5-9-year-olds categorisation of regional accents: the role of exposure to variation

Abstract

This study investigates primary school children's ability to categorise speakers based on regional accent variables found in the UK. Thirty-three children (5;7-9;9) in York took part in a task in which they were asked to group speakers according to whether they sounded as though they came from the same place. Results showed that children were much more accurate at grouping together different speakers according to a Yorkshire/Standard Southern British English accent distinction, rather than a Yorkshire/Scottish or a Yorkshire/North East accent distinction. The distinctiveness and the familiarity of the Standard Southern British English accent features can account for this finding. Furthermore, the children's general exposure to variation was found to predict their accuracy in the task; children with more exposure to regional variation performed better when grouping speakers based on their pronunciation of the same phoneme embedded within the same word. Building on the results of a previous study with preschool children, these results are discussed in line with an exemplar model of indexical learning.

Keywords: children's sociolinguistic development, accent perception, regional variation

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1. Introduction. Investigating children's perception of regional variation

This study investigates primary school children's ability to categorise speakers based on regional accent variables found in the UK. Tasks with adults have found that they are able to categorise speakers according to broad regional accent distinctions (Clopper & Pisoni, 2004b; 2007) with varying levels of success depending on the participants' level of geographical mobility (Clopper & Pisoni, 2004a) and whether they have had particular experience with the accents in question (Clopper & Pisoni, 2004a; Williams, Garrett & Coupland, 1999; Yan, 2015). Baker, Eddington & Nay (2009) also find that participants from

a particular region (in this case, Utah in the U.S.) are able to rely upon less stereotypical features when distinguishing between local and non-local speakers (Utah vs. non-Utah speakers) in comparison to participants originally from other regions of the U.S. While familiarity is therefore key for adult listeners, the results from studies with child listeners are less clear. The motivation for investigating children's perception of regional variation lies in determining when and how such perceptual skills develop and what factors play a role in this development.

In recent years, a small but growing number of studies have investigated the perception of regional variation amongst young children. Various factors have been found to affect children's abilities to perceive accent variation, including the design of the task itself (Girard, Floccia & Goslin, 2008; McCullough, Clopper & Wagner, 2019), the child's age (Author, 2019; Jones, Yan, Wagner & Clopper, 2017; Kaiser & Kasberger 2018; McCullough et al., 2019; Dossey, Clopper & Wagner, 2020) and the (un)familiarity and distinctiveness of the accents in question (Floccia, Butler, Girard & Goslin, 2009; Wagner, Clopper & Pate, 2014; Dossey et al., 2020). There has been less of a focus on investigating the effects of children's general exposure to regional variation on their abilities to perceive such variation (although Floccia et al., 2009; Beck, 2014 and Kaiser & Kasberger, 2018 do look at this to some extent). Exposure is a key focus of the current study; this builds on Author's (2019) finding that pre-school children with more exposure to regional accent variation were found to perform better in an accent grouping task. The remainder of this section considers the results of previous experiments investigating children's perception of regional variation.

1.1 Task design

Studies focused on sentence categorisation, termed 'ad hoc identification tasks' by McCullough et al. (2019), have found that 5-6-year-old children are unsuccessful at identifying speakers according to a home vs. regional accent distinction. These tasks involve the children listening to full sentences spoken in either their home accent or a non-local

accent and then deciding whether the speaker belongs to one or the other accent groups. The accent groups are represented by different coloured puppets (Wagner et al., 2014), different coloured characters on screen (Girard et al., 2008) or different coloured buttons (Floccia et al., 2009) and the children are trained beforehand to associate each accent with one of the two groups. This arbitrary association between an accent and a particular puppet design/colour of cartoon is perhaps confusing for children who may already have an awareness of a link between accent and geography (cf. Weatherhead, White & Friedman, 2016 and Weatherhead, Friedman & White, 2018).

Another reason for unsuccessful results in such sentence categorisation tasks is a lack of rigorous linguistics design of the sentences themselves. For example, in Floccia et al. (2009), the children were presented with a random selection of the 26 sentence-length stimuli. Therefore, different children heard different stimuli and it isn't clear which particular linguistic features the children may have been attending to when categorising the speakers. Additionally, although measurements were taken of two vowels (/æ/ and /ɪ/) to show differences between the accents, it isn't explained why these particular vowels were chosen and how discernible the pronunciation differences were. Furthermore, it isn't known how many examples of these vowels the children heard from each of the accented speakers as they each heard different sentences in a random order.

Finally, the non-local accents used in these experiments vary in their degrees of difference from the children's home accent and also their likely familiarity to the children; Floccia et al.'s (2009) study focuses on a Plymouth vs. Irish English (both varieties from the British Isles), Wagner et al. (2014) use a Transatlantic comparison, by focusing on Midland American English vs. Lancashire British English, and Girard et al. (2008) focus on Southern vs. Northern accented French. McCullough et al.'s (2019) study nicely demonstrates the importance of carefully considering the accents in question. Their experiment also used a categorising sentences task but focused on four different regional varieties in the U.S. with different levels of familiarity for the children: Midland, Northern, Southern, New England. The

experiment included participants across a range of ages and they found some success in children as young as 6–7 years, but only when comparing a New England vs. a Midland accent.

Other task designs, which focus on a discrimination ability rather than a categorisation ability, have demonstrated more consistent success in children's perception of accent differences. Using an ABX task design, in which participants decide whether speaker 'X' best matches with speaker 'A' or speaker 'B', Beck (2014) found that 5-6-year-old children in Philadelphia, U.S. were able to discriminate between familiar, local and unfamiliar, non-local speakers. Kaiser and Kasberger (2018) found that children 5 years + were able to discriminate between Austrian standard German vs. dialect speakers in Austria, also using an ABX design.

Even younger children are found to be successful in categorising speakers with different accents in free categorisation tasks. In these tasks, participants are provided with audio from speakers with different accents to group as they wish. Focusing on four U.S. varieties, both Jones et al. (2017) and Dossey et al. (2020) found an improvement in the correct classification of accents throughout childhood. In particular, Jones et al. (2017) found that even some of the youngest children, at 4-5-years-old, were able to separate out the New England speakers from the other accents. Again, the particular accents involved and their familiarity/distinctiveness comes into question.

Author's (2019) study used a grouping task design, somewhere between the ABX-style tasks and sentence categorisation tasks described above. The children heard a short sentence, featuring only one key accent variable, from two 'mothers' – one with a local (Yorkshire) accent and one with a non-local accent. They were then asked to group five 'babies', heard producing a sentence in either one of the accents, with one of the two mothers. All stimuli were produced by the same speaker in two different guises. With a limited focus on key variables and a likely familiar 'non-local' accent (in this case, a Standard Southern British

English accent), the 3-4-year-old children were found to be able to group the speaker guises accurately above chance level. Building on this success, the current study uses a similar design.

1.2 Distinctiveness and social markedness

In a group of studies focusing on four varieties of U.S. English, Jones et al. (2017) and McCullough et al. (2019) found that 4-year-olds were able to discriminate between/separate out New England speakers from the other varieties (Midland, Northern and Southern). The explanation provided by the researchers is that the New England accent is quite distinctive, with features such as r-lessness separating it out from the other accents. On the other hand, Dossey et al. (2020) used a Mid-Atlantic accent instead of New England and the results showed that the youngest children found that the Southern speakers were the easiest to group together. The explanation given here is that the Southern dialect is the most socially marked non-standard variety and, as such, the most likely to be linked to cultural stereotypes. Therefore, this variety stands out more from the other accents as it associated with low status and low intelligence.

The explanatory power of distinctiveness is supported by the results from other studies which find that children can categorise according to a foreign or second-language accent/home accent distinction better than a regional/home accent distinction (Girard et al. 2008; Floccia et al. 2009; Wagner et al. 2014). Wagner et al. (2014) explain this by describing children as having a ‘gradient’ representation of accent/dialect, in which they compare other accents in terms of their distinctiveness from their ‘core’ home accent. In this sense, the more different an accent is from their home accent, the better they are able to categorise it as ‘different’. Weatherhead, Friedman & White’s (2019) study also found that 4-5-year-olds rated speakers with a foreign accent as more different to their home accent than speakers with a regional accent.

Overall, although these studies find dialect-specific variation in the children's performance, it is difficult to know exactly what the children are focusing on in these tasks as a combination of variable features are included in the sentence-length stimuli. The current study aims to address this by focusing on one key accent variable at a time.

A further difficulty in generalising across the results of previous studies lies in the fact that the scope of geographic variation, the concept of accent (and/or dialect), and the relationship between standard/non-standard varieties differs quite widely between the language varieties in question and their associated countries and cultural practices. It is therefore important to consider the results from individual studies in light of the context of these variations.

Kaiser and Kasberger (2018) describe the concept of the standard in Austria as a standard-dialect continuum, ranging from Austrian standard German to the various dialects spoken throughout the country. Most children will experience these differences on an everyday basis and therefore the standard/non-standard(dialect) distinction is prevalent. However, because the dialects lie on a continuum, there isn't a necessarily easy categorical distinction to be made. Despite this, the study finds that children from 5 years have basic perceptual abilities and are able to discriminate between standard and dialect speakers. In the British English context, as found by Author (2019), the standard (SSBE) vs. local distinction is also gathered early on. The 3-4-year-olds in this study were able to group speakers according to a Yorkshire/SSBE distinction. Exposure-related effects, such as the prevalence of SSBE features in the accents of mobile residents, the features of SSBE in middle-class speakers throughout the country and the prevalence of SSBE in the media are likely contributors to this result.

1.3 Exposure to variation

More explicit exposure-related effects are found by some of the aforementioned studies. Although not a statistically significant result, Floccia et al. (2009) found that the 'bidialectal' 7-year-olds (with at least one parent who spoke a non-local variety of British English)

generally performed better than ‘monodialectal’ 7-year-olds (whose parents both spoke the local variety) in the sentence categorisation task. A stronger effect was found in Author (2019) in which children with at least one non-local parent performed significantly better in the accent-grouping task, particularly in the part of the experiment in which they were asked to group across different accent variables. Similarly, Kaiser and Kasberger (2018) found that, in their second experiment in which children were asked discriminate the speakers across different accent variables, the language variation at home was a significant predictor. In particular, they found that those who received input primarily from their local dialect at home, performed better than children whose main input was the standard variety, or a ‘mixed’ input of different dialects at home. As Austrian standard German is encountered frequently in their daily lives anyway, the authors interpret this result as indicating that some variation is helpful, although not too much.

In their sentence categorisation task, Evans and Tome Lourido (2016) found that both monolingual and bilingual 5–7-year-olds performed above chance at categorising sentences from London vs Singaporean English speakers and London vs Yorkshire English speakers. Part of their interpretation of this result is that even the monolingual children in London are likely to have been exposed to much variation in such a diverse and multilingual city which attracts people from all over the country and all over the world to live and work there. On the other hand, Beck’s (2014; 2016) study with 5-6-year-olds in Philadelphia the U.S. found that there was no difference in performance in the ABX discrimination task between Insiders (with at least one local parent) and Outsiders (with both parents non-local).

Ideally, a more comprehensive way of measuring children’s exposure to variation would provide a clearer picture. However, measuring an individual’s exposure to linguistic variation in detail would be a very difficult undertaking and would need to involve somehow tracking all of the speakers that an individual hears on a daily basis and how much of their speech they are exposed to. In a broader sense, though, it is possible to comparatively measure

children's exposure to variation, through capturing an account of the familiar individuals with whom they interact regularly. This, therefore, is a key focus of the current study.

1.4 The current study

The current study gives important consideration to task design (including a focus on the particular accent variables in question), the comparative distinctiveness of the accents involved and the children's exposure to accent variation. These considerations will be described in the following sections. The focus on exposure is in order to contribute to a theoretical account, using an exemplar theoretic model of the acquisition process in order to link the abilities of the younger children to the developments that happen throughout childhood, adolescence and even into adulthood.

2. The acquisition of variation in an exemplar model

As De Vogelaer, Chevrot, Katerbow & Nardy (2017:1) summarise, whilst remaining quite distinct fields of enquiry, there has been a rise in studies 'bridging the gap between language acquisition and sociolinguistics'. These studies find that children are acquiring aspects of the social indexicality of linguistic variation in their early years. Perception studies such as Author (2019) and Jones et al. (2017) have found that children are developing sociolinguistic competence at the age of 3 or 4 years, when they are able to separate talkers from different regions of the UK/US. These findings are complementary to studies evidencing children's sociolinguistic production at the same age (cf., Barbu, Nardy, Chevrot, & Juhel, 2013; Foulkes, Docherty & Watt, 1999; Roberts & Labov, 1995; Smith, Durham & Fortune, 2007). Therefore, the preschool years see sociolinguistic development in both production and perception. The current research investigates beyond the preschool years, focusing on primary school age children. The aim is to understand children's ability to deal with further variation as they are confronted with individual speaker differences and accent distinctions that they are less familiar with. In order to support this line of investigation, it is necessary to

account for how social-indexical information may be acquired alongside the linguistic in a theoretical model.

Exemplar-based models claim that our linguistic knowledge develops from individual encounters and can account for the development of our linguistic knowledge at different levels, for example our phonetic knowledge (see Johnson, 1997) and our grammatical knowledge (see Bybee, 2006). Bybee (2006:730) describes an account of how our grammatical knowledge builds up in the form of exemplars: 'Grammar is built up from specific instances of use that marry lexical items with constructions; it is routinized and entrenched by repetition and schematized by the categorization of exemplars'. Importantly, an exemplar model proposes that the exemplars are stored with relevant detail, such as contextual and social information. From a sociophonetic perspective, then, (cf. Foulkes 2010, Foulkes & Hay, 2015), there is an intrinsic connection between the phonetic properties of speech and relevant social information, which are stored together in memory and accessed together when processing speech.

As described by De Vogelaer et al. (2017), in an exemplar model, schemas emerge from the accumulation of individual instances. These schemas are mental categories which contain representations of the specific instances we have encountered. What makes these representations specific depends on the relevant details that we encode as part of the encounter. In turn, which particular details we encode alongside each representation is mediated by multiple factors, such as the role of the attention we pay to our experiences and how this attention depends on different social, motivational and contextual factors (cf. Smith & Zárate, 1992). These mental categories develop through experience and are constantly being updated with our increasing number of linguistic encounters. Categories that develop which are relevant to regional accent variation, for example a 'local speaker' category, rely on relevant sociolinguistic factors, such as how much variation an individual encounters at a local level, as well their developing social knowledge of such variation and their relationships with speakers in a particular community. Little is known about how these categories develop

234 at a young age and therefore by investigating the link between exposure and categorisation
235 ability amongst young children, the current study aims to address this gap.

236 Although there is support for an exemplar-based account of cognitive processing in studies
237 of speech perception, language acquisition and sociolinguistics more generally, there are still
238 general issues with an exemplar account remaining to be answered. One major issue, as
239 pointed out by Foulkes and Hay (2015), is that of the link between stored episodic memories
240 and the abstractions based upon them. While most exemplar theoretic accounts now
241 suppose the storing of abstract categories as well as phonetically detailed instances (cf.
242 Docherty & Foulkes, 2014), it isn't entirely clear what exactly is being stored and how the
243 exemplars are linked together. Different perspectives in sociolinguistics (Docherty & Foulkes,
244 2014; Foulkes & Hay 2015) and speech perception (Nygaard & Pisoni 1998; Johnson 1997,
245 2006; Sumner, Kim & King 2014) point to different interpretations.

246 Studies in both speech perception and sociolinguistics have emphasised the need to look at
247 children's development to further understand these processes. Sebastián-Gallés (2005)
248 points out that most studies in speech perception tend to focus either on infants or on adults
249 and therefore the perceptual development of children forms a necessary link to better
250 understand the changes taking place. From a sociolinguistic perspective, Foulkes (2010)
251 underlines the importance of considering the more limited experience of linguistic variation
252 amongst children as this will help in the formulation of an account which details the
253 progressive development of cognitive categories (i.e., which develop first and which come
254 later).

255 ***2.1 The key role of exposure to variation in an exemplar model***

256 A usage-based, exemplar theoretic account of how the social and linguistic information are
257 intrinsically connected and built up through experience is a good basis for making exposure-
258 related, testable predictions (cf. Foulkes 2010; Foulkes & Hay, 2015). A hypothesis that
259 develops from an exemplar model of indexical learning is that the more a child is exposed to

regional variation produced by different groups of people, the better equipped they will be to group incoming variants according to the categories that they have developed. In other words, more diverse accent exposure leads to an advancement in being able to categorise variation in a relevant manner.

In the exemplar model of indexical learning proposed by Foulkes (2010), it is hypothesised that speaker groups based on social criteria develop initially from storing exemplars of individual familiar speakers in memory. It is proposed that categories of speaker develop over time to reflect relevant social and/or linguistic distinctions. These categories can develop at different levels of abstraction and with developing levels of specificity; for example, a 'familiar speaker' category might develop into separate categories for 'local familiar' and 'non-local familiar'.

In studies with adults, it has been found consistently that both exposure to more variation in general, and more experience with a particular variety helps participants to categorise and/or identify speakers according to their accent (Clopper & Pisoni, 2004a; Williams et al. 1999; Yan, 2015; Baker et al.,2009). On the other hand, previous studies investigating children's perception of regional accent variation have either limited their investigation to locally raised children (Wagner et al., 2014; Jones et al., 2017), or categorised children in different ways and found different results. As described in section 1.3, Floccia et al. (2009) found that bidialectal 7-year-old children from Plymouth in the UK (who had at least one parent with a non-local regional accent) performed better than the monodialectal children in their accent-grouping task. Contrastingly, Beck's (2014) study with children in Philadelphia (U.S.), found no difference in performance between the Insiders (children with at least one local parent) and the Outsiders (children whose parents were both non-local) in her accent discrimination task. Starr, Theng, Wong, Tong, Ibrahim, Chua & Peh (2018) found that 5-7-year-old Expat children in Singapore with non-local parents, were better able to identify speakers of Singapore English (in comparison to speakers of Australian English, Northern-China-accented English, and Filipino English) than children with at least one parent from

Singapore. They interpret this finding as ‘children of parents from a nonlocal background [showing] certain advantages in gaining sociolinguistic knowledge’ (Starr et al. 2018:530). This interpretation also supports the results of Author (2019) which found that 3-4-year-old children in York with non-local parents were better able to categorise speakers according to regional accent distinctions between Yorkshire English and SSBE.

Overall, the findings from previous studies highlight the importance of considering children’s regional background as well as the local circumstances of the children’s exposure to variation. An exemplar account foregrounds the importance of considering the broadest possible range of variation that children may encounter in their linguistic exposure. Therefore, the exposure of each child to other familiar speakers, beyond their parents, and the regional background of these speakers, is also considered in the current study.

2.2 Aims and hypotheses for the current study

The current study aims to uncover primary school children’s ability to categorise speakers based on different accent variables, taking into account their age and their individual exposure to regional variation. It is anticipated that children who encounter more variation will be better able to analyse and abstract over this variation appropriately in order to categorise speakers by their accent.

2.3 Choice of accents and features

The experiment reported here was carried out in York, situated in North Yorkshire in the UK. Three regional accent varieties (Standard Southern British English (SSBE), Scottish English and North East English) were tested in comparison to the local Yorkshire accent. These three regional varieties were chosen because of their varying differences from the Yorkshire accent. Author (2019) found that preschool children can differentiate between phonological accent features indicative of a Yorkshire accent compared to an SSBE accent. These accents are both likely to be frequently encountered by children living in York. It is unknown, however, how well children will respond to other Northern accents which are encountered

less frequently and yet are more similar to the accent of their local area. Therefore, speakers with accents from two other regions of the north of the UK are included in this experiment: Scottish Standard English speakers and North Eastern English speakers. The experimental stimuli focus on key phonological variables as this is the usually the most noticeable indication of where someone is from (Trudgill, 1999). In order to avoid intonational variation the sentence-length stimuli were all constructed as statements. While it is acknowledged that there is potential for intonational variation between the speakers according to their accent (as found by Grabe, Kochanski and Coleman, 2005), variation in intonation patterns at the individual speaker level is also common place and therefore it would be difficult to disentangle the roots of such variation. This is still a developing area of research and to my knowledge there are no systematic accounts of variation in intonation patterns for the specific accents in question here and such an exploration is beyond the current study.

Table 1 summarises the accent features of focus for each of these comparisons. They are described in further detail below.

Table 1. Summary of the accents and accent features used in the experiment

Accent features (lexical set, from Wells, 1982a)		
	Yorkshire	**SSBE**
GOAT	[ɵː]	[əʊ]
FACE	[ɛː]	[eɪ]
	Yorkshire	**Scottish**
NURSE	[ɜː]	[ɜɹ]
lettER	[ə]	[əɹ]
	Yorkshire	**North East**
GOAT	[ɵː]	[oː]
FACE	[ɛː]	[eː]

The SSBE accent forms a distinctive comparison to the Yorkshire accent, demonstrated by the pronunciation of the vowels in the FACE and GOAT lexical sets, which are features of the North/South linguistic divide in England (Wells, 1982a/b) and were therefore chosen as the features to use for the current study. Importantly, features indicative of SSBE including the SSBE pronunciations of the FACE and GOAT vowels, are also present in the speech of many middle-class speakers throughout the country and are therefore familiar to populations outside of the South East of England as well. This combination of both distinctiveness and familiarity is different to previous accent categorisation tasks with children which tend to equate unfamiliarity of an accent with distinctiveness (cf. Floccia et al. 2009; Girard et al. 2008; Wagner et al. 2014). In the current study, the focus on the SSBE vowels as a familiar and distinctive contrast to the Yorkshire vowels enables a comparison to the less familiar but distinctive contrast of the Scottish vowels and the less familiar and less distinctive North East vowels.

The phonemic inventory of Scottish English is different to other varieties of English in many ways (Wells, 1982b:399) and the feature of rhoticity divides speakers from Scotland and speakers from most of the rest of England (Llamas, Watt & MacFarlane, 2016:8). Therefore, the Scottish accent[1], and the feature of rhoticity specifically, was chosen to represent another distinctive feature embedded in an accent likely to be less familiar to the children in York. See Figure A3 in the Appendix for a spectrogram illustrating an example of rhoticity in one of the experimental stimuli from a Scottish speaker.

The North East[2] accent was chosen in order to represent a comparison much closer to Yorkshire. Deriving from neighbouring regions in the North of England, these two accents share many similar vowel realisations. As Watt (2000;2002) describes, the pan-northern monophthongal variants of the FACE and GOAT vowels([e:] and [o:]) are replacing the traditional centering diphthongal variants in Tyneside, therefore increasing the similarity of North East speakers to speakers from Yorkshire. Despite the similarities however, there are some fine-grained differences between speakers from these areas. In Yorkshire, fronting of

the GOAT vowel to a centralised [ə:] or [ɜ:] variant has been a change in progress for a while now (Williams & Kerswill, 1999; Watt & Tillotson, 2001) and found to be present in speakers from York specifically (Haddican, Foulkes, Hughes & Richards, 2013). This fronting is characterised by Cooper (2017) as an enregistered feature of the Yorkshire dialect. The FACE vowel also shows fine-grained differences between speakers from these regions, with a more front [e:] in Tyneside, particular for young female speakers, and a slightly lower vowel [ɛ:] found for speakers in Yorkshire (Watt & Allen, 2002) (see Figures A1 and A2 in the appendix for these vowel measurements for the speakers in the current experiment). Due to these differences which are rather inconspicuous, it is expected that the children will find it much more difficult to group speakers according to this accent distinction. While the North East accent is likely to be less familiar to the children than the pervasive SSBE, as a neighbouring region and with a large number of migrants and tourists from the North East in York (York Visitor Survey, 2015), it is possible that speakers with a North East accent are recognisable to the children.

2.4 Research questions

1) Can 5-9-year-olds group different speakers by phonological variables indexing:

(a) a Yorkshire/SSBE regional accent distinction?

(b) a Yorkshire/Scottish regional accent distinction?

(c) a Yorkshire/North East regional accent distinction?

2) To what extent does the children's ability to group the speakers in (1a-c) vary according to the children's age, their exposure to different regional accents and the level of abstraction of the accent features?

3. Method

3.1 Participants

Thirty-three primary-school children took part in the study (*M* age = 7;1; *SD* = 1.28, range = 5;8-9;9). There was uneven distribution of females and males but no significant difference in

382 the ages of these two groups (twenty-one girls, *M* age = 7;1, *SD* = 1.2; twelve boys, *M* age =
383 7;5, *SD* = 1.2).[3]

384 Consent forms and background information sheets were collected from each child's parents.
385 These forms asked about the regional background of the child and their parents, and
386 whether the child had regular contact with anyone else from another region. It also asked
387 about the parents' education and occupation. Data on the children's ethnic background was
388 not collected.

389 Thirty-one of the children were born in York or moved to York under the age of 1 year. Two
390 of the children were born in London but had lived in York for 2.5-3 years. In order to consider
391 the children's exposure to regional variation in the statistical analysis, using the background
392 information collected from the children's parents, the children were split into two groups
393 according to whether they had regular exposure to regional variation (either through their
394 parents or extended family), or no such exposure to regional variation. Altogether, 23 of the
395 children had exposure to non-Yorkshire English parents and/or extended family (the
396 'exposed' group), 10 of the children had local, Yorkshire parents and no reported regular
397 exposure to non-Yorkshire English speaking family or friends (the 'non-exposed' group).

398 The exposed group were reported to be exposed to a range of English varieties from
399 different regions of the UK and beyond (e.g. London, Tyne and Wear, Hampshire and South
400 Africa). Table A1 in the Appendix provides full details. While it is acknowledged that this
401 measure is by no means a perfect representation of the children's exposure to variation, the
402 parents' reports of who their children are in regular contact with is deemed the best way of
403 receiving this information in an easy and comparable manner.

404 Children's social class background, as measured by their parents' highest level of education,
405 was strongly skewed by their exposure grouping: 17/23 children in the exposed group and
406 1/10 children in the non-exposed group had at least one parent with a postgraduate level of
407 education. In comparison, 1/23 children in the exposed group and 4/10 children in the non-
408 exposed group had no parents educated beyond secondary school.

3.2 Experiment stimuli

A total of eighteen speakers were recorded to provide stimuli for the experiment. All of the speakers were young adult females, aged 18-28 years (*M* age = 21.7, *SD* = 3.6). The speakers were chosen for their accents, which represented the four regional varieties: Yorkshire (six speakers, one each from Selby, Barnsley, Mirfield, Leeds, Huddersfield, Dewsbury), SSBE (three from Norfolk, one from Suffolk), Scottish English (three from Edinburgh, one from Glasgow), and North Eastern English (one from Whitley Bay, two from Gateshead, one from Newcastle). The allocation of the speakers to the different stimuli included in the experiment (the 'reference' sentences vs. the 'grouping' sentences, as described below) was pseudo-randomised so that no two stimuli within each set featured the same speaker.

The speakers were recorded either in the recording studio of the Department of Language and Linguistic Science at the University of York or in a quiet room using a Zoom H4n recorder which was set to record at a 16 bit 44.1kHz sampling rate. The speakers were recorded reading a list of sentences, 10 of which were used in the final experiment. These stimuli were created specifically for use in the experiment in order to include words with variables that distinguish the different regional accents: the vowels in the GOAT, FACE, NURSE and lettER lexical sets (Wells, 1982a). The sentences were designed such that the target word featuring the vowel was always located at the end. The rest of the words in each sentence were chosen carefully in order not to include any variables that might distinguish the accents. For example, the sentence in (1) features the GOAT vowel and (2) features the FACE vowel:

(1) The reply to the question is NO

(2) We should be in the SHADE

Table 2 presents a summary of the accents and accent features used for each accent pairing in the experiment (see Table 1 for phonetic transcription of these vowels and Figures A1-A3 in the appendix for comparative vowel measurements between the accents).

Table 2. Summary of the accents and accent features for each accent pairing of the experiment

Accent pairing	Accent features (lexical set)
Yorkshire/SSBE	GOAT FACE
Yorkshire/ Scottish	NURSE lettER
Yorkshire/ North East	GOAT FACE

3.3 Experiment design

The experiment was constructed as a series of grouping tasks involving three accent comparisons (Yorkshire/SSBE; Yorkshire/Scottish; Yorkshire/North East). For each accent pairing, there were three sets of stimuli and five trials per set. Each set of stimuli was based on hearing two 'reference sentences', one of each accent, spoken by two teachers (Miss A and Miss B, represented by cartoon characters on screen) and then five 'grouping sentences' (represented by five smiley faces on screen), a mixture of the two accents (two of one, three of the other – randomised throughout) - see Figure 1. In order not to impose excessive memory demands, there was no limit to the number of times the children were able to listen to each of the speakers. The three accent pairings were presented in the same, fixed order for all participants. While it is acknowledged that there is the potential risk of fatigue effects, this was based on the projected difficulty of each of the pairings and was intended to provide a progressive aspect to the experiment so that knowing what to do with the Yorkshire/SSBE stimuli would lead to an understanding of how to carry out the same task with the Yorkshire/Scottish and Yorkshire/North East stimuli. The Yorkshire/North East comparison was anticipated to be the most difficult as the features of the North East accent were the least distinctive from the Yorkshire accent.

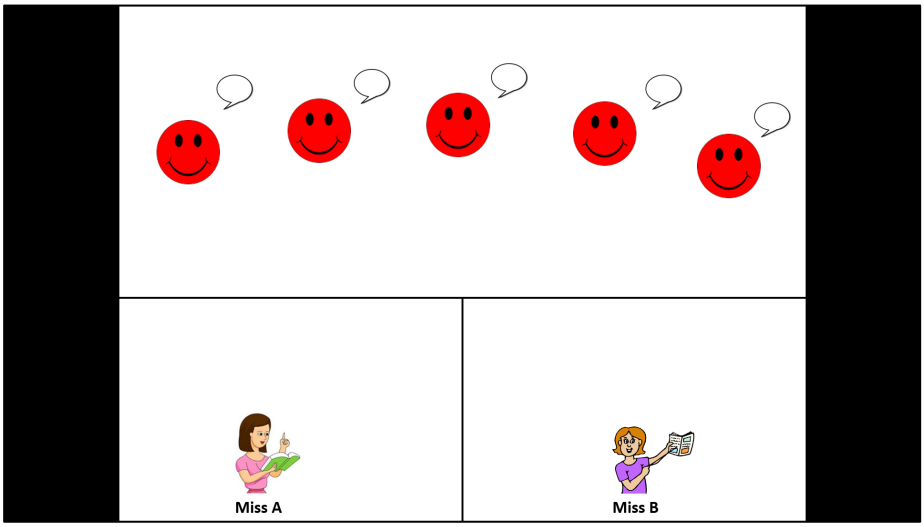

Figure 1. Screen shot of one set of stimuli from the experiment.

The children were asked to match each of the five smiley faces to one or other of the teachers. In all sets of stimuli, the teachers were heard reading the same sentence, with only the target vowel at the end of the sentence marking them as different. For example, the [ɐ:]/[əʊ] GOAT vowel distinction in (1) and (2).

(1) The reply to the question is n[ɐ:]

(2) The reply to the question is n[əʊ]

In the first two sets of each accent pairing, the grouping sentence produced by the smiley faces was the same as the reference sentence produced by the teachers, featuring the same target vowel within the same word. The only difference between the smiley faces was their pronunciation of the target vowel, for example either as (1) or (2) above.

In the third set of each accent pairing, the grouping sentence produced by the five smiley faces was a different sentence to the reference sentence produced by the teachers. The grouping sentence focused on the same vowel variable as the reference sentence but the vowel was embedded in a different word, for example see (3) below. This was in order to test the children's ability to group across an extra level of abstraction, at the level of the phoneme.

(3) Reference sentence: ‘Tell me when I should go’

Grouping sentence: ‘I have a very sore toe’

Accent difference: ‘g[ɵ:] /’g[əʊ]’ vs. ‘t[ɵ:]’/‘t[əʊ]’

This higher level of abstraction was included as it was anticipated that this would present a higher level of difficulty for the children. Author (2019) found that the 4-year-olds but not the 3-year-olds were able to group speaker guises at this higher level of abstraction. Due to the progression in difficulty, the stimuli for each accent pairing followed the same order (2 x sets with same sentence, 1 x set with different sentence) and focused on the two variables differentiating the accents for that pairing. The order of the accents was randomised within each set. Table 3 presents a summary of the experiment design.

Table 3. Design of the experiment detailing the accents, accent features, target words and the level of abstraction included in each accent pairing and each set of stimuli

Accent pairing	**Set**	**Level of abstraction**	**Miss A: Accent feature and target word**	**Miss B: Accent feature and target word**	**Smiley faces: Accent feature and target word**
Yorkshire vs. SSBE	1	Same word	GOAT *no*	GOAT *no*	GOAT *no*
	2	Same word	FACE *shade*	FACE *shade*	FACE *shade*
	3	Same phoneme	GOAT *go*	GOAT *go*	GOAT *toe*
Yorkshire vs. Scottish	4	Same word	NURSE *church*	NURSE *church*	NURSE *church*
	5	Same word	lettER *sugar*	lettER *sugar*	lettER *sugar*
	6	Same phoneme	NURSE *word*	NURSE *word*	NURSE *burst*
Yorkshire vs. North East	7	Same word	GOAT *goat*	GOAT *goat*	GOAT *goat*

	8	Same word	FACE *late*	FACE *late*	FACE *late*
	9	Same phoneme	GOAT *toe*	GOAT *toe*	GOAT *go*

3.4 Procedure

The experiment was run with each child individually, either in a quiet space at their school or at the child's home. The children were invited to play a game on the computer with the experimenter. For each set of stimuli (see Figure 1), the children were asked to listen to Miss A and then Miss B (by clicking on them) and then listen to each of the smiley faces (by clicking on their speech bubbles). After hearing each smiley face, they were asked to decide whether they thought the smiley face sounded like they came from the same place as Miss A or Miss B. They indicated their answer by using the mouse to drag the smiley face over to either Miss A or Miss B and leaving it there. The children were asked to group the speakers according to 'the place' they came from rather than if they 'sounded similar' in order to try and avoid the children making their decision based on other non-regional aspects of the speakers' voices, such as pitch.

After the instructions were given and the child confirmed that they understood the task, the child was provided with headphones and given control of the mouse to start the game. The experimenter also wore headphones in order to monitor the game and check that all the audio clips worked. After the three sets of stimuli from the Yorkshire/SSBE pairing, the child was presented with a screen indicating that they were about to begin hearing another three sets of stimuli (the Yorkshire/Scottish pairing) and they were asked if they would like to continue playing the game. The same happened before the last three sets of stimuli (the Yorkshire/North East pairing). All sets of stimuli for all of the accent pairings were played in exactly the same way. At the end of the game, children were rewarded with a sticker. All thirty-three children completed the whole experiment.

4. Results

Across the whole experiment the children's mean average score was 64.31% correct answers (SD = 10.10). This was significantly above chance level (50%), t (32) = 7.47, p < .001.The overall results across the sets are presented in the RDI (Raw (data) Description and Inference) plot in Figure 2, created using the yarrr package (Phillips, 2017) in R. The children performed best in the Yorkshire/SSBE pairing, with a mean of 78.59% correct (SD=18.01) which was significantly above chance level (50%), t (32) = 9.12, p < .001. The mean for the Yorkshire/Scottish pairing was 55.56% correct (SD=18.91); this was not significantly above chance level (50%), t (32) = 1.69, p = .10. The mean for the Yorkshire/North East pairing was 58.79% correct (SD=14.67) and significantly above chance level (50%), t (32) = 3.44, p = .002.

The 95% Highest Density Intervals in Figure 2 are clearly distinct and not overlapping between the different accent pairings. This indicates that there is a significant difference in performance between the Yorkshire/SSBE and the Yorkshire/Scottish pairings, and between the Yorkshire/SSBE and the Yorkshire/North East pairings. This is further evidenced in the statistical analysis below (see Table A1 in the Appendix for each individual child's results across the pairings).

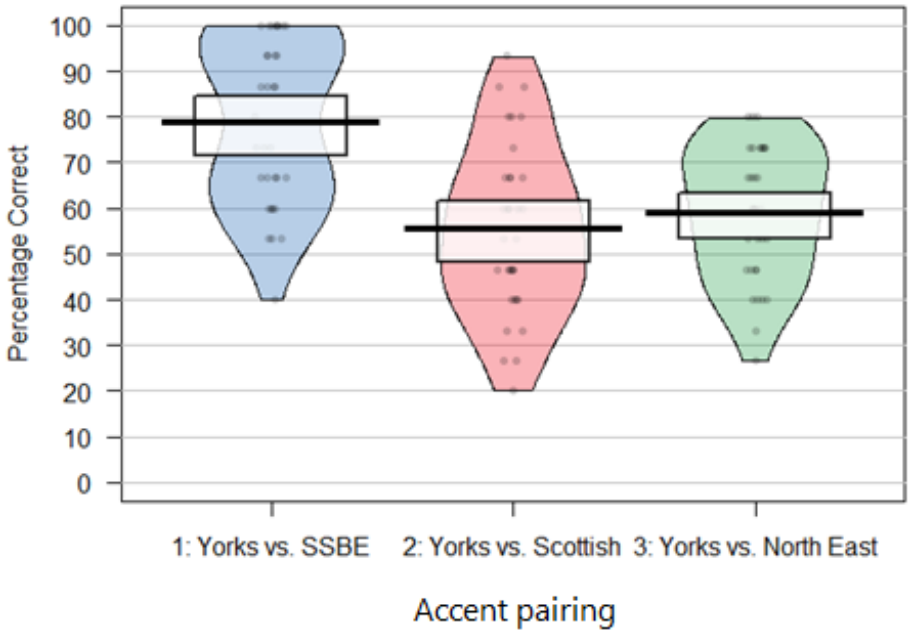

Figure 2. Overall results across the accent pairings

4.1 Statistical analysis

The following statistical analysis was carried out in order to predict the probability of the children correctly grouping each stimulus that they heard. The dependent variable was therefore binary data, based on whether each stimulus received either a correct or an incorrect response from each child (1485 responses in total). A binary mixed effects logistic regression model was run in R (R Core Team, 2013) to test the significance of the two background variables specified in the research questions: 'age' (continuous) and 'exposure to other regional varieties' (yes/no). In addition, 'accent pairing' (Yorkshire/SSBE, Yorkshire/Scottish, Yorkshire/North East) was entered into the model as a categorical variable and 'level of abstraction' (same word/same phoneme) was entered into the model in order to test for differences across these variables. As described above, social class distinctions were heavily skewed according to the different exposure groups and therefore this variable wasn't entered into the model separately. The children's social class backgrounds are considered, alongside their exposure to variation in the analysis and

discussion. 'Individual child' and 'stimulus set' were included as random intercepts in order to take account of variation within these samples. In order to consider the relationships between the independent variables, interactions were tested. A two-way interaction between 'level of abstraction' and 'exposure to other regional varieties' was included in the final model. Other two-way interactions (between 'accent pairing' and 'exposure to other regional varieties' and between 'age' and the other variables) and higher order interactions (between more than two of the variable) were not found to add to the model's fit. The model's goodness-of-fit was measured by the Akaike information criterion (AIC) which takes into account the model's complexity (its number of predictions). Table 4 shows the final model with the best fit. The reference level in the model amounted to 'Yorkshire/SSBE pairing, no exposure to regional variation, same phoneme'.

Table 4. Logistic mixed effects model run across the full results from the thirty-three children (n responses =1485, significance level: '*' = 0.05, '**' = 0.01, '***' = 0.001)

	Number of observations	**Mean correct answers (%)**	**Estimate**	**Std. Error**	**z value**	**Pr(>|z|)**
(Intercept)			1.02667	0.64791	1.585	0.11306
Age (continuous)			0.07633	0.07507	1.017	0.30922
Accent pairing						
Yorkshire/SSBE	495	78.6	ref level	ref level	ref level	ref level
Yorkshire/Scottish	495	55.6	-1.08879	0.18619	-5.848	4.98e-09***
Yorkshire/North East	495	58.8	-1.02578	0.18628	-5.507	3.66e-08***
Exposure to regional variation			0.04328	0.27299	0.159	0.87404
Yes	1080	66.5				
No	405	58.5				

Level of abstraction Same word Same phoneme	 990 495	 62.02 69.09	-0.80759	0.25365	-3.184	0.00145**
Level of abstraction: Exposure Interaction			0.62038	0.27541	2.253	0.02429*

560

561 As Table 4 shows, the variable 'accent pairing' was a highly significant predictor of whether
562 the children scored a correct answer. Supporting the data presented in Figure 2, the
563 statistical model shows that the children were much more likely to score a correct answer in
564 the Yorkshire/SSBE pairing, in comparison to the other two pairings. The children's exposure
565 to other regional varieties is also found to be a significant predictor in interaction with the
566 level of abstraction. This interaction is explored further in Figure 3 and Table 5. The
567 children's age is not found to be a significant predictor in the model.

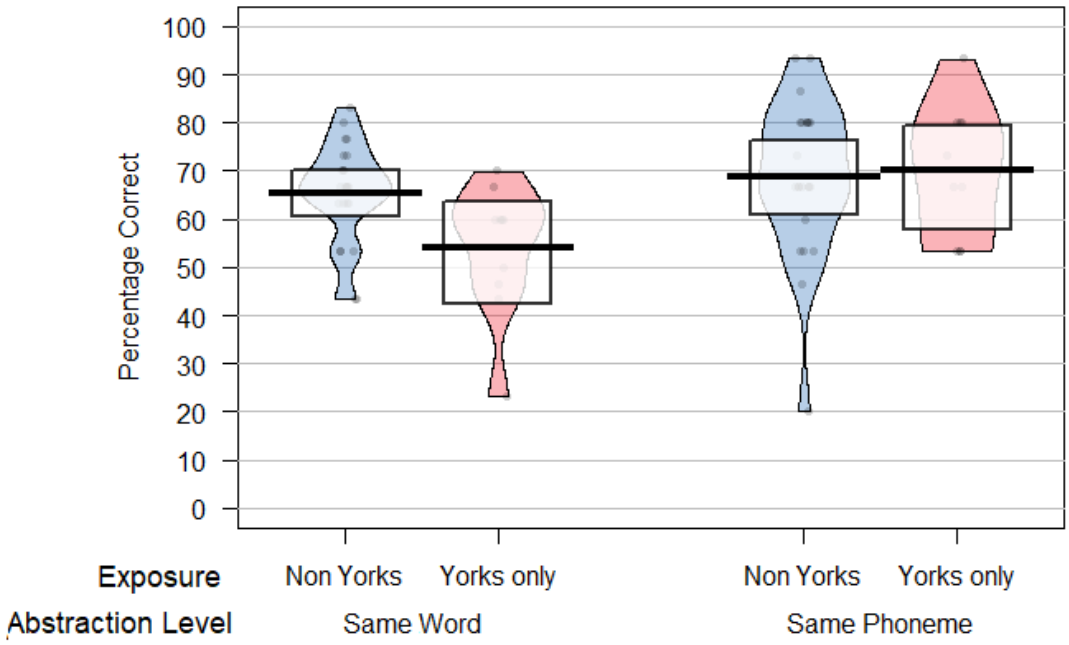

Figure 3. All children's results across the stimuli with different levels of abstraction, divided by exposure.

Table 5. Mean accuracy, standard deviations, one-sample t-test statistics per exposure group and subtraction level. t-test of mean against chance level test value of 50%.

Exposure group	**Abstraction level**	**Mean %**	**Standard Deviation**	***t* (df)**	***p***
Non-Yorkshire	Same Word	65.51	10.47	7.1 (22)	<.001*
Non-Yorkshire	Same Phoneme	68.70	16.51	5.43 (22)	<.001*
Yorkshire only	Same Word	54.00	13.68	.925 (9)	.379
Yorkshire only	Same Phoneme	70.00	13.79	4.6 (9)	.001*

Figure 3 shows that the children who have exposure to regional variation perform significantly better at grouping the speakers when the stimuli focus on the same word. An independent t-test finds the mean averages to be significantly different (Non-Yorkshire group, M = 65.51%, SD = 10.47; Yorkshire-only group, M = 54.0%, SD = 13.68, t (31) = 2.64, p = .013). For the Yorkshire-only group, a paired samples t-test finds a significant difference between their scores across the different levels of abstraction; (Same word, M = 54.0%, SD = 13.68; Same phoneme, M = 70.0%, SD = 13.79, t (9) = 2.82, p = .02). As shown in Table 5, children in the Non-Yorkshire exposure group perform significantly above chance level across the stimuli at both levels of abstraction. The Yorkshire-only group, however, only perform significantly above chance level when the stimuli feature the same phoneme.

5. Discussion

While previous studies have found that children from 5-years-old fail to categorise sentences based on a regional accent distinction, the current study shows that with a simpler task, focused on one accent variable at a time, it is possible for children this age to perceive accent differences and categorise speakers accordingly. In the following sections, the results will be discussed in relation to the significant effects of the independent variables, in comparison to findings from previous studies and in light of an interpretation through an exposure-related exemplar theoretic account.

5.1 Performance across the accent pairings: distinctiveness and familiarity

Children were found to perform best (and statistically better than chance) when grouping speakers based on a Yorkshire/SSBE accent distinction. This was the only pairing for which any of the children correctly grouped all of the speakers; eight children were 100% correct in their grouping of the speakers for this accent pairing. This finding builds on the results of Author (2019) which found that preschool children were able to differentiate speaker guises on the basis of accent features pertaining to a Yorkshire/SSBE distinction. The current study

has expanded on these results and found that older primary school children are able to disregard the individual differences of the speakers in favour of grouping the speakers according to common properties of their accents.

The results across the accent pairings indicate that out of the accents tested in the experiment, the differences between Yorkshire and SSBE accented speakers were the easiest for the children to categorise. It is likely that both the familiarity and the distinctiveness of the SSBE accent can explain these findings. The diphthongal FACE and GOAT vowels of SSBE provide a conspicuous distinction for the children to draw upon, (see Figure A1 in the Appendix), resulting in their relative ease when categorising the speakers. This interpretation is supported by the conclusions of previous work in this field which find that children perform better in an accent categorisation task when the accents are sufficiently different (Floccia et al. 2009; Girard et al. 2008; Wagner et al. 2014). On the other hand, while these same studies have emphasised that the unfamiliarity of the accent is key to its distinctiveness, it is the combination of familiarity and distinctiveness that likely drives the high performance in the Yorkshire/SSBE pairing in the current study. As described in section 2.3, features of SSBE are ubiquitous in the speech of middle-class people throughout the country. Therefore, the children's prevalent exposure and consequent familiarity with features of SSBE, alongside the features of their local Yorkshire accent, is likely to have helped in their ability to perceive differences between the accents.

The children's familiarity with SSBE variants is also likely to be a result of their exposure to child-directed speech (CDS). Sociolinguistic studies of CDS have found that parents and caregivers often use more standard forms in speech to their children in linguistic contexts where they would almost exclusively use the local, vernacular form with other adults (Foulkes et al., 2005; Smith et al., 2013). Children are therefore exposed to more variation between standard/vernacular forms in CDS (Foulkes et al., 2005:197). Standard forms in British English equate to variants found in SSBE and therefore the children were likely to be exposed to SSBE forms in CDS which may have contributed to their success in grouping the

Yorkshire/SSBE speakers in the current experiment. Moreover, the linguistic input that children receive inevitably reflects their parents' own education and social class; children from higher class families are likely to be exposed to more standard forms at home. A high percentage of the children in the Non-Yorkshire exposure group had at least one parent with a postgraduate education (taken as a proxy measure of social class) and therefore they were likely to be exposed to higher rates of SSBE forms at home.

Another related aspect of the children's exposure to SSBE variants is in terms of their exposure to diphthongal pronunciations of the FACE and GOAT vowels in their home community more generally. There is a current change in progress whereby the SSBE diphthongal forms of FACE and GOAT are spreading to northern regions of the UK. Haddican et al. (2013) found evidence of a real-time change in York, with an increase in use of the diphthongal forms by young upper working-class/lower middle-class speakers in the local community. They found that there was a social indexing of the monophthongal forms which the community associated with sounding 'local'. Therefore, it is likely that children from middle-class speech communities in York have regular exposure to diphthongal forms of these vowels and also possible that the social markedness of the monophthongal forms helps them to stand out, making useful grouping criteria. This is comparable to Dossey et al.'s (2020) study in the U.S. which found that the Southern accent was the most marked and therefore easiest for the children to group.

Children's lower performance for the Yorkshire/Scottish and Yorkshire/North East accent pairings indicate that they were much harder for the children to differentiate than the Yorkshire/SSBE distinction. This may partly be explained by the fact that features of the Scottish and North East accents are less pervasive than SSBE in general; they are not features of the standard accent and therefore the children are less likely to have exposure to speakers with these accent features. Children's lack of experience with the Scottish accent is corroborated by the fact that only two children were reported as having regular exposure to Scottish family or friends. These two children were two of the three highest scoring for the

Yorkshire/Scottish accent pairing (children 1 and 7 in Table A1 in the Appendix), indicating the possibility that their experience with the accent helped them to categorise the Scottish speakers more accurately.

Children's performance for the Yorkshire/Scottish pairing was significantly lower than for the Yorkshire/SSBE pairing and not significantly above chance level. A rhotic/non-rhotic distinction of the NURSE and lettER vowels differentiated the Scottish speakers from the Yorkshire speakers in the Yorkshire/Scottish pairing. Rhoticity is generally regarded as a distinguishing feature of Scottish accents in comparison to English accents. The addition of a phonetic segment in a rhotic pronunciation (e.g. [ɜɹ]), compared to a non-rhotic pronunciation (e.g. [ɜː]), seems likely to form a very perceptually distinct contrast. However, the rhotic pronunciation does not appear to be discernible for many of the children in this experiment and this is likely due to the 'complex articulatory variability' (Lawson, Scobbie & Stuart-Smith, 2011:260) in the realisation of /r/ in Scottish English (Stuart-Smith, 2003; 2007). In the current experiment, the Scottish speakers' rhotic realisations may not have been strongly or consistently rhotic enough for the children to perceive them as rhotic. The variability inherent in rhoticity is also demonstrated by the fact that it is difficult to measure acoustically; there are conflicting interpretations regarding the role of F2 and F3 in the perceptual salience of rhotic segments (Heselwood & Plug, 2011). In order to best capture the rhotic movement, the spectrogram in Figure A3 in the Appendix demonstrates the F2 movement characteristic of rhoticity found in the experimental stimuli for the Scottish speakers.

The children's performance for the Yorkshire/North East pairing was significantly lower than for the Yorkshire/SSBE pairing. This is unsurprising as the GOAT and FACE vowels were pronounced very similarly by the Yorkshire and North East speakers with only a small average difference in height/frontness differentiating them (see Figure A2 in the Appendix). Despite this, the children's overall performance for this pairing is significantly above chance level, indicating that some of the children were able to correctly the group the speakers to some extent. While the Yorkshire and North East accents are very similar, as they are in

neighbouring regions and there are lots of migrants from the North East, it is possible that the children are generally familiar with the North East accent. Indeed, six of the children are reported as having regular exposure to a parent or close family member from Tyne and Wear (see Table A1 in the Appendix). Although the numbers are too small for test for significances of specific accents, this effect of exposure may provide some explanation for the children's higher than chance performance in this accent pairing.

5.2 Age, general exposure to variation and level of abstraction

No significant effect relating to age is found in the statistical analysis of the results. This indicates that between the ages of 5;7-9;9 these children are not showing major developmental improvement in the task based purely on their age, but instead that their individual experience and exposure to variation has a stronger effect on their abilities.

It was surprising to find that the Yorkshire-only exposure group performed significantly above chance level only when the stimuli were focused on the same phoneme. The comparison between these stimuli was at a higher level of abstraction than the stimuli focused on the same word and were therefore anticipated to be more difficult to group together (as found in Kaiser and Kasberger, 2018 and Author, 2019). This result could indicate a practice effect and that these children performed better in the third set of stimuli because they had become accustomed to the experiment design and therefore were more confident about how to complete the task, as well as more familiar with the accent differences of the speakers. A different (but compatible) interpretation is that, for the same word stimuli, these children might have been more confused as to how to group the speakers because they heard the same sentence featuring the same word from each speaker. Therefore, the children might have paid more attention to the fact that the speakers were all saying the same thing and not have noticed any differences between the speakers. In the same phoneme stimuli, on the other hand, the children heard different sentences featuring different words. Therefore, they already had a stronger initial indication of a difference between the speakers and this may have primed them to listen out for more differences.

709 In comparison, the children in the Non-Yorkshire exposure group performed significantly
710 above chance level across both levels of abstraction with no significant difference between
711 the two levels. For the stimuli featuring the same word, therefore, the Non-Yorkshire
712 exposure group performed significantly better than the Yorkshire-only exposure group. This
713 indicates that the children's general exposure to variation gave them an advantage in
714 recognising the differences in the pronunciation of the accent features when embedded in
715 the same word. Such an explanation endorses the general hypothesis of this research: that
716 variation in the children's linguistic input helps them to interpret the variation that they
717 encounter.

718 ***5.2.1. An exemplar-based account***

719 There are two parts in accounting for exposure-related findings in an exemplar-based
720 account. First, exposure to the specific variety in question is relevant but second, overall
721 exposure to variation plays a role in and of itself. Both will be explored here. In an exemplar-
722 based account, the stored exemplars from previous encounters with accent variation are
723 activated when similar exemplars are newly encountered. This simultaneously activates the
724 stored social information and the associated category that has formed on the basis of that
725 social information. In other words, encountering a GOAT vowel in an SSBE accent, activates
726 the store of SSBE GOAT vowels in the listeners' memory and the associated category of
727 speakers. As such, the listener is able to group this new exemplar within this existing
728 category. The process of exemplar category formation is based on experiences and
729 exposure to variation over time and therefore develops over the lifespan (Foulkes and Hay,
730 2015). While these categories build from the accumulation of individual instances, they can
731 develop at varying levels of specificity and abstraction. Children, who have had less
732 exposure to variation than adults, are likely to be at an earlier stage of creating these
733 categories with increasingly detailed nuance.

734 An exemplar model would predict that exposure to the specific varieties in question is most
735 relevant. While there is not enough data in the current experiment to analyse the children's

736 exposure to the individual accents featured in the different pairings, the children's exposure
737 to SSBE variants through CDS and in the speech of middle-class speakers in the community
738 likely played a role in their successful grouping of speakers using these features (as
739 described in section 5.1). Beyond this, the children were exposed to a number of different
740 varieties, too numerous to categorise for statistical analysis in relation to the sample size.
741 There is also the added complication that it might not be direct exposure to the variety in
742 question that is needed to activate stored exemplars, but that exposure to the features
743 themselves would be enough. For example, a Yorkshire and Lancashire accent share many
744 features including a monophthongal FACE/GOAT vowel and therefore perhaps exposure to
745 one of these accents would help in the categorisation of the other, particularly when the
746 focus is on the individual variables themselves.

747 Here it is proposed that general exposure to variation beyond their local accent also helps
748 the children in the current experiment as they are experienced in perceiving such
749 differences. For the Non-Yorkshire exposure group, having a larger store of exemplars from
750 speakers with different accents gives them more to draw upon as a basis for grouping
751 incoming exemplars. The children in the Yorkshire-only exposure group do not have such
752 exposure to variation and therefore do not perform as well in grouping the stimuli focused on
753 the same word. Their better performance in grouping the stimuli focused on the same
754 phoneme is difficult to interpret and more data is needed to investigate whether practice and
755 priming effects are at work here.

756 Support for an account highlighting the role of general exposure to variation comes from
757 Drager and Kirtley's (2016:15-16) discussion of the emergence of stereotypes across
758 episodic memories based on Kirtley (2011). Kirtley studied listeners' perceptions of military
759 speech and found that listeners who had not been in the military were more likely to decide
760 that a speaker using a Southern guise sounded like a serviceman and in doing so were
761 relying upon a stereotype of how military men would sound. On the other hand, listeners who
762 had experience of being in the military and had therefore experienced a variety of accents

among military men did not stereotype in the same way and were just as likely to identify the non-Southern guise as being a serviceman. In a broad sense, these results suggest that those with more experience of the variation within a group of speakers are more accepting of variation into that group. In relation to the current experiment, the children who had more exposure to variation were more accepting of variation into a 'other/non-local speaker' group. While this isn't a direct prediction from an exemplar model relying solely on the storing and accessing of episodic memories, it is compatible with exemplar accounts which advocate a role for abstraction. Such accounts describe the effects of top-down processing on incoming stimuli where the indexical information associated with the linguistic stimuli have an influence on how incoming stimuli are categorised (Foulkes, 2010; Foulkes and Docherty, 2014). In the current study, this would equate to the indexicality of 'non-local/other' feeding in to the categorisation of incoming stimuli. As Foulkes puts it, 'variation in the input is a pre-requisite to develop the knowledge necessary to produce and interpret socially-indexical variation' (Foulkes, 2010:25).

Although other usage-based accounts may also be compatible with the findings in the current study, the advantage of an exemplar account is its ability to account for the storing of both indexical and linguistic information as well as its accountability for both the individual stored exemplars that listeners encounter and the abstractions that develop across linguistic/indexical categories. Leading on from the current experiment, further research is needed in order to dig deeper and find out whether exposure to specific varieties helps in children's perception of these varieties (as found in studies with adults, c.f. Clopper & Pisoni, 2004a; Williams et al.1999; Yan, 2015).

6. Conclusion

The results of the current study find that a combination of familiarity and distinctiveness of regional accent features predict the ability of 5-9-year-old children to group speakers according to their accent. This is in contrast to previous studies which have relied upon the

distinctiveness of unfamiliar accents in order to find success in such a task. Using a novel design, the experiment was able to focus on key accent variables and avoid relying on the children's memory in order for them to be successful in the task. By comparing across the three regional accent pairings, the Yorkshire/SSBE pairing was found to be the most distinctive and the easiest for the children to group. The success for this pairing was also likely due to the children's familiarity with features of SSBE through exposure to such forms in middle-class speech.

General exposure to regional variation was found to play a significant role for a subset of the stimuli (featuring the same word). An underexplored factor in previous studies, this finding builds on the results of Author (2019) which found a similar effect for younger children. An exemplar account of children's sociolinguistic development is used to explain these findings as it can incorporate a role for both the individual stored exemplars that listeners encounter and the abstractions that form on accumulation of the exemplars. In an exemplar account, the variation that children receive in their linguistic input enables them to develop, and add to, exemplar-based categories which store relevant social detail alongside the linguistic content. Therefore, the more exposure to variation that a child has, the better enabled they are to categorise incoming variation appropriately.

As highlighted by Foulkes and Hay (2015), more experimental work needs to be carried out to more thoroughly test the various predictions of exemplar theory, such as how the detailed exemplars and their categorical abstractions interact. The design of the current study is an experimental representation of how we navigate individual voices to find the commonalties and categorise speakers according to socially salient criteria. The results therefore provide support for how our exposure to variation might enable us to categorise speakers in the real-world.

Further work is needed to explore the implications of the current findings in more detail; this includes an in-depth consideration of the social salience of individual accent features, a consistent way of measuring distinctiveness and further investigation into the stimuli's level

of abstraction (in particular, trying to counteract any potential practice or priming effects). The consideration of the role of exposure to specific regional variation, as well as other accents, and languages, from within and outside of the UK, are also important potential avenues for further research to investigate the full implications of an exemplar-based model of sociolinguistic learning.

Appendices

Figure A1. Mean, normalised vowel measurements of Yorkshire and SSBE FACE and GOAT vowel stimuli. Normalised and autoaligned using FAVE (Rosenfelder et al. 2014). Over 20-80% vowel measurements (left) and showing the same measurements in F1/F2 space (right).

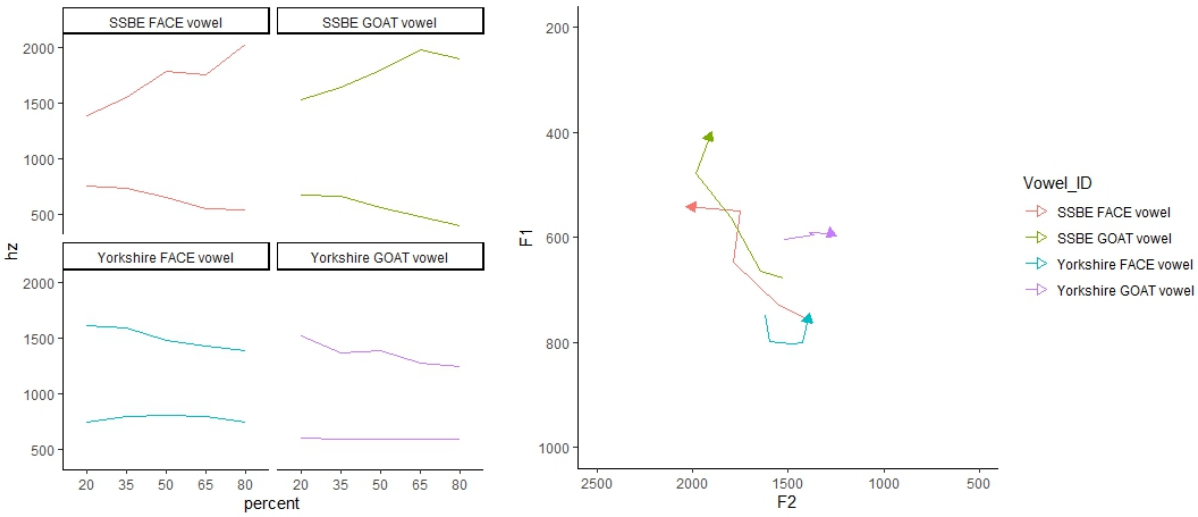

Figure A2. Mean, normalised vowel measurements of Yorkshire and North East FACE and GOAT vowel stimuli. Normalised and autoaligned using FAVE (Rosenfelder et al. 2014). Over 20-80% vowel measurements (left) and showing the same measurements in F1/F2 space (right).

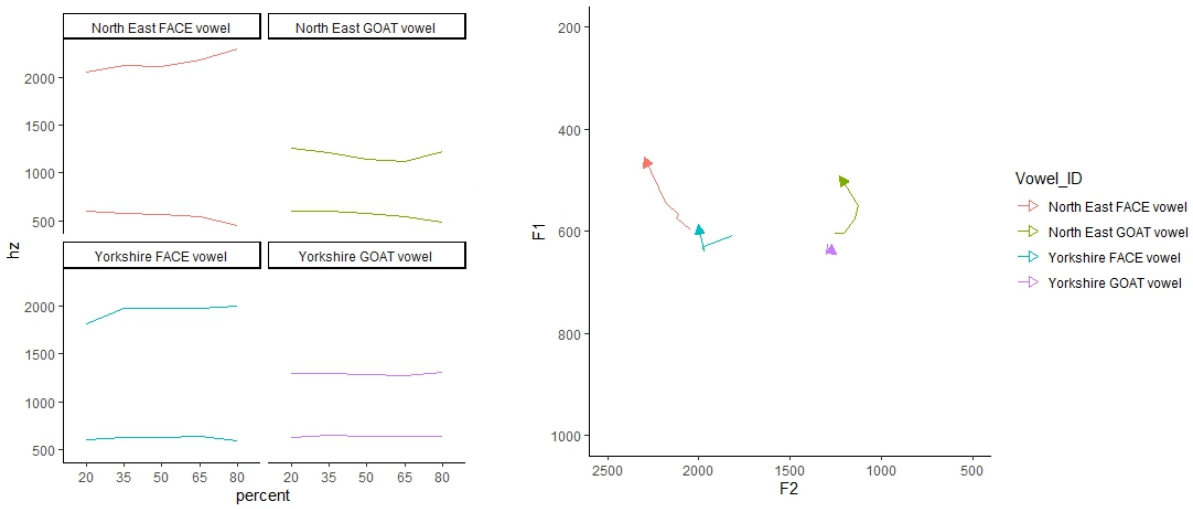

Figure A3. Spectrogram (produced in Praat, Boersma & Weenink, 2019) showing pronunciation of the word ‘burst’, by a Yorkshire speaker (left) and a Scottish Standard English speaker (right). The F2 movement in the Scottish speaker’s vowel (right) reflects the rhotic movement.

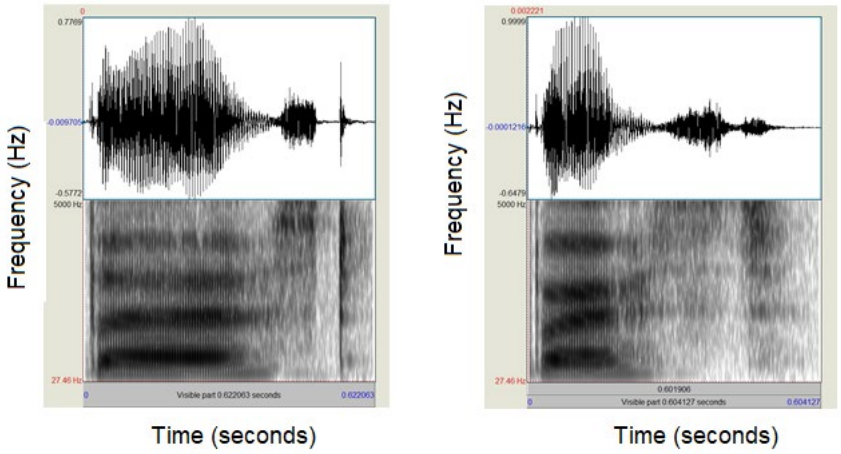

Table A1. Results from each child across each accent pairing, including background information.

Child	Age (Years; Months)	Gender	Parents from	Extended family from outside Yorkshire	Exposure to regional variation	Yorkshire/ SSBE % correct	Yorkshire/ Scottish % correct	Yorkshire/ North East % correct	Overall % correct
1	9;1	F	Tyne and Wear, Wiltshire	Scotland	Yes	86.67	93.33	73.33	84.44
2	6;4	F	Yorkshire	Tyne and Wear, Wales	Yes	100.00	60.00	80.00	80.00
3	6;2	F	Northamptonshire, Germany		Yes	100.00	66.67	66.67	77.78
4	8;8	F	County Durham		Yes	66.67	86.67	73.33	75.56
5	6;4	F	Yorkshire	Tyne and Wear, Wales	Yes	100.00	60.00	60.00	73.33
6	7;2	F	Yorkshire	Northumberland	Yes	73.33	80.00	66.67	73.33
7	8;7	M	Yorkshire, Tyne and Wear	Tyne and Wear, Scotland	Yes	93.33	86.67	40.00	73.33
8	5;11	F	Yorkshire, Lincolnshire	Lincolnshire	Yes	86.67	60.00	73.33	73.33
9	8;2	F	Merseyside, London		Yes	100.00	40.00	73.33	71.11

10	?	M	Yorkshire		No	93.33	33.33	80.00	68.89
11	8;4	M	Yorkshire		No	93.33	66.67	46.67	68.89
12	5;8	F	South Africa	South Africa	Yes	60.00	80.00	66.67	68.89
13	6;1	F	Derbyshire, Lebanon		Yes	80.00	46.67	80.00	68.89
14	6;1	F	Merseyside, London		Yes	100.00	53.33	53.33	68.89
15	9;1	F	Yorkshire		No	73.33	53.33	73.33	66.67
16	6;6	F	Israel, Lincolnshire	Derbyshire	Yes	86.67	46.67	66.67	66.67
17	6;10	M	Yorkshire		No	60.00	66.67	73.33	66.67
18	7;8	F	South Africa	South Africa	Yes	73.33	80.00	46.67	66.67
19	6;2	F	Yorkshire, London	Hampshire	Yes	100.00	46.67	53.33	66.67
20	6;1	M	Lancashire, Hampshire	Lancashire, London	Yes	93.33	60.00	46.67	66.67
21	6;11	M	Yorkshire		No	53.33	73.33	60.00	62.22
22	6;4	F	Yorkshire	Tyne and Wear	Yes	100.00	40.00	40.00	60.00
23	9;9	M	Yorkshire	Tyne and Wear	Yes	100.00	40.00	40.00	60.00
24	8;7	F	Yorkshire		No	60.00	66.67	53.33	60.00

25	8;9	M	Yorkshire		No	86.67	33.33	53.33	57.78
26	6;9	F	Yorkshire		No	66.67	46.67	60.00	57.78
27	6;0	M	Yorkshire, Essex	Dublin, County Durham, Essex	Yes	60.00	40.00	73.33	57.78
28	5;8	F	Yorkshire, Kent	Hampshire	Yes	66.67	60.00	46.67	57.78
29	8;10	F	Yorkshire		No	66.67	46.67	40.00	51.11
30	6;11	M	Cheshire, Derbyshire		Yes	66.67	46.67	33.33	48.89
31	7;1	M	Yorkshire, Lincolnshire	Essex	Yes	53.33	26.67	60.00	46.67
32	7;3	F	Yorkshire, Oxfordshire		Yes	40.00	26.67	60.00	42.22
33	6;10	M	Yorkshire		No	53.33	20.00	26.67	33.33
Mean	**7;1**	**-**	**-**			**78.59**	**55.56**	**58.79**	**64.31**

Notes

[1]Although the speakers recorded for the Scottish English stimuli were Scottish Standard English speakers, rhotic realisations may be used by Scottish speakers with non-standard accents too. Therefore, in order to represent the broad distinction between speakers from Scotland more generally and speakers from England, henceforth reference will be made to 'Scottish/Scottish English speakers' and the 'Scottish accent'.

[2]Here the North East refers to the region as defined by Hughes, Trudgill & Watt (2012) which forms of the one of the major accent types of the British Isles.

[3]Although often a variable included in sociolinguistic studies, gender was not added in to the analysis here as there was little motivation to do so. Previous accent perception studies of children this age did not report any difference in results between the genders.

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