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Phonetics and phonology

Ian Cushing & Sam Hellmuth

Abstract

Equipping students with some basic tools of phonetics and phonology unlocks an unlimited supply of linguistic data for them to work on, opening up a variety of pedagogical ideas and approaches. In this chapter we provide some practical suggestions for incorporating awareness of phonetics/phonology into the secondary English classroom, and review recent 'myth-busting' research related to the phonetics and phonology of Key Stage 4/5 topics, including accents and dialects, child language acquisition, language change and forensic linguistics. We also recommend further reading and sources of language data.

Introduction

Phonetics and phonology share a common interest in all things 'phon', that is, related to the use of sounds in language. This definition shows the wide scope of the subject, ranging from study of the individual vowels and consonants used to form words in a particular language or dialect, to sounds which stretch over longer chunks of speech (stress, rhythm and intonation). Phoneticians/phonologists study speech sounds in diverse contexts and for diverse reasons: how do infants develop the ability to speak their mother tongue in a few short years? how do speakers manage turn-taking in an orderly fashion in naturally occurring conversation? how are listeners able to form an opinion about where a speaker is from (and about their age, and gender) from just a few seconds of speech?

In simple terms, phonetics can be defined as the actual *production and perception* of speech sounds by humans, whereas phonology is about the *systems* of sounds in use in a particular language or context. Signed languages also be described in terms of articulatory gestures (defined in terms of handshape or position in the signing space) which are combined in non-random, systematic ways to form meaningful units of language (signs). Although most work on phonetics and phonology operates in the speech modality, many of the basic conceptual questions can equally be asked and answered with regard to signed languages. We will focus on spoken languages here, but provide some recommended reading on the phonetics and phonology of signed languages at the end of the chapter.

The questions that phonetics and phonology allow us to explore are inherently interesting and form part of the everyday linguistic experience of all of us, including our students. More importantly, these are questions which could or should feature fairly high up on the agenda of most teachers of secondary English. The link is perhaps the most obvious at Key Stages 4/5 – since questions of this type appear on GCSE and A level specifications, under headings such as accents and dialects, child language acquisition and language change – but also at Key Stage 3, as we will demonstrate. Later on in this chapter we therefore provide an overview of some recent research in phonetics and phonology which sheds new light on common lay assumptions (or 'myths') about language in these areas. Before that, in the next section, we suggest practical ways to introduce 'phon' concepts already in the Key Stage 3 classroom, as preparation for later stages, and in light of increasing awareness of the importance of Knowledge about Language. The National Curriculum for English refers to a number of 'phon'-related concepts – digraphs, phonemes, sound to spelling relationships, homophones, homonyms, accents, vowels and consonants.

Why bring more 'phon' into the secondary English classroom? A first strong argument is that it can be a lot of fun, if students are equipped with just a few basic tools of phonetic and/or phonological

analysis. A second strong argument in favour of raising awareness of phon concepts is that it unlocks an almost unlimited resource, namely the speech patterns of those involved in the lesson. One of the great attractions about doing linguistics is that the 'data' (the raw material that research linguists analyse) is all around us, all the time (this is true for all areas of linguistics of course, and is not the preserve of phonetics/phonology). Each and every classroom in the UK is home to a group of students who i) have acquired or are acquiring English, whether as a first or additional language (and both of those are equally interesting) and ii) who differ from each other in their speech patterns (even the most homogenous classroom will reveal some sociophonetic variation). Teachers seeing students – and them seeing themselves, and each other – as a valuable and rich source of linguistic data offers limitless engaging opportunities in the classroom.

Using phonetics and phonology in the Key Stage 3 classroom

A lesson on applying phonology and phonetics in a Key Stage 3 classroom may begin in a number of ways. The following sections outline what some of these ways might look like, and they are designed to be suggestive rather than didactic – these are not 'lesson plans' as such, but ideas to adapt and explore.

Using the phonetic alphabet and transcribing speech

Objectives:

- To understand some of the differences between speech and writing
- To understand how speech sounds can be written using the phonetic alphabet

Encouraging students to think explicitly about phonetics and phonology in day-to-day environments, without necessarily the need to use any specific or new linguistic terminology, is a good way to begin exploring phon concepts in the classroom. Open questions, such as the following, should begin to draw out the speech-writing distinction:

- Why do accents exist and where do they come from?
- Do we write the same way we speak?
- What are some of the differences between speech and writing?
- How many different sounds are there in the English language?
- If accents are a spoken feature of language, then how could we write them down?

The final question here leads naturally on to introducing the phonetic alphabet, and there being more sounds than letters in English (which could also be an opportunity to discuss phonetic and non-phonetic writing systems). Here might be a good spot to show some very basic transcription, with an explanation (and class rendition!) of the individual phonemes, and how in some words, each phoneme is represented by a single letter:

speech	writing
[kæt]	<cat>

Next, displaying a word where the relationship between sound and spelling isn't quite so straightforward might help to illustrate the complexities of phonetic transcription - such as in:

speech	writing
[kɒf]	<cough>

Here, the idea is to elicit that English spelling is not always purely phonetic, and that often there is a mismatch between the number of letters and sounds in a word. This kind of information is useful for the next activity, when students begin to do some phonetic transcription of their own.

In the English phonetic alphabet, the (roughly) 44 sounds each have their own symbol, just like the 26 letters of the written alphabet do. Students could then be given a copy of the alphabet and the chance to look over some of the more 'strange' looking symbols: [ʒ], [æ] and [ŋ] for example, and then explore some of the subtle differences in sounds, for example the voiceless-voiced differences as in pairs such as [s z] and [θ ð]. Asking students to produce these sounds whilst holding their finger and thumb on the neck where the vocal folds are and 'feel the vibration turn on and off' always produces enlightened reactions!

Students could then have a go at transcribing some individual words themselves, such as their name and their hometown. At this point, the classroom should be filled with noise – emphasis should be given to the importance of 'sounding out' the words, and not to think of the spellings. Many students will make errors, such as using two phonemes for double letters, as in [hæɹi:] for <Harry> yet these can be seen as opportunities to discuss further mismatches between spelling and sound. A further activity, of students identifying the first sound in the following words: *judge*, *pneumonia*, *church*, *though*, *thought* and *yellow* will open up further discussion for sound to spelling relationships.

Once a class has been given the tools for phonetic transcription, a suggested follow-up activity is discussing accents and how the phonetic alphabet can be used to represent these. Beginning with an example of accent variation in the UK – the north/south distinction between [gɹæs] and [gɹɑ:s] is likely to be well-known, and could be a starting point for attitudes and perceptions about accents. Depending on the demographics of the class, students may well speak a variety of accents themselves, and once again we encourage teachers to see the class itself as a rich and valuable resource.

Exploring further

- Students record a natural conversation and then transcribe the speech – what happens? For example, does the glottal stop [ʔ] replace [t] in medial and final positions? Does [f] replace [θ]? Why might these patterns emerge?
- Students research and listen to a variety of UK accents, including how world languages have influenced them. The British Library *Sounds Familiar?* archive, which is available at: (http://sounds.bl.uk/Accents-and-dialects/BBC-Voices) provides a rich resource for this kind of work.

Phonoaesthetics and the 'beauty' of sounds

Objectives:

- To understand that sounds can be judged to be 'pleasant' or 'unpleasant'
- To understand some of the phonetic characteristics of 'pleasant' and 'unpleasant' sounds

Phonoaesthetics is the study of inherent 'beauty' or 'pleasantness' (euphony = 'pleasant' sounds; cacophony = 'unpleasant sounds) within speech sounds, and a lesson on phonoaesthetics would aim to answer the following question: why are certain words deemed to be more pleasant sounding than others? Teachers might ask their students to 'rate' the list of words given below (or, even better, ask them to contribute words themselves that they think sound particularly pleasant or unpleasant) on a scale of pleasantness. For the time being, phonoaesthetic judgements should disregard semantics (the meaning of words), and focus only on the phonological structure and acoustic properties.

conscience, *jump*, *cellar*, *duty*, *jazz*, *chinchilla*, *rasp*, *lumpy*, *gravel*, *pomegranate*, *mingle*

Once the scale has been made, students could think and discuss *why* they have made the decisions they have. Do they see certain phonemes appearing more regularly than others (transcribing the words phonetically and creating some numerical data will help them to spot this)? What about the number of syllables, and where the stressed syllable falls? What about the distribution and pattern of vowels and consonants? What about the frequency of voiced and voiceless sounds? What about the types and complexities of articulatory movements involved? How does the inclusion of semantics affect the rating of pleasantness?

Following on from this, introduce a piece of research conducted by David Crystal (1995) [www.davidcrystal.com/?fileid=-4009]. Crystal analysed a corpus of words judged to be pleasant sounding and found that certain phonemes appeared more than others. The relative frequencies are shown here (where phonemes towards the left appeared more frequently):

Consonants
/l, m, s, n, r, k, t, d, f, b, v, ŋ, w, g, z, ʃ, h, ʧ, ʤ, j, θ, ʒ, ð/

Vowels
/ə, ɪ, æ, e, iː, aɪ, əʊ, ʌ~ʊ, ɒ, eɪ, uː, ɔː, aː, ɜː, ɪə, aɪə, aʊ, ʊə/

In addition, Crystal found three further features that correlated with pleasantness: (1) polysyllabic words, (2) the stressed syllable at the beginning of word and (3) high variance of manners of articulation. So according to the patterns in the corpus, a word such as *malleable* has a pleasing phonoaesthetic quality – because it uses consonants and vowels towards the more 'pleasant' end of the scale, it is polysyllabic and has different manners of articulation. Here would be a good opportunity for students to draw some comparisons between their and Crystal's findings – what similarities and differences were found – and are there explanatory reasons for these?

Exploring further

- Creating nonsense words that are phonoaesthetically pleasant or unpleasant, and using these in a creative writing activity. Using the data a class have generated from their own phonoaesthetic judgements would be particularly interesting.
- Analysing poetry for its use of phonoaesthetic sounds, thinking about why certain sounds are used and how they help to construct meaning

Stylistic phonetics

Objectives

- To understand how stylistic phonetics can help with the interpretation and understanding of meaning
- To understand how writers use phonetics and phonology self-consciously to construct meaning

Stylistic phonetics deals with the analysis of sounds in literature, using tools and approaches from linguistics. This section brings together the classroom ideas explored earlier and although we give an extract of a poem here - *The Harvest Moon*, by Ted Hughes (2003) - it is hoped that the tools we have explored could be applied to a number of texts. This is the first stanza of the poem:

> The flame-red moon, the harvest moon,
> Rolls along the hills, gently bouncing,
> A vast balloon,
> Till it takes off, and sinks upward
> To lie on the bottom of the sky, like a gold doubloon.
> The harvest moon has come,
> Booming softly through heaven, like a bassoon.
> And the earth replies all night, like a deep drum.

As with all poetry, reading the text aloud is the most illuminating way to appreciate the sounds. Students might then begin spotting three sound patterns in the poem using different coloured pens or a similar key: **long vowels**, short vowels and *diphthongs*. The resulting patterns should look like this:

The fl*a*me-red m**oo**n, the h**a**rvest m**oo**n,
R*o*lls along the hills, gentl**y** b*ou*ncing,
A vast ball**oo**n,
Till it t*a*kes off, and sinks upward
To l*ie* on the bottom of the sk*y*, l*i*ke a gold doubl**oo**n.
The h**ar**vest m**oo**n has come,
B**oo**ming softl**y** thr**ou**gh heaven, l*i*ke a bass**oo**n.
And the **ea**rth repl*ie*s **a**ll n*i*ght, l*i*ke a d**ee**p drum.

Figure 1 'The Harvest Moon', with long vowels, short vowels and diphthongs marked.

This process enables students to do a number of things. Firstly, identifying the different types of vowels allows for a more specific analysis and interpretation. Secondly, it highlights repeating patterns and clusters of data – important for strengthening interpretative ideas. Finally, it makes them aware that different types of vowels can contribute to meanings in different ways.

'Zooming in' on the long vowels will help to put this into perspective. They are found within: *moon*, *harvest*, *balloon*, *doubloon*, *booming*, *through*, *bassoon*, *earth*, *all* and *deep*. The repeating [u:] is particularly salient. But why this sound? Here, it is important to start thinking about the bridge between sound and semantics and for students to think about *why* poets would make highly self-conscious, stylistic choices. When considering that poetry is primarily an oral tradition, the significance of sound choices in poetry becomes an important thing to explore.

Words such as *moon*, *bassoon*, *doubloon* and *booming* are all associated with large-scale objects, massiveness or loud, deep sounds. The same 'qualities' can be mapped onto the vowel sound. A vowel is a maintainable sound – one that can be lengthened for as long as the speaker's breath allows. It typically has a low resonant frequency, much like the sound of a 'booming bassoon'. These acoustic properties help to contribute to the meaning of the poem, and to create the image of a big, round, dominant moon in the night sky.

A look at the effects of certain diphthongs reveals further indication of conscious, stylistic choices. The gliding vowel sounds such as [aʊ] in *bouncing* and [əʊ] in *rolls* both indicate movement and transition – in the same way that the moon appears to move across the sky, captured through the poet's choice of verb processes.

Further phonoaesthetic judgements could be made about certain words, in what is a generally uplifting and gratifying poem, providing opportunities for exploring the relationship between sounds and semantics.

Recent research in phonetics and phonology: AS/A2 curriculum links

The primary purpose of research is to broaden our knowledge of how the world works. This often has the effect of showing that our current understanding of things, based on earlier research, needs further thought. In this section we take three generalisations related to 'phon concepts'– which are all at least partially accurate – and show how recent research sheds interesting new light on them.

"Child directed speech is simpler than adult directed speech."

The phenomenon of child-directed speech (CDS) or 'motherese' is likely to feature in teaching of child language acquisition for AS/A Level English Language. It is well established that, in cultures which use it[1], CDS differs systematically from adult-directed speech (ADS). For example, CDS is produced at a higher pitch than ADS, with shorter utterances and longer pauses (Fernald et al., 1989), and tends to contain a more limited subset of the lexicon and simpler syntax than ADS (Snow, 1995). This apparent 'simplification' is usually assumed to provide the listening infant with an easier set of input data to work on, in his/her task of acquiring the sound system, vocabulary and grammar of the language they are hearing.

If this is the case, then we might also expect care-givers to simplify their speech to children by cutting out some of the sociolinguistically driven phonetic variation we find in ADS. However, research on Tyneside English (spoken in and around Newcastle, i.e. 'Geordie') found a much more complex picture (Foulkes, Docherty, & Watt, 2005). The accent feature they were looking at was Tyneside 'glottalisation' of [p], [t] and [k] between two vowels. A Standard Southern British English (SSBE) pronunciation of 'water' has a [t] in the middle: [wɔːtə], but in Tyneside you will hear a glottalised (t) [ʔt] in the middle: [wɔːʔtɐ]. This contrasts with complete replacement of the (t) with a glottal stop, in 'Cockney' English and now also in many urban British accents: [wɔːʔə] (Watt & Allen, 2003).

In their ADS data, the researchers found 90% local (t) and 10% standard (t). In the CDS data this changed dramatically to just 36% local (t) and 59% standard (t). A closer look showed that mothers used more standard (t) with younger children and more local (t) with older children, suggesting that CDS becomes more adult-like over time. Why would early CDS be produced with *more* variation in it than is found in ADS? This does not fit with the idea that the goal of CDS is to be simpler than ADS.

A possible answer lies in another finding of the study, which was that mothers used much more standard (t) if their child was a girl (70%); mums of boys used standard vs. local (t) roughly equally (48% vs. 45%). This makes sense if set alongside the fact that, in adult Tyneside speech, women generally use less local (t) than men do (Foulkes & Docherty, 2006); the variation in CDS resembles the sociolinguistic variation children need to learn to handle in future. A similarly complex picture was found in research on CDS in Scottish English in relation to content and context (Smith, Durham, & Fortune, 2007). They looked at the diphthong [au], pronounced as standard (house) [haʊs] vs. local (hoose) [huːs], and found that the local variant (hoose) was used by parents more during playtime (78%) than in more formal contexts such as when trying to discipline the child (31%) or teach something (19%).

Overall, these results suggest that children acquire sociolinguistic properties of language alongside strictly grammatical or structural properties (Foulkes, 2010): a child doesn't just need to learn how to pronounce (t), she also needs to learn when to produce which sort of (t) in her community.

Exploring further: Identify examples of CDS in transcriptions/recordings from CHILDES (e.g. data from Manchester: http://childes.talkbank.org/browser/index.php?url=Eng-UK/Thomas/), or obtain some recordings from family members. Are there any dialect-specific features in the CDS?

"All children produce the same sounds in babble."

In the early stages of phonological development, the majority of children go through roughly the same stages of development, from babble, through the one-word stage, on to longer utterances, as is widely taught. In the case of babble, the production of repetitive rhythmic vocalisations emerges at around the same time that children start to display other repetitive rhythmic movements, such as kicking (Thelen, 1981). The consonant sounds that are easiest to produce in this way are 'stop' sounds (in English: [p b t d k g m n ŋ]) which require only an opening/closing jaw movement . It turns out that the first words children produce general feature the same sounds that the child has been using in babble. But how does the child know which words to try to say first? Does the child actually know which words will be too hard for them?

A recent study (DePaolis, Vihman, & Keren-Portnoy, 2011) tested the possibility that the sounds used most often in a child's earliest babble (in the sounds they *produce*) will also be the sounds that the child pays most attention to in words that they hear (in the sounds they *perceive*). First, the babble in recordings of 28 children (average age 10 months) was phonetically transcribed. The researchers then identified each child's preferred stop consonants: most used [t]/[d], but others used [b]/[p] or [k]/[g]); some children were more advanced and had mastered more than one of these pairs of sounds. Next, the children came into the baby-lab for an experiment. The child sits on the mum's lap, in a sound-proofed booth. The researchers played recordings of different children's 'stories' made up of five sentences, each with one or two invented 'nonsense' words in them. There were four different stories, each containing lots of occurrences of one pair of stop consonants (only one of which the baby will already be producing) or [f]/[v]. The recordings are played through a speaker to the child's left or right, changing the side at random each time a new story starts, and the child's reactions are recorded on video. Each time a new story starts the child will generally turn towards the source of the sound, so this is known as a head turn preference task. The researcher counts how many seconds the child keeps his/her head turned towards the source of the sound as a measure of attention to the type of sound featured in that story.

The researchers found that the children who were only using one consonant type with high frequency in their babble tended to listen more to the story with that sound in it, whereas those who were more advanced in their development and do already using more than one consonant type paid attention longer to stories containing the stops that they were *not yet* producing. The researchers interpret this as the child with more diverse babble experience being ready to listen to what is new, while the child just beginning to use a single consonant frequently finds it exciting to hear it in the speech he or she hears. Overall, this suggests that children are not just learning to *produce* sounds during the babble stage. Instead, during this stage the child is picking up on the match between the sounds she produces and the sounds she perceives in the speech around her - and what she perceives is affected by what she is able to produce.

Exploring further: Find some babble in transcriptions/recording from CHILDES, or obtain recordings from family members. Try transcribing a short section of babble using the IPA: how easy/difficult is it? Are there any group(s) of sounds that the child uses more than others? Read more about this study at http://www.yorkphondev.org/projects/current-projects/production-and-perception/.

"You can identify an individual speaker's voice using software."

In 'Goldeneye' (1995), James Bond is hiding at the entrance to a Russian military base. We see an officer approach and speak his name into a voice-activated door access system. A speech waveform flickers across the access screen, then a matching waveform is found, and the door slides open.[2] Scenes like this create the impression that individuals can be automatically identified from a 'voiceprint' – just like fingerprints – but this is not (yet) how things work in real forensic cases.

Some portrayals in fiction are closer to the truth though. In a recent episode of US legal drama 'The Good Wife' (Season 6, Episode 9), a legal firm obtains a leaked copy of an FBI wire tap (covert recording) in which a suspect is heard to say he wants one of the lawyers killed, within the week. The clock is ticking. Is the threat real? Or has the FBI faked the wire tap, to persuade the frightened lawyer to hand over privileged information? The firm's investigator offers to get the wire tap checked out – she will ask one of her 'sound guys' to take a look. First, he performs an authenticity check, and confirms that the recording doesn't contain any edits; the FBI haven't just taken bits of other recordings and edited them together to say something different. This is a reasonable approximation of the type of work that can be carried out using speech analysis software (such as Praat, www.praat.org). Now, the lawyers want to know if the person on the tape is really who the FBI says it is. The sound guy says he can do it if they provide some sample recordings of the suspect's voice to compare to. The task thus becomes speaker *comparison*, rather than speaker *identification*, which is indeed how such cases are analysed: known samples of speech from the suspect, are compared to the disputed samples of speech, and a conclusion reached as to how likely it is that the recordings are of the same person. In 'The Good Wife' the 'sound guy' came up with a conclusion (it *was* the suspect in the wire tap) within an hour or so - which isn't completely realistic - but how did he do it?

How do forensic speech experts work, in cases of speaker comparison? It is as yet very rare for experts to rely purely on an automated system (French & Stevens, 2013); most international experts use a combination of acoustic analysis (using speech software such as Praat) and the auditory impression of the forensic expert, and this combination is the currently recommended norm in the UK.

So what are the experts listening out for? Current UK practice advises that the analysis must determine not only the degree of *similarity* between the known and disputed samples of speech, by looking at a range of features; but also how *distinctive* the features are that are found in both recordings (French & Harrison, 2007; French, Nolan, Foulkes, Harrison, & McDougall, 2010). The two speech samples may contain features that are very similar, but if these are all features that almost anyone of that age/gender/dialect would produce in their speech, the evidence does not provide strong support that the samples are likely to have been produced by the same person.

Although some of the features in a particular case may relate to a speaker's habits of grammar or lexis, very often the key features in a case relate to phonetics and phonology. It is vital in such cases to be able to establish what dialect is being spoken in both samples, and, if they are found to be in the same dialect, to know what the 'typical' features are in that dialect. This is where the study of accents and dialects hits harsh reality, in criminal cases. The basic task of identifying the typical features of regional accents (as in the Key Stage 3 activities described above), lies at the heart of all UK forensic speaker comparison work. Automated voice-matching software is as yet only found in fiction – instead, we use trained linguists with skills in phonetics and phonology for this task.

Exploring further: Set up a dummy speaker comparison case by creating samples from same/different speakers (e.g. edit speech different parts of the same recording vs. different recordings). Students can work through the steps: i) what dialect does the speaker have in each sample? ii) are the two samples similar (if not, what is different? e.g. is the pitch higher/deeper?); iii) if the samples are similar, what features of speech in the samples are typical of the speaker's dialect and which are not? Overall, students could reflect on how good they were at identifying when it was/wasn't the same speaker, and what factors might lead to a 'bad decision'? (e.g. think about size of the available speech samples). Read some real forensic speaker comparison case studies here: http://www.york.ac.uk/language/postgraduate/taught/forensic-speech-science/#tab-4

Recommended reading and resources

Useful tools

- Phonetic symbols for use in documents: http://ipa.typeit.org/ or http://weston.ruter.net/projects/ipa-chart/view/keyboard/
- A phonetic chart for English: http://learnenglish.britishcouncil.org/en/apps/sounds-right

Further reading

- Recommended introductory texts are: Ogden (2009), McMahon (2002) and Knight (2012).
- There is a useful two page summary of the phonetics of signed languages (based on American Sign Language) in the chapter on phonetics in Fromkin et al (2013). A recent article on child language acquisition of BSL phonology is Morgan (2006): http://openaccess.city.ac.uk/364/
- Summaries of recent research on English Language can be found on the following blogs:
    - http://linguistics-research-digest.blogspot.co.uk/
    - http://languagelog.ldc.upenn.edu/nll/

Sources of spoken language data

- British Library *Sounds Familiar?* archive: http://sounds.bl.uk/Accents-and-dialects/BBC-Voices
- International Dialects of English Archive (IDEA): http://www.dialectsarchive.com/

    - Designed as a tool for actors to hear how different dialects sound, this archive provides downloadable sound files of dialects of English from all over the world.
- Intonational Variation in English (IViE): www.phon.ox.ac.uk/IViE
    - Recordings with adolescent speakers of English from nine locations in the UK. The 'free conversation' and 'narrative' recordings are probably the most useful.
- Speech Accent Archive: accent.gmu.edu/
    - Recordings of the same text read by second language learners of English from all over the world, and also by speakers of different dialects of English. Useful 'generalizations' highlight the errors/features found in each recording.
- Child Language Data Exchange System (CHILDES): http://childes.talkbank.org/browser/
    - This site is aimed at researchers, so is not as user-friendly as the other sites, but does contain a large volume of transcripts of child data. Click on one of the 'Eng-UK' transcripts to see what is available; some transcripts have accompanying sound files. Some CDS data can be found, in and around the children's speech.

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[1] CDS appears only to be observed in cultures in which children are "expected to be active communicators early in life" (p80); lack of CDS does not delay acquisition of grammatical competence (Ochs & Schieffelin, 1995).
[2] You can see the scene at about 3.54 in this youtube clip: https://www.youtube.com/watch?v=ToWUx1cfDgU