Novel accent perception in typically-developing school-aged children

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Abstract

Many schools in Western countries like the United Kingdom have become increasingly diverse communities in recent years, and children are likely to be exposed to a variety of accents which are different to their own. While there is a wide body of research exploring accent comprehension in the adult population and in infancy, little has been done to investigate the impact that an unfamiliar accent has on perception in school-aged children. This study investigated the effect of an unfamiliar novel accent on the ability of typically-developing children aged six and seven to repeat simple sentences. Stimuli were presented in speech-shaped noise using an adaptive staircase procedure in order to compare the speech reception thresholds of the two accents. Participants were required to repeat back short English sentences and their speech reception thresholds were calculated as the sound-to-noise ratio in which they were able to repeat back 100% of the key words in the sentence. Results showed that the participants required a significantly higher signal-to-noise ratio (i.e. less noise) to achieve the same level of comprehension for the novel accent as the familiar accent. Measures of cognitive flexibility and selective attention were also taken but were not found to correlate to performance with the unfamiliar accent. These findings have implications for professionals working with children and should alert them to the possible difficulties in communication as a result of unfamiliar accent.

I Introduction

Interacting with someone with an accent different to their own is a regular occurrence for many people. This may particularly be the case for pupils, teachers and other staff working in schools. An increase in international immigration and internal immigration has resulted in many schools, including those in the United Kingdom (UK), becoming communities where there is considerable diversity. No information is available on the breadth of accent variety which is typical in schools – and of course the extent and nature of such variety will itself vary depending on location. However, figures available from the UK Department for Education on the ethnic background and native language of students and staff show consistent increases in the proportion of individuals who have a first language other than English and who are not ‘White British’ in state-funded primary schools (DfE 2004a; 2004b). While these figures will certainly not overlap completely with those who speak English with a non-native accent (and indeed many categorised as ‘White British’ will have regional accents that differ from the accent local to their school), they do provide an indication of the level of diversity in English schools.

The benefits of increased diversity in schools are considerable, and there is much to be gained from children’s exposure to different cultural practices and different accents. However if children have difficulties understanding these less familiar accents this may affect their interactions with peers and staff and perhaps impact their social participation and academic progress at school. These effects may be even more marked where children have communication difficulties; indeed unfamiliar accents have been found to be particularly problematic for adults with acquired language disorders (Bruce, To & Newton, 2012). Though there is now a wide body of research investigating the effects of unfamiliar accented-speech in adults, there is relatively little which examines its effects in school-aged children, and yet this is an important area to research in order to understand the potential challenges that children are faced with in the classroom and the playground which may impact on their learning or participation at school. The research reported in this paper seeks to help fill this gap in our knowledge by exploring the impact of an unfamiliar accent on typically-developing children’s perception of simple sentences.

1 *Accent processing in adults*

Research with adults with no reported cognitive or language difficulties shows that variation in accented speech affects comprehension. Listeners make a greater number of errors and show longer response times in listening to unfamiliar native accents than a familiar native accent, in single words (Adank & McQueen, 2007) and longer utterances (e.g. Floccia, Goslin, Girard & Konopczynski, 2006). These difficulties with unfamiliar accented speech have been reported to be even more pronounced in the processing of non-native (foreign) accents (e.g. Adank, Evans, Stuart-Smith & Scott, 2009). However, research also shows that listeners are able to adapt rapidly to the unfamiliar accent of a specific speaker (Clarke & Garrett, 2004) and that in some circumstances they are also able to generalise this learning across speakers with the same accent (Bradlow & Bent, 2008).

2 *Accent processing in infancy*

There is also a rapidly growing body of research which explores accent processing amongst infants, which shows that the ability to recognise words spoken in an unfamiliar accent develops over the first two years of life: whilst at 9 months children are unable spontaneously to recognise words produced in an unfamiliar accent, either non-native or regional, by the end of the first year they can cope with this kind of variation (Schmale, Cristià, Seidl & Johnson, 2010; Schmale & Seidl, 2009), and by 19 months show a preference for listening to known words (van Heugten & Johnson, 2014) and high frequency words (Best, Tyler, Gooding, Orlando & Quann, 2009) in an unfamiliar accent as well as in their own accent. As in research with adults, exposure to the accent in question has been shown to facilitate word recognition in infants, both in a task where the experimenters carefully controlled a single vowel change (White & Aslin, 2011), and in tasks where a natural accent has been used (van Heugten & Johnson, 2014). However, even at the end of their second year, children may still have some difficulties with unfamiliar accents when the task demands are high. For example, Schmale, Hollich and Seidl (2011) found that children aged 2;0 had difficulty generalising newly-learned words across accents, though they could make such generalisations by the age of 2;6. A further experiment by the same research group showed that experience with the unfamiliar accent – i.e. listening to a passage read in the accent – reduced the negative impact of the accent on comprehension and improved the performance of the two-year-olds (Schmale, Cristià & Seidl, 2012). By the age of three, children are able to identify words produced in an unfamiliar accent, but their responses are slower and they make more errors with pronunciations which are more distant from their own accent (Creel, 2012).

Barker & Turner (in press) sought to extend the work with toddlers which focused on the recognition of isolated words to older children and to include a context more like real-life listening conditions, in this case involving story comprehension. Their findings showed that whereas at the isolated word level, the pre-schoolers (21-42 months) in their study performed better with the native accent than the non-native, in story comprehension the opposite pattern of performance was observed. The authors note that this latter unexpected result could be due to a number of factors including the possibility that listeners might be drawn to the novelty of the unfamiliar accent in the story condition, and allocate greater attentional resources to the task involving it.

3 Accent processing in childhood

The isolated word has also been the focus of most of the relatively small amount of research exploring accent processing in children in their school years. In the first published study in this field, Nathan, Wells and Donlan (1998) compared the effects of an unfamiliar regional accent of English (Scottish Glaswegian) on two groups of 4-year-old and 7-year-old children living in London. The results of the study showed that both groups were less accurate at repeating and providing a definition for words in the unfamiliar accent condition. Older children performed better in giving a definition for the word but also produced a greater number of phonological responses to the unfamiliar accent, repeating the words in their own accent. Younger children, in contrast, responded with more phonetic responses, imitating the unfamiliar accent in their production of the word rather than accessing their lexicon. These results suggest that between the ages of four and seven children develop a significantly improved competence at understanding unfamiliar accents.

A similar developmental trend was found by Bent (2014). She asked American English-speaking children aged between four and seven to repeat words spoken by native and non-native (Korean) speakers of English, which were presented in speech-shaped noise. They performed worse in the non-native condition, and made more errors with words with low frequency and higher neighbourhood density. This pattern was matched in a group of adults also included in the study, so that the non-native accent was no more detrimental for the children than it was for the adults. Performance amongst the children was related to age, and was also associated with vocabulary size, mirroring similar findings for younger children (van Heugten et al., in press; Mulak et al., 2013) and supporting a suggestion made, but not explicitly tested, by Nathan et al. (1998) to account for their findings.

While it has been demonstrated that age and lexicon size are related to accent processing abilities, there is not yet any research which reports whether these abilities are also linked to cognitive skills. In research with adults, cognitive measures such as executive function, short-term and working memory and selective attention (as well as vocabulary size) have been found to predict the effect of an unfamiliar accent on processing (Janse & Adank, 2012; Adank & Janse, 2010). That is, lower scores in tasks which tap these abilities predict difficulties with an unfamiliar accent. The current study explores whether measures of selective attention and cognitive flexibility are associated with the abilities of children to process sentences produced in an unfamiliar accent. Cognitive flexibility – the ability to consider and shift flexibly between two representations of a word – may help listeners to match the novel productions of words in an unfamiliar accent to their stored representations of those words. This ability has been found to be related to children's ability to process visual speech (Erdener & Burnham, 2006). Selective attention has also been shown to be related to support aspects of speech processing (Astheimer & Sanders, 2012). Listeners with good selective attention may be better able to focus on the features in the speech signal of the novel accent stimuli which are relevant to the task, whilst ignoring information which is irrelevant.

Holtby (2010) used sentence stimuli in a sentence verification task in her study with 9 and 15-year-olds. She found a significant difference in accuracy between the two groups for accuracy in response to the Cantonese-accented speaker. However, without a familiar accent for comparison, it is difficult to know whether the difference reported reflects improvement in accent processing or in performing the task. O'Connor and Gibbon (2011) also included sentence stimuli – of increasing complexity – in their investigation of the performance of 7- and 9-year-olds from Ireland with an unfamiliar regional accent in a task similar to the Token Test for Children (McGhee, Ehrler & Di Simoni, 2007). Results showed that the older group made fewer incorrect responses than the younger group, and though overall performance was worse in the unfamiliar accent condition, the effect of accent was only significant for the younger children. The authors comment however that they cannot rule out the possibility that these results may be due to the fact that the unfamiliar-accented speaker had a faster rate of speech than the speaker with the familiar accent.

Indeed, in order to ensure findings of accent studies can be interpreted accurately, it is important to control as much as possible for potential confounding variables that occur between speakers, such as rate, prosody and voice quality differences between speakers. Such issues have been avoided in some research with adult listeners by the use of a novel accent (either synthetically manipulated (e.g. Maye, Aslin & Tanenhaus, 2008) or produced by a phonetically-trained speaker (e.g. Adank & Janse, 2010)). The study reported here makes use of a novel unfamiliar accent which deviates from the familiar accent only by carefully controlled vowel changes, with both accents produced by the same speaker. Use of a novel accent also avoids the potential influence of variation between listeners in their previous exposure to the accent, which has been difficult to control for in previous studies.

4 Aims of the study

The study reported here therefore aims to address the following questions:

- Does an unfamiliar novel accent have an effect on typically-developing school-aged children's comprehension of simple sentences when compared to a familiar accent in the presence of competing noise?
- Are cognitive flexibility and selective attention related to the ability to perceive novel-accented sentences?

II Method

The study was a repeated measures design with all participants listening to both familiar and unfamiliar accents. Speech reception threshold – the signal-to-noise ratio at which each child could respond with 100% accuracy to each accent – was the dependent variable. In order to answer the second research question, the relationship between scores on the cognitive tasks and difference scores (i.e. the difference between speech reception thresholds for the accents) was evaluated using correlation coefficients.

1 Participants

Twenty-six typically-developing children participated in this study, recruited from an infant school in Rugby, a town in the West Midlands of England. All were monolingual English speakers, and had no speech, language or hearing difficulties (established by teacher report). The group consisted of 11 boys and 15 girls, ranging in age from 6;6 and 7;5, with a mean age of 6;10. All participants were in Year 2 at the school. This is the final year of Key Stage 1 of the National Curriculum of England and Wales and is the point at which children normally undertake their first formal assessment at school.

2 Stimuli

Stimuli were 60 sentences from the Bamford-Kowal-Bench (BKB) sentence lists (Bench, Kowal & Bamford, 1979). These sentences are widely used as an assessment tool in tests of speech perception (e.g. McGettigan, Rosen & Scott, 2014; Rees & Bladel, 2013). The sentences used contained between three and seven words and each contained three highly familiar keywords (e.g. 'A girl kicked the table'). All sentences were recorded by one female speaker both in her natural Standard Southern British English accent (SSBE) and in the novel accent. SSBE is not the local accent of Rugby; that accent is situated in the East Midlands dialect area (see Trudgill, 1999) and marked vowel differences from SSBE are:

- [ʊ] rather than [ʌ] in words such as 'cup' and 'bus'
- [a] rather than [ɑ] in words such as 'bath' and 'grass'
- [ʌɪ] rather than [aɪ] in, for example, 'price' and 'white'

The novel accent was created by making alterations to a subset of the vowels of SSBE as listed in table 1; the remaining vowels were left unaltered. Rather than subject vowels to a systematic shift of the kind used by Maye et al (2008), or use vowel alterations found in a single real accent, we chose to target specific vowels and include the kinds of alterations found in natural accents. For example, the vowel change of [ɪ] to [ə] in words such as 'little' and 'children' may be heard in New Zealand speakers of English; many South African speakers of English produce [e] instead of [æ] in words such as 'bad' and 'happy.

Table 1. Vowel Alterations for the Novel Accent

SSBE	Novel Accent
[ɪ]	[ə]
[æ]	[e]
[ɒ]	[ɔ]
[ʌ]	[o]
[ɔ]	[o]
[ɜ]	[e]
[eɪ]	[aɪ]
[aɪ]	[eɪ]
[əʊ]	[o]
[aʊ]	[æ]

Examples of sentences in SSBE and the converted version are given in table 2, with a broad phonetic transcription of each. The speaker was trained in phonetics and was briefed with respect to the specified vowel changes in the novel accent. During recording she read the artificial accent stimuli using a systematically altered orthography (e.g. ‘He cut his finger’ became ‘He cot hus funger’); natural accent recordings were made using normal orthography. It was thought that reading all stimulus sentences from orthography would render a more natural reading for both accents.

Table 2. Example Stimuli in SSBE and the Novel Accent

	SSBE	Novel Accent
The light went out	ðə laɪʔ went aʊt	ðə leɪʔ went æt
A letter fell on the mat	ə letə fel ɒn ðə mat	ə letə fel ɔn ðə met
The lady packed her bag	ðə leɪdi pækt hə bæg	ðə laɪdi pekt hə beg
The bus went early	ðə bʌs went ɜli	ðə bos went eli

The recordings were made in an anechoic room. The speech signal was obtained from a Bruel & Kjaer sound level meter type 2231 fitted with a 4190 microphone cartridge. The microphone was positioned 30cm from the speaker's mouth, at 15 degrees to the mid-sagittal line. The ac output from the sound level meter was fed to the left line input of a Focusrite Scarlett 2i4 USB audio interface which was connected to a Dell OptiPlex PC. Speech prompt and record software called ProRec (© Mark Huckvale, University College London) was used for presenting the material (on a visual display unit in the chamber) and for recording signals onto the hard disk. The signals were digitized at 44.1kHz.with 16 bit quantization.

3 Procedure

Each participant was tested individually in a quiet but not sound-proofed room where background noise was kept to a minimum.

Accent task. An adaptive procedure (see Baker & Rosen, 2001) was used to estimate each participant's speech reception threshold (SRT) for each accent, which is defined here as the signal-to-noise ratio (SNR) at which all of the key words in a sentence presented in speech-shaped noise could be repeated. Speech comprehension in everyday life typically occurs in the context of noise, and so this procedure represents naturalistic method of establishing comprehension abilities. It has been used as a measure of speech intelligibility both clinically (e.g. Goswami, Fosker, Huss, Mead & Szűcs, 2011) and in previous studies of accent comprehension in adults (e.g. Adank & Janse, 2010).

For the task, the 60 stimuli were split into four lists with 15 sentences in each list. Each child was randomly assigned two of these four lists (one for each accent). There were nine unique combinations of lists in both accents (SSBE1-Novel2, SSBE1-Novel3 etc), to ensure that accent was counterbalanced across all four lists. Different lists were used to account for and counterbalance the effects of linguistic predictability as well as any variation in the level of impact the novel accent had on the pronunciation of each sentence. Similarly the order in which the accents were presented was counter-balanced across participants.

The procedure started with an easy stimulus for which the SNR was set at +20dB. Each sentence contained three key words. Each time that the participant repeated all three key words correctly the SNR level was decreased by 10dB, until the first reversal – the first point at which the child made at least one error – at which point the SNR was increased by 7dB. After that, the SNR changed in steps of 4dB. If listeners correctly repeated all three of the key words, the SNR for the next sentence decreased (i.e. more noise was added). If listeners correctly repeated one or none of the key words, the SNR was increased. If listeners correctly repeated two of the key words, then the SNR remained the same, and no reversal was counted. Participants listened to all 15 stimuli in each set. Individual children's SRTs for the two accents were calculated as the mean of the SNRs at each reversal (i.e. changes in SNR), excluding the first two reversals.

The test was administered on a Toshiba C855 laptop, and children sat directly in front and 50cm away from the screen. Stimuli were presented via the internal speakers of the laptop using a programme called Sent In Noise (© Stuart Rosen, University College London), which is designed to present a set of auditory stimuli and methodically modified signal-to-noise ratios using speech-shaped noise as a masker.

The sound level was set once at a comfortable level for the group, and this initial setting was not changed between children. After hearing each sentence, the children were instructed to tell the experimenter the sentence they had heard. The experimenter scored the number of correctly repeated key words after each sentence. Participants were not given any explicit feedback. Each child completed two practice trials – delivered in the familiar accent – before beginning the experiment.

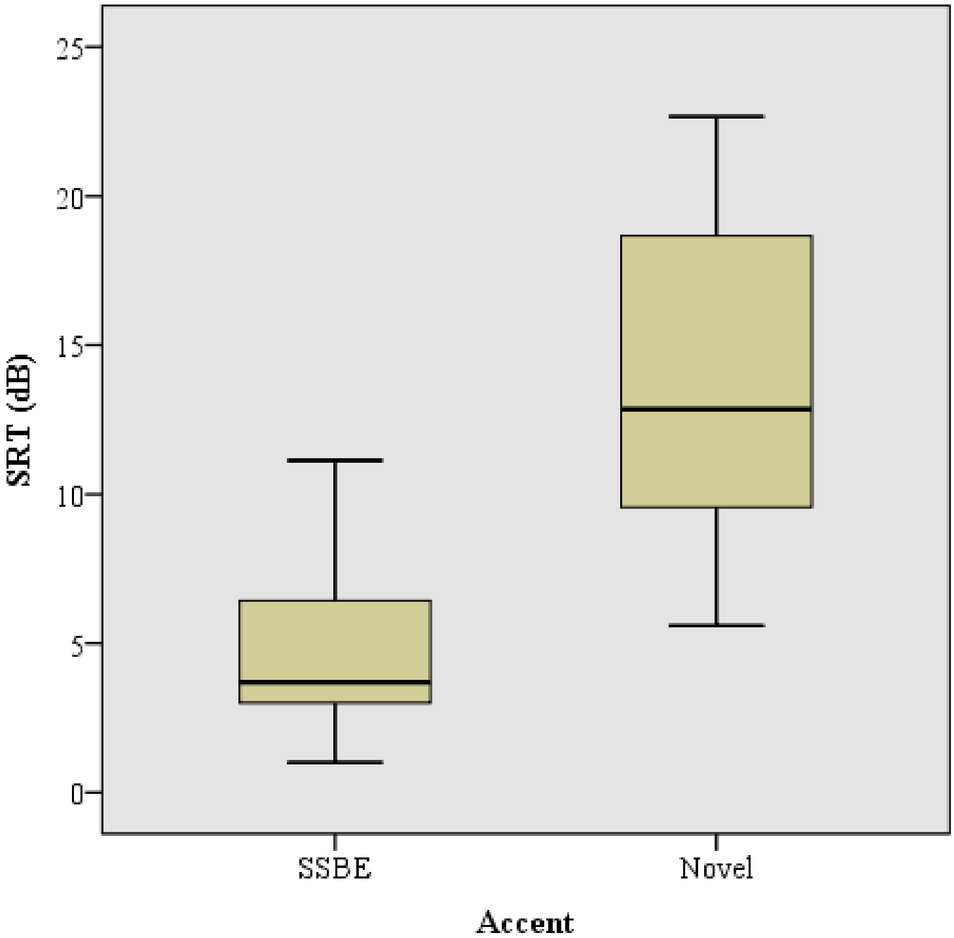
Cognitive measures. In order to assess cognitive flexibility and selective attention participants carried out two subtests from the Test of Everyday Attention for Children (TEA-Ch; Manly, Robertson, Anderson & Nimmo-Smith, 1999). The 'Creature Counting' subtest was used to test the participants' cognitive flexibility. It requires children to switch between counting upwards and downwards and measures their accuracy in the task and the speed with which they are able to complete the task. The 'Map Mission' subtest was used to assess participants' ability to attend selectively to a particular symbol (in this case a knife and fork) and find as many of them on a map (containing similar stimulus distractors) as they could in one minute. The TEA-Ch provides standard scores for children ages 6;0 to 15;11 and includes two parallel forms of each subtest; for both subtests used in this investigation, Version A was used.

III Results

1 Accent effect

We used a paired-samples t-test to compare the SRTs for the familiar (SSBE) and unfamiliar (novel) accents. The results indicate that the hearing threshold for the novel accent (M = 13.88, SD = 5.32) is significantly higher (t (25) = 9.424, p < 0.001; Cohen's d = 2.22) than the hearing threshold for SSBE (M = 4.58, SD = 2.60) in this sample of 26 typically-developing children. Listeners needed a higher SNR (i.e. less noise) to achieve 100% accuracy with the novel accent than they did with the familiar accent (see figure 1). Inspection of the data showed that all of the participants had a higher SRT for the unfamiliar accent than SSBE, though there was variation between individuals in the size of the 'accent effect' – i.e. the difference between SRTs for the familiar and unfamiliar accent. The mean difference between accents was 9.31dB (ranging from 0.72dB to 20.67dB), with a standard deviation of 5.04dB.

Figure 1. Speech Reception Thresholds for SSBE and Novel Accents



Further analysis of the data showed that there was no difference in performance between boys and girls. Similarly neither the order of presentation of accent nor the sets of stimuli heard by the children affected scores. There was also no relationship between children's scores and their ages.

2 Cognitive measures

Possible associations between the accent effect and the cognitive measures taken were explored by using Pearson's product-moment correlation coefficients. Results of these showed the following: no significant correlation between children's scores on the Map Mission task (testing selective attention) and the accent affect (r = 0.059, p = 0.776), no correlations between accent effect and neither the accuracy (r = 0.041, p = 0.844) nor the timing scores (r = 0.196, p = 0.383) on the Creature Counting assessment of cognitive flexibility.

IV Discussion

1 The effect of accent on performance

Understanding speakers from different backgrounds, often with less familiar accents, is of vital importance in many school settings. The results show that the participants in the study had considerably more difficulty understanding the unfamiliar novel accent than the familiar standard accent. This was demonstrated by the higher speech reception thresholds for the novel accent compared to the standard accent. Each one of the 26 children included in the study required a more advantageous signal-to-noise ratio in order to be able to repeat correctly all the key words spoken in the unfamiliar accent. It is possible that such an effect might not have been found had the accents been presented in quiet conditions; indeed, Adank et al (2009) found an impact of accent on performance amongst adults only when they were heard in noise. However, we chose the approach comparing SRTs (i.e. where both accents were presented only in noise) because we felt it provided a more naturalistic method of measuring the children's comprehension performance with two accents, not least since the usual context for hearing speech is in non-ideal conditions. Furthermore, the findings of this study support the results of other published research on the detrimental effect of unfamiliar accents on comprehension in children (Bent, 2014; O'Connor & Gibbon, 2011) and mirrors similar experiments presenting a novel accent in noise where the listeners were adult (Adank & Janse, 2010).

The results are valuable to those working in classroom settings with children, as they highlight the need for better listening conditions when hearing an unfamiliar accent in order to achieve results comparable to those with a familiar accent. Estimates of the signal-to-noise ratios (SNRs) typically found in school classrooms have been given as ranging from -7dB to +5dB (e.g. Arnold & Canning, 1999). SNRs required by the children in this study to perform successfully with the unfamiliar accent ranged from +5.2 to +22.7dB. Research has demonstrated that listening to speech in noisy classroom environments requires significant effort from children (e.g. Howard, Munro & Plack, 2010); the task may become even more challenging when children are exposed to an unfamiliar accent. The use of sound field systems, which project the teacher's voice and which have been shown to benefit children's listening comprehension (Dockrell & Shield, 2012), may be particularly valuable in situations which combine poor classroom acoustics and unfamiliar accented speech. Bruce et al. (2012) suggest speakers with strong accents that are unfamiliar to their listeners take steps to minimize other potentially problematic variables such as speed of delivery and poor visibility. These systems and strategies may not be necessary if children adapt spontaneously to unfamiliar accent in the way that has been shown in adult listeners (e.g. Clarke & Garett, 2004); further research is needed to explore whether that is the case, both in quiet conditions and in noise.

We used an artificial accent in this study, and such accents – almost exclusively involving altered vowel categories – have been used increasingly in research exploring accent comprehension in children (Creel, 2012; White & Aslin, 2011) and in adults (e.g. Maye et al., 2008). There are several advantages to this in terms of experimental methodology: artificial accents allow researchers to circumvent the difficulties of measuring familiarity with and previous exposure to an accent as variables, to give a precise measure of phonetic difference between accents and to avoid possible confounding variables when using more than one speaker such as voice quality and speech rate (O'Connor & Gibbon, 2011). Studies using novel accents have been found to replicate studies with natural accents (e.g. Adank & Janse, 2011). However, it is not yet known to what extent processing artificial accents resembles the processing of natural unfamiliar accents either in adults or children The accent used in this study differed from the familiar accent on in a subset of vowels. Real accents are likely to be more complex than artificial accents (Cristià, Seidl, Vaughn, Schmale, Bradlow & Floccia, 2012) may also differ in consonantal (e.g. voice onset time of stops) and prosodic (e.g. rhythm) characteristics, which may present additional problems for the listener. For example, children are known to use prosodic information to assist linguistic decoding (Beach, Katz & Skowronski, 1996) and unusual prosodic patterns in an unfamiliar accent may disrupt this process. Children may have more difficulty with accents which differ across more features. Conversely, it may be that the isolation of vowels used in the novel accent here makes comprehension of this accent more difficult than processing a real unfamiliar accent. It is possible therefore that the findings reported here may be relevant only to the specific artificial accent used in this study – and the phonetic differences involved. Further research is needed which shows whether the findings are replicated in real accents, either with careful matching of two speakers or with one 'actor' producing both natural accents.

Whilst we controlled for exposure to the test accent in our study by using a novel accent, we did not control for or take an account of children's broader exposure to accents in general and to other languages (though all children had English as their first language). It is possible that this may have affected their performance, with children who had been exposed to more accent and language variety better able to cope with the unfamiliar accent. There is now a considerable body of research which shows that exposure to increased variability can aide perception, including in word learning in toddlers (Schmale et al., 2011) and when adults listeners are exposed both to multiple speakers of one accent (Bradlow & Bent, 2008) and to speakers from multiple language backgrounds (Baese-Berk, Bradlow & Wright, 2013). Further research is required which explored he impact on accent comprehension in school-aged children of talkers from several different linguistic backgrounds. This research should determine whether children are able to derive commonalities across different accents (e.g. difficulties with unstressed vowels often observed in non-native speakers of English), and to identify information that is highly variable across speakers and can be disregarded. If such abilities were observed, the long-term outcome of exposure to accent variability at school may be increased rather than decreased comprehension.

In contrast to accent exposure as a variable, we did examine whether individual variation in response to the novel accent was associated with other factors such as a child's gender or age and found no such relationship.

2 The relationship with cognitive measures

Individual differences were also explored in relation to children's scores on the assessments of selective attention and cognitive flexibility. Neither of these cognitive skills was found to have a significant relationship with accent intelligibility; a finding which contrasts with research carried out with adults (Janse & Adank, 2012; Adank & Janse, 2010). This discrepancy may be because this relationship is yet to develop in the six and seven year old children tested in this study: it may be that cognitive flexibility and selective attention will become tools used to help process unfamiliar accents once these abilities have developed further with age. It may also be the case that our sample of children did not provide sufficient range of scores on the two cognitive tasks for an association to be found.

No formal speech, language or hearing assessment was carried out with the participants as part of this study. However, none of the participants were identified by their teachers as having any communication impairment, including any difficulties listening in class or in other environments, and none showed any problems in conversation with the investigator before and after the experimental task or in comprehending task instructions. Furthermore, the effect of accent found in the study is so compelling that hearing difficulties could not account for the findings, though it may be that unidentified hearing – or other – problems might account for some of the individual differences. This points, though, to the need for further research which explores in more detail a broader range of factors – cognitive, speech, language and hearing-related – which may account for the impact of unfamiliar accent in individuals.

This study included children from an exclusively monolingual English background. However, UK government statistics show that, as mentioned earlier, a significant minority of children at schools in England have English as an additional language (EAL); a pattern which is likely to be found in many Western societies. Difficulties with unfamiliar English accents may be even more marked for them and is an area of research that would also benefit from more attention (amongst adults as well as children).

3 Conclusion

Difficulties with a novel accent that deviated from the standard only by a subset of vowels were observed in this study in children for whom English is their first language completing a simple sentence repetition task. The comprehension task may be even more challenging, not just for children with EAL, or for children who have communication difficulties (see Nathan & Wells, 2001), but also when the listening task is more demanding, with natural accents which deviate by more than just vowels, and in the context of multi-talker babble (rather than speech-shaped noise) as a background masker. We hope that this study provides some pointers for future research which might uncover where the greatest challenges lie for children and how these challenges can be overcome. For example, exposure to perceptual variability across multiple accents may improve perception of a newly-encountered accent. In the meantime the findings highlight the need for those working with children in classrooms to be aware of some of the difficulties associated with processing unfamiliar accents in this age group.

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