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Regional and Foreign Accent Processing in English: Can Listeners Adapt?

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Abstract Recent data suggest that the first presentation of a foreign accent triggers a delay in word identification, followed by a subsequent adaptation. This study examines under what conditions the delay resumes to baseline level. The delay will be experimentally induced by the presentation of sentences spoken to listeners in a foreign or a regional accent as part of a lexical decision task for words placed at the end of sentences. Using a blocked design of accents presentation, Experiment 1 shows that accent changes cause a temporary perturbation in reaction times, followed by a smaller but long-lasting delay. Experiment 2 shows that the initial perturbation is dependent on participants' expectations about the task. Experiment 3 confirms that the subsequent long-lasting delay in word identification does not habituate after repeated exposure to the same accent. Results suggest that comprehensibility of accented speech, as measured by reaction times, does not benefit from accent exposure, contrary to intelligibility.

Keywords Accents · Lexical decision · Adaptation · Participants' expectations

One of the consequences of the multiplication of population movements around the world and the increasing communication facilities, is that more and more often we hear speech produced in a different regional accent or in a foreign accent.[1] Anecdotal reports suggest that when presented the first time with an unfamiliar accent or speaker, a few words or sentences seem necessary to adjust. This two-stage normalisation process, namely initial

[1] Following Wardhaugh (1992), the term accent refers to the language varieties spoken by communities from various regions of the world, within a given language (Standard English for example). Grammar and vocabulary are similar, only pronunciation differs.

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comprehension disruption followed by adaptation leading to total or partial recovery of baseline comprehension, has partially received empirical support over the past few years. Initial language processing impairments due to foreign accents have been noted in a number of studies, and have been found to affect syntactic, semantic and lexical processing (Floccia et al. 2006; Lane 1963; Munro and Derwing 1995; Shmid and Yeni-Komshian 1999; van Wijngaarden 2001; Weil 2003). Evidence for subsequent adaptation to foreign accent offers mixed conclusions (Clarke 2000; Gass and Varonis 1984; Bradlow and Bent 2003; Clarke and Garrett 2004; Weil 2001; Wingstedt and Schulman 1987). Following our investigation of initial impairment due to regional and foreign accent presentation (Floccia et al. 2006), the aim of this study is to examine the time-course of a possible adaptation to these varieties.

There are basically two disparate measures of the cost of accented speech: intelligibility and comprehensibility. Speech is said to be intelligible if the message intended by the speaker is properly conveyed. This is usually evaluated by accuracy measures collected for instance in orthographic transcription tasks (Derwing and Munro 1997), repetition tasks (Wingstedt and Schulman 1987), mispronounciation detection (Shmid and Yeni-Komshian 1999) or sentence recognition task (Bent and Bradlow 2003). Speech is comprehensible as a function of the perceptual and cognitive effort which was necessary to identify the intended word. This is usually measured by subjective ratings (Derwing and Munro 1997) or reaction times (Clarke and Garrett 2004; Floccia et al. 2006; Munro and Derwing 1995; Weil 2003).

Intelligibility and comprehensibility for accented speech are not necessarily correlated, as showed by Derwing and Munro (1997), who reported no relations between these two measures used in a range of accented varieties of English (Cantonese, Japanese, Polish, and Spanish). Similarly, Weil (2003) failed to find a correlation between reaction-time based measures of comprehensibility collected in a repetition task using Mandarin and Russian accented words, and measures of intelligibility of the same words obtained in a discrimination task. Therefore, an accented speech sample can be rated as highly intelligible, but difficult to process at the same time.

In terms of classic models of lexical access based on the computation of abstract entries for lexical storage (e.g. Lahiri and Marslen-Wilson 1991; Pallier et al. 2001), comprehensibility refers to the processes necessary to retrieve a possible lexical candidate, involving mainly bottom-up activation from phonetic representations up to the lexicon. In contrast, intelligibility refers to the decision process arising from the computation of these lexical candidates, entailing top-down mechanisms involving lexical and pragmatic knowledge. In the framework of such models, Norris et al. (2003) explain regional or foreign accent normalisation in adults as follows. An unfamiliar accent would cause initial disruption due to inaccurate pre-lexical processing. When the listener eventually establishes the identity of the words (through guessing for instance), the lexicon can begin to instruct the pre-lexical processing levels to interpret mismatched phonemes or accent patterns to fit the unfamiliar accent. Over time, information available from the lexical level of analysis could lead listeners to retune their pre-lexical categories, which in turn leads to enhanced lexical recognition. Therefore, if intelligibility is linked to lexical levels of processing, and comprehensibility to the pre-lexical ones, in such a model adaptation of both comprehensibility and intelligibility is expected after a certain delay.

The present study explores the components of the possible adaptation of comprehensibility to accented speech, which has been largely overlooked in the past literature (but for adaptation of intelligibility, see Clarke 2000; Gass and Varonis 1984; Bradlow and Bent 2003; Jongman et al. 2003; Weil 2001; Wingstedt and Schulman 1987). There are basically two ways to search for the effect of repeated presentation of an unfamiliar accent upon

comprehensibility: one is to focus on the transfer of learning from one (set of) speaker(s) to a new speaker of the same accent, or to examine the evolution of performance over time within the same speaker (Clarke and Garrett 2004).

In the Clarke and Garrett study, three groups of native English speakers were tested in a cross-modal matching task, in which the dependent variable was the time necessary to match visual probes with the final word of test sentences. Each group was exposed to sixteen sentences, each having duration of two seconds. In the first group (Control group) the 12 initial sentences were produced in listeners' native English dialect, followed by four in a Spanish accent. In the second group (Accent group) all of the sentences were produced with a Spanish accent, and in the third group, they were produced with the home American accent (No accent group).

Results show that participants were initially faster during the first block of foreign accent presentation as compared to appropriate controls. Specifically, the Accent group was slower during the very first accented block as compared to the same first non-accented block in the No Accent group; the Control group was also slower during the fourth accented block as compared to the same non-accented fourth block in the No Accent group. This suggests that the very first presentations of a foreign accent result in an impairment of speech processing in a sentential context. Clarke and Garrett also report that participants fully adapted to this foreign accent, for reaction times resumed to baseline level during the fourth accented block in the Accent group as compared to the corresponding non-accented fourth block in the No Accent group.

However, a close inspection of the results and the design of these experiments suggest another interpretation. The initial impairment in speech processing could be partially or entirely attributed to a surprise effect, caused by the sudden and unexpected change in accent. Indeed participants were simply warned that a change in voices could occur, but no explicit mention of changes in accents was made. In addition, the change was introduced only once in the Accent group (just after a set of non-accented training sentences) and in the Control group (between the third and the fourth block). This interpretation does not rule out the possibility that a foreign accent induces an initial impairment in speech processing, but it lessens the conclusion that this impairment diminishes over time. It could be that comprehensibility never fully adapts to a foreign accent, but that the surprise component due to the task design does habituate. It must be noted that during the third block of accented sentences in the Accent group, participants are still 80 ms above the performance of the No Accent group during the corresponding non-accented third block (see Experiment 1). They are also still 120 ms above baseline during this third block in Experiment 2, and 30 ms above baseline in Experiment 3. It must also be noted that out of the three experiments reported in the study, reaction times in the Accent group only resume fully to baseline level in the first experiment (during the last and fourth block), but not in the subsequent two experiments. This general picture casts some doubt about the origins of the initial impairment following foreign accent presentation, and about its subsequent adaptation.

To summarize, there is evidence showing that presentation of a foreign accent triggers an initial disruption in comprehensibility (Floccia et al. 2006; Munro and Derwing 1995; Shmid and Yeni-Komshian 1999), whereas evidence for subsequent adaptation, as would be demonstrated by a resuming to baseline level, or by a transfer of learning from one speaker to another, is far less clear. Clarke and Garrett's results suggest that what they claim to be a full adaptation curve might be due to a habituating surprise effect, superimposed upon a non-adaptable comprehensibility disruption. The aim of the present study is to investigate the process of comprehensibility adaptation to accents, by specifically addressing issues raised by Clarke and Garrett's study, namely the influence of a single accent change presentation

(Experiment 1) versus multiple changes (Experiment 3), and the role of instructions upon the observation of speech processing disruption (Experiment 2).

Moreover, in an attempt to enlarge the range of investigation, we will also compare the processes underlying foreign and regional accents adaptation. All the studies mentioned so far contrasted foreign accents with home accent. It is often acknowledged that accents can be ranked on a perceptual scale according to their acoustic distance from native speech (e.g. Clarke and Garrett 2004), with most foreign accents standing at the far end of the perceptual scale and regional accents somewhere in-between. Under this assumption the mechanisms underlying regional accent processing would simply be attenuated versions of those activated during foreign accent processing. However, there are several reasons to suppose that regional accents and foreign accents may recruit different normalisation procedures (see Floccia et al. 2006, for a full discussion). Whereas foreign accents embody many irrelevant variations that have no relation to the listener's maternal language, regional accents mainly consist of *coherent* deviations in phonetic, phonological, phonotactic and prosodic information found within the language (e.g. Wells 1982). It is also often suggested that the between-speaker variability in a foreign accent is far more important than within a regional accent (see Livescu and Glass 2000), rendering any potential transfer of learning from one speaker to another much more difficult to observe in the case of a foreign than in the case of a regional accent.

In the first experiment, three goals will be pursued: firstly, we aim at replicating and extending to another language the previous findings that both regional and foreign accents elicit a word identification disruption (e.g. Floccia et al. 2006, in French). Second, the design of the experiment will allow us to investigate directly the relative time course of a possible adaptation to these speech styles, that is, recovery to baseline level. Thirdly, we will examine how this learning can transfer across speakers within the same accent. Given the greater between-speaker variability found in foreign as compared to regional accents, we predict that speaker change within a regional accent should result in a transfer of adaptation, contrary to speaker change within a foreign accent, which should elicit a renewal of comprehensibility disruption.

Experiment 1

This experiment was designed to examine the relative time-course of comprehensibility adjustment to a foreign and a regional accent, as well as its possible transfer across speakers. Experimental design is largely inspired by that used by Clarke and Garrett (2004), namely, presentation of a list of sentences organised in blocks, with accents and/or speakers being changed from one block to the other. The task is a forced choice lexical decision on words and pseudo-words placed at the end of sentences.

Accents

The British accents under investigation in this study are threesome: Received Pronunciation (RP), Irish and Plymouth. The Received Pronunciation is considered to be the most prestigious form of British English pronunciation, and is sometimes referred to as the Queen's English. Until recently, it was also used by the BBC speakers (see Hughes and Trudgill 1979, for a description). When compared with the Received Pronunciation, the Plymouth regional accent, as most of the West Country regional accents, is usually characterised as having a

slow rate of speech, with lengthened vowel sounds (West Country entails Cornwall, Devon, Bristol, Somerset and Dorset, plus parts of Wiltshire and Gloucestershire). A full description can be found in Upton and Widdowson (1996). The two Irish speakers engaged for the production of stimuli originated from the areas of Dublin and Cork. According to Trudgill and Hannah 1985, the regional accents spoken in these southern Ireland areas can be categorised as originating from the same English–English varieties (as opposed to regional accents spoken in the North, which originate from Scottish–English). Details about the vowel and consonant systems characterising these regional accents are extensively presented in Trudgill and Hannah (1985).

French–accented English has been mainly described at the segmental level as it usually entails inaccurate realisations of certain English phonemes which do not exist in French, such as the rounded lax vowel /ʊ/ as in "book", the ending consonant /ŋ/ of "taking" (Arslan and Hansen 1996), and the fricatives /ð/ (as in "this") and /θ/ (as in "think"). The English /ɹ/ would be produced as its French uvular fricative equivalent, and the voice onset time values for voiceless plosive consonants would be shorter than those for English equivalents (Flege 1984; Ladefoged 2005; Laver 1994).

Participants

Fifty-four monolingual English speakers were involved, with an average age of 19.7 (SD 3.7), including forty-four females. Thirty-six originated from the South West of England (that is, the West Country),[2] as attested by a post hoc questionnaire about their life from birth until the end of puberty, and their parents' origin (referred to as the SW group). The other eighteen were from other regions of England, covering basically all other areas, but had been living in Plymouth for at least 4 months prior to the experiment (referred to as the O group, O standing for other). Therefore, it was anticipated that they would have developed sufficient familiarity with this accent for coping with any potential intelligibility or comprehensibility problems. All participants were psychology students who received course credits for their participation.

Stimuli

Stimuli were made up of a list of sixty simple sentences with zero to two levels of embedding, using between fourteen and twenty syllables (no embedding: "In the evening Virgil and Thomas usually complain about their tummy", two levels of embedding: "Eric shouted very loud when he saw that we had broken the present"). Forty of them ended with a high frequency disyllabic word, and the remaining twenty with a disyllabic pseudo-word built with the WordGen software (Duyck et al. 2004). Because the lexical status of items was not a critical dimension in this study, characteristics of words and pseudo-words were chosen in an attempt to homogenise as much as possible lexical decision times for words and pseudo-words (see Table 1). Henceforth pseudo-words were selected so that they had a poor number of orthographic neighbours, together with an early point of auditory uniqueness. In contrast, words had more orthographic neighbours and a later point of auditory uniqueness (characteristics were based on the English Lexicon Project, Balota et al. 2002). As in our previous experiments (Floccia et al. 2006), targets and carrier sentences were selected randomly, without attempting to control for potential specific accent markers. It was thought

[2] From now on, the term South West will be used to refer to the South West of England.

Table 1 Characteristics of sentence-final targets in Experiment 1, as a Function Of Speaker Accent

	Mean number of phonemes	Mean log frequency HAL	Mean number of morphemes	Mean number of orthographic neighbours	Mean frequency of orthographic neighbours	Mean phonemic uniqueness point
Plymouth	4.9	8.6	1.1	2.1	7.2	4.3
Irish	4.9	7.1	1.3	2.2	7.7	4.5
French	4.4	8.7	1.0	2.3	6.7	3.8

that each sentence would carry *some* information about the speaker's accent, sufficient to trigger any normalisation mechanism.

The sixty sentences list was randomly divided into four blocks containing each ten word-ending sentences and five pseudo-word ending sentences. Each participant was presented with these four blocks (1–4), blocks 1 and 4 being produced with a Plymothian accent, and blocks 2 and 3 by Irish, French or Plymothian accents. Sentences in the first block were produced by a 40-year-old Plymothian female speaker (referred to as speaker PL1). The second block was uttered by two female French speakers (aged 35 and 37, in Plymouth for respectively 12 years and 4 months, referred to as FR1 and FR2), two Irish female speakers (aged 51 and 35, in Plymouth for 25 years and 2 years, referred to as IR1 and IR2) and one Plymothian female speaker (aged 53, referred to as PL2). Block 3 was produced by the same French and Irish speakers, and by a new Plymothian speaker (aged 38, referred to as PL3). Finally block 4 was uttered by a last Plymothian female speaker (aged 41, referred to as PL4). Throughout all this study, speakers were selected on their linguistic history and on subjective judgments from the experimenters that their speech was representative of their country/region of origins. Mean duration of the sentences and the ending targets are presented in Table 1. Another set of ten training sentences was used, half of which ended with a word and the other half with a pseudo-word, selected on the same criteria as above. They were recorded by a 32-year-old female speaker originated from Plymouth who had trained to use a Received Pronunciation as part of her work as a BBC radio speaker.

Procedure

Participants were initially presented with a ten sentences training block, produced by the RP speaker. The task was to press a given key when hearing a known word at the end of the sentence, and another key when hearing a pseudo-word. Participants were always instructed to use their dominant hand to press for the word response key. After the training, the test phase consisted in the presentation of four consecutive blocks of fifteen sentences each (blocks 1–4). It began by a baseline block B1 of fifteen sentences uttered by the first Plymouth speaker PL1, identical for all participants. Then each participant was randomly assigned to one of the three conditions, depending on the accents of the stimuli in blocks 2 and 3: French, Irish, or Plymouth.

Within the French and the Irish conditions, another random assignment across participants was the order of speaker presentation in blocks 2 and 3, to control for potential speaker effect. Therefore, each participant heard blocks 2 and 3, made up of exactly the same fifteen sentences, but produced by different speakers. For half the participants in the French accent

condition, blocks 2 and 3 were produced by speakers FR1 and FR2 respectively, or by FR2 and FR1 for the other half. Similarly, in the Irish accent condition, blocks 2 and 3 were produced by speakers IR1 and IR2, or IR2 followed by IR1. In the Plymouth accent condition, block 2 was produced by speaker PL2 and block 3 by speaker PL3. Finally, all participants were presented with a last fifteen sentences block (block 4), produced by the same PL4 speaker. Within each block, the order of sentences was random. The inter-stimulus interval was set to 6000 ms. The experiment was controlled by E-prime, and sound was presented individually through earphones.

Results

Three moments are of interest: the baseline (blocks 1 and 4), the transition from block 1 to block 2 to evaluate the impact of a change from the home dialect toward a foreign or a regional accent, and its adaptation course; the transition from block 2 to block 3 to examine the transfer of adaptation across speakers. Between-participant variables were participants' origins (SW or Other), accent of the stimuli (French, Irish and Plymouth), and speaker order for the French and Irish accent conditions. Within-participant variables were blocks (1–4) and lexical status (word or non-word).

Errors

Out of the 3240 expected responses, 84 were errors on words, 27 were false alarms on pseudo-words, 72 were too slow (superior to 2000 ms or to 2.5 SD of each participant's average reaction times), 11 were too fast (inferior to 300 ms or to 2.5 SD), and 11 were misses. Resulting missing values were equally distributed across the three groups and the four blocks ($\chi^2(6) = 8.48$, $p = .20$).

Baseline

A first analysis was carried out on blocks 1 and 4, to verify that every group or condition was comparable during these two baseline periods. In particular, it was anticipated that the O group, if anything, might be slower than the SW group, because of their relative unfamiliarity with Plymothian dialect. For the participant analysis, between-participant factors were accent of the stimuli (French, Irish or Plymouth) and origins (South-West or Other part of England). Block (1 or 4) and lexical status of the items (words or pseudo-words) were within-participant factors. For the item analysis, lexical status and block were between-item factors, whereas accent of the stimuli and origins were within-item factors. There was no main effect of origins ($F1\ (1, 48) = 2.20$, $p = .14$, $F2\ (1, 26) = 40.90$, $p < .001$, $\min F'(1, 53) = 2.09$, $p = .15$) or accent of the stimuli ($F1\ (2, 48) = 1.88$, $p = .16$, $F2\ (2, 25) = 25.50$, $p < .001$, $\min F'(2, 55) = 1.75$) during baseline. The lexical status of the items did not have any main effect ($F1\ (1, 48) < 1$; $F2\ (1, 26) < 1$), nor did block ($F1\ (1, 48) < 1$; $F2\ (1, 26) < 1$). No significant interaction was found.

Therefore, unless specified otherwise, each participant's reaction times during the test blocks 2 and 3 will be subtracted to his/her mean reaction times during the two baseline blocks (for words and pseudo-words separately). These dependent variables will be referred to as 'normalised reaction times'. This normalisation was also performed by Clarke and Garrett (2004, p. 3649), in order to account for inevitable between-participant variability. More specifically, they systematically subtracted the reaction times during baseline trials

from the experimental reaction times for each participant, and used these differences in reaction times as their primary dependent measure of processing speed. It must be added that we verified that effects were similar when both un-normalised and normalised reaction times were used, the usage of normalised reaction times simply helps getting a clearer idea of the size and direction of the effects.

Effect of Accent Change

In a first analysis, we examined the effect of accent of the stimuli and origins on the mean normalised reaction times during block 2, with lexical status of the items as within-participant variable. A main effect of accent of the stimuli was found ($F1\ (2, 48) = 15.26$, $p < .001$, $F2\ (2, 12) = 6.12$, $p = .015$, $\min F'\ (2, 23) = 4.37$, $p = .025$), but no effect of origins ($F1\ (1, 48) = 1.82$; $F2\ (1, 13) = 1.71$), and no interaction between origins and accent of the stimuli ($F1\ (2, 48) < 1$; $F2\ (2, 12) < 1$). No effect of the lexical status of the item was found either ($F1\ (1, 48) < 1$; $F2\ (1, 13) < 1$), and no other interaction was found to be significant. As shown in Fig. 1, the accent of the stimuli effect is due to the fact that participants in the French accent condition experience a mean increase in overall reaction times of 51.9 ms between baseline and block 2, as compared to −2.96 ms for participants in the Irish accent condition, and −64.8 ms for participants in the Plymouth accent condition. Pairwise comparisons for the two dependent variables (words and pseudo-words) showed that all three groups differed significantly from each other.

In order to verify that the accent effect was consistent for each speaker within each accent, participants in the French accent condition and in the Irish accent condition were divided into two subgroups, depending on whether they heard speaker 1 or speaker 2 during block 2. For the French accent condition, there was no main effect of speaker ($F1\ (1, 14) < 1$; $F2\ (1, 13) = 1.45$, $p = .25$), neither for the Irish accent condition

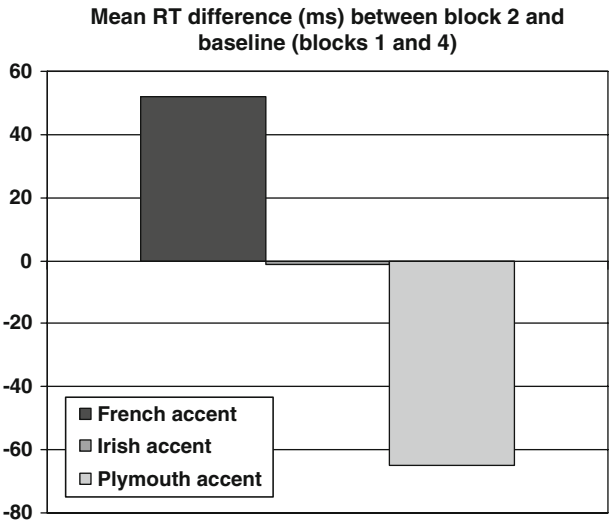

Fig. 1 Experiment 1: mean difference across all participants in reaction times between baseline and block 2, as a function of the accent of the stimuli (French, Irish, or Plymouth)

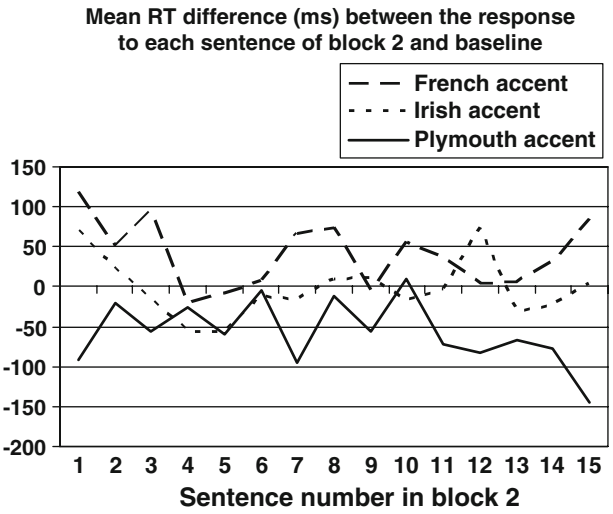

Fig. 2 Experiment 1: mean difference across all participants in reaction times for each 15 sentence of block 2 (minus baseline), as a function of the accent of the stimuli (French, Irish, Plymouth). Sentence number corresponds to the chronological order of sentence presentation

(F1 (1, 14)<1; F2 (1, 13)<1). This suggests that the effect of accent change was equally consistent across speakers.

Fine-grained analyses of the time course of these accent change effects were performed by introducing 'time' as a within-participant factor, that is, the chronological sequence of the 15 sentences constituting block 2 (first sentence presented, second sentence, etc.). Because the order of sentences was randomised for each participant, the effect of time can only be explored in a participant analysis. Participants' reaction time for each sentence was subtracted to his/her mean reaction time during baseline (separately for words and pseudowords). Evolution of mean differences across time can be seen in Fig. 2. There was no main effect of time (F1 (14, 154)=1.15, $p = .32$), but time interacted significantly with the accent of the stimuli (F1 (28, 154)=3.29, $p < .001$). Origins did not have any significant effect, and there was no other significant interaction. When analyses were carried out sentence by sentence, a main effect of accent of the stimuli was obtained only for the first, the seventh, and the last sentence, as can be seen on Fig. 2 (respectively F1 (2, 41)=3.12, $p = .055$; F1 (2, 47)=4.8, $p = .01$; F1 (2, 46)=3.87, $p = .03$; degrees of freedom vary as a function of missing values). In all these cases, the effect is always due to reaction times in the Plymouth accent condition being lower than in the French and Irish accent conditions.

Effect of Speaker Change within an Accent

In order to examine the effect of a speaker change within an accent, reaction times during block 3 were compared to those during block 2. Figure 3 shows the difference in reaction times in each block, as a function of accent of the stimuli. There was no main effect of block (F1 (1, 48)=2.76, $p = .10$; F2 (1, 26)<1), but a main effect of the accent of the stimuli (F1 (2, 48)=11.57, $p < .001$; F2 (2, 25)=8.92, $p = .0012$, min F′ (2, 60)=5.03, $p = .0096$), which did not interact with blocks (F1 (2, 48)=4.29, $p = .019$, F2 (2, 25)<1, min

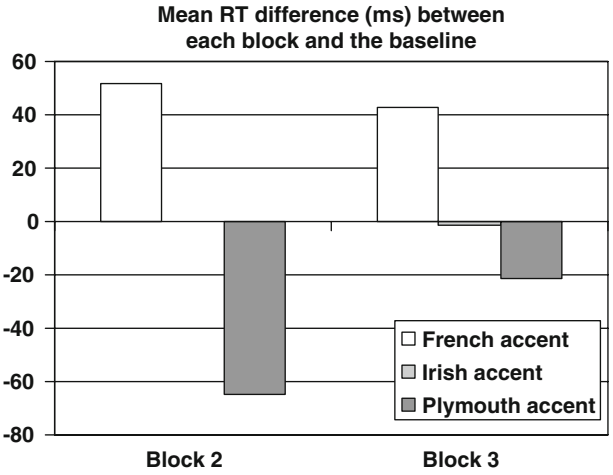

Fig. 3 Experiment 1: mean difference across all participants in reaction times (subtracted to baseline) during block 2 (*left*) and block 3 (*right*), as a function of the accent of the stimuli

F' (2, 35) < 1). No other effect or interaction was significant. This suggests that the speaker change continued to elicit slower reaction times in the French and the Irish accent conditions as compared to the Plymouth accent condition.

As above, fine-grained analyses of the time course of these speaker change effects were performed by introducing 'time' as a within-participant factor, that is, the chronological sequence of the fifteen sentences constituting block 3. Participants' reaction time for each sentence was subtracted to his/her mean reaction time during baseline (separately for words and pseudo-words). There was a main effect of time (F1 (14, 154) = 2.14, $p = .012$), which did not interact with the accent of the stimuli (F1 (28, 154) < 1). Origins did not have any significant effect, and there was no other significant interaction. When analyses were carried out sentence by sentence, a main effect of accent of the stimuli was obtained only for the first, the ninth and the tenth sentence (respectively F1 (2, 42) = 3.56, $p = .04$; F1 (2, 44) = 3.84, $p = .03$; F1 (2, 44) = 3.46, $p = .04$; degrees of freedom vary as a function of missing values). In all these cases, the effect is always due to reaction times in the Plymouth accent condition being lower than in the French and Irish accent condition. Figure 4 provides the mean reaction times per sentence as a function of accent of the stimuli.

In order to search for a possible effect of the accent in the stimuli at the moment of speaker change, reaction times during the last sentence of block 2 were compared to those during the first sentence of block 3. A main effect of block was observed (F1 (1, 40) = 4.27, $p = .045$), but no interaction between blocks and accent condition (F1 (2, 40) < 1), showing that the speaker change elicited an increase in reaction times similar for all three accent conditions.

In order to verify that the speaker change effect was consistent for each and every speaker, participants in the French accent condition and in the Irish accent condition were divided into two subgroups, depending on whether they changed from speaker 1 (block 2) to speaker 2 (block 3), or the contrary. No effect of speaker was found for the French accent condition on block 3 (F1 (1, 14) < 1; F2 (1, 13) < 1), nor for the Irish accent condition (F1 (1, 14) < 1;

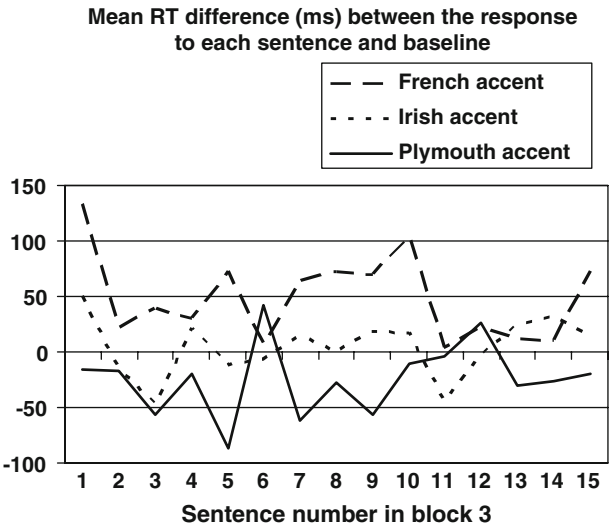

Fig. 4 Experiment 1: mean difference across all participants in reaction times for each 15 sentence of block 3 (minus baseline), as a function of the accent of the stimuli (French, Irish, Plymouth). Sentence number corresponds to the chronological order of sentence presentation

F2 (1, 13) < 1). This suggests that the effect of speaker change was equally consistent across speakers within a given accent.

Discussion

This first experiment was designed to investigate the time course for a possible full adaptation process of comprehensibility for regional and foreign accents. Its design was directly inspired by the block by block design used by Clarke and Garrett (2004). Specifically, the speaker and/or the accent were changed once in a while for each participant. It was hypothesised that an accent change would elicit a perturbation in speech processing (Floccia et al. 2006), followed by an adaptation leading to recovery (Clarke and Garrett 2004). We also predicted that adaptation, if any, would transfer across speakers within the same regional accent, but not within the same foreign accent.

First, a change in accent after the home accent did result in a significant increase in reaction times, as attested by the differences between block 1 and block 2 as a function of accent of the stimuli. Furthermore, the accent change effect was significant for both the foreign accent and the regional one. This replicates the results obtained by Floccia et al. in French, and extends them to another language.

The change for the foreign accent elicited a wider effect than the change for the regional accent. This difference in magnitude could be attributed to a greater perceptual distance between the foreign accent and the home accent on one hand, as opposed to that between the regional accent and the home accent on the other hand. In an attempt to quantify the amount of unfamiliar features in each speaker productions, we conducted an accentedness rating study with a new pool of participants. A pool of sixteen adults originating from the South West (mean age 27, including eleven females) were asked to rate a random subset of thirty sentences uttered by each of our speakers (five per speaker). After

each sentence was delivered, the origin of each accent was displayed onscreen (French, Irish or Plymouth), and the listeners were asked to rank the sentence on a scale of 1–4 (1 being the lowest) according to the level of "Irishness", "Frenchness" or "Plymouthness" they estimated in each sentence. When rating the Plymothian speakers the listeners were explicitly asked to give a maximum score (4) if the accent sounded very familiar, therefore very Plymothian. The raters judged the Irish speakers as having a stronger accent than the French speakers (F1 (1, 15) = 8.74, $p = .0098$), whilst the accent of the Plymothian speakers was rated weaker than both the Irish (F1 (1, 15) = 12.38, $p = .003$) and the French (F1 (1, 15) = 8.01, $p = .013$). This, of course, could be attributed to the fact that people have difficulties in rating their own accent. However, an additional pool of six British listeners from outside the South West (mean age: 28, including one female) also rated the Plymothian accent as lower than that of the Irish or the French speakers (mean rate for the Plymouth speakers: 2.18; Irish: 2.68; French: 2.47). The comparability of the perceptual scales applied to the two types of accents can certainly be discussed, however this rating test indicates that the accentedness was equally moderate across speakers and accents. Therefore, the difference in the accent change effect amplitude for the foreign and the regional accents could be attributed to a genuine difference in processing two distinct categories of accents.

Looking further into our results, indications for subsequent adaptation of the initial perturbation are far less clear than the initial disruption itself. Figure 2 shows that the very first sentence produced in an unfamiliar accent produces higher reaction times than the next sentences. However, reaction times remained much higher for both Irish and French accents throughout the fifteen-sentence block, with no other sign of decrease over time. In addition, when the speaker was changed from block 2 to block 3, a very temporary delay in word identification was observed, but it was similar across all groups, French, Irish or Plymouth. Even throughout this third block, reaction times remained higher for the two unfamiliar accents than for the home accent.

In summary, this experiment replicates some previous findings, namely, that presentation of a regional or foreign accent equally triggers a delay in word identification. However, on the contrary to what was reported by Clarke and Garrett (2004), no sign of consistent adaptation to accents was observed. Surprisingly, a change in speaker within the same speech style did not renew the initial perturbation in a different way depending on the accent. These results suggest that a strong component of the effects we observed here might be due to surprise. Participants were not instructed that changes in accents would be made (they were only warned that speakers might be changed from time to time, following Clarke and Garrett). It is quite likely that the very first time an accent change was introduced, it elicited a strong surprise effect, which might be responsible for the high reaction times during the first sentence of block 2 (see Fig. 2). Following this initial surprise, subsequent speaker changes might not renew the same components of this surprise effect, because they did not violate participants' expectations any more.

Experiment 2 investigates whether this strong initial disruption in word identification can be modulated as a function of participants' expectations. Listeners will be presented with a list of new sentences, and an accent change will be introduced at some point (Plymouth to French). For some listeners, this experiment will take place straight after Experiment 1, therefore they will share some knowledge about the general design of our experiments, and they will be anticipating some accent or dialect change. Therefore, they should not exhibit any strong slowing down at the moment of accent change. For another group of listeners, no prior training with the design will be provided, therefore any change in accent will be perceived as new and unexpected. These participants should exhibit a strong disruption

in word identification at the moment of accent change, similar to what was observed in Experiment 1.

Within each of these groups, another condition will be added: for some participants, instructions will be given to pay special attention to accents, whereas for the others, no mention of accents will be made. The attempt here is to reverse the previous pattern of results: by specifically pointing people's attention towards the accents, we expect to renew the surprise component in the trainee participants, and contrastively, diminish it in the non-trained participants.

Experiment 2

Experiment 2 was designed to evaluate the robustness of the word identification disruption caused by a change in accent as a function of attention and expectations. If the accent change effect found in Experiment 1 entails a strong surprise component, it should be possible to modify it by changing listeners' expectations. A forced-choice lexical decision task will be used on a set of twenty new sentences, whose first half will be produced by a new Plymothian speaker, and the second half by a new French speaker. Two between-participant factors will be manipulated: the amount of prior training with the design of our experiments, and the specific instructions given before the task itself.

Participants

Forty-eight participants including ten males (mean age 23 years, SD 7.8) were tested, and assigned to one of two conditions. Thirty participants were assigned to the Training condition, because they were all tested straight after Experiment 1, therefore they had extensive training with the task and the general design of our study. For the remaining eighteen participants, the task was administered with no prior experience with the paradigm and the design of our experiments. Out of the forty-eight participants, thirty-three originated from the South West (19 in the Training condition and 14 in the No Training condition), while the remaining fifteen were from other parts of England. Within each condition, participants were further assigned to two instructions conditions, the Accent group (15 in the Training condition, 10 in the No Training condition) and the Neutral group (15 in the Training condition and 8 in the No Training condition).

Stimuli

Two sets of ten new sentences were built up with the same criteria as those used in the previous experiment. Half of the sentences in each set ended with a word, and the other half with a pseudo-word. The first block was produced by a 31-year old female Plymothian speaker, and the second block by a 41-year old French female speaker, originating from the South of France (Toulon) and who had spent the last 12 years in Bristol and Plymouth. The exact list of sentences can be found in Appendix, together with their characteristics.

Rating of accentedness was obtained from the same sixteen South West listeners as those mentioned in the Discussion of Experiment 1. Each participant was asked to rate on a scale from 1 to 4 the strength of "Plymouthness" or "Frenchness" in each sentence (only the five word-ending sentences produced by each speaker were presented). An average score of 2.21

was attributed to the Plymothian speaker, and 3.28 for the French speaker. An additional group of six non-South West native English speakers rated the Plymothian speaker as 2.17 and the French speaker as 3.20. This confirms the experimenters' impression that the French speaker's productions contained sufficient amount of information to trigger any accent processing detection and normalisation.

Procedure

For the Training group, this experiment took place immediately after the administration of Experiment 1, whereas for the No Training group, no prior similar experiment was administered. Both groups were randomly split into two instruction conditions: Neutral and Accent. In the Training condition, participants in the Neutral group were simply told to keep on going as previously (therefore, as they did in Experiment 1). In the Accent group, they were told that the task would be the same, but that now they had to pay a particular attention to accents, because questions would be asked at the end. In the No Training condition, participants assigned to the Neutral group were given the same instructions as participants at the start of Experiment 1, that is, they were informed that voices might be changed from time to time, with no mention of accents. Participants assigned to the Accent group were asked to pay attention to accents, because questions would be asked at the end. All participants in the No Training group were administered first an initial set of ten training sentences, that is, the same set of RP accented training sentences presented initially to participants in Experiment 1. This was done to ensure consistency of reaction times by the time of test blocks presentation. Finally, all participants were given a set of questions about voices and accents at the end of this experiment.

The experiment started by a first block of ten sentences uttered by the new Plymothian female speaker, followed by a block of ten sentences uttered by the new French speaker (these speakers had not been presented in Experiment 1). Sentences were randomly presented within each block, and the task was, as before, a forced-choice lexical decision on the last item of each sentence.

In summary, participants in the No Training and Training condition were given the same set of instructions depending on the condition they were assigned to (Neutral or Accent), but they differed on the amount of prior experience they had with the design of the task. Participants in the Training condition knew that the accents/dialects could be changed within the list, whereas participants in the No Training condition didn't know.

Results

Out of the 960 responses during the two test blocks, 8.75% were errors, distributed as follows: errors on words (31%), on pseudo-words (23%), misses (20%) and slow responses (26%). Cutoff for slow or anticipation responses was set primarily to 2000 and 200 ms, and then to 2.5 SD above or under the mean reaction time for each participant. Erroneous responses were equally distributed across the two training groups, the two test blocks and the two instructions conditions.

Analyses included training condition (Training vs. No Training), instruction group (Accent vs. Neutral) and origins (South West vs. another part of England) as between subject variables. Block (block 1 and block 2) was a within-subject variable, together with the lexical status of targets (words vs. pseudo-words).

In the first analysis collapsing reaction times in each block, the only significant effect to emerge was an effect of training condition (F1 (1, 40) = 8.70, $p = .005$), due to expected slower reaction times in the No Training group (960 ms) than in the Training group (832 ms). No other main effect or interaction was significant. Especially, the block effect was not significant (F1 (1, 40) = 2.60), even though differences in reaction times were in the predicted direction (Plymouth accented block: 866 ms; French accented block: 894 ms). The lexical status of the targets will not be included in the following analyses any more. This first analysis shows that with the collapsing of data across ten sentences, training or instructions did not modulate the potential accent change effects.

However, when fine-grained analyses are performed to compare reaction times during the last sentence in block 1 and the first sentence of block 2, a different pattern of results emerges. During the last sentence of block 1, there was an effect of training condition (F1 (1, 40) = 7.23, $p = .01$), but no other main effect (origins, instructions) or interaction was significant. This shows that before the moment of accent change, participants' reaction times were not influenced by the instructions, but simply by the amount of training with the task they had received previously.

When comparing reaction times during the last sentence of block 1 and the first sentence of block 2, a main effect of block emerged (F1 (1, 40) = 25.02, $p < .001$), together with a main effect of training (F1 (1, 40) = 11.06, $p = .002$). Instructions did not have any main effect (F1 (1, 40) < 1). However, the triple interaction between blocks, instructions and training was significant (F1 (1, 40) = 12.0, $p = .0013$). No other interaction was significant. When examining the components of this interaction, as can be seen on Fig. 5, it was found that in the Neutral condition, the accent change elicited a stronger delay in reaction times in the No Training group, as compared to the Training group (F1 (1, 19) = 8.20, $p = .010$). Contrastively, in the Accent condition, the accent change tended

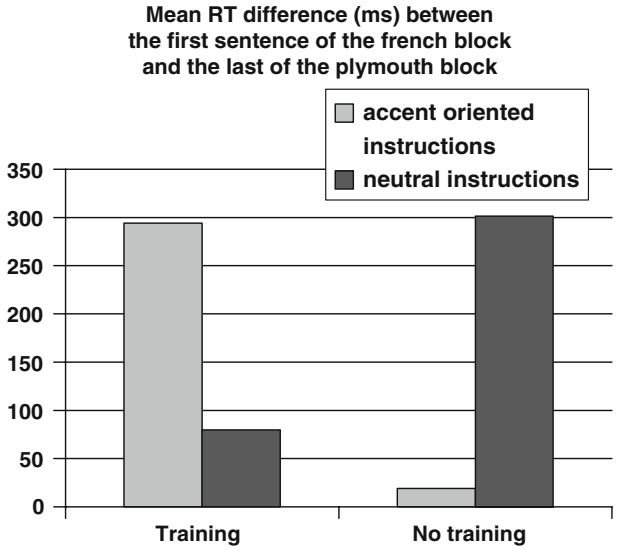

Fig. 5 Experiment 2: mean difference across all participants in reaction times between the first sentence in the French accented blocks minus the last sentence in the Plymouth accented block, as a function of training condition and instruction group. A positive difference indicates a slowing down of reaction times at the moment of accent change

to elicit a stronger reaction in the Training group as compared to the No Training group, but this was not significant (F1 (1, 21) = 3.62, $p = .071$). When analyses are extended to the second sentence after the accent change, no more effects of instructions or training are observed.

Post hoc analyses were made to verify whether the nature of the training administered during Experiment 1 affected equally the results of Experiment 2. Specifically, whether participants in the Training group had been exposed to the Irish dialect, to the French accent, or to different samples of the Plymouth accent, did not affect significantly the amplitude of the disruption at the moment of accent change in Experiment 2.

Discussion

This experiment was designed to investigate whether the delay in word identification caused by changes in accent observed in Experiment 1 could be modulated as a function of participants' expectations about the task. Two different aspects of listeners' expectations were manipulated: the amount of prior training participants had with the general design of our experiments (Training vs. No Training), and the instructions given prior to the task itself (Neutral vs. Accent). It was expected first that with the Neutral instructions, participants who had no training with the task would be surprised by an unexpected change in accent, contrary to those participants who had an extensive experience of the design by performing Experiment 1. Results confirm these hypotheses: a strong, but very temporary, disruption was observed for participants in the No Training group as compared to those in the Training group, at the moment of accent change.

Second, the Accent instruction condition was introduced to explore whether the preceding pattern of results could be reversed by focusing participants' attention upon accent characteristics. Indeed, instructing the participants in the Training group to pay attention to the accents used in the experiment was sufficient to induce an accent change disruption of around 280 ms (see Fig. 5), as if these participants experienced a renewal of their initial surprise effect. The same instructions given to the No Training group resulted in an important decrease in reaction times (around 250 ms), which we can attribute to the fact that the sudden accent change fulfilled their expectations.

In summary, participants' expectations were clearly found to predict accurately the observation of a word identification disruption at the moment of accent change. This finding corroborates the explanation we offered to account for some aspects of the results of Experiment 1, namely the strong disruption effect found immediately after the first presentation of a new accent or dialect.

Having said that, it remains to be explained why, in Experiment 1, following this initial surprise effect, reaction times for the unfamiliar accents remained higher than for the home accent during the entire second and third blocks.[3] At least two explanations can be proposed: the first one would be naturally that there is no such thing as an adaptation process of

[3] In Experiment 2, comparison of reaction times across the entire blocks revealed that the French accent did not elicit significantly slower reaction times than the Plymothian accent. This result could appear to contradict those obtained in Experiment 1, however Experiment 2 did not provide the appropriate controls that would have allowed a direct evaluation of the cost of the French accent upon the processing of the sentences in block 2. In order to do so, it would have been necessary to present another group of participants with exactly the same sentences than those used in block 2, but uttered by a Plymothian speaker. All things being equal, the sentences in block 2 may elicit faster reaction times than those in block 1, which would be compensated for by the cost resulting from the use of a foreign speaker.

comprehensibility to an accent in these laboratory situations, and/or as measured by reaction times. The second possibility is that participants expect another sudden change in speaker, therefore they constantly mobilise more attention.

In order to distinguish between these hypotheses, we ran a third experiment in which exactly the same material as in Experiment 1 was used, but a different organisation was employed. Instead of introducing only one accent change and one within-accent speaker change per participant, accents and speakers were randomly presented throughout the list. This design is inspired from that used in Floccia et al. (2006), in which long lists of randomly presented sentences with various accents and speakers were used. This resulted in the observation of a general delay in processing when presented with an unfamiliar accent. With such a design, participants are rapidly aware that changes in accents are frequent, and then any surprise effect and attentional component due to speaker change expectancy should be largely reduced.

However, with such a design, it would be impossible to evaluate the time-course of adaptation to accents, if such adaptation takes place on more than one sentence. Therefore, we also "hid" within each random list shorter lists of four consecutive sentences uttered by the same speaker, in order to evaluate the evolution of reaction times over these periods. It was anticipated that participants would not detect the occurrence of such lists, and would attribute them to the random process of sentence selection.

Experiment 3

Effects observed in Experiment 1 could have been due to the superimposition of two mechanisms, a surprise effect due to the first accent change, followed by increased attentional mechanisms triggered by the blocked design of the experiment. Experiment 3 used a sub-set of the material used in Experiment 1, but using a random presentation of speakers and accents throughout the list. In addition, shorter lists of four consecutive sentences produced by the same speaker were hidden within the main list, in order to observe a possible adaptation to a particular accent.

Participants

Twenty eight participants were tested, nineteen of whom originated from the South West, and the other nine were from other regions of England. The twenty-eight participants were aged 29 years (SD 13.6), and included seven males. All participants were part of a paid pool of volunteers within the university, which explains the greater variability in age range.

Procedure

The task was identical to that used in Experiment 1, that is, a forced-choice lexical procedure on the last item of each sentence. All participants heard the same list of forty-eight sentences, made of three blocks of sixteen sentences, with accents and speakers randomly presented. However, every sixteen sentences, a four-sentences short list was inserted (short list 1 or SL1 was presented after the first sixteen sentences, SL2 after the first thirty-two sentences). The division of the main forty-eight sentences list into three blocks of sixteen sentences was pseudo-randomised, so that the same number of speakers, accents, and words/pseudo-words were presented in each block.

The first short list, SL1, was produced by a French speaker for participants in the French accent condition (11 participants), by an Irish speaker for participants in the Irish accent condition (9 participants), and by a Plymouth speaker for the members of the Plymouth accent condition (8 participants). Two speakers per accent were used, so that half of the participants in each group heard SL1 produced by the first speaker of a given accent, and the other half heard the second speaker. All four sentences were identical for the three groups, and all ended up with a word.

The second list, SL2, was made up of four new sentences ending up with a word, and was produced by the same Plymouth speaker for all participants. Therefore, all participants heard the same SL2 list. Order of sentence presentation within each of the short lists was randomised for each participant.

Stimuli

Stimuli are identical to those used in the first experiment. However the within-participant design of this experiment made it necessary to remove some sentences. The complete list of items and sentences can be found in the Appendix. Here again, pseudo-words and words were chosen so that the difference in reaction times due to their lexical status would be minimised.

Results

Two sets of analyses were performed: first, participants' reaction times for the common main list of forty-eight sentences were analysed, with accent of the sentences (three modalities: French, Irish and Plymouth) as a within-participant variable. The accent in the first short list (French, Irish or Plymouth) and participants' origins were between-participant factors. A main advantage of processing the Plymouth dialect over the two other less familiar accents was expected, following the previous experiment and Floccia et al. (2006). It was also expected that the French accent would elicit slower reaction times than the Irish one.

Second, the evolution of reaction times within each hidden short list was analysed for each group. Because exactly the same sentences had been presented across participants, any between-group effect for each short list might reveal a direct effect of accent. Most importantly, these short lists should allow us to observe a progressive decrease in reaction times, due to an adaptation.

Errors

Out of the 1680 expected responses, 6.4% were erroneous and distributed as such: 30 were errors on words, 6 were false alarms on pseudo-words, 39 were too slow (sup to 2000 ms or to 2.5 SD of each participant's average reaction times), 30 were too fast (inferior to 300 ms or to 2.5 SD), and 3 were misses. Missing values were equally distributed across the two groups ($\chi^2(1) < 1$).

Main List Analysis

A repeated measure participant ANOVA was performed on reaction times with accent in the first short list (French, Irish and Plymouth) and origins (South-West or other part of

Table 2 Experiment 3: mean reaction times for words and pseudo-words depending on the accent of the carrier sentence

Accent		Words		Pseudo-words		Combined	
		Mean RT	SD	Mean RT	SD	Mean RT	SD
Plymouth	All speakers	647	112	666	123	657	117
	P1	630	118	607	136	619	127
	P2	674	126	722	142	698	135
French	All speakers	921	123	874	153	898	140
	F1	933	147	840	160	886	160
	F2	892	127	900	179	896	154
Irish	All speakers	960	131	878	117	919	130
	I1	995	119	895	104	945	121
	I2	923	166	869	164	896	166

England) as between-participant factor. Within participant factors were the lexical status of the item (words vs. pseudo-words) and the accent of the sentences (French, Irish or Plymouth) (see Table 2). For the item analysis, origins and accent in the first short list were within-item variables, and lexical status and accent of the sentences were between-item variables.

Accent in the first short list did not have any main effect ($F1\ (2, 22) < 1$; $F2\ (2, 41) = 1.66$), neither did origins ($F1\ (1, 22) = 1.12$; $F2\ (1, 42) = 15.11$, min $F'\ (1, 25) = 1.04$), although there was a tendency for South West participants to respond faster than participants from other parts of England. Accent in the first short list and origins did not interact significantly with each other either ($F1\ (2, 22) = 1.99$; $F2\ (2, 41) = 60.56$, min $F'\ (2, 23) = 1.92$), or with any other factor.

No main effect of the lexical status of the item was found ($F1\ (1, 22) = 11.45$, $p = .0027$; $F2\ (1, 42) = 1.70$, min $F'\ (1, 53) = 1.48$). It did not interact with accent of the sentences ($F1\ (2, 21) = 7.41$, $p = .004$; $F2\ (2, 42) < 1$, min $F'\ (2, 48) < 1$) or with any other factor.

A main effect of accent of the sentences was found ($F1\ (2, 21) = 303.60$, $p < .001$; $F2\ (2, 42) = 34.10$, $p < .001$), due to the fact that participants were better in processing sentences in the Plymothian dialect (657 ms) than in the Irish (919 ms) or the French accent (898 ms). A two-by-two comparison of accents revealed that reaction times for the Plymothian speakers were significantly faster than for the French ones ($F1\ (1, 12) = 411.90$, $p < .001$; $F2\ (1, 33) = 35.20$, $p < .001$) and the Irish ones ($F1\ (1, 16) = 384.50$, $p < .001$; $F2\ (1, 33) = 47.30$, $p < .001$). Irish sentences produced slower reaction times than French ones, but not significantly ($F1\ (1, 22) = 4.13$, $p = .054$; $F2\ (1, 18) < 1$). No other interaction was significant.

Table 2 also provides the mean reaction times elicited by each speaker within each accent during the main list. No effect of speaker was found for the French accent ($F1\ (1, 22) < 1$; $F2\ (1, 7) < 1$), or for the Irish accent ($F1\ (1, 22) = 2.97$, $p = .098$; $F2\ (1, 7) = 1.98$). A marginal effect of speaker was obtained for the Plymouth accent ($F1\ (1, 22) = 43.60$, $p < .001$, $F2\ (1, 22) = 3.18$, $p = .09$; min $F'\ (1, 25) = 2.96$, $p = .097$). However, the Plymothian speaker who elicited the slowest reaction times (698 ms) still elicited faster reaction times than the unfamiliar accent speaker who elicited the fastest reaction times (the first French speaker FL1, with a mean reaction times of 886 ms) (difference between these two speakers:

F1 (1, 22) = 166.10, $p < .001$, F2 (1, 13) = 9.72, $p = .008$). What these results clearly show is a strong effect of accent familiarity, with participants being consistently faster with their home accent than with another accent.

Adaptation Along the Main List

A first way to investigate whether participants adapt to accents presented throughout the list is to search for a possible block effect. Recall that the list was divided in three blocks, to allow the presentation of two hidden sub-lists of sentences produced by the same speaker. A comparison of reaction times during the first block and the last one should provide us with some indication of a possible decrease in reaction times in the French and the Irish accent, as compared to the home accent. An ANOVA was conducted with accent in the first short list and origins as between-participant variables, and accent of the sentences (Plymouth, Irish and French), lexical status of the target (words vs. pseudo-words) and block (first vs. third) as within-participant variables. In the item analysis, accent in the first short list and origins were within-item variables, whereas lexical status, accent of the sentence and blocks were between-item variables.

Block had a marginal effect (F1 (1, 22) = 12.22, $p = .002$; F2 (1, 20) = 2.82), showing that reaction times tended to decrease over the blocks (778 to 751 ms), but did not interact with accent of the sentences (F1 (2, 21) = 3.66, $p = .043$; F2 (2, 20) < 1), or with any other factor.

Analyses of Reaction Times During the Short Lists

Evolution of reaction times during SL1 and SL2 are provided in Fig. 6. As can be seen, three main observations can be made: first, reaction times of the French and Irish short list groups during SL1 seem higher than reaction times of the Plymouth group; second, there

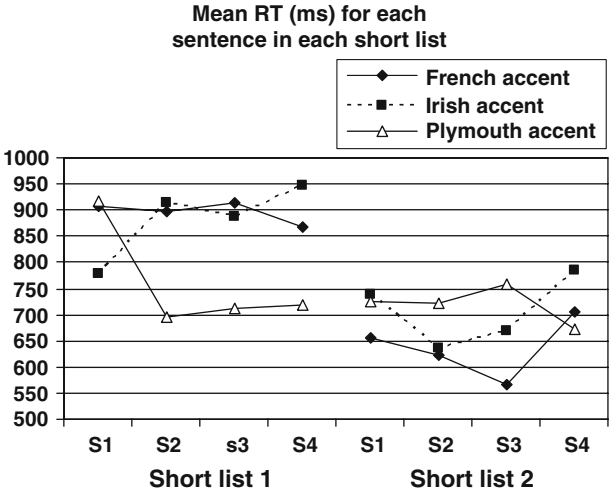

Fig. 6 Experiment 3: mean lexical decision reaction times across all participants for each consecutive sentence (S1 to S4) of the short lists SL1 and SL2, as a function of accent in the first short list

does not seem to be any sign of adaptation in the French or Irish short list group over the four sentences of SL1; third, reaction times of the three short list groups during SL2 seem identical, as would be expected given that they were all presented with the same Plymouth speaker.

To verify these observations, ANOVA were carried out on the RT in a participant analysis using list (SL1 vs. SL2) and time (first presented sentence in each list, then second, third, and fourth) as a within-participant factor, and accent in the first short list (French, Irish and Plymouth) and participants' origins as between-participant variables. In the item analysis, accent in the first short list and origins were within-item variables, whereas list was the only between-item variable (time could not be included because items were randomised within each list).

Origins did not have any main effect (F1 (1, 22) < 1; F2 (1, 6) = 2.99), nor did it interact with any other factor. Therefore, it will not be mentioned again hereafter. Overall, mean RT for SL1 were significantly higher than for SL2 (852 ms versus 683 ms) (F1 (1, 22) = 35.41, $p < .001$; F2 (1, 6) = 33.10, $p = .001$). Accent in the first short list did not have any main effect (F1 (2, 22) = 1.17; F2 (2, 5) = 2.38), but the interaction between accent in the first short list and lists was found to be significant by participant (F1 (2, 22) = 4.15, $p = .029$; F2 (2, 5) = 3.73, $p = .10$, min F′ (2, 15) = 1.96). Further analyses revealed that the main effect of list was mostly due to the French short list group (F1 (1, 9) = 41.55, $p < .001$; F2 (1, 6) = 22.55, $p = .003$), and to the Irish group (F1 (1, 7) = 8.93, $p = .020$; F2 (1, 6) = 13.31, $p = .011$), but not to the Plymouth group (F1 (1, 6) = 3.39, $p = .15$; F2 (1, 6) = 3.27, $p = .12$). These analyses confirm that the French and the Irish short list groups displayed significantly higher reaction times during SL1 than the Plymouth group, as compared to their respective baseline (SL2).

When considering each list separately, it was found that accent in the first short list had a significant effect on SL1, at least by participant (F1 (2, 22) = 4.50, $p = .023$; F2 (2,2) = 3.65, min F′ (2, 6) = 2.01), but not on SL2 (F1 (2, 22) < 1; F2 (2, 2) < 1). Two by two comparisons during SL1 revealed that the Plymouth short list group differed from the French short list group by participant (F1 (1, 15) = 6.70, $p = .020$; F2 (1, 3) = 10.33, $p = .049$; min F′ (1, 13) = 4.06, $p = .065$), and from the Irish group (F1 (1, 13) = 7.30, $p = .018$; F2 (1, 3) = 8.50, $p = .062$; min F′ (1, 11) = 3.93, $p = .073$), whereas the French and the Irish short list groups did not differ from each other (F1 (1, 16) < 1; F2 (1, 3) < 1).

Finally, the effect of sentence order was examined in a participant analysis only, and no main effect was found (F1 (3, 20) < 1). Interaction between sentence order, list and accent in the first short list was not significant either (F1 (6, 42) = 1.22). For each of the three accents in the first short list, the interaction between lists and sentence order was not significant (French group: F1 (3, 7) < 1; Irish: F1 (3, 5) = 1.21; Plymouth: F1 (3, 4) < 1). As can be seen in Fig. 6, reaction times during SL1 seem to decrease between the first sentence and the following ones in the Plymouth short list group, while they remain relatively more stable for the two other short list groups. However, none of these tendencies is significant (effect of sentence order for the Plymouth group: F1 (3, 4) = 1.67, $p = .31$; French group: F1 (3, 7) < 1; Irish group F1 (3, 5) = 2.65, $p = .15$).

The overall effect of foreign/regional accent was further investigated, to check whether it could be related to durational characteristics of target items. In order to examine the relation between reaction times, target word length and sentence length, separate regression equations were computed for each participant. Each equation involved regression from the 48 observations from each participant to the two predictor variables, namely target word length and sentence duration (up to the beginning of the target word). To test whether each

regression coefficient differs reliably from zero, single group t-tests were run for each variable coefficient set (see Lorch and Myers 1990). The coefficients of regression relating reaction times and sentence duration were not significant ($t(27) = 1.10$, $p = .28$). The regression coefficients relating target word length and reaction times were significantly different from zero (mean B= 0.15, $t(27) = 2.48$, $p = .020$), indicating that, not surprisingly, participants' lexical decision were partially predicted by target duration. However, words and pseudo-words uttered by the Plymouth speakers were on average longer ($M = 590$ ms, SD = 120) than words and pseudo-words uttered by the Irish speakers ($M = 579$ ms, SD = 114 ms) or the French ones ($M = 550$ ms, CD = 110 ms). Therefore, the strong difference in reaction times elicited by the Irish and the French accent in the sentences as compared to the Plymouth accent seems unlikely to be due to differences in reaction times between targets uttered by the different speakers.

Discussion

Experiment 3 was designed to investigate whether the accent change effect observed in the first experiment was due to a lasting surprise effect due to its blocked design, similar to that used by Clarke and Garrett (2004). By varying randomly the speaker, and therefore the accent in the sentences, we assumed that surprise due to the sudden presentation of a new accent would quickly disappear. The consequence of this random design was of course that it would have been impossible to explore what happens over a sequence of unchanging speaker, that is, to study adaptation. Therefore we introduced two hidden sub-lists within the main list, during which the speakers remained unchanged for four consecutive sentences.

Results show first a strong effect of accent over the main list: listeners were much faster in processing items placed at the end of Plymouth accented sentences than at the end of Irish or French accented sentences. This replicates the accent effects found in Experiment 1 and therefore, seems to rule out definitely the explanation based solely on a surprise effect.

The second important result is that this accent effect did not habituate at all, as would be expected from an adaptation process. The word identification disruption was as important at the beginning and at the end of the main list, showing no sign of long-term adaptation. Neither did reaction times within each four-sentence sub-list diminish significantly over time. This casts some serious doubts on the possibility of observing a consistent adaptation of the disruption caused by an unfamiliar accent, in laboratory situation.

A third result found in this last experiment is that regional and foreign accents triggered equally slow responses, contrary to what was reported in Experiment 1, where the same French accented speakers elicited slower reaction times than the same Irish ones. However, this discrepancy between experiments was not confirmed by statistical analysis. The interaction between experiments and type of accents in the sentences (Irish vs. French) was not significant (F1 (2, 87) = 1.43, $p = .24$), neither was the main effect of type of accents over the two experiments (F1 (2, 87) = 2.22, $p = .11$).[4] This suggests that overall, French and Irish speakers elicited comparably slow reaction times.

[4] In this comparison, type of accent in the sentences is a between-participant factor for Experiment 1, whereas it is a within-participant factor for Experiment 2.

General Discussion

The aim of this study was to explore the time-course of the normalisation mechanisms of comprehensibility for regional and foreign accents. A recent study by Clarke and Garrett (2004) had shown that the first presentation of a foreign accent triggers an initial disruption in word identification, followed by a subsequent adaptation. In a first experiment, we attempted to replicate and extend their results, by contrasting a foreign and a regional accent, and by changing speaker within the same accent. Using a blocked design similar to that chosen by Clarke and Garrett, the speaker and/or the accent was changed regularly during the lists. Results showed that a first change in accent resulted in a temporary disruption of word identification, which habituated within two consecutive sentences. However, no return to baseline level was obtained, questioning the possibility of observing a consistent adaptation to accents. In addition, a further change in speaker within the same accent did not elicit any significant modification of reaction times as compared to appropriate controls.

Experiment 2 examined whether the initial disruption following the first accent change could be modulated by modifying participants' expectations. By manipulating the amount of training with the general design of our experiments, and the instructions provided to the participants, we established that the observation of the initial disruption could be predicted by the nature of participants' expectations.

Experiment 3 explored further the second component of the accent change effect, namely the apparently non-habituating delay in reaction times following the initial disruption, as displayed in Experiment 1. The design of this last experiment involved the random alternation of speakers and accents throughout a main list of sentences. Two sub-lists of four sentences produced by an unchanging speaker were introduced in the main list, in order to search for a possible adaptation to a particular accent. Results showed first that a general non-habituating delay in word identification was observed for the foreign and the regional accent as opposed to the home accent, replicating the results of Experiment 1. Moreover, no trace of adaptation of this delay was observed, either on the main list or within the short hidden sub-lists.

Altogether, these three experiments suggest that the speech perception system is perturbed by the presentation of a foreign or a regional accent, and that this perturbation does not habituate, at least not within the timeframe allowed in these experiments (up to fifteen consecutive sentences in Experiment 1). This study also suggests that an important component of the perturbation caused by an unfamiliar accent might be due to surprise, due to the design of the experiments which sometimes can cause violations of participants' expectancies.

The amplitude of the word identification disruption was not found to vary systematically as a function of the kind of accent presented, foreign or regional. This contrasts with what was reported by Floccia et al. (2006) in French, who contrasted a Southern dialect with an English accent (Experiment 4) in a lexical decision task for items placed at the end of sentences. It was found that the English accent elicited on average reaction times slower by 120 ms as compared to the Southern dialect. However, it must be noted that the level of proficiency in French of the English speakers selected by Floccia et al. (2006) was by no mean comparable to that of the French speakers used in the present study. The productions of the English speakers in Floccia et al. (2006) were twice as long as the corresponding productions of native speakers, indicating, together with subjective reports from the authors (including a trained phonetician), that these speakers' productions were characterised by a thick accent. Contrastively, the French speakers used in the present study were highly proficient in English,

as showed by the rating results (see Discussion of Experiment 1) and the duration of their productions (see Appendix).

Inevitably, this comment raises the question of the comparability of speakers' productions within a given accent, or even between different accents. As every phonetician or phonologist knows, it is very difficult, if not impossible, to quantify the amount of foreign or regional accent within an utterance. It appeared to us that one of the less worse options was to ask for subjective ratings on the different productions, in an attempt to verify that the level of accentedness was similar between the different speakers. However, one can question the equivalence of the scales used by the raters when judging the foreign or the regional accents: the fact that the French speakers were rated as less accented than the Irish speakers may reflect differences in the endpoints of the scale, rather than differences in the perceptual distances from the home accent. Another approach was taken by Wingstedt and Schulman (1987), who created an artificial foreign accent in Swedish by varying systematically three categories of features: segmental rules, stress placement, and vowel insertion in consonant clusters. The resulting sentences and isolated words were recorded by one of the authors, and presented to Swedish listeners for training and transcription. Results show a gradation of the amount of correct responses as a function of the type of non-native features, or as a function of their combination. For example, if only segmental rules were modified, sentences are understood by 77%, whereas if the three types of variations are introduced, comprehension dropped to 14%. Intermediate combinations of pairs of rules (for instance, segmental rules plus vowel insertion) lead to intermediate comprehension scores. This study indicates that it might be possible to predict the amount of word identification disruption, as evidenced in our experiments, as a function of the type of variations found within a non-native production (see also Flege 1995). Future research might be devoted to systematically examine the weight of each distinctive feature characterising non-familiar accents upon the observation of speech processing disruption.

What are the consequences of our findings for the traditional models of lexical access? In the architecture proposed by Norris et al. (2003), the initial disruption caused by the presentation of an unfamiliar accent is rapidly compensated for by modifications of the pre-lexical encoding triggered by lexical levels. This predicts an adaptation of comprehensibility after a certain delay, which is not what our data suggest. Rather, pre-lexical processing seems constantly impaired by the presentation of an unfamiliar accent, as suggested by the long-lasting slowing down of word identification delays. In contrast, post-lexical processing (measured by intelligibility) can be taught to become more efficient, perhaps by applying a specific phonological accent-filter onto the outcome of lexical activation. This accent-filter would build on repetitive exposure to the same accent, storing in long-term memory a specific device that would allow accurate identification and increased intelligibility. Possibly, very long-term exposure might result in modifications of the pre-lexical encoding device as well, leading to modifications of comprehensibility: this process might be particularly visible in children who have been shown to perfectly learn a new regional accent when moved from a region to another (Chambers 1992; Trudgill 1986). This proposition makes the testable prediction that comprehensibility for pseudo-words uttered with a foreign accent should never increase with prolonged exposure, whereas intelligibility of the same words should.[5]

The main finding of this study is that, at least in the laboratory conditions that we used here, comprehensibility of accented speech does not benefit from repeated exposure to the same accent. This does not contradict the fact that intelligibility of the same accented speech

[5] This cannot be tested in the present study: error rates in the lexical decision responses, which provide intelligibility measures, are very low. This suggests a floor effect, resulting in the fact that error rates do not vary significantly as a function of the lexical status of the words.

might increase over time, as reported for instance by everyday anecdotical reports when we listen to accented speech, and by previous studies on adaptation of intelligibility. Indeed, as far as transfer of learning from one (set of) voice to another is concerned, the emerging picture is that listeners benefit from exposure to accented voices in a sentential context (Bent and Bradlow 2003; Bradlow and Bent 2003; Clarke 2000; Weil 2001).

Recently, Adank and McQueen (2007) also reported a failure to elicit a short-term adaptation effect to an unfamiliar regional accent in Dutch. Using an animacy decision task on isolated words, responses were measured both before and after 20 min of exposure to sentences produced in the unfamiliar accent by six different speakers. Although a strong delay in word processing was obtained for the unfamiliar accent, extending the current study and the results by Floccia et al. (2006), no effect of short-term exposure was reported. The authors suggest that the use of one speaker only in the Clarke and Garrett's study (2004), as opposed to the use of several speakers in their study, might be responsible for the discrepant results. However, in that respect our design is closer to that of Clarke and Garrett, since we also used one speaker only in Experiment 1 (block 2) and failed to observe speaker-specific adaptation.

Another factor that could account for these conflicting results is participants' prior exposure with the accents under study. It could be that the Americans listeners tested by Clarke and Garrett were, on the overall, less familiar with non-native accents, as compared to our British listeners, or even the Dutch listeners tested by Adank and McQueen (2007). Then our results and those by Adank and McQueen would reflect a floor effect: listeners' comprehensibility could not adapt more than what had already happened due to years of prior exposure, whereas American listeners in the Clarke and Garrett's study would have benefited from the laboratory exposure situation. One testable prediction would be to test British listeners with very rare regional and foreign accents, which could result in the observation of short-term exposure effects similar to what was obtained by Clarke and Garrett.

In summary, the present study suggests that both regional and foreign accents trigger a delay in word identification processes, which does not seem to habituate with repeated exposure to the same speech style, at least within the timeframe of the present experiments. Further research will be needed to ascertain whether adaptation of comprehensibility to foreign or regional accents can not be evidenced in other situations, such as prolonged exposure to real conversations. Our results so far confirm the existence of a dissociation between comprehensibility and intelligibility for accents, with the latter only benefiting from repeated exposure to the same accent (e.g. Bent and Bradlow 2003; Clarke 2000).

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Appendix

List of stimuli used in each experiment, together with their durational characteristics (first column: sentence duration in ms; second column: target duration in ms). Sentences ending with pseudo-words are written in italics. The origins of speakers who produced the sentences is abbreviated as follows: Plymouth (PL1 to PL5), Irish (IR1 and IR2), French (FR1 to FR3).

Experiment 1

Block 1	PL1	
Alexander likes to run as fast as he can when he sees a dolphin	4095	484
Allison always insists on having the biggest of all the puppets	4000	713
Angelina is sad because she can't see all the bubbles	3521	581
Barbara doesn't want children to get close to her garage	3071	588
Because she forgot her glasses Michelle couldn't see all the beautiful badgers	4782	591
Caroline collects all the small boxes to keep her little candles	3855	730
Dad doesn't want to me to use all the buttons on the castle	2847	386
Elisabeth doesn't understand why she can't touch all the buckets	3862	632
Eric shouted very loud when he saw that we had broken all the presents	3883	685
Every day my Dad and brothers enjoy eating their butter	3116	492
You can't sort out all these pictures because they all have different gamlets	3965	725
Yesterday Arthur didn't want to put anything new in his dopic	3837	571
When we are at school the teacher often tells us about coclones	4234	865
When they are at home children are allowed to play with the barlot	3670	692
What I prefer when i'm on holiday is to collect all the dopels	3519	577

Block 2	PL2		FR1		FR2		IR1		IR2	
Every day this month Matthew refused to eat his breakfast	3720	790	3697	750	3807	636	3713	665	3669	734
Everything was so mixed up that you could'nt find your pencil	3715	530	3391	538	3496	495	3267	462	3227	558
Fanny still hasn't succeeded in selling her nicest tortoise	4060	773	3379	729	4019	746	5072	878	3873	787
Hannah is still searching for the bag she wants to give to her brother	3677	320	3570	450	3793	449	4051	401	3401	482
He always prefered playing with his car rather than with the dragon	4010	466	3056	424	3674	414	4437	487	3473	449
In the afternoon John and Mary enjoyed finishing their tea with a trifle	4261	501	3650	510	4557	648	5139	576	4296	654
In the evening Virgil and Thomas ususally complain about their tummy	4634	439	3917	381	4436	305	4826	393	4142	436
Jessica broke the chair when she went up in the tractor	3368	568	3124	575	3688	514	3611	578	3184	611

Experiment 1 continued

Karen will help you to go there to collect all the pillows	3824	629	3162	612	3923	553	3908	620	3390	700
Last month my dream finally came true when I had a new table	4267	495	3750	461	3860	459	4594	482	4066	477
We couldn't put everything in your cupboard because of all the other gipples	4294	716	3890	563	4127	646	4449	694	4050	669
Valerie's grandmother doesn't want to keep all these dakers	3624	672	3350	634	3679	706	3867	717	3138	654
Unfortunately Heather has forgotten where she has put all her clavors	4423	741	4084	696	4654	657	4779	695	4192	699
This week my sisters and I will go to the big shop to buy a bosler	4258	518	3841	550	4272	463	4542	529	4132	598
They never agreed to learn how to run the big biffin	3308	433	2881	471	3399	446	3573	434	3093	511
Block 3	PL3		FR1		FR2		IR1		IR2	
Last Christmas Samuel and Derek managed to catch a tiger	3547	536	3851	574	3823	548	4302	544	3550	468
Madeleine went with her grandfather to the shop to buy some towels	3760	807	3689	639	3924	575	4980	800	3663	702
Mandy always comes to visit me so that we can play with my kitten	3911	506	3938	500	3537	432	4446	462	3964	446
Mark fell when he was trying to avoid walking on a bottle	3408	355	3050	416	3169	426	3840	426	3171	448
Mary returned to her granparents to see all the parcels	3742	900	3420	744	3717	742	4399	849	3619	983
Mum doesn't understand why my brother refuses to drink any coffee	4053	549	4008	387	3837	426	4502	516	3842	575
Mum punished all the children who refused to eat the pasta	3541	592	3426	560	3688	511	4423	581	3400	600
My mother really didn't like us playing with the new basket	3694	789	3550	764	3140	581	3643	632	3620	730
Nicholas is disappointed because he didn't manage to find his donkey	3815	524	4133	526	3767	495	4451	545	4073	522
Rebecca was very sad when she was told she couldn't use the basin	3437	415	3735	488	4035	527	4634	522	3788	475
The new teacher told us last Wednesday that she liked the gieder	3476	505	4222	455	3855	471	3816	454	3638	503
She would like to go shopping so she could get us some busner	3067	500	3436	582	3730	450	3913	564	3675	625
Samantha knew that it was Leon who had taken all her billers	4416	577	3327	546	3485	413	4399	650	3551	610
Once again Philip and Luclie forgot that they had to get some doover	4079	491	4099	523	3786	447	4972	466	4193	489
No-one wants to play with Timothy because he nevers let us have his new proson	4921	548	4469	560	4234	615	4849	516	4774	509

Experiment 1 continued

Block 4	PL4	
Seren would like Father Xmas to bring her a brand new carpet	4443	790
Stephanie always hesitated to say that she wanted to buy some curtains	4776	744
Her mother would like Rosemarie to be very careful with the pumpkin	3715	600
Toni has made a gorgeous little box to collect all her papers	3922	760
Victoria gets closer to the stage so that she can see the party	4053	581
When he was a child Rodney used to like playing with his parrot	3776	615
When it's cold outside my brother enjoys a nice cuddle	3654	420
While she was in town Catherine insisted to have a picnic	3733	535
With her magic wand the witch changed all the children into babies	4349	753
Yasmine doesn't want to go and see what stands next to her garden	4230	522
My grandmother always says that we should buy more carwer	3395	523
Margaret and Mum did everything they could to move your red pindon	3862	512
Louis would like that he wouldn't cry each time he sees some danay	3891	441
Julian doesn't know where his Dad has hidden all the badbles	3429	723
Tonight Jeremy wants his brothers to put away the little togger	3824	416

Experiment 2

Block 1	PL5	
She won't let him have her toy's because he took all her doughnuts	5088	808
Sophie was so happy that she said she would give her a nice drawing	5166	552
William prefered to exchange his toys so that he could have some nice cookies	5827	755
My uncle would like Paul and James to stop breaking the puzzle	5084	623
Dad was very upset with Ann because she lost her new bandage	4780	727
If Alexis agrees we will all go to the shop to get some cunnel	5386	542
I don't know who came into my room to steal all my red tifter	4848	603
He fell asleep watching cbeebies on tv with his podlin	4674	584
Grannie is standing right behind Sophie so she can catch her peaker	5761	624
Grandpha always said that he would never allow us to take his tankle	5014	707
Block 2	FR3	
For Christmas Geraldine would like to receive a beautiful puppy	3543	401
My sister said she wanted to buy lots of presents for the small princess	3736	561
Rosemarie found this beautiful mew watch of the pavement	3173	550
Next week my mother has decided to help me to get some trousers	3718	572
Oliver didn't want his grandmother to talk to the teacher	2927	492
Everyone likes it when my grandmother cooks some ganner	2828	296
Dad went up the ladder that allows him to see all doren	3568	419
Dad has go to shopping because we don't have any more tobbin	3416	412
Claire didn't like it when her mother refused to give her some dexay	4246	633
Andrew visited all the rooms in order to find the dimey	3800	492

Experiment 3

Block 1			
Victoria gets closer to the stage so that she can see the party	4053	581	PL4
When he was a child Rodney used to like playing with his parrot	3776	615	PL4
My grandmother always says that we should buy more carwer	3395	523	PL4
Margaret and mum did everything they could to move your red pindon	3862	512	PL4
Alexander likes to run as fast as he can when he sees a dolphin	4095	484	PL1
Alison always insists on having the biggest of all the puppets	4000	713	PL1
Angelina is sad because she can't see all the bubbles	3521	581	PL1
You can't sort out all these pictures because they all have different gamlets	3965	725	PL1
Yesterday Arthur didn't want to put anything new in his dopic	3837	571	PL1
We couldn't put everything in your cupboard because of all the other gipples	3890	563	FR1
Fanny still hasn't succeeded in selling her nicest tortoise	3379	729	FR1
Valerie's grandmother doesn't want to keep all these dakers	3679	706	FR2
In the afternoon John and Mary enjoyed finishing their tea with a trifle	5139	576	IR1
Unfortunately Heat her has forgotten where she has put all her clavors	4779	695	IR1
In the evening Virgil and Thomas usually complain about their tummy	4142	436	IR2
This week my sisters and I will go to the big shop to buy a bosler	4132	598	IR2

Short List 1	FR1		FR2		IR1		IR2		PL2	
Every day this month Matthew refused to eat his breakfast	3697	750	3807	636	3713	665	3669	734	3720	790
Everything was so mixed up that you could'nt find your pencil	3391	538	3496	495	3267	462	3227	558	3715	530
Hannah is still searching for the bag she wants to give to her brother	3570	450	3793	449	4051	401	3401	482	3677	320
He always prefered playing with his car rather than with the dragon	3056	424	3674	414	4437	487	3473	449	4010	466

Experiment 3 continued

Block 2			
When it's cold outside my brother enjoys a nice cuddle	3654	420	PL4
While she was in town Catherine insisted to have a picnic	3733	535	PL4
Louis would like that he would'nt cry each time he sees some danay	3891	441	PL4
Julian doesn't know where his Dad has hidden all the badbles	3429	723	PL4
Barbara doesn't want children to get close to her garage	3071	588	PL1
Because she forgot her glasses Michelle couldn't see all the beautiful badgers	4782	591	PL1
Caroline collects all the small boxes to keep her little candles	3855	730	PL1
When we are at school the teacher often tells us about coclones	4234	865	PL1
Dad doesn't want me to use all the buttons on the castle	2847	386	PL1
Madeleine went with her grandfather to the shop to buy some towels	3689	639	FR1
The new teacher told us last Wednesday that she liked the gieder	4222	455	FR1
Mark fell when he was trying to avoid walking on a bottle	3169	426	FR2
She would like to go shopping so she could get us some busner	3730	450	FR2
Jessica broke the chair when she went up in the tractor	3611	578	IR1
Samantha knew that it was Leon who had taken all her billers	3551	610	IR2
Nicholas is disappointed because he didn't manage to find his donkey	4073	522	IR2
Short List 2	**PL4**		
Seren would like Father Christmas to bring her a brand new carpet	4443	790	
Stephanie always hesitated to say that she wanted to buy some curtains	4776	744	
Her mother would like Rosemarie to be very careful with the pumpkin	3715	600	
Toni has made a gorgeous little box to collect all her papers	3922	760	

Experiment 3 continued

Block 3			
With her magic wand the witch changed all the children into babies	4349	753	PL4
Yasmine doesn't want to go and see what stands next to her garden	4230	522	PL4
Tonight Jeremy wants his brothers to put away the little togger	3824	416	PL4
Elisabeth doesn't understand why she can't touch all the buckets	3862	632	PL1
Eric shouted very loud when he saw that we had broken all the presents	3883	685	PL1
Every day my Dad and brothers enjoy eating their butter	3116	492	PL1
When they are at home children are allowed to play with the barlot	3670	692	PL1
What I prefer when I'm on holiday is to collect all the dopels	3519	577	PL1
Karen will help you to go there to collect all the pillows	3162	612	FR1
Mum punished all the children who refused to eat the pasta	3426	560	FR1
Last month my dream finally came true when I had a new table	3860	459	FR2
Once again Philip and Lucile forgot that they had to get some doover	3786	447	FR2
Mary returned to her granparents to see all the parcels	4399	849	IR1
No-one wants to play with Timothy because he nevers let us have his new proson	4849	516	IR1
Rebecca was very sad when she was told she couldn't use the basin	3788	475	IR2
They never agreed to learn how to run the big biffin	3093	511	IR2

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