................................. ii

Acknowledgments ........................................................................ iv

Vita ............................................................................................ v

Fields of Study ........................................................................ v

Table of Contents ......................................................................... vi

List of Figures ............................................................................ viii

List of Tables ............................................................................. ix

Chapter 1: General Introduction ................................................. 1

Chapter 2: Experiment 1 Introduction ....................................... 17

Chapter 3: Experiment 1 Methods ............................................ 21

Chapter 4: Experiment 1 Results ............................................. 23
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Experiment 1 Discussion</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>Experiment 2 Introduction</td>
<td>25</td>
</tr>
<tr>
<td>7</td>
<td>Experiment 2 Methods</td>
<td>26</td>
</tr>
<tr>
<td>8</td>
<td>Experiment 2 Results</td>
<td>28</td>
</tr>
<tr>
<td>9</td>
<td>Experiment 2 Discussion</td>
<td>31</td>
</tr>
<tr>
<td>10</td>
<td>General Discussion</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>References</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Appendix</td>
<td>45</td>
</tr>
</tbody>
</table>
List of Figures

Figure 1. The Novel Objects and their Action Sequences ........................................... 37

Figure 2. Example Display ......................................................................................... 38

Figure 3. Experiment 1 Mean Imitation Scores .......................................................... 39

Figure 4. Experiment 2 Mean Imitation Scores .......................................................... 40
List of Tables

Table 1. Example Trial Sequence with Script .................................................. 41
Chapter 1: General Introduction

Children encounter considerable variation in the language spoken in their environment. They must learn to parse through the language variation in order to know what members of their own speech community deem relevant cultural information. From young ages, children show strong preferences to learn functional cultural information from native speakers of their native language over foreign-accented speakers (Kinzler, Corriveau, & Harris, in press). The current studies explore whether children also learn non-functional cultural information from native speakers over foreign-accented speakers.

*How do children learn cultural information?*

Cultural information is the specific knowledge that is transmitted between members of a community that will aid in one’s appropriate functioning specifically within their culture. For example, Greenfield, Maynard, and Childs (2003) note the importance of social interactions for learning the culturally-specific weaving traditions of the Zinacantec Maya. For these Mayans, the complex technological skill of weaving is a piece of cultural information that is transmitted through generations of females within their community (Greenfield, Maynard, & Childs, 2003). The Mayan weaving practice is passed on as children interact with older women within their homes. The informal home instruction emphasizes the value of social interaction in the Mayan culture. The cultural information must be learned from older females, specifically from other members of the
cultural community. The process of determining what is and is not important and relevant cultural information is a great task that children accomplish from very young ages as they engage with their environments.

Other researchers have also attempted to define what they believe to be examples of cultural information. Kinzler, Corriveau, and Harris (in press) refer to object function as a piece of information that is gained from members of one’s cultural community. Tomasello (2000) discusses cultural knowledge in terms of the artifacts a culture transmits. For Tomasello, tools, language, and Arabic numerals are all types of cultural information. Behaviors and actions within specific contexts can be culturally-specific knowledge (Tomasello, Kruger, & Ratner, 1993; Whiten, Custance, Gomez, Teixidor, & Bard, 1996), even if the behaviors are not functionally-transparent (Gergely & Csibra, 2005).

Baumeister, Zhang, and Vohs (2004) emphasize the importance of language in learning and transmitting cultural information. Baumeister et al. theorize that gossip is a form of cultural learning that extends observational learning and allows “communicative pooling” of cultural information. Gossip can facilitate the transmission of discoveries and advances, such as novel solutions to problems, to other generations. Baumeister and his colleagues view gossip as one possible mechanism for implicit learning of culturally-relevant rules and skills.

Particularly notable evidence for children’s natural propensity to learn cultural information is found in the domains of imitation and tool use. At 9- to 12-months of age, infants reliably imitate the way an adult acts on objects (Tomasello, 2000). When
children are given a rake-like tool and an out-of-reach object, 24-month-olds learn and imitate the one technique demonstrated for how to use the tool to obtain the object, despite the children’s ability to use the tool in other ways (Tomasello, 1996).

Humans seem to be especially invested in learning and transmitting culturally-relevant skills and information because it will allow efficient communication and aid in survival within the cultural community (Tomasello, 2000). Older members of the community must act as teachers in order to complete the information transmission process to younger members (Tomasello, Kruger, & Ratner, 1993). Children must learn the cultural information both implicitly through communicative signals (Gergely & Csibra, 2005) and explicitly through processes such as imitation and cooperation (Tomasello, 2000). The ability to transmit behavioral traditions and information is possible because humans possess species-specific social cognition, especially perspective-taking and understanding others’ intentions as meaningful.

Children have the ability to encode other people’s behaviors as meaningful from very early in development. For example, children search for meaning in unknown and ambiguous situations by looking for other people’s responses to the situation, a phenomenon called social referencing. Within one year of age, infants use adults as emotional referents, follow adults’ gaze directions, begin to understand that other people have intentions, and engage with objects in similar ways as adults (Tomasello, 2000; Woodward, 2009).

The acute attention that young children focus on other people aids in their evaluations of new situations. Shutts, Kinzler, McKee, and Spelke (2009) demonstrated
that 1-year-old infants use other people’s affect and language to guide whether they are willing to try new foods. In the study, Shutts et al. (2009) presented videos of two women, a native speaker with positive affect and a foreign language speaker with negative affect, tasting two different foods. One-year-old infants choose to sample the foods that were associated with the happy native language speaker over the unhappy foreign language speaker. In a second experiment, the researchers eliminated affective cues and showed children videos of women using either native language or foreign language tasting distinct foods. Again, the infants choose to sample the foods that were associated with the native language speaker. Thus, linguistic cues, such as speech accent, seem to be as important as affective cues when infants evaluate food options. Despite the specific cues being utilized, children are engaging in social referencing to make their choices.

With the help of social referencing, infants within the first year and a half of life are able to understand that human actions are goal-oriented, leading children to represent other people’s actions as means to an end (Woodward, 2009). With the aid of a means-end cognitive representation, children begin to imitatively learn the use of many different cultural tools, artifacts, and symbols, such as language by two years of age (Tomasello, 2000). Children’s attention to means-end properties of behavior allow them to make the decision as to whether they too should use the same behavioral means if they have the same goal.

Humans engage in many behaviors that are not rational or functional when they see other members of their cultural community doing them. Indeed, typically-developing
humans do not generally engage in non-functional actions that they have not seen other people engage in previously. One example is the side of the road that people drive on. Functionally, it should not matter which side of the road someone drives on because she will eventually reach her destination regardless of the manner used to get there. However, people drive on the right side of the road in the United States and on the left side of the road in the United Kingdom. The side of the road that one drives on is a cultural convention that originally served no obvious functional role, but because members within each cultural community behaved the same way, a “correct” behavioral convention emerged and is now culturally meaningful: drive on the right side of the road in the United States and drive on the left in the United Kingdom. Thus, some non-functional behaviors are learned as meaningful behaviors and are transmitted by observing other members of one’s own cultural community. In the current study, cultural information is discussed in terms of such non-functional behaviors.

Gergely and Csibra (2005) argue that infants look to receive ostensive signals from knowledgeable adults to determine whether new, sometimes non-functional behaviors are culturally-relevant. Adults “manifest” the knowledge to the infants to ensure transmission of the cultural information, a process termed natural pedagogy. Natural pedagogy allows for the acquisition of functionally-opaque, arbitrary, conventional knowledge (Gergely & Csibra, 2005). Children are thus born ready to accommodate the social and communicative signals from adults in order to make sense of their sometimes functional, sometimes non-functional new worlds.
Very young children have even been shown to imitate the awkward, seemingly non-functional behaviors of other people. Meltzoff (1988) showed 14-month-olds an adult bending over to touch her forehead to a panel, thus turning on a light. The children imitated the adults’ awkward behavior even though they could have more easily and naturally touched the panel with their hands to turn on the light. The infants had to have distinguished both the means and the end of the adult’s action as being relevant in order for them to have engaged in imitation of both these aspects of the adult’s behavior. Gergely, Bekkering, and Kiraly (2002) modified Meltzoff’s (1988) study and found that young children imitate awkward means-end information depending on whether the behavior was “rational” or not.

Children imitate awkward behaviors because they have no rational explanation as to why they should not. Children do not indiscriminately imitate other people, but seem to discriminate between rational and irrational social behaviors. Children may thus also imitate the non-functional behaviors of other people if they are seen as rational and intentional actions. The social process of imitation is one of the ways that cultural learning can occur (Tomasello, 2000). Meltzoff (1988) argues that the predisposition to imitate and the need to identify with other people are the basic mechanisms driving the learning of cultural information.

Even preschoolers imitate adults’ causally-irrelevant actions, reproducing actions that are unnecessary and not explicitly functional to attain a goal (Horner & Whiten, 2005; Lyons, Young, & Keil, 2007). Lyons et al. (2007) tested 3- to 5-year olds on a task where children saw an adult engage in inefficient, non-functional behaviors before
retrieving a prize from a novel object. Lyons and his colleagues hypothesized that children represented the adult’s behaviors as being intentional and thus encoded the extra behaviors as causally-meaningful. Even under time pressure and with direct warnings that some of the behaviors were unnecessary, children still persistently “over-imitated” the adult’s inefficient actions. In addition to being intentional, children may understand the superfluous, non-functional actions to be explicit socially-relevant cues to how members of their cultural community should be retrieving the prize.

Children not only receive cultural information from other people, but they can also be the givers of information in the process cultural transmission. Indeed, Flynn and Whiten (2008) found that 5-year-olds not only imitate novel, causally-irrelevant actions performed by adults and peers, but they also reliably transmit that information. Preschoolers thus have the capacity to pass on cultural information (causally-irrelevant, non-functional behaviors) to other members of members of their community.

Until now, the emphasis has been on discussing what constitutes cultural information and how culturally-specific knowledge is learned and transmitted. However, it must not be overlooked that members of a cohesive cultural community are defined at least in part by the way that people speak within their group. Thus, the speech accent used by the cultural group becomes important as a factor that may affect cultural learning.

*How do children interpret speech accents?*

One aspect of the linguistic input, a speaker’s accent, can carry great amounts of sociolinguistic information. For example, adults evaluate other peoples’ personalities
along dimensions such as intelligence and friendliness based on speech accent (Dornic, Nystedt, Laaksonen, & Arberg, 1989). An accent’s implicit sociolinguistic information can lead to social preferences for native speakers over foreign language or foreign-accented speakers.

The current study focuses on children’s preferences based on native versus foreign speech accents. Native speech accent is the variety of speech that one learns from birth. In contrast, a foreign speech accent occurs when one learns a new language after childhood and does not sound like a native speaker of the new language. Foreign speech accent is thought to be a combining of the established phonological representations from the native language into the second (foreign) language (Flege, 1981). Flege (1981) explains that foreign accent occurs as a result of the developmental decline in the ability to learn to pronounce a new, non-native language properly. In the present study, foreign accent will refer to a non-native variety of speech.

In order to discriminate among the multitude of information in their language input, children must use the speech signal to guide their learning. For example, children can use statistical properties in their speech input to learn transitional probabilities of word boundaries (Aslin, Saffran, & Newport, 1998). Implicit non-linguistic information that can aid speech processing is also available in the input, such as sociolinguistic information about the speaker’s identity and background (Ladefoged & Broadbent, 1957). Speech accent may carry particularly important sociolinguistic information that children make use of from a very young age. Before going too far with this claim, one
should ask whether children can discriminate different speech accents and whether they know what type of sociolinguistic information the accents carry.

Children begin to show the capacity to discriminate and categorize aspects of human speech from birth. For example, newborns can differentiate between distinct languages, especially based on rhythmic differences (Nazzi, Bertoncini, & Mehler, 1998), two-day-olds show a preference for their own language over a foreign language (Moon, Cooper, & Fifer, 1993), and 6-month-olds show a preference for native language spoken naturally as opposed to unnaturally (played in reverse) (Kinzler, Dupoux, & Spelke, 2007).

Slightly older children are also able to hear speech accents and determine a meaning that goes along with speaking with a foreign accent. Girard, Floccia, and Goslin (2008) showed that 5- to 6-year-old children have the ability to distinguish their own native speech accent from a foreign speech accent better than they can distinguish separate regional speech accents within their native language. In the study, Girard and his colleagues presented French-speaking children with pairs of spoken sentences contrasting native and foreign accent, instructing the children to press a button if the speakers were from the same town. The experimenters used the same procedure to contrast the children’s own accent with another regional French accent. Children had no difficulty discriminating the native versus foreign speech accents, but were just barely able to distinguish their own accent from another regional accent. The researchers explain that children’s low degree of awareness of regional accent may be due to their sensitivity to more broad, less predictable variability in foreign-accented speech in contrast with
regionally-accented speech, their lack of geographical knowledge needed to categorize based on region within their own country and knowledge of foreign countries may be more salient, little exposure to regional as opposed to foreign accents, or an accent learnability issue (it may be more difficult to acquire a foreign accent than another native regional accent).

Other studies have shown that five-year-old children can report their own ability to understand peers who speak with a foreign-accent (Kinzler, Shutts, DeJesus, and Spelke, 2009). Humans likely have highly-flexible speech perception processes that allow for adaptation to foreign-accented speech; humans’ perceptual processes can adapt to foreign accents that are very different from native speakers’ conventional pronunciations (Bradlow & Bent, 2008). Despite evidence that human speech processing is quite adaptable, it is still worth mentioning that adults’ processing speed is initially slower for foreign-accented speech than native speech, but this difference can weaken in less than a minute of hearing the accented speech (Clarke and Garrett, 2004).

Children not only show the ability to discriminate between speakers of different languages (Nazzi, Bertoncini, & Mehler, 1998), they also begin to reveal strong social preferences towards native speakers of their native language. For example, six-month-olds show a looking preference for an adult who has previously spoken their native language over an adult who has previously spoken a foreign language (Kinzler, Dupoux, and Spelke, 2007). In the study, the infants look equally towards both speakers as they were being familiarized, but during the silent test the infants looked longer towards the speaker who had previously spoken the infant’s native language. This suggests that
infants prefer people who speak their own language over people who speak in a foreign language.

Over development, children show additional social preferences towards native speakers of their native language. Ten-month-olds prefer to accept toys from an adult who previously spoke their native language over a foreign language (Kinzler, Dupoux, and Spelke, 2007), twelve-month-olds prefer to try foods that a native speaker has endorsed over those that a foreign language speaker has tried (Shutts, Kinzler, McKee, and Spelke, 2009), and preschoolers said they would be friends with pictures of peers paired with native language-speech over pictures of peers paired with foreign-language or foreign-accented speech (Kinzler, Shutts, DeJesus, and Spelke, 2009).

Speech accent has even been shown to be more important than race in guiding children’s social preferences. Kinzler, Shutts, DeJesus, and Spelke (2009) presented 5-year-olds with pictures of novel peers, but manipulated the race of the peers. When the peers were silent, the participants chose to be friends with pictures of same-race peers over other-race peers. In another condition, both race and the speech of the peers were manipulated such that the peers (either same-race or other-race) either used native or foreign-accented speech. When race and accent were pitted against each other, 5-year-olds consistently chose to be friends with native speakers over foreign-accented speakers, regardless of race. This suggests that children favor the way an individual sounds over the way individuals look when choosing who to be friends with. However, children’s decisions were made by looking at pictures on a computer, so Kinzler et al.’s finding may not extend to children’s actual friendships.
The semantic meaning of an utterance also does not seem to deter children from showing a preference for native speaking individuals. Kinzler, Corriveau, and Harris (in press) allowed 4- to 5-year-old children to listen to nonsense speech spoken by both foreign-accented and native speakers. Then, children watched silent videos of both speakers demonstrating the functions of novel objects. When asked which speaker’s demonstration they would endorse, the children reliably chose the native speaker over the foreign-accented speaker. Results suggest that despite a lack of meaningful semantic content in speech, 4- to 5-year-olds prefer native-accented speakers over foreign-accented speakers (Kinzler, Corriveau, and Harris, in press).

As mentioned above, these native language preferences are not necessarily due to lacking intelligibility of the foreign-accented speaker. When 5-year-olds are forced to decide between foreign-accented speech and speech in a foreign language, they report understanding the foreign-accented speaker more than the foreign language speech, but they do not choose to be friends with either speaker over the other (Kinzler, Shutts, DeJesus, and Spelke, 2009). Kinzler et al (2009) thus claim that children’s social preferences are not based upon the comprehensibility of the foreign-accented speech because children did not make social distinctions between foreign-accented and foreign-language speakers.

Children learn from their linguistic in-groups

Spoken language identifies people as members of specific ethnic and cultural groups (Dornic, Nystedt, Laaksonen, and Arnberg, 1989). Lippi-Green (1997) calls attention to the fact that speech accents can trigger strong positive beliefs about members
of one’s linguistic in-group (who use the same accent as one’s self) and negative beliefs about members of linguistic out-groups (who don’t use one’s own accent). Because of this positive regard for linguistic in-group members over out-group members, children may also prefer to learn from the linguistic in-group. However, it is important to consider that humans are highly selective in terms of who they learn from.

Previous research has shown that children do not trust to learn from other people indiscriminately. Children prefer to learn from familiar people over strangers (Corriveau & Harris, 2009), adults over children (Jaswal & Neely, 2006), accurate over inaccurate others, and from a person who has been part of a consensus in the past (Corriveau, Fusaro, & Harris, 2009; Fusaro & Harris, 2008). Many speaker-dependent aspects influence who children trust; these aspects include age, confidence, ignorance, previous veridicality, reliability, familiarity, and whether the speaker was distracted (Jaswal, 2004; Jaswal and Malone, 2007; Jaswal & Neely, 2006; Koenig, Clément, & Harris, 2004; Koenig and Harris, 2005; Birch, 2005; Birch, Vauthier, and Bloom, 2008; Corriveau and Harris, 2009). Children as young as three years of age even realize that people who hesitate and are uncertain are less credible sources of information than confident speakers who do not hesitate (Jaswal & Malone, 2007). These findings suggest that children’s highly selective learning is based upon who they trust.

Kinzler, Corriveau, and Harris (in press) have made the claim that speech accent may also influence who children trust. In their experiments, Kinzler et al. presented preschoolers with videos of a native speaker and a foreign-accented speaker who each spoke for ten seconds. Each speaker then demonstrated the functions of novel objects
while in silence. Children later endorsed the function demonstrated by the native speaker. The researchers thus concluded that 4- to 5-year-olds selectively trust native speakers—members of their linguistic in-group—over speakers with foreign accents to learn novel information about the functions of objects.

**Overview of Current Research**

The current research broadens existing knowledge of the way children use speech accent to guide their learning. Kinzler et al.’s (in press) results demonstrate that children selectively endorse native speakers’ knowledge about object functions, and the researchers claim that the functional information is analogous to cultural information. However, non-functional behaviors may be more embedded within the framework of cultural learning. Non-functional behaviors must be learned socially, from other people who are viewed as reliable, trustworthy members of one’s cultural community. Experiment 1 investigated whether children use native versus foreign speech accent to guide their learning of arbitrary, non-functional information. If children do use speech accent as a guide for cultural learning, then it is predicted that they will imitate the non-functional behaviors of the native speaker.

The learning of cultural information is dependent upon the sharing of information between members of the same cultural community. This transmission process is crucial to cultural learning (Tomasello, 2000). The influence of speech accent on the transmission of non-functional information is yet to be studied. Experiments 1 and 2 both looked at whether children transmit the non-functional information they learn to another member of their linguistic in-group, namely their parents. If children use speech accent as
a guide for cultural transmission, then it is predicted that they will demonstrate non-
functional behaviors that they from learn from a native speaker to another native speaker.

Finally, Experiment 2 tests the possibility that children obtain information about
speaker credibility from speech accent. The speaker’s accent (foreign versus native) is
crossed with explicit credibility cues to determine which cues are most important for
children when learning non-functional information. If children use credibility as a guide
for cultural learning, then it is predicted that they will follow the credible speaker over
the non-credible speaker. If accent is a credibility cue, then it is predicted that there
should be an interaction between speech accent (native vs. foreign) and speaker
credibility (credible vs. non-credible) insofar as both variables should affect whose non-
functional behaviors children imitate.
Chapter 2: Experiment 1 Introduction

Experiment 1 looks at whether children use speech accent for cultural learning. Subjects watched videos of two actors producing both functional and non-functional actions to retrieve prizes from novel objects. The non-functional actions are the behaviors of interest in the experiment. One actor spoke English with a native accent and the other informant spoke English with a Mexican-Spanish accent. Subjects’ use of speech accent to cue from whom they should learn cultural information was subsequently compared.
Chapter 3: Experiment 1 Methods

Participants

Sixty-four 5- to 6-year-old children (*M*= 72;18, *range*: 61;8 – 99;27) and 32 adults participated in this study (*M*=19 years, *range*: 18-23 years). Additionally, nineteen children and four adults were tested but excluded due to experimenter error (8), bilingualism (16), or failure to cooperate (1). Bilinguals were excluded to control for participants’ previous exposure to foreign-accented individuals. From parent reports, it is known that all but one of the child participants is from the Midwest and 75% of children have no regular contact with people who speak with foreign accents; the majority of the remaining 25% are reported to have contact with foreign-accented individuals solely through television and movies. Approximately half of all subjects were female. All participants were monolingual English speakers. Half of the children were recruited from and tested in the children’s area of an urban science museum. The other half of the children were recruited from a calling list of families from a large metropolitan area in the Midwest and tested in a laboratory at the local university. Adults were recruited from the psychology student subject pool at the same university.

Materials

*Visual Stimuli*
The visual stimuli were a series of ten video recordings, corresponding to two familiarization trials and four pairs of test trial videos. The four pairs of test trial videos correspond to four novel objects. See Appendix 1 for pictures of all objects and their corresponding action sequences. Each video presented one of the two female actors either being introduced (during the familiarization trials) or manipulating novel objects (during test trials). The two actors never appeared in the same video. Familiarization trials were recorded so that the only visual differences between the two videos were the two distinct actors. Test trials were recorded so that the only visual differences between the two videos were the two distinct actors and the manner in which they manipulated the novel objects to retrieve the prize. The manner of manipulating the objects to get the prized differed only in non-functional actions produced by the actors.

In all videos, actors first looked at the camera, smiled, and waved, but proceeded to be filmed over their right shoulder so that subjects could not see the actors’ faces while they spoke. The audio that accompanied the visual recording did not begin until the actors’ faces were away from the camera. This ensured that both the native and foreign-accented audio tracks could be added to all of the videos to allow for complete counterbalancing of actors with native or foreign-accented speech.

**Auditory Stimuli**

Specialized auditory tracks were recorded separately and added to the visual recordings. Auditory stimuli were recorded using Final Cut Pro software on a Macintosh computer. Two female, college-age females were recorded speaking the same texts. For familiarization trials, the speech described how the actor had to go down the hall to get to
the next room that was full of “new toys.” Thus, the speech was in first person. During test trials, the speech described how the actor played with the toy to retrieve the prize. The text only differed for the non-functional steps that were unique to each video. One of the females was a monolingual English speaker from the Midwest who spoke with a local accent; the other was a native Mexican-Spanish speaker who spoke in English with a Mexican-Spanish accent.

The audio and visual tracks for each video were merged into a single file and exported into QuickTime files using Final Cut Pro. The QuickTime videos were then shown to subjects on a MacBook.

Procedure

At the beginning of the study, the children’s parents were seated out of earshot of the child and computer. Parents were given a questionnaire to fill out about their child’s previous language experiences (see Appendix 2).

Familiarization Trials.

To introduce the task, the experimenter told subjects that they were going to watch movies of two women playing with some new toys, but before they saw the women playing with toys, they needed to be introduced to the women. Subjects then watched a video of one of the actors walking down the hall and then watched the video of the other actor walking down the hall. The actors and accents (native or Mexican-Spanish) were crossed and counterbalanced between subjects.

Test Trials.
Subjects viewed four pairs of videos (corresponding to the four novel objects) for a total of eight test trials. The experimenter told subjects that they would watch the two women they had just met (in familiarization) play with a new toy. For each novel object (“toy”), subjects watched the two videos of the two actors manipulating the objects in slightly different ways to retrieve the prize. The experimenter picked up the same novel object seen in the videos, offered the object to the subject, and told the subject that it was now his or her turn to play with the toy. Until this point, the novel objects had all been hidden under a cloth next to the experimenter. See Figure 2 for an example display of the videos.

Transfer Trials.

After the subject took his or her turn, the experimenter got the attention of either the parent of the child or another research assistant for the adults (the third person had been out of earshot during the familiarization and test trials). The experimenter told the subject to show the parent or research assistant how to play with the new toy. See Table 2 for an example sequence of the familiarization, test, and transfer trials with corresponding script.

The test and transfer trials were repeated three more times so that each subject watched the videos of both women, took his or her own turn with the object, and showed an adult how to play with the object over a total of four trials. Thus, each trial consisted of one test and one transfer. The actors and accents were crossed and counterbalanced between subjects in the test trials, as was the order of object presentation.
Chapter 4: Experiment 1 Results

Preliminary analyses in this experiment showed no main effects or interactions involving gender, accent order, actor order, or object order, so these factors will not be addressed further. In general, both children and adults understood the task: 5- to 6-year-olds imitated the non-functional behaviors 95% of the time ($SD=18\%$) and adults did so 89% of the time ($SD=9\%$). All of the functional behaviors (actions functionally necessary to retrieve the prize) were imitated 100% of the time by both age groups. Because the non-functional imitation occurred at such high rates, trials were removed in which participants did not engage in any non-functional imitation and the average scores on the remaining trials were used for analysis. Using this criterion, one child was removed entirely from analysis because he did not engage in any non-functional imitation.

The remaining non-functional imitations were coded as following the native speaker (=1), imitating the foreign-accented speaker (=0), or neither (=.5). Behaviors coded as “neither” consisted of participants producing their own novel actions to retrieve the prize, not imitating a non-functional action, or imitating both the native and the foreign-accented speaker. Using this coding system, the average of participants’ imitations yielded a mean imitation score.

A 2x2 ANOVA looking at the influence of age group (children vs. adults) and trial type (test vs. transfer) on the mean imitation score show a marginally significant main effect of age group ($F(1,53)=3.42, p<.10$), no main effect of trial type, and no
significant interactions. One-sample t-tests reveal that children imitated the native speaker significantly more than chance ($M=.64$, $t(63)=4.54$, $p<.001$), but adults showed no significant preference in who they imitated ($M=.56$, $t(31)=1.46$, ns). See Figure 1.

Participants’ first reactions to the task were measured by analyzing who they imitated during just the first trial. Children imitated the native speaker on the first trial significantly more than chance (chance = .5) ($M=.63$, $t(63)=4.481$, $p<.001$) and adults did not show any significant biases in whom they imitated in their first trials ($M=.54$, $t(31)=.867$, ns).

Participants were also classified based on the number of trials that they followed the native speaker. This classification allowed for three categories of participants: mostly native-imitators, mostly-foreign imitators, or neither. A chi-square test of the majority scores reveal that most children preferentially imitated the native speaker ($X^2(2)=24.592$, $p<.001$), but the adults showed no such preference ($X^2(2)=2.313$, ns).
Chapter 5: Experiment 1 Discussion

Experiment 1 investigated whether children use native versus foreign speech accent to guide their learning of non-functional information. Results indicate that accent does influence children’s behavior in the task: children selectively imitated the non-functional behaviors of the native speaker at much higher rates than those of the foreign-accented speaker. This robust finding is true for the first test trial pair and across all test trial pairs, when participants are initially allowed to manipulate the object, and when they show another person how to manipulate the object.

Unlike children, adults did not show any selective preference in whose non-functional behaviors they imitated. The speech accent manipulation in Experiment 1 was not enough for adults to demonstrate an imitative bias. In contrast with children, adults did not use the speaker’s accent to decide whether she was a reliable source of information.

One possible explanation for the results is that children did not understand the foreign-accented speaker. To address this issue, another eight 5- to 6-year-olds were presented with only the foreign-accented videos used in Experiment 1. In this scenario, children imitated the non-functional behaviors of the foreign-accented speaker 100% of the time. Children seem to be able to understand the native speaker when she is not put in contrast with a native speaker. Thus, it is not the case that children will never follow the foreign-accented speaker.
A second possibility is that children are using speech accent to guide their judgments of who is a credible source of non-functional information. Following this idea, adults may not be using speech accent as a credibility cue in the same way that children do (which is why adults’ imitative behaviors are at chance in Experiment 1). To test the hypothesis that speech accent is a credibility cue that children but not adults make use of, Experiment 2 contrasts speech accent with explicit credibility cues.
Chapter 6: Experiment 2  Introduction

Experiment 2 explores whether speech accent is a type of credibility cue that children use when they learn cultural information. The same stimuli were used and procedure followed as in Experiment 1 with the following exception: one of the speakers in the video pairs shows hesitation and uses the linguistic hedge “I think” (an explicit credibility cue) to describe the way the actor retrieves the prize from the novel objects. Thus, one speaker is less confident in the way she manipulated the objects. The other speaker is the same as in Experiment 1, using speech that indicates certainty in her manipulation of the objects. The two actors’ speech accents and use of hedging were fully-crossed across conditions. Participants’ use of speech accent and explicit credibility cues in learning non-functional information were subsequently compared. If speech accent does not signal speaker credibility, then participants should only use explicit credibility cues, and not accent, when determining whose non-functional behaviors to imitate. If speech accent does signal speaker credibility, then participants will use both explicit credibility cues and the speaker’s accent to distinguish the credible source of non-functional information.
Chapter 7: Experiment 2 Methods

Participants

Thirty-four 5- to 6-year-old children (M= 5;5, range= 60;7 – 74;1) and 36 adults (M=18 years, range: 18 -21 years) participated in this study. Approximately half of all subjects were female. Additionally, one child and five adults were tested but excluded due to experimenter error (2), bilingualism (4). All remaining subjects were monolingual English speakers. From parent reports, it is known that all but one of the child participants is from the Midwest and 60% of children have no regular contact with people who speak with foreign accents; the majority of the remaining 40% are reported to have contact with foreign-accented individuals either through the media or with peers at school. All children were recruited from a calling list of families from a large metropolitan area in the Midwest and tested in a laboratory at the local university. Adults were recruited from the psychology student subject pool at the same university.

Materials

Visual Stimuli

The visual stimuli were identical to those used in experiment 1.

Auditory Stimuli

Experiment 2 used the same audio stimuli as Experiment 1 for just one of the speakers (either the native or Mexican-accented speaker). The speech used from Experiment 1 indicates certainty. The other speaker used language that expressed
uncertainty about how to play with the toys. Both the native and Mexican-Spanish accented speakers recorded the same text used in experiment 1, but adding hesitation and the phrase “I think” to the beginning of their sentences in an attempt to express uncertainty about how to play with the toys.

The audio and visual tracks for each video were made and displayed the same way as experiment 1. However, over the entire sequence of videos (familiarization and test) one actor used certain language (in experiment 1) and the other actor used uncertain language (“I think”).

Procedure

The procedure in experiment 2 exactly mirrored the procedure in experiment 1. In addition to the previously mentioned counterbalancing factors, language certainty (“I think” vs. Experiment 1’s certain speech) was crossed with accent and counterbalanced as well.
Chapter 8: Experiment 2 Results

Preliminary analyses showed no main effects or interactions involving gender, accent order, actor order, or object order, so these factors will not be discussed further. Both children and adults seemed to understand and be engaged in the task: 5- to 6-year-olds imitated the non-functional behaviors 98% of the time ($SD=9\%$) and adults did so 84% of the time ($SD=35\%$). All of the functional behaviors were imitated 100% of the time by both age groups. Following the previous experiment, trials were removed in which participants did not engage in any non-functional imitation and the average scores on the remaining trials were used for analysis.

The rest of participants’ non-functional behaviors were coded as imitating the native speaker (=1), the foreign-accented speaker (=0), or neither (=.5) as in Experiment 1. Again, the average of the imitation scores provides the mean imitation scores. A 2x2x2 ANOVA looking at the influence of age group (children vs. adults), certainty (certain vs. uncertain), and trial type (test vs. transfer) on the mean imitation scores reveals a marginally significant main effect of age group ($F(1,45)=3.97, p<.10$), a significant main effect of certainty ($F(1,45)=7.21, p<.01$), no significant main effect of trial type, and no significant interactions. Across all trials, both children and adults imitated the native speaker significantly more than chance (chance = .5) when the native speaker was certain and the foreign-accented speaker was uncertain (children: $M=.76, t(16)=5.28, p<.001$; adults: $M=.69, t(17)=2.42, p<.05$). In the case in which the native
speaker was uncertain and the foreign-accented speaker was certain, adults imitated the foreign-accented speaker significantly more than chance ($M=.65, t(17)=-2.79, p<.05$) but children no longer showed an imitative preference ($M=.46, t(16)=-.73, ns$).

Again, participants’ initial reactions to the task were analyzed by looking at their behavior during just the first trial. Participants followed the native speaker when she was certain (and the foreign-accented speaker was uncertain) significantly more than chance during the first trial (children: $M=.77, t(16)=5.39, p<.001$; adults: $M=.68, t(17)=2.41, p<.05$). However, for the native uncertain, foreign-accented certain contrast, adults imitated the foreign-accented speaker significantly more than chance ($M=.29, t(17)=-2.83, p<.05$) and children no longer preferred to follow one speaker over the other ($M=.44, t(16)=-.558, ns$). See Figure 3.

As in Experiment 1, participants were also classified as a native-imitator, a foreign-imitator, or neither during the majority of their trials. A chi-square test demonstrates that children were significantly more likely to be classified as native-imitators when the native speaker was certain (and the foreign-accented speaker was uncertain) ($X^2(2)=11.41, p<.01$), but children were not classified into any category more than another when the foreign-accented speaker was certain (and the native speaker was uncertain) ($X^2(2)=4.353, ns$). Adults on the other were significantly more likely to be classified as native-imitators when the native speaker was certain (and the foreign-accented speaker was uncertain) ($X^2(2)=6.30, p<.05$) and adults were significantly more likely to be classified as foreign-imitators when the foreign-accented speaker was certain (and native speaker was uncertain) ($X^2(2)=6.28, p<.05$).
Comparison between Experiment 1 and Experiment 2 were also conducted in order to assess whether changing the certainty of the speakers in the videos changed the way participants behaved in the task. An 2x2 ANOVA looking at whether experiment (1 vs. 2) and age group (children vs. adults) influence mean imitation scores reveals that there is a significant main effect of age ($F(1,158)=5.37, p<.05$) and a significant main effect of experiment ($F(1,158)=5.91, p<.01$), but no significant interaction. Planned comparisons show that children imitated the native speaker’s non-functional behaviors significantly more in Experiment 2 when the native speaker was certain and the foreign-accented speaker was uncertain than in Experiment 1 ($t(95)=-2.37, p<.05$). Furthermore, children imitate the foreign-accented speaker significantly more in Experiment 2 when the foreign-accented speaker is certain and the native speaker is uncertain than in Experiment 1 ($t(95)=2.77, p<.01$).

Additional planned comparisons demonstrate that native speakers showing certainty and foreign-accented speakers showing uncertainty led adults to significantly change who they imitated in Experiment 2 compared to Experiment 1 ($t(65)=3.01, p<.01$). In the case in Experiment 2 when the native speaker was uncertain and the foreign-accented speaker was certain, the adults imitated the foreign-accented speaker significantly more than in Experiment 1 ($t(65)=3.27, p<.01$).
Chapter 9: Experiment 2 Discussion

Experiment 2 examined whether speech accent is a credibility cue that children and adults use above and beyond explicit credibility cues such as hedging and hesitation. The results reveal that children did prefer to imitate the non-functional behaviors of a confident native speaker over an uncertain foreign-accented speaker. Interestingly, children did not show an imitative preference when the confident speaker was foreign-accented and the native speaker was certain. However, children did imitate the foreign-accented speaker more in Experiment 2 when she was certain (and the native speaker was uncertain) than in Experiment 1. For children, speech accent may be an implicit cue to speaker credibility.

In contrast with children, adults imitated the non-functional behaviors of the more certain speaker, regardless of accent. These behaviors show that adults relied primarily on explicit credibility cues and did not use speech accent as an implicit credibility cue.
Chapter 10: General Discussion

The current studies explored whether children use speech accent as a guide for cultural learning. Experiment 1 demonstrated that children imitated the non-functional behaviors of a native speaker over a foreign-accented speaker. However, adults showed no preference to imitate one speaker over the other. There were no differences in behavior (for neither children nor adults) between test and transfer trials in Experiment 1 or 2, demonstrating that participants transmitted the same non-functional behaviors as that they imitated. Thus, children but not adults use speech accent as a guide for cultural learning and cultural transmission.

Learning the non-functional behaviors in this task is dependent upon seeing someone else first engage in the behaviors. In the experiments described, non-functional behaviors were pieces of information that had to be learned socially. Learning information within a social context is essential to the transmission of cultural information. In the current experiments, native speakers facilitate children’s—but not adults’—learning and transmission of a non-functional behaviors to other native speakers of their speech community. The non-functional behaviors are analogous to non-functional cultural information that can be transmitted between members of a community.

Children’s imitative preferences in Experiment 1 suggest that they selectively learned non-functional information from members of their native-speaking in-group. The imitative preference may be showing an in-group bias that children hold for native
speakers of their native language. The results in Experiment 1 reveal that, although children seem to prefer the native speaker, they are still imitating the foreign-accented speaker a substantial minority of the time (about 35% of trials). Aboud (2003) argues that in-group favoritism is “psychologically primary” to out-group prejudices. Furthermore, negative biases towards out-groups emerge when the out-group is compared to the in-group (Aboud, 2003). The current data support this claim in that preschoolers imitated the foreign-accented out-group member less than the native-accented in-group member when the two speakers were pitted against each other. However, selective learning from the native speaker may have been aided by covert credibility cues offered by each speaker’s accent.

Experiment 2 tested this possibility and found that when explicit credibility cues (i.e. expressing certainty with confidence) were paired with the native speaker, both children’s and adults’ imitations of the native speaker increased in relation to the uncertain foreign-accented speaker. In this case, imitation of the native speaker was increased for both children and adults in comparison to Experiment 1.

Contrasting speech accent with explicit credibility cues (Experiment 2) such that the foreign-accented speaker showed certainty and the native speaker was uncertain was not enough for children to prefer to imitate the foreign-accented speaker, but it was enough to significantly change children’s behaviors between Experiments 1 and 2. When all explicit credibility cues are equal (Experiment 1), children follow the non-functional actions of the native speaker. Children use the explicit cues (Experiment 2) to solidify their choice to imitate the native speaker when the native speaker is confident, but the
explicit cues were not enough to persuade children to follow the foreign-accented speakers any more than chance would predict. Despite the lack of a significant interaction between speech accent and credibility cues in Experiment 2, the data still suggest that children use both speech accent and explicit credibility cues to guide their cultural learning (because the children in Experiment 2 did not follow the foreign-accented speaker when she was certain). Future studies could investigate situations that would induce children to learn from a foreign-accented speaker. For example, children may learn about objects they know to be foreign from foreign-accented speakers.

Adults in Experiment 2 behaved somewhat differently than children when the native speaker was uncertain and the foreign-accented speaker was certain. Adults seemed to rely exclusively on the explicit credibility cues to determine which speaker they should imitate, showing a preference for the confident speaker regardless of her speech accent. This data is not surprising given that adults did not show any consistent imitative preference based on accent alone in Experiment 1. Thus, adults use explicit credibility cues and not speech accent to guide their cultural learning.

One possible explanation of the results is the comprehensibility of the foreign-accented speakers. Future studies should try to add background noise to the native speech to see if making native speech less comprehensible will increase children’s propensity to follow the foreign-accented speaker. It may be a challenge to determine exactly how much noise must be added to native speech to make it comparable to foreign-accented speech, but it seems a critical point for making claims about children’s preferences for native speakers.
Another explanation of the results is that, for children, speech accent is a credibility cue itself that signals whether an information source is reliable. In this view, speech accent is an implicit cue to speaker credibility. Speech accent independent of other factors may be enough for children to determine whether to trust a person (the case in Experiment 1). When other credibility signals beyond speech accent are added to the repertoire of cues available for children to use, the signals work together in interesting ways to enhance a native speaker’s credibility and likelihood of being imitated, but not in such credibility-enhancing ways for a foreign-accented speaker (as in Experiment 2).

Following this view, speech accent would not be an implicit credibility cue for adults. Adults did not rely on accent in either experiment; explicit credibility cues were the most important. However, adults may have been highly-aware of the task demands in each experiment. One possible explanation for the developmental differences in the data is that adults may have come into contact with many foreign-accented speakers that have demonstrated reliable information and proven trustworthy, whereas children have likely not had similar experiences. It is also possible that the experimental design was not suitable for adults such that adults may have realized what was being tested and behaved accordingly. Adults may not have wanted to make it obvious that they hold any prejudices towards native or foreign-accented speakers. Further research should look at adults under cognitive load to see whether sufficient distraction or “stress” will lead them to also show favoritism for a native-speaking in-group over a foreign-accented out-group.

In conclusion, the current data show that children used speech accent to preferentially learn and transmit non-functional information from native speakers over
foreign-accented speakers. This preference increased when the certain native speaker was contrasted with an uncertain foreign-accented speaker. Children did not learn or transmit non-functional information when the certain foreign-accented speaker was contrasted with an uncertain native speaker. Children viewed the native speaker as the credible source of non-functional information. Thus, children learn and transmit non-functional cultural information from linguistic in-group members (native speakers) over linguistic out-group members (foreign-accented speakers) because in-group speech implicitly signals credibility.
Figure 1. The Novel Objects and their Action Sequences
The four novel objects used in the two experiments. The two possible action sequences for each toy follow are below the corresponding picture. The actions in italics are the non-functional actions that differed between the test trial videos. The order of action sequences and toys were counterbalanced between subjects.
Figure 2. Example Display
Example display of the two videos shown for familiarization and the two videos shown for one of the four test trials.
Figure 3. Experiment 1 Mean Imitation Scores
Mean imitation scores for both age groups during the test and transfer trials in Experiment 1. Five- to 6-year-olds selectively imitate the native speaker a significant amount of the time, but adults do not demonstrate any imitative bias.
Figure 4. Experiment 2 Mean Imitation Scores
Mean imitation scores for both age groups for the initial imitation in Experiment 2 (transfer trials not displayed because there are no significant differences between participants’ behaviors during initial imitation and transfer trials). Five- to 6-year-olds selectively imitated the native speaker significantly more when she was certain than they do when the foreign-accented speaker was certain and significantly more than chance. Adults showed a significant preference to imitate the certain speaker, regardless of accent.
<table>
<thead>
<tr>
<th>Trial Type</th>
<th>Actors in Videos</th>
<th>Experimenter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Familiarization</strong></td>
<td>“Hello! I am so glad you came here today so that I can show you some new toys. The toys are in the next room. I have to walk down the hall to get to the next room. Here is the room with the toys!”</td>
<td></td>
</tr>
<tr>
<td><strong>Test</strong></td>
<td>“Hello! I have this toy that I want to show you. This is how I play with it to get the prize. First, I take off this black part like this. Then I put the black part in the hole like this/attach the black part to the other side like this. Then, I twist the door to get the prize.”</td>
<td>“Now it’s your turn to play with the toy to get the prize out.”</td>
</tr>
<tr>
<td><strong>Transfer</strong></td>
<td></td>
<td>“Now you can show your mom/research assistant how to play with the toy to get the prize out.”</td>
</tr>
</tbody>
</table>

Table 1. Example Trial Sequence with Script
This is an example of the script participants would hear in Experiment 1. Participants viewed both actors’ videos before the experimenter spoke. Both actors in the videos used the same script, but the non-functional actions in the test trial differed. The order of presentation of the two non-functional actions was counterbalanced.
REFERENCES


Appendix A. Language Experience Surveys

1. Do you and your child currently live in Ohio?  Yes       No
   If no, please indicate the city and state of residence.

2. Where are you from? (Please indicate the city and state, or country if outside the U. S., where you lived ages 0-16 years. Please list more than one location if applicable.)

3. Has your child ever traveled outside the U.S.?  Yes       No

4. Does your child attend daycare/preschool/kindergarten?  Yes       No
   If no, skip to question 7.
   If yes, please answer the following questions:

5. Which of the following best describes the daycare/preschool/kindergarten setting:
   a. In home-care (relative, friend, neighbor, etc.)
   b. Commercial daycare center/preschool program
   c. Elementary school kindergarten class

6. For approximately how many hours/week does your child attend daycare/preschool/kindergarten?

7. Does your child have regular contact with anyone who speaks English with a foreign accent?  Yes       No
   If yes, please indicate the relationship of this person(s) to your child:

8. Does your child speak any languages other than English at home?  Yes       No
   If yes, please indicate the language(s) spoken.

9. Does your child have contact via television/movies, etc. with anyone who speaks English with a foreign accent?  Yes       No
   If yes, please explain.