Word Learning Ability of 9-Month-Old Ethnic Chinese Infants

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Abstract. The conventional nature of language refers to the fact that words have meaning because they are shared among speakers of the same linguistic community. Evidence from previous research suggests that infants who are around 9-13 months of age have a basic understanding of the conventional nature of language. However, it remains unknown whether younger infants understand that words have consistent labels and these labels should be generalized across different people. To answer this question, the present study examined whether 9-month-old Chinese infants who are habituated to the event in which a speaker provides a label for a novel object, would expect a second speaker to apply the same label to the same objects. Findings indicate that 9-month-olds expect different speakers to use the same label to refer to the same objects. Thus, by 9 months of age, infants have some understanding that an object label should be remain consistent on different occasions across people. The mechanism underlying the acquisition of conventional knowledge and implications for word learning and culture are discussed.

Introduction

The infant’s social world is full of a variety of human actions that they must accurately interpret to make sense of their world. One important distinction that infants must make is between conventional and non-conventional forms of human actions [1]. Conventional actions are those that appear arbitrary, but have meanings that are shared across individuals within a particular community such as linguistic (e.g., words) and social conventions (e.g., waving) [2]. On the other hand, non-conventional actions such as personal preferences and desires are person-specific and do not generalize across members of the same community. There is a growing body of evidence supporting infants’ understanding of both types of information [3][4]. For example, by their first birthday, infants expect object labels to be shared by different people, but not preferences [5]. Although there is evidence suggesting that infants possess at least a basic appreciation of the conventional nature of words, a number of questions remain concerning the scope of infants’ understanding.[6] One remaining question is whether infants understand that the conventional nature of words are shared among different speakers. This ability in an integral part of a person’s learning ability and have major influences in the infants’ social communication behavior. The present research will extend the current knowledge on infants’ understanding of conventionality by investigating whether 9-month-old ethnic Chinese infants understand that spoken object labels can be generalized across different people. The significance of this study lies within the extension of such investigation on infants to ethnic Chinese infants with much younger age range.

Method

Participants

Twenty-three full term infants (14 males and 9 females were recruited, overall mean age = 9 months, 15 days, range = 8 months, 21 days to 9 months 24 days) participated in this study. All test were conducted in a laboratory in Shanghai, China. All infants were from homes in which mandarin
was the primary language spoken (for more than 70% of the time) and were recruited from a database of volunteers who are interested in early childhood education and signed up during events and road shows. Families were also approached via social media relating to early childhood education and stated that they were interested in infant development studies. Caregivers reported infants as belonging to following ethnic groups: Ethnic Han (n = 22), and Muslim (n=1). All infants received a small toy and parents received a comprehensive workshop on early childhood education and free car parking as tokens of appreciation.

Data Collection Procedure

Four objects deemed to be unfamiliar to infants were used in the present study. The objects consisted of two exemplars of each of the following object types: a ball shaped sponge and a long, oddly shaped toy. The session began with a brief warm-up period during which the experimenter interacted with the infant for a brief period of time to ensure he/she was comfortable in the new environment. During this time the experimenter also described the study to the parent and instructed the parent not to do anything that would distract the infant during the experiment. The parent was then given an information sheet about the study and was asked to complete a consent form and a demographic survey. The demographic survey contained questions regarding the infants’ ethnicity and most importantly, the number of languages (in percentages) to which the infants were exposed on a daily basis. These questions ensured that infants received sufficient exposure to Mandarin Chinese.

The parent and the infant were then escorted to the habituation room. The infant sat on the parent’s lap approximately 60 cm from a 23-inch Tobii T120 eye tracker. Once the parent and infant were seated comfortably in the habituation room, a Speaker Familiarization video was first shown on the screen. The speaker played a peek-a-boo game on the screen saying “Here I am” in Mandarin. The habituation phase followed in which the infant was shown a video in which one of the speakers from the Speaker Familiarization video (i.e., the habituation speaker) attracted the infant’s attention by making direct eye contact and saying “Nihao (Hi in Chinese)”, looked at one of the two stimuli in front of him/her (i.e., the target), provided a novel label (“a Duo Mi”), grasped the target object, and provided the label the second time (“a Duo Mi”). The habituation speaker maintained his final position until the infant looked away for more than two consecutive seconds or after 120s had elapsed to end the trial. The other object (i.e., the distracter) was not labelled or acted upon. The infant was shown the same habituation event repeatedly until his/her total looking on three consecutive trials fell below half of the total amount of time they looked on the first three trials or until 14 trials had elapsed. After this criterion was reached, infants watched the habituation event one more time which provided an unbiased baseline measure of post habituation levels of attention (i.e., the baseline trial).

After the baseline trial, the infants were shown two “where is it” trials in which the side of the objects was switched. In the first “where is it” video, the speaker who had been in the habituation event attracted the infant’s attention by smiling and saying “Nihao” and then asked the question “where is the Duo Mi, look at the Duo Mi, do you see the Duo Mi?” (in Chinese) before putting his/her head down to break eye contact. The infants’ looking during this type of trial was timed beginning after the speaker had put his/her head down and stopped moving and continued until the infant looked away for two consecutive seconds.

After infants ended the first “where is it” trial, a new speaker who the infant had seen in Speaker Familiarisation but not in habituation trials (i.e., the test speaker: not the original habituation speaker) performed the same action sequence and asked the same questions. The “where is it” trials served to familiarize infants with the object locations and the test speaker before the test trials began. Infants’ attention towards each object was also coded to determine whether infants responded to the speaker’s question by looking at the object that had been labelled during habituation.

After the “where is it” trials, infants were shown six test trials in which the test speaker alternated his/her labelling by either naming the test target using the familiarized label “Duo Mi” (i.e., the
target test trials) or naming the distracter using the word “Duo Mi” (i.e., the distracter test trials). The labelling procedures consisted of the same vocalizations and action sequence as during the habituation event. The on-line coding procedure was also identical to habituation trials.

Results

Test Pair Analyses

It was predicted that if 9-month-old infants understood that individual should consistently using the same label for an object. Test subjects would look longer towards the test trials in which the speaker labels the distracter using the word “Duo Mi”, but not towards the test trials in which the speaker uses the word “Duo Mi” to refer to the test target.

A 2 (test trial type) x 2 (first test type) mixed-design ANOVA with test trial type as the within-subject factor was conducted to investigate whether there were any differences in infants’ looking time towards the first distracter and target test trials.

![Figure 1. Looking Time of 9-Months Infants in Trials with Target and Distracter.](image)

The results were significant at a 5% level, $F(1, 22) = 5.13$, $p = .04$. This suggests that there was a strong tendency for infants to look longer towards the first distracter test trial than towards the first target test trial. As shown in the figure above, on average infants tend to look at the target for about 8.2 (SE=1.31) seconds whereas a distractor attracts approximately 11.3 (SE=1.19) seconds of attention. These results confirm our initial hypothesis of 9-month infants have the ability to learn words through repetition and expect the speakers to apply the same label to identical objects.

Discussion and Conclusion

The goal of this study was to explore the basic word learning ability of 9 months old infants and whether infants expect that different people use the same label for the same object. The experiment results confirmed these hypotheses. Nine-month-olds in the study looked significantly longer towards the distracter test trial, when a different speaker used the label “Duo Mi” for an object that was not the same kind as the target object. Due to issues such as sample recruitment and low level of cooperation, the majority of relevant research focuses primarily infants over 12 or 13 months of age. However, these issues can be resolved in China where volunteers are relatively abundant with high tendency of cooperation. Therefore, this finding provides the first evidence that 9-month-olds understand that different speakers should use the same label for objects of like kind.

Understanding this aspect of conventionality would help infants communicate with other people because they would not spend time seeking the name for every object from each individual person.
Together, these findings and those from previous research [7] [8] suggest that, by the age of 9 months, ethnic Chinese infants have the basic understanding of the conventional nature of language. Future research will investigate the age at which this understanding develops and how this understanding influences infants’ language development. There are some limitations in the present study. Firstly, although it is relatively easier to recruit participants in China where there are more infants, the sample size is also restricted by time and budget. A larger sample size or repetitive experiments may yield more compelling results. Also, most of our participants live in Shanghai, the most economically developed city in China where the access to education, nutrition and overall living standard ranked top in China. Therefore, whether the results can be generalized to infants from less developed demographics may require further experiments. Overall, the findings of the present study align with relevant literature [9]. The study confirms infants’ ability to understand conventionality in language. However, the study focused on younger infants in comparison with studies on infants in Western countries. As a result, it suggests that infants as young as near-10-months of age have a basic understanding of language and conventions.

Reference


