CARDIFF UNIVERSITY

Does Cued Speech Affect the Communicative Ability of deaf Primary School Children in the UK?

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Declaration

This dissertation is submitted in partial fulfilment of the requirements for the award of the degree of BA with Honours in English Language Studies, of the University of Wales. It is the result of my own independent investigation, except where otherwise stated.

Signed: ……. Date: …….

Supervisor: …… Date: …….

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Abstract

Cued Speech (CS) is a communicative mode that the hearing impaired (the deaf), not considering themselves as part of the Deaf community or culture, could use to access the English language. CS was invented to present phonemes (auditory input) visually to the deaf in an attempt to diminish the subsequent communicative difficulties (in English) that an auditory disability creates. The aim of this case study was to investigate whether 'communicative ability' (speech perception and production, literacy skills and social and emotional stability) improved in four UK deaf primary school children during three months of CS-exposure at their school. Whether phonological awareness (PA) improved was simultaneously investigated. Subsequently, whether CS could be introduced to UK deaf schools' curriculum was considered. A phoneme perception and utterance perception test was used, in a baseline assessment and monthly throughout CS-exposure, to monitor whether speech perception (phoneme and utterance) and production was affected. The Schonell reading and spelling tests assessed literacy, and a teacher questionnaire was used to examine the children's social and emotional stability, before and after CS-exposure. The main results (averages of the four children's scores) found that when CS (month two to four), additionally to SSE (month one to four), presented words phoneme perception increased by 14.0% and speech production declined by 20.2%. Utterance perception increased by 4.1% (considering CS presentation). Literacy skills improved by an average of 56.6% and emotional and social stability improved in all four children (according to their teacher's perception). It was assumed that improved speech perception improved PA, subsequently improving literacy (and social and emotional stability by reducing miscommunication). The results suggest that CS, on the whole, benefited communicative ability. It was concluded, therefore, that CS could be introduced to UK deaf schools' curriculum. However, opposition to CS may prevent this. Future work was recommended to investigate whether continued CS-exposure showed further improvements in the communicative ability of the children and whether the reported benefits were apparent nationwide.

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Abbreviations

Certain terms will be abbreviated after first mention. The full list of abbreviations used is below:

- ADHD Attention Deficit Hyperactivity/Disorder
- ASL American Sign Language
- BSL British Sign Language*
- CS Cued Speech*
- PA Phonological Awareness*
- RNID The Royal National Institute for the Deaf
- SSE Sign Supported English*

**Definitions of these terms can be found in Appendix A*

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Chapter One: Introduction

1.1 Introduction

A UK deaf school is piloting **Cued Speech***[1] (CS) as an additional method for teachers and pupils to communicate, alongside the currently used **British Sign Language** (BSL) and **Sign Supported English** (SSE) systems. CS is a coding system that demonstrates **phonemes** (units of sound) of spoken languages (Cornett&Daisey 1992:3). The system is intended to give **the deaf** (the hearing impaired who do not consider themselves to be part of the Deaf community/culture) access to the spoken languages of the hearing communities (Crystal 1995). This study arose on behalf of the school and follows the progress of its four reception class children over three months of CS introduction to investigate whether their **communicative ability**, for instance their **speech perception** and **production**, **literacy skills**, and **social** and **emotional stability**, were affected by CS.

This study was, also, carried out to satisfy the investigator's personal interest in the reported benefits of CS (Cornett&Daisey 1992). Much research demonstrates that CS has a positive effect on the communication of the deaf (Kipila 1985; Metzger 1994; Moseley, et al 1991). However, the majority of research derives from France (Leybaert 1993; Perier, et al 1988; LaSasso&Metzger 1988) and the USA (Wandel 1989; Kyllo-Larsen 2003; Berendt, et al 1990). Consequently, generalisations of the findings may not be appropriate to the deaf in the UK due to the educational standards, social prejudices (of family, teachers, and communities, for instance), sign language and speech roles, as well as spoken languages, accents and their

*[1] *Terms in **bold** throughout this paper will be defined in Appendix 1. Definitions are from Crystal (1995)*

phonological systems, differing between countries. Further, these studies, solely consider subjects that have been exposed to CS (CS-exposed) from birth and, thus, those that have been introduced to the system in the home, rather than institutionalised settings, such as schools. Therefore, a third motivational factor behind this investigation was to fill the apparent gap in the literature regarding CS in the UK and CS's introduction within an institutionalised setting.

1.2 Aims/Research Questions

The study aims to investigate whether:-

a) CS affects the **phonological awareness** (PA), thus speech perception and, subsequently, literacy and speech production, of deaf primary school children in the UK (Stackhouse&Wells 1997). This study will assess PA through combining 'tests' of phoneme and **utterance** perception (thus testing speech perception, though speech production will be simultaneously monitored) with reading and spelling abilities.

b) CS improves the children's social and emotional stability. This study will assess social and emotional benefits through a teacher questionnaire.

c) CS could be introduced to UK deaf schools' curriculum through considering a) and b).

1.3 Hypotheses

It can be hypothesised that:-

a) because CS illustrates phonemes (Cornett&Daisey 1992:3), speech perception will improve, developing PA and therefore improving the children's literacy (reading and spelling) and, possibly, speech production (Bradley&Bryant 1983:409).

b) as a result of communicational improvements (a), social and emotional stability will be benefited by CS (Owen&Blazek 1985:389).

c) positive effects on communicative ability will indicate that UK deaf schools could consider introducing CS to their curriculum.

Chapter Two: Literature Review

2.1 The Origins of Cued Speech

2.1.1 deaf Communicative Ability

For decades, it has been documented that the deaf have lower communicative ability than their hearing peers (Ewing 1960; Dodd 1977; Conrad 1979; Dodd & Campbell 1987). Dodd and Campbell (1987:30), for instance, state that the auditory disability, preventing speech (sound) reception, has associated parallel effects on speech production and literacy skills, resulting in disability across all modes of communication. Dodd and Campbell (1987:30) concluded that this influences the deaf to feel socially isolated and unable to express themselves emotionally.

This apparent consequence of auditory disability has been the catalyst for the development of numerous manually coded systems of English, such as Sign Supported English (SSE), Signed English and Paget Gorman Signed Speech (McCracken & Sutherland 1991:89). These systems present English syntax and grammar (especially morphology) to varied extents, in an attempt to improve the deaf's communicative ability, particularly literacy (McCracken & Sutherland 1991:101). However, despite manual codes The Royal National Institute for the Deaf (RNID) recently stated that "GCSE results and educational achievements of most deaf children remain well below a quarter of the national average. The majority of deaf adolescents still leave school with a reading age of nine" (RNID 2007a).

2.1.2 Cued Speech

In 1967, in an attempt to alleviate the inherent problems that the deaf experience with oral-aural communication, Orin Cornett invented CS (Cornett & Daisey 1992:2). This manual code system aimed to visually convey American spoken language to the deaf

at the same linguistic level that it is conveyed to hearing people (Cornett & Daisey 1992:2). CS has since been adapted to 65 languages and the dialects within them (RNID 2007b). CS utilizes lip-movements with a system of eight consonant hand shapes (Appendix 2.a) and four vowel hand placements (Appendix 2.b) near the mouth to distinguish visually confusable phonemes of spoken languages (Cornett & Daisey 1992:2). The system is, therefore, a support for **lip-reading**. Cornett (1967) assumed that by presenting phonemes (auditory input) visually to the deaf, the effects of the aural disability would diminish alongside the subsequent communicative deprivations (cited in Cornett & Daisey 1992:6).

2.2 Phonological Awareness

If CS does adequately convey phonemes it is possible that subsequently improved speech perception could influence further communicative ability (such as speech production and literacy skills) as Cornett (1967) assumed (cited in Cornett & Daisey 1992:32). This depends on whether the visual input of phonemes can develop phonological awareness (PA) in the deaf as auditory input does in the hearing. According to many models of language processing and development (for instance, Fodor 1983; Levelt 1989; Levelt et al 1999 and Stackhouse & Wells 1997), in hearing people auditory reception of speech (phonemes) is crucial. Stackhouse and Wells' (1997) model illustrates that "physical sound waves" (the input unavailable to the deaf) are processed to identify phonemes in speech (what CS aims to visually convey). In turn "phonological representations" are developed in the brain which subsequently influence comprehension and production of speech and orthography (Appendix 3); this is PA (Stackhouse & Wells 1997). This explains the widely documented reports that the deaf's aural deficiency influences further communicative modes (Ewing 1960; Dodd 1977; Conrad 1979; Dodd & Campbell 1987) as deafness

does not permit the initial stage of language processing/development ("auditory processing") (Stackhouse & Wells 1997). Therefore, subsequent PA development is compromised affecting the deaf's ability to produce and monitor speech, comprehend rhyme, and decode the written and spoken word to read and spell in alphabetic languages (Bradley & Bryant 1983).

However, whether the deaf can develop PA, regardless of CS, is controversial. There is a lot of conflicting research (for instance, Dodd 1980; Hanson 1986; Campbell 1992; Hanson et al 1983; Burden & Campbell 1994 and Sterne & Goswami 2000 all concluded that PA can develop in the deaf, whereas Merrills et al 1994 and Waters & Doehring 1990 concluded that it could not, moreover Beech & Harris 1997 and Harris & Beech 1998 reported results that were inconclusive). Therefore, Cornett's (1967, cited in Cornett & Daisey 1992:6) assumption that visual input can substitute auditory input is risky, particularly regarding the congenitally deaf who have had absolutely no experience of sound, and especially as the auditory or visual processing of sound in either a hearing or deaf person cannot be directly observed (McCracken & Sutherland 1991:3). Research into the effects of CS-exposure on associated PA skills such as reading and spelling could be the only indication of whether CS (as a visual substitute) can develop PA (Bradley & Bryant 1983). This is limiting because whether CS improves communicative ability due to PA is difficult to conclude as PA development can only be demonstrated by improved associated skills (communicative ability, such as reading and spelling).

2.3 Relevant Cued Speech Research

2.3.1 Cued Speech and Speech Perception

According to Perier et al (1986) until CS was invented lip-reading was the only direct representation of spoken language available to the deaf. However, this claim ignores Visible Speech (Bell 1867) and fingerspelling (McCracken & Sutherland 1991:100), systems that conveyed spoken language prior to CS, though perhaps not as efficiently as CS. CS appears to adopt Visible Speech's and fingerspelling's best assets. For instance, Visible Speech represents phonetics (similarly to CS), though does not mediate speech in real time (dissimilarly to CS) (Bell 1867), whereas fingerspelling can represent speech in real time (similarly to CS), though represents spellings not sounds (dissimilarly to CS) (McCracken & Sutherland 1991:100). Fingerspelling particularly seems less beneficial considering the deaf's literacy difficulties (RNID 2007a).

Arguably, because lip-reading happens in real time and needs no special skills, it is the most effective representation of spoken language; however, some lip-shapes are ambiguous (McCracken & Sutherland 1991:68). Emmorey and Lane (2000:282) reported that only 30% of the English language is lip-readable. For example, although /p/, /b/ and /m/ phonemes are three distinct auditory stimuli varying through voice and manner of articulation (acoustic information inaccessible to the deaf), they are perceived indistinctively by the deaf due to a common bilabial place of articulation (Roach 2000:65). CS therefore attempts to amend this shortfall of lip-reading by distinguishing visually similar phonemes (Cornett & Daisey 1992:4). CS does appear to bridge the gap to a more specific capacity to lip-read, Emmorey and Lane (2000:282), for instance, report that CS increases lip-reading accuracy from 30% to 98%.

It could be assumed that reliance on CS would degrade lip-reading ability without CS. However, Uchanski et al (1994:39) reported that 80% of consonant-vowel syllables, when lip-read (without CS), remained recognisable to CS-exposed subjects, whereas only 30% were recognisable to non-CS-exposed subjects. Uchanski et al (1994:39) concluded that the CS-exposed have nearly perfect reception of everyday connected speech. Uchanski et al's (1994:39) report may suggest that CS develops PA, influencing a connection between internalised phonemes and lip-movements, making guesswork in lip-reading more successful (Stackhouse & Wells 1997). This is speculation, though CS-exposure benefiting speech perception has been well documented (Kaplan 1974; Chilson 1979; Nicholls 1979; Perier et al 1986; Perier et al 1988; Clarke & Ling 1976; Nicholls & Ling 1982; Neef & Iwata 1985; Fleetwood & Metzger 1998).

2.3.2 Cued Speech and Speech Production

According to the LiteracyTrust (2007), approximately 60% of the deaf in the UK never use their voice due to fear of producing inappropriate pitch, tone or volume, which they cannot monitor. Perier et al (1986) stated that CS, though not directly producing the ability to monitor voice aurally, reduced inhibitions of oral communication because the CS-exposed have a greater understanding and better internalised representations of their acoustically uttered attempts. This justification is feasible considering PA (Stackhouse & Wells 1997). Moreover, Kipila (1985), Perier (1990), Hage et al (1990) and LaSasso and Metzger (1988) all concluded that speech production difficulties and subsequent language or educational delays were reduced by exposing deaf babies to their parents' first language via CS.

There is currently no research showing that CS improves the deaf's spoken language to the extent of reflecting a hearing person's speech. This goal may be unrealistic as CS does not actually permit the deaf to audio-monitor their own speech. Conversely, this may identify a problem with the CS system. It could be argued that because CS illustrates phonemes, not allophones (phoneme variations), the deaf CS-exposed's speech may be consequently unnatural (Cruttenden 2001:245). For example, CS's representation of /t/ in 'must', 'talk' and 'better' would be identical, though in each case a distinct allophone of the phoneme /t/ would be expressed by a hearing person (in English, depending on accent). Therefore, the deaf CS-exposed could be disadvantaged by CS not conveying the complete auditory spectrum (Cruttenden 2001:245); this is yet to be investigated.

2.3.3 Cued Speech and Literacy Skills

Considering that speech perception appears to be positively affected by CS-exposure and that speech (phoneme) identification is the first stage of language processing leading to PA development, according to Stackhouse and Wells (1997), reports on CS's affect on literacy could be expected to be positive. This is apparent. Alegria et al (1989) reported that CS-exposed deaf children acquired reading skills at the same average age and developmental rate as hearing children. Moreover, Wandel (1989) concluded that CS-exposed deaf students achieved similar reading grades to hearing students, whereas non-CS-exposed deaf students scored significantly worse. Similar results were reported by Charlier (1992), Leybaert (1993), Perier et al (1988), Lechat and Leybaert (2001) and Leybaert and Alegria (1993).

Regarding CS-exposure and spelling, Leybaert and Alegria (1995) reported that CS-exposed deaf children perform similarly to hearing children in spelling tests, whereas

non-CS-exposed deaf children performed consistently below average. Similarly, Leybaert and Charlier (1996) concluded that CS-exposed deaf children achieved spelling skills at a similar rate and level to hearing children and more adequately than non-CS-exposed deaf children. The link between literacy development and CS-exposure developing PA was assumed in all of the studies concerning spelling and reading. Leybaert (1993), Kyllo-Larsen (2003) and LaSasso et al (2003) particularly stressed PA in their studies of literacy skills and CS.

2.4 Criticisms of Current Cued Speech Research

As the relevant research studies have similar methodologies and subject samples, the apparent wealth of data is actually limited. Some criticisms have already been stated in Chapter One. However, further discrepancies are evident. None of the researchers studied the CS-exposed subjects longitudinally. CS's effect in an isolated timeframe does not give any indication of when or how it is best to introduce the system to a deaf child or adult. Further, a lack of detail in the subjects' descriptions compromises insight into CS's effect depending on length and consistency of CS-exposure, other sign systems/languages used in conjunction with CS, how/when deafness occurred and the age of introduction.

Charlier and Leybaert (2000) did study the effect of preschool early versus preschool late CS use, concluding that the earlier the introduction and use of CS the more beneficial it is. Charlier and Leybaert (2000) found that the early group recognised and produced orthographically presented rhyming patterns more successfully than the late group and hearing peers. This suggests that the early CS group have the best PA (Stackhouse & Wells 1997). However, Charlier and Leybaert (2000) did not consider that the early CS users may have grasped the system earlier because PA was already

developed or developing (even better than hearing peers) allowing CS to be acquired, whereas the late users were late because PA had not developed, developed later or developed subsequently to CS-exposure.

Consequently, a further criticism of the relevant CS research arises. Despite the majority of studies comparing CS-exposed with non-CS-exposed deaf subjects, not one considers that the ability to understand and use CS (be CS-exposed) may be due to PA development prior to CS introduction, whereas non-CS-exposed are thus due to a lack of PA (Stackhouse & Wells 1997). The regularly drawn correlation between CS and PA may be an inverse correlation. This is feasible considering the inconclusive reports of whether the deaf can develop PA, regardless of CS (Beech & Harris 1997; Harris & Beech 1998). Longitudinal studies of PA before and after CS-exposure are therefore a greatly needed extension of the current research.

2.5 Cued Speech and Social and Emotional Stability

A further criticism of CS research is that the social and emotional effect of the system is not documented. Conversely, it has been well documented that BSL alleviates social exclusion and emotional expression inabilities experienced by the Deaf in the hearing world (Grant 1990; Brennan 1992; Ladd 2003; Kyle & Woll 1985; Sutton-Spence & Woll 1999). Though BSL's benefits are spectacular, outside of the Deaf community when BSL communication, perhaps, is not possible and where the social exclusion and emotional expression inabilities arise because the English language (in the UK) is dominant, there remains a social and emotional stability void in the deaf (RNID 2007a).

Siever (1997:270) and Bruce et al (2006:58) proposed that over half of UK deaf children feel socially excluded and unable to express emotions, which may lead to social and emotional disabilities, such as Attention Deficit/Hyperactivity Disorder (ADHD), a behavioural problem associated with poor attention span (Hindley & Kroll 1998:70). Furthermore, Owen and Blazek (1985:389) stated that the deaf's regular experiences of miscommunication, caused by inaccurate lip-reading for instance, are a source of frustration and aggression which triggers clinical behavioural difficulties (both emotional and social) in over 60% of the deaf. Therefore, the reported benefits of CS reducing miscommunication, whether through enhanced speech perception, greater literacy skills or more efficient voice production, suggests that CS could benefit the deaf's social and emotional stability, outside of the Deaf community.

Kipila (1985), Peterson (1991) and Berendt et al (1990) all report that CS enables deaf children to develop affective English language at an equivalent rate to hearing children. This research could be interpreted as indicating that CS alleviates emotional frustration, though this is not directly shown. CS complementing BSL could, perhaps, close the gap between the hearing and Deaf community (Dodd & Campbell 1987:30). Conversely, BSL could be more widely learnt by the hearing throughout the UK (RNID 2007c)

2.6 Arguments Against Cued Speech

Overall, CS appears advantageous for speech (perception, and production), literacy and, theoretically, social and emotional communicative ability. However, despite the reported advantages and success in other countries, CS has never been widely used amongst the UK deaf (RNID 2007b). LaSasso et al (2003:251) suggest that this is due to misconceptions that CS is designed to solely develop 'speech' instead of

representing societies' spoken languages. Conversely, critics of CS state that the system is boycotted because it is a representation of societies' spoken language (RNID 2007b).

Sutton-Spence (2007), for example, argues that BSL is the native language of the UK Deaf and that CS, encouraging native spoken language, challenges the historic and ongoing efforts to establish BSL as an independent language. This protest has been used as a justification for the lack of governmental support in reinforcing CS in UK education (UK Council on Deafness 2007). For instance, Maria Eagle (former Secretary of State for Health) declared that the government cannot meddle in the communicative choices of parents and schools of the Deaf or deaf because, even if a communicative system has great benefits, it will never succeed if opposed by the Deaf community (UK Council on Deafness 2007). Further, CS could affect the social stability of the Deaf negatively if BSL is sacrificed (Sutton-Spence & Woll 1999). Conversely, as mentioned previously regarding BSL, Hauser (2000) stated that CS is most effective when complementing American Sign Language (ASL).

The Cued Speech Association (2007) boasts that a major advantage of CS is its simplicity to learn, reporting that the system can be learnt by a complete novice in twenty hours. Parents of deaf babies potentially, therefore, can expose their child to their language via CS without delay, whilst BSL, a whole new language, is being learnt by the parent (RNID 2007c). CS could therefore diminish any associated language setbacks due to a lack of input (Dodd & Campbell 1987:30). However, The Cued Speech Association (2007) do assume that everyone can grasp the concept of phonemes and ignores that some parents whether deaf or hearing may not have adequate PA to be able to understand CS and pass it onto their children.

2.7 Summary

Research has shown that the deaf CS-exposed have advanced speech perception in comparison to the non-CS-exposed (Emmorey & Lane 2000; Uchanski et al 1994). It has been assumed that this is due to CS developing PA (Stackhouse & Wells 1997), thus justifying the further reports of CS-exposure and enhanced speech production (Kipila 1985; Perier 1990; Hage et al 1990) and literacy skills (Wandel 1989; Alegria et al 1989; Leybaert & Alegria 1995; Leybaert & Charlier 1996). There is currently no direct research regarding CS and its effect on social and emotional stability. CS opposition indicates that the system could be detrimental to the Deaf's social stability by demeaning BSL (Sutton-Spence 2007), whereas research into affective English language use via CS suggests that the system could benefit the deaf's emotional stability. Therefore, the present study aims to investigate the effect of CS on communicative ability (speech perception and production, literacy, as well as social and emotional stability) of deaf primary school children in the UK. Further, longitudinal studies, establishing PA before and after CS-exposure, are lacking in the current CS research; the present study will attempt to fill this void.

Chapter Three: Methodology

3.1 Introduction

A longitudinal case study, with a qualitative perceptive, was conducted to fulfil the aims of this investigation.

3.1.1 Background of the Cued Speech Exposure

At the start of this investigation the reception class teacher communicated with all the children through SSE primarily. CS was introduced by the teacher after the baseline assessments were conducted (the following week). CS introduction involved a fifty minute CS games lesson and CS specific interactions, such as announcing the timetable, everyday. Further, a member of The Cued Speech Association, once a month (three times during this investigation), taught the children CS for an hour. In the first of these sessions CS hand shapes and positions were introduced, the children learnt to cue names, select vocabulary and greetings (CS production). In the second session, the children were taught "cue-reading" (CS comprehension), identifying nouns such as people, animals and body parts presented in CS. In the third session, the children learnt to ask and answer questions in CS (comprehension and production).

3.2 Subjects

Four reception class children of a UK deaf school participated in this case study. All children had profound sensorineural deafness, which is an irreversible type of hearing loss occurring when the cochlear sensorineural element or the cochlear nerve is damaged (McCracken & Sutherland 1991:11). Two of the children were male (KK and TC) and two were female (JB and LJ) thus avoiding any gender bias in language development (Coates 2004:3). Age varies between children, though as each child was measured against their baseline score validity was not affected (Brinberg & McGraph

1985:94). JB and LJ were nine (Appendix 7.b-c), KK was eight (Appendix 7.a) and TC was six (Appendix 7.d) at the time of the assessments. Further information regarding aids to hearing, schooling and family are in Appendix 7 (blurred for confidentiality).

3.2.1 Consent

Consent was gained from each child's parents/guardians stating that the child could participate in this case study provided their initials were used maintaining confidentially (see Appendix 6.a). Parents were informed that they had a right to withdraw.

The children's language therapist (Appendix 6.b) and teacher (Appendix 6.c-d) gave consent for all assessments.

3.3 Pilot Study

A pilot study was conducted. All assessments are included in the "Pilot Study" booklet (Appendix 15). The Schonell reading and spelling test, used to assess literacy, was not in the pilot study because the children were already familiar with it. KK participated in the pilot study because there were limited children available (Schonell & Schonell 1952). The alterations made to assessments after the pilot study were significant enough to avoid KK having an advantage over the other children, a practise bias (Brinberg & Gareth 1985:19).

The speech (phoneme) perception test designed (Appendix 15) was too long and did not keep the interest of the child. Consequently, it was not completed (line 76-78, Transcription Two, Appendix 4).

76	**AR**	(3.0) >going to do:↑ a little bit↑< mo:re↓ (.hhh) because↑ loo:k	**KK looks through papers**
77		(10.0) ((mouths)) >have you had↑enou:gh↓< I:↑ <think you've	
78		done↑ rea:lly> we:↑ll↓	**(28.05)**

Following the pilot test, the test was shortened and pictures were used to maintain the child's interest ("Word to Picture" test). Sign and voice production in answers seemed appropriate to monitor (Transcription Two, Appendix 4 and Appendix 16). Considering the accommodation theory, it was assumed that the children would accommodate the assessor by answering questions in the same mode of communication that they were asked (Giles & Powesland 1975). KK did accommodate (Appendix 16). Therefore, speech perception and production were assessed, in the main study, through this test.

Once transcribed (Transcription One, Appendix 4), the spontaneous speech (utterance perception) test (Appendix 15), was deemed too difficult to score and, therefore, to compare from month to month. Consequently, the "Picture Interaction" test was designed, a more controlled method of monitoring utterance perception.

The child questionnaire was deemed too difficult for the children in the main study by their language therapist (Feedback, Appendix 17), therefore was not used. The teacher questionnaire was altered as a result to address emotional and social stability more directly, as in the main study it was the only assessment concerning social and emotional stability.

3.4 Main Study

All assessments are included in the "Case Study" booklet (Appendix 18). The children's classroom assistant carried out all assessments to avoid anxiety or investigator bias (Brinberg & McGraph 1985:94). Administrator instructions (and instructions to be read to the child) were supplied (Appendix 8.a-c). The "Word to Picture" and "Picture Interaction" tests (assessing speech perception and production) were conducted in the baseline (without CS presentation) and monthly for three months during CS-exposure. These tests were recorded (for the investigators reference only). Similar scoring to Templin (1957), counting correct versus incorrect, was used for both of these tests. The teacher questionnaire (assessing social and emotional stability) and Schonell reading and spelling tests (assessing literacy) were conducted in the baseline and three months after CS introduction, due to time constraints (questionnaire) and the school's policies (limiting literacy assessments). The equipment, protocol and data analysis of each assessment is detailed below.

3.4.1 Word to Picture Test

Appendix 9 shows an example of the "Word to Picture" test. This test consisted of six sections. The first section required distinction between two words with initial phonemes articulated in different places, for instance /s/ and /r/ in "soap" and "rain". The second section required distinction between two words with final phonemes articulated in different places, such as /p/ and /d/ in "grape" and "bird". The third and fourth sections required distinction between initial and final phonemes with the same place of articulation, for instance /f/ and /v/ in "fox" and "vet" (initial) and /d/ and /t/ in "rod" and "cat" (final). The fifth and sixth sections required distinction between initial and final phonemes with the same place of articulation in minimal pairs, such

as /p/ and /b/ in “pin” and “bin” (initial) and /t/ and /d/ in “seat” and “seed” (final). Both initial and final phonemes were targeted for distinction because stress on an initial versus a final phoneme is different possibly affecting perception (Cruttenden 2001:24). In each section there were three questions. Question one was mouthed. Question two was presented in SSE. Question three was presented in CS (not in the baseline). Words were alternated in each question’s sub-questions (i-ii, though i-iii in the baseline) and each month different words were used to avoid practise bias (Brinberg & McGraph 1985:131). The words were always one syllable nouns with a CV, in the initial target, and VC, in the final target, form (Roach 2000:10).

The child was presented with two pictures representing the two words in the relevant question. The child was asked to point to, sign and say the correct picture/word (presented appropriately by the assessor).

The answers were marked either correct or incorrect. Appendix 12.a shows an example of marking.

3.4.2 Picture Interaction Test

Appendix 10 shows an example of the “Picture Interaction” test. This test consisted of three questions. Question one was mouthed. Question two was presented in SSE. Question three was presented in CS (not in the baseline). Each question had six instructions/questions, such as “point to the dog” and “how many fish are there?”, relating to a picture. The picture changed each month to avoid practise bias (Brinberg & McGraph 1985:131), though the format of instructions/questions remained. For instance, in month three “dog” was replaced by “cat” and “birds” was replaced by

"fish", from the example above (month two) (Appendix 18). Colouring and graphite pencils were required.

The child was told to follow the instructions/questions (presented appropriately by the assessor). Therefore, the child answered questions about, coloured in, and pointed at the picture.

Each aspect of the instructions/questions was awarded a point if it was carried out correctly. For instance, if mouse not dog was pointed to, in the example above, one point for pointing would be awarded, though the second point for the correct animal would not. Appendix 12.b shows an example of marking.

3.4.3 Schonell Reading and Spelling Tests

Appendix 11 shows the Schonell reading (Appendix 11.b) and spelling (Appendix 11.a) tests. The children were presented with the tests to read or to spell the words before, and three months after, CS-exposure. The second spelling test was presented in CS.

The number of words in the first tests read and spelt correctly was compared with the number correct in the second tests. The Schonell tests calculate reading and spelling ages (Schonell & Schonell 1952) (see Appendix 11).

3.4.4 Teacher Questionnaire

Appendix 5 shows an example of the teacher questionnaire. There were ten questions regarding the teacher's perception of the children's communicative ability. The

question of interest was question nine, directly asking for perceived social and emotional stability (as shown below).

Question Nine: Do you feel that this child is…
a) emotionally stable? **b)** socially stable?

A five-point scale of options “always” to “never ” was used (as below) to give choice rather than a restricted yes/no option (Wray & Bloomer 1998:160).

Always	Nearly Always	Sometimes	Rarely	Never

The closed question allows direct comparison between the questionnaires (before and after CS-exposure). A section for elaboration was included.

One questionnaire per child was completed. The questionnaire was completed by the teacher before CS-exposure and three months after exposure. Comparison of the two questionnaires’ answers to question nine was interpreted as the children’s social and emotional stabilities improving, worsening or not changing. This depended on movement on the scale; up, down or none.

Chapter Four: Results

4.1 Word to Picture Test

4.1.1 The Effect of Phoneme Presentation: Lip-reading, SSE, CS

An improvement was found in phoneme perception across the four months of "Word to Picture" assessments. Considering the average scores*[2] of all four children (Fig.1), 70.7% in the baseline month, 84.7% in month four, an improvement of 14.0% is evident.

Fig.1

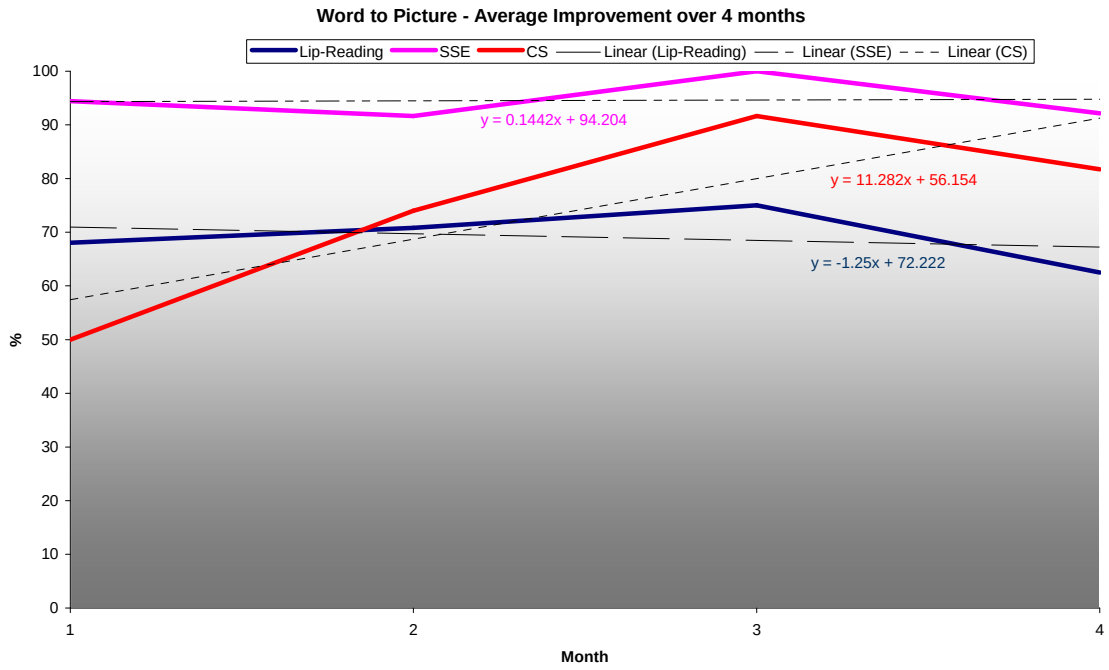


Fig.1 demonstrates that the greatest improvement of the phoneme perception was apparent when phonemes (words) were presented in CS. A gradient of y=11.28x (the incline rate of the line of best fit), shows the rate of improvement from a 50% chance score which had been assumed as the children were not tested in CS in the baseline assessment. The scores considering SSE presentation are consistent (slightly improving), with a gradient y=0.1442x. Lip-reading shows a decline in phoneme perception, gradient

*[2] *Average scores derive from figures in the Data Spreadsheet (Appendix 13)*

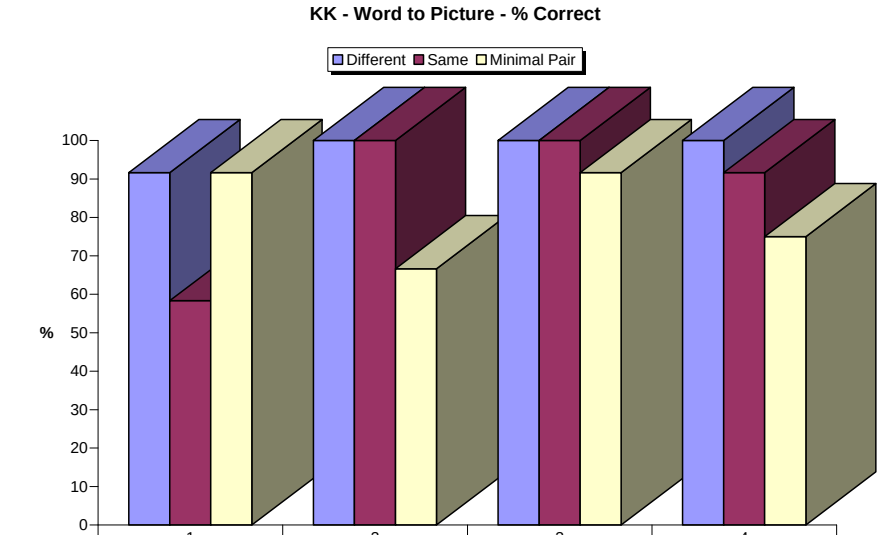
y=-1.25x. CS, after one month of exposure, was 2.8% more accurate than lip-read phoneme (word) perception.

4.1.2 The Effect of Phoneme Presentation: Place of Articulation

Considering the average scores of all four children regarding the "levels of difficulty" in phoneme perception according to the place of articulation, an improvement of 1.4% accuracy of phoneme perception is evident from the baseline score of 81.3% to the 82.7% scored in month four (Fig.2-5). The average score of distinguishing phonemes with a different place of articulation increased from 83.4% (baseline) to 91.7% (month four) (Fig.2-5). The average score of distinguishing phonemes with the same place of articulation increased from 75.0% (baseline) to 83.4% (month four) (Fig.2-5). Conversely, the average score of distinguishing phonemes with the same place of articulation in a minimal pair decreased from 85.5% (baseline) to 72.9% (month four) (Fig.2-5).

Results

Fig.2

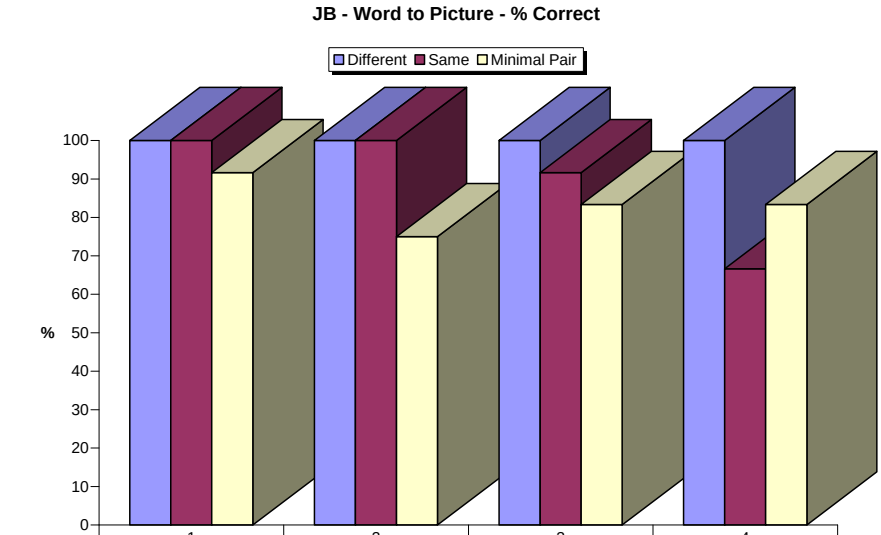


	1	2	3	4
Different	91.66666667	100	100	100
Same	58.33333333	100	100	91.66666667
Minimal Pair	91.66666667	66.66666667	91.66666667	75

Fig.2 shows that KK has improved phoneme perception since CS introduction, though not consistently, from an average baseline score of 80.6% to 88.9% in month two, 97.2% in month three and 88.9%, again, in month four. Different place of articulation phoneme distinction increased from 91.7% in the baseline to 100% in month two to four. The same place of articulation phoneme distinction increased from 58.3% to 97.2% in month two to four. The minimal pair phoneme distinction declined from 91.7% in the baseline to 77.8% in month two to four. The latter scores across the four months are inconsistent in comparison with the different and the same place of articulation scores.

Results

Fig.3

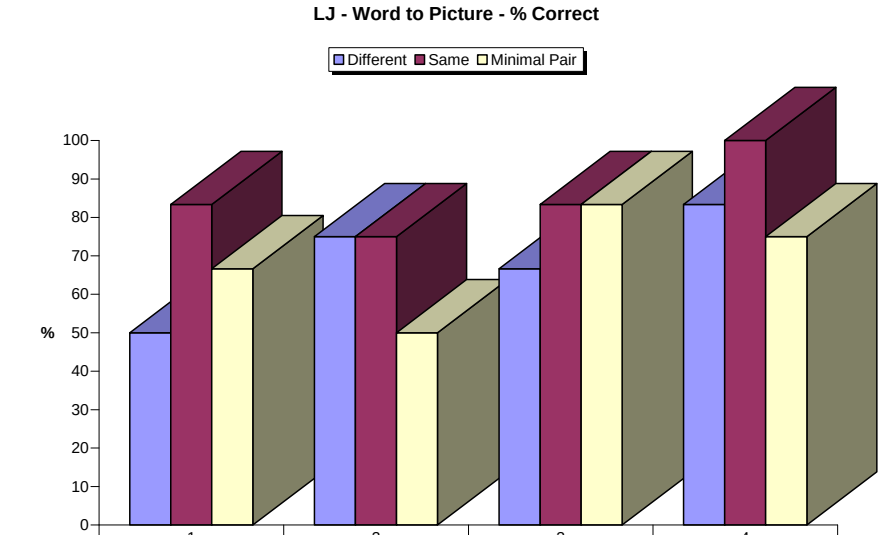


	1	2	3	4
Different	100	100	100	100
Same	100	100	91.66666667	66.66666667
Minimal Pair	91.66666667	75	83.33333333	83.33333333

Fig.3 shows that JB's score declined from the average 97.2% in the baseline month to 91.7% after three months of CS-exposure. The minimal pair phoneme distinction increased from 75.0% to 83.3% in month two to four (when CS presentation of questions was included). However, 83.3% remains 8.4% below the minimal pair baseline score (when lip-read and SSE presentation were solely included).

Results

Fig.4

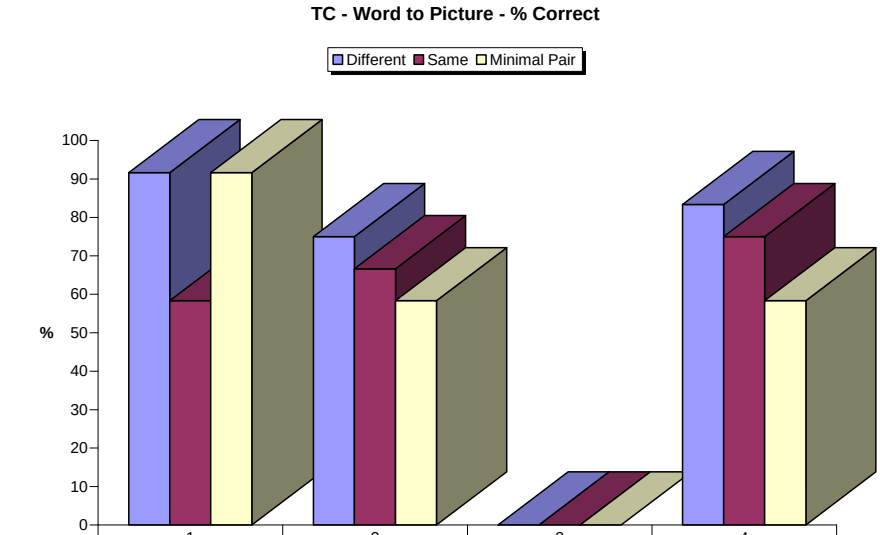


	1	2	3	4
Different	50	75	66.66666667	83.33333333
Same	83.33333333	75	83.33333333	100
Minimal Pair	66.66666667	50	83.33333333	75

Fig.4 demonstrates that LJ's phoneme perception improved over the four months. LJ scored an average of 66.7% in the baseline, 66.7% in month two, 77.8% in month three and 86.1% in month four. Between month two and four (CS presentation included) an improvement in all "levels of difficulty" is evident, 8.3% improvement for the different place of articulation and 25.0% improvement for both the same and the minimal pair phoneme distinction. The same place of articulation phonemes were most accurately distinguished considering the average score of the four months, 85.4%. The different place of articulation and minimal pair phoneme perception was equally less accurate with a 68.8% average.

Results

Fig.5



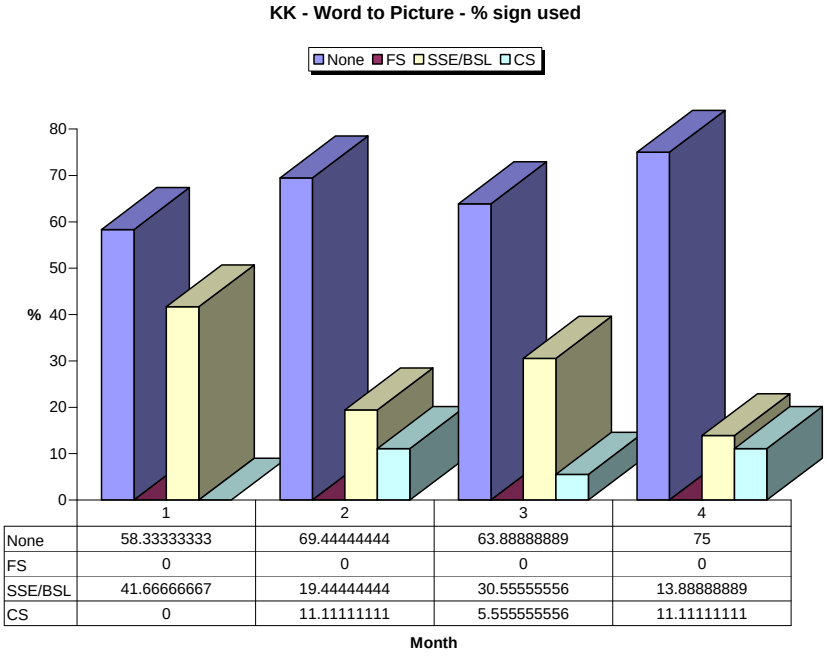
	1	2	3	4
Different	91.66666667	75	0	83.33333333
Same	58.33333333	66.66666667	0	75
Minimal Pair	91.66666667	58.33333333	0	58.33333333

Fig.5 shows that TC improved in the months when CS presentation was included in the assessment from an average accuracy of 66.7% to 72.2%. However, a decline from the 80.6% average score in the baseline is evident. Both of the different and the same place of articulation phoneme distinction accuracy improved by 8.3%, whereas the minimal pairs' score remained 58.3%, from month two to month four.

4.1.3 Mode of Communication in Answering Questions

A third of the "Word to Picture" test questions in months two to four were presented using no sign (lip-read), a third were presented using SSE and a third were presented using CS. The children's responses did not emulate the segmented mode of communication (Fig.6-9). BSL was used in some instances, primarily by LJ and TC.

Fig.6

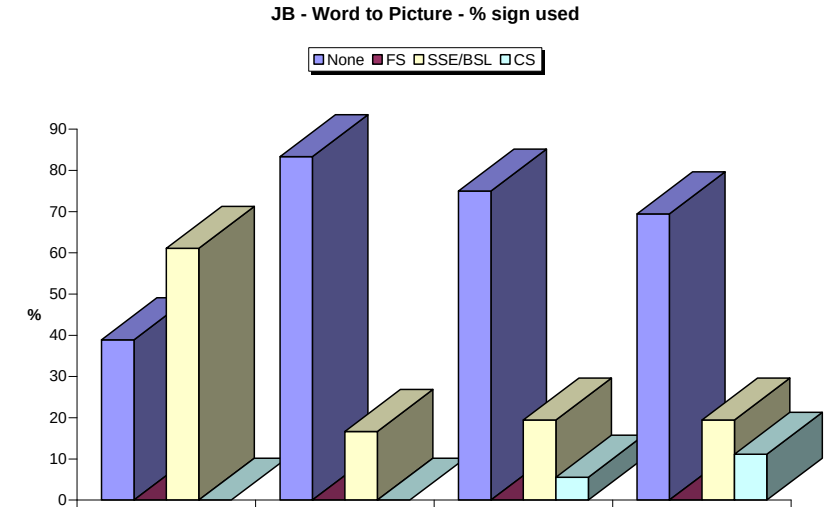


	1	2	3	4
None	58.33333333	69.44444444	63.88888889	75
FS	0	0	0	0
SSE/BSL	41.66666667	19.44444444	30.55555556	13.88888889
CS	0	11.11111111	5.555555556	11.11111111

Fig.6 shows that KK used CS an average of 9.2% across the three months of which the children were CS-exposed. Comparatively, SSE was used in 21.3% of answers for those months.

Results

Fig.7

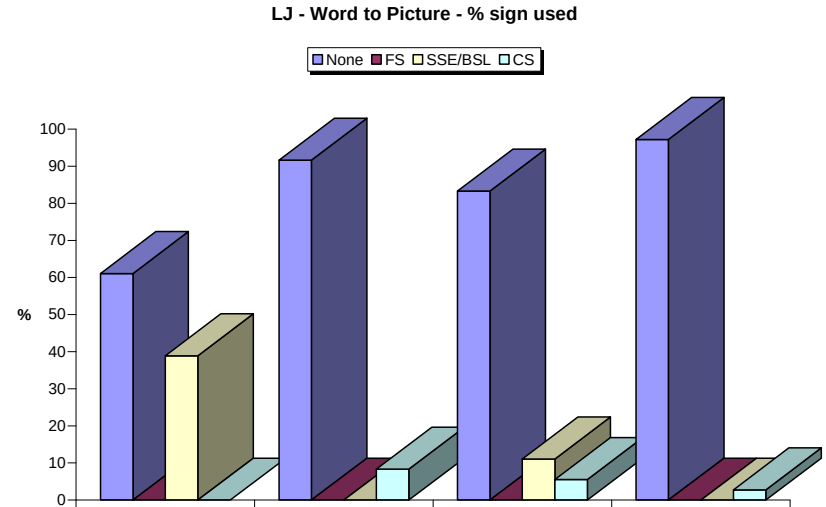


	1	2	3	4
None	38.88888889	83.33333333	75	69.44444444
FS	0	0	0	0
SSE/BSL	61.11111111	16.66666667	19.44444444	19.44444444
CS	0	0	5.555555556	11.11111111

Fig.7 shows that JB increased use of CS to answer questions from 0.0% in month two to 11.1% in month four. SSE's use was reduced from the baseline, 61.1%, to month four, 19.4%.

Results

Fig.8

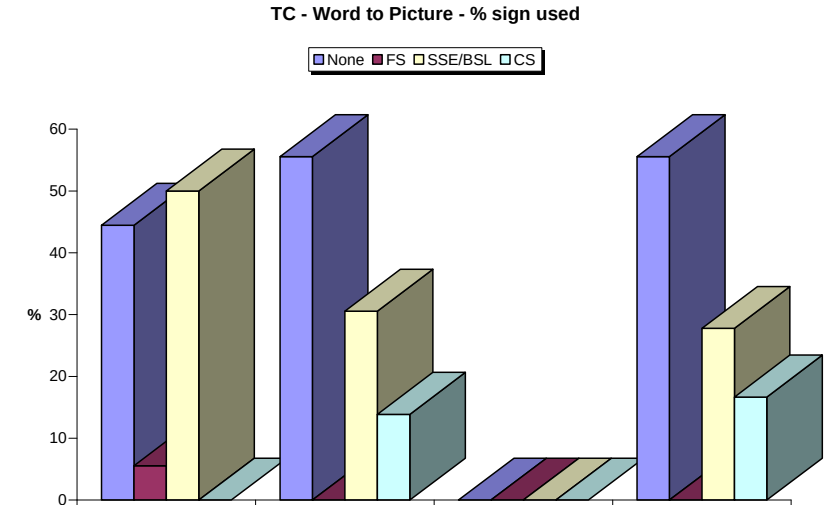


	1	2	3	4
None	61.11111111	91.66666667	83.33333333	97.22222222
FS	0	0	0	0
SSE/BSL	38.88888889	0	11.11111111	0
CS	0	8.333333333	5.555555556	2.777777778

Fig.8 shows that LJ answered using CS mostly in the first month of exposure, 8.3%, reducing use by 2.8% each month. BSL was only used in the baseline and in month three, otherwise CS or nothing (pointing) was used.

Results

Fig.9



	1	2	3	4
None	44.44444444	55.55555556	0	55.55555556
FS	5.555555556	0	0	0
SSE/BSL	50	30.55555556	0	27.77777778
CS	0	13.88888889	0	16.66666667

Fig.9 shows that TC increased answers given in CS by 2.8% from month two, when CS-exposure began, to month four. BSL production was reduced by an equal 2.8% from month two to four, though from the baseline BSL production was reduced by 22.3%.

Tab.1

Production of Voice

	Month One	Month Two	Month Three	Month Four
KK	41.7	33.3	33.3	11.1
JB	52.8	36.1	30.6	80.6
LJ	36.1	16.7	11.1	0
TC	41.7	0	-	0

Tab.1 shows the children's production of voice over the four months. The average of all children's voice production in the baseline, 43.1%, reduced by 20.2%, to 22.9% in month four, over the three months of CS-exposure.

4.2 Picture Interaction Test

Considering the average scores of all four children in the "Picture Interaction" assessments (57.3% in the baseline month, 47.2% in month two, 58.3% in month three and 54.9% in month four), a decline in accuracy by 2.4% across the four month is evident (Fig.10-13). However, an improvement of 4.4% is evident considering the average score when utterances were presented in CS, increasing from 33.3% accuracy in month two to 37.7% accuracy in month four (Fig.10-13).

Fig.10

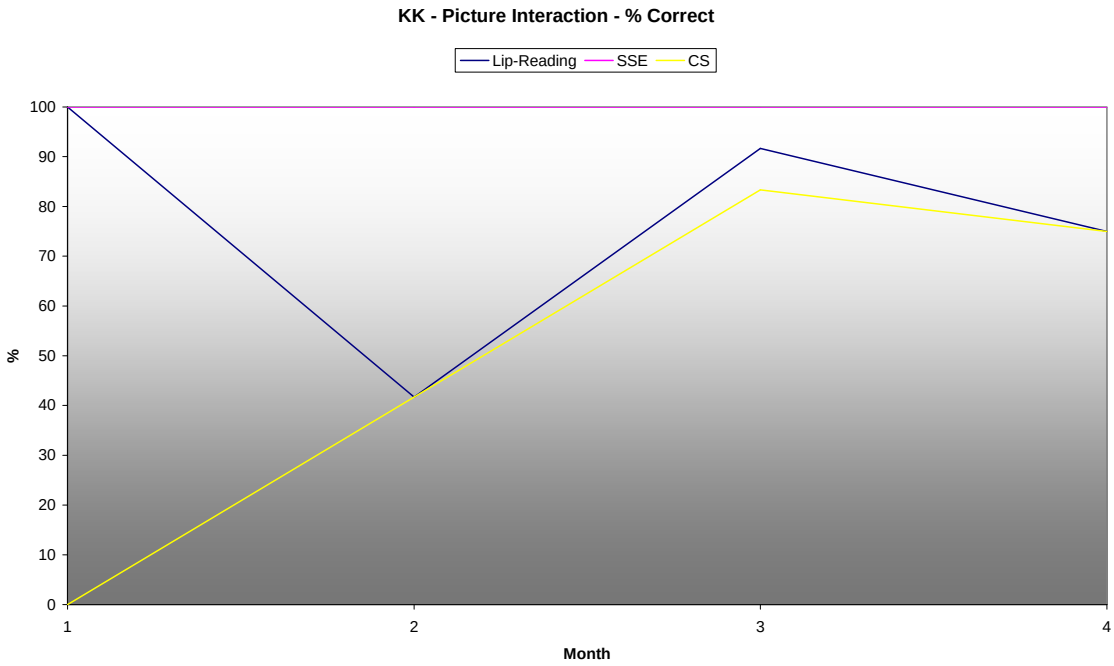


Fig.10 shows that KK followed all instructions correctly in the baseline assessment whether presented with SSE or without any sign (lip-read). In month two, when CS instructions were included, the percentage of lip-read instructions answered correctly decreased to 41.7%, equal to the percentage correct when instructions were presented in CS. Though lip-reading and CS increased to 91.7% (lip-read) and 83.3% (CS) in month three, accuracy in month four declined to 75.0% for both presentations.

Results

Fig.11

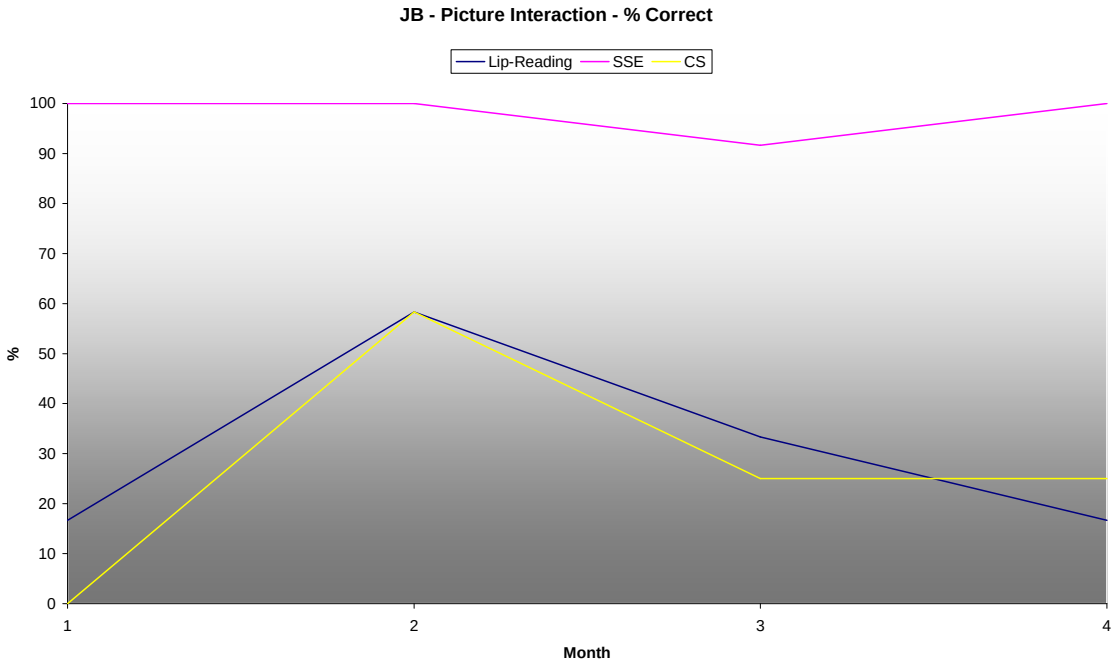


Fig.11, similarly, demonstrates that JB's perception of SSE was 100% (mode score) accurate. Dissimilarly to KK, JB's lip-reading in the baseline assessment was 16.7%. Lip-reading increased in accuracy, to 58.3%, equal to CS presented instruction accuracy, in month two. As evident in Fig.10, Fig.11 shows a decline in lip-reading at month four, in this instance to 16.7%; equal to the baseline score. JB's accuracy when instructions are presented in CS is 9.0% higher than when lip-read.

Results

Fig.12

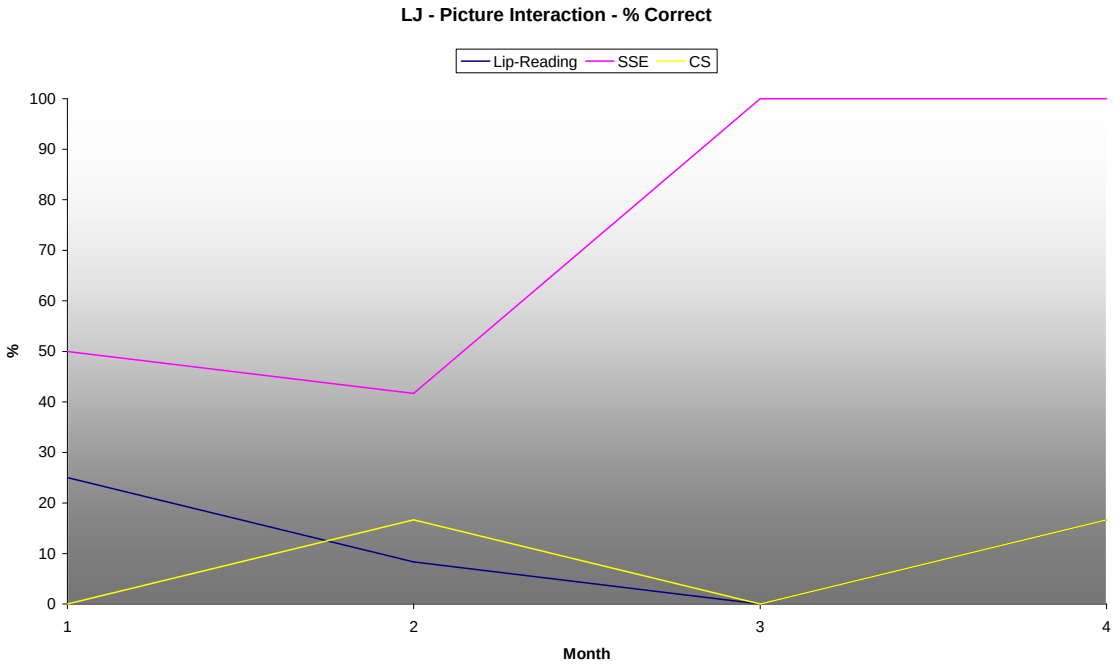
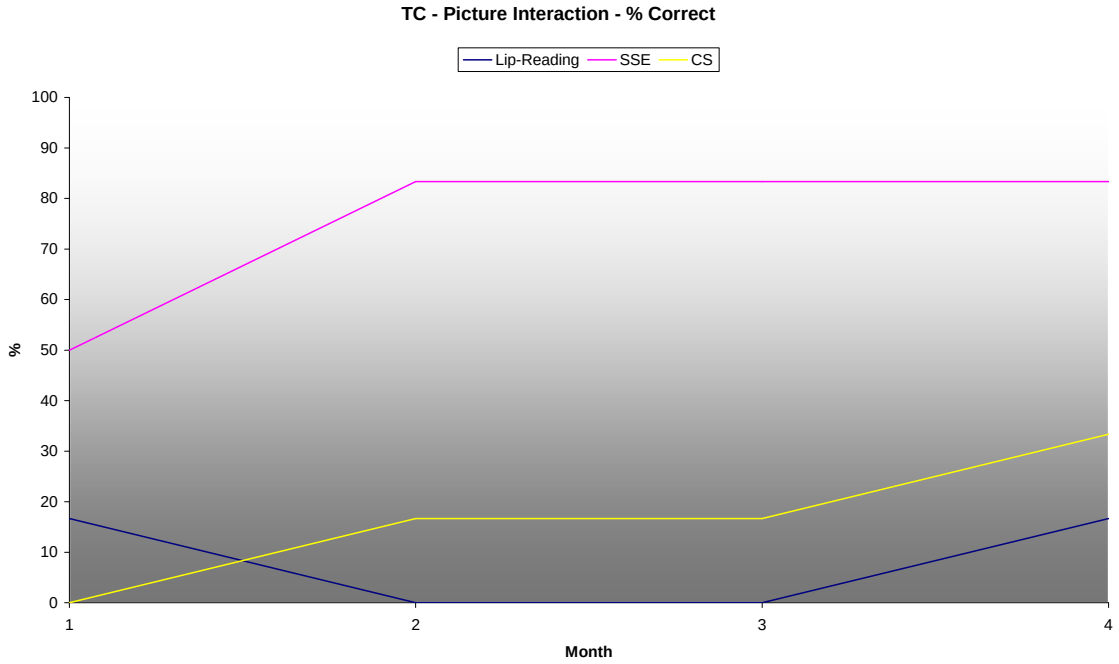


Fig.12 shows that LJ increased accuracy from 50.0% to 100%, over the four months, if instructions were presented in SSE. Lip-read instructions reduced in accuracy from 25.0% to 16.7%, equalling the percentage correct in month four when presented in CS. Overall, the percentage of instructions followed correctly by LJ in the baseline (before CS-exposure) was 37.5% compared with 44.5% in month four (three months of CS-exposure).

Results

Fig.13



Due to TC's absence in month three, month two's points have been plotted twice to maintain the trend of development in Fig.13. TC, similarly to LJ, improved SSE accuracy from 50.0% in the baseline to 83.3% in month four. In month two and four CS accuracy remains 16.7% above lip-read accuracy in utterance perception. From month two to month four CS accuracy increased by 16.7% whereas from the baseline to month four lip-read accuracy remained consistent.

4.3 Literacy Skills

75% of the children improved literacy skills over the three months of CS-exposure, 25% showed no change (Tab.2-5). The percentage of improvement (Tab.3 and 5) was calculated by dividing the difference in the number correct in month one to four by the number correct in month four.

4.3.1 Reading Ability

Tab.2

Schonell Reading Skills: Number of Correctly Read Words

	Before CS-exposure	After CS-exposure
KK	20	36
JB	8	10
LJ	1	3
TC	0	0

Tab.3

Schonell Reading Skills: Improvement of Correctly Read Words

	% Improvement over 4 months
KK	44.44
JB	20.00
LJ	66.67
TC	0.00

Tab.2 and 3 indicate that reading ability of KK, JB and LJ increased by an average of 43.7% from their baseline score.

4.3.2 Spelling Ability

Tab.4

Schonell Spelling Skills: Number of Correctly Spelt Words

	Before CS-exposure	After CS-exposure
KK	10	44
JB	8	11
LJ	0	1
TC	0	0

Tab.5

Schonell Spelling Skills: Improvement of Correctly Spelt Words

	% Improvement over 4 months
KK	77.27
JB	27.27
LJ	100.00
TC	0.00

Similarly, Tab.4 and 5 demonstrate that spelling ability of KK, JB and LJ increased by an average of 68.2% from their baseline ability. Therefore after three months of CS spelling improved 25.5% more than reading.

4.4 Teacher Questionnaire

Tab.6

Teacher's Perceived Improvement in Child's Stabilities

	Improved	No Change
emotional stability	100%	0%
social stability	100%	0%

Tab.6 shows that the teacher perceived all of the children to have improved socially and emotionally over the three months of CS-exposure.

4.5 Summary

The main findings were that, firstly, phoneme perception improved over the four months of assessments, considering that the average "Word to Picture" test score of the four children's improved by 14.0%. Secondly, utterance perception, considering the children's average score (month one to four), decreased by 2.4%, though considering the CS presentation average (month two to four) an improvement of 4.4% is evident. Thirdly, literacy skills improved by 42.0% considering the average of all four children's improvement of spelling and reading combined. Finally, the teacher perceived social and emotional stability improvement for all children.

Chapter Five: Discussion

5.1 Did Phoneme Perception Improve?

The average score of all the children and the average of the three modes of communication of which the words (phonemes) were presented (SSE, CS and lip-read) showed an improvement of 14.0% for phoneme perception ("Word to Picture Test") from the baseline to month four (Fig.1). When presented in CS phoneme perception improved the most, with a gradient of y=11.282x (Fig.1). Perception of phonemes in CS remained below perception of phonemes/words in SSE, by 8.3% in month three and 10.4% in month four (Fig.1). This difference did reduce, from CS being 17.7% less accurate in month two (a month after CS introduction) (Fig.1). SSE is likely to be the most accurate as this is the system that the children were most familiar with in school, particularly in assessments (Feedback, Appendix 16).

Lip-read (mouthed by the assessor with no sign) presentation of phonemes/words achieved least accuracy, perhaps illustrating the unfamiliarity of the English language (lip-reading English phonemes). The lip-read presentation was 3.2% less accurate than CS in month two, and 19.2% less accurate in month three and four (Fig.1). Fig.1 shows that CS-exposure reduced lip-read phoneme accuracy, with a gradient of y=-1.25x, contrary to Uchanski et al's (1994:39) reports that CS-exposure aids lip-reading even without CS accompaniment. This contradiction may be because the children were becoming dependent on the complementary hand shapes and positions of CS. Though, Uchanski et al's (1994:39) subjects were "highly trained receivers of CS", whereas this investigation's children are in the beginning stages of learning CS.

The average (subject score and three signs combined) accuracy of phoneme perception considering the place of articulation, different (easy), same (difficult),

minimal pairs (very difficult), improved from the baseline by 8.3% regarding different place of articulation phonemes' distinction and by 8.4% regarding the same place of articulation phonemes' distinction whereas minimal pairs' distinction declined in accuracy from 85.5% in the baseline to 72.9% in month four (Fig.2-5). However, considering CS presentation the average accuracy of all children's phoneme perception in months two to four was consistently high, 91.2% (Different), 97.1% (Same) and 92.6% (Minimal Pair) (Fig.2-5), the latter scores indicate that CS does represent the visually similar phonemes successfully.

The accommodation theory would suggest that in the "Word to Picture" test the children would answer in the mode that the phoneme/word to distinguish was presented (a third in SSE, CS and lip-read) (Giles & Powesland 1975:157). This was not apparent (Fig. 6-9). Moreover, SSE and BSL was reduced from month two (22.3%) to month four (15.3%) by 7.0% and voice production (equivalent to the lip-read presentation) reduced from 43.1% to 22.9% (by 20.2%) (Tab.1). CS increased from 8.3% to 16.7% (by 8.4%). The teacher's feedback sheet suggested that the children made progress with CS, "KK has confidently and rapidly grasped the concept of cued speech", "TC attempts to copy all hand movements", "JB can hesitantly though accurately use CS" and "LJ has become more aware that lip-patterns hold information" (Appendix 14), these comments do primarily regard comprehension more than production.

The reduced use of voice opposes the findings by Perier (1990), Hage et al (1990) and LaSasso and Metzger (1988). These studies investigated non-CS-exposed versus CS-exposed subjects' use of voice without entertaining the opposition to CS. For instance, Sutton-Spence (2007) argues that CS-exposure and use of voice (the English

language) demeans sign language. It may be the choice of the non-CS-exposed to be non-CS-exposed to avoid using the English language which CS conveys. Thus voice, using English language in speech, would also be avoided. Consequently, an inaccurate conclusion may have been drawn that lesser voice production in the non-CS-exposed was due to inhibitions as a result of monitoring inability (Perier 1990; Hage et al 1990; LaSasso & Metzger 1988).

One out of the four children did increase voice production, JB, from 52.8% in the baseline to 80.6% in month four (Tab.1). Although JB pronounced the initial consonant and vowel accurately throughout the assessments, the production of final consonants improved over the three months of CS-exposure (Appendix 19-22). Final consonants in monosyllabic words are less stressed in the English language and therefore more subtle when lip-read (McCracken & Sutherland 1991:70). CS-exposure therefore, arguably, has increased JB's phoneme perception, subsequently increasing phoneme production (Stackhouse & Wells 1997). This is particularly evident considering that JB's voice production was 11.1% more accurate when questions were presented in CS rather than lip-read or SSE (Appendix 19-22). This remains speculation as PA cannot be directly observed.

5.2 Did Utterance Perception Improve?

Phoneme perception in connected speech (utterance perception) ("Picture Interaction" test), did not appear to improve as consistently as in single words ("Word to Picture" test). The average scores of all the children in all modes of communication (Fig.10-13) demonstrated that accuracy reduced by 10.1% in month two from the baseline, then increased by 11.1% (1% higher than the baseline) in month three, then reduced again by 3.4% (2.4% under the baseline score) in month four (Appendix 23-26). KK's

100% accuracy for both SSE and mouthed (lip-read) presentations of instructions (utterances) in the baseline was reduced to 41.7% accuracy for lip-reading though SSE remained 100% accurate in month two (Fig.10). Lip-reading equalled the accuracy of CS possibly indicating that lip-reading becomes dependent on CS (Fig.10). LJ (Fig.12) and TC (Fig.13) also initially reduced accuracy of lip-reading. Conversely, JB, in month two, raised lip-reading accuracy from 16.7% in the baseline to 58.3%, equal to the accuracy of CS (Fig.11). However, CS presentation of instructions' accuracy increased considering the average scores, 33.4% accuracy in month two to 37.5% in month four (Fig.10-13, Appendix 13). Thus reflecting the findings of Emmorey and Lane (2000) that CS aided speech perception.

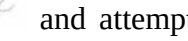
As suggested in Chapter Two a potential deficit of CS is that the system does not illustrate allophones, only phonemes. It is possible that this deficit affected speech (utterance) perception because connected speech has more allophones than the pronunciation of isolated single words (Roach 2000:41). This justifies an overall phoneme perception improvement in the "Word to Picture" test of 14.0%, simultaneously to the decline of 2.4% considering the average scores between the baseline and month four (Fig.10-13) in the "Picture Interaction" test. For instance, "dog" in the "Word to Picture" test is articulated as /dɒg/ either in "dog" (as the administrator presented the word, on the DVD's of assessments which are not appended due to confidentiality) or "point to the dog" (Section C, Appendix 20), whereas "dog" in the "Picture Interaction" test, "colour the dog in yellow" (Appendix 26, DVD as above), was articulated as /dɒgˀ/ (/g/with no audio release) (Cruttenden 2001:166). The latter of which was only correct once (25% correct in its overall presentation) by one child (Appendix 26) whereas the former was correct by all

children at least twice (overall 81.3% correct) (Section C, Appendix 20). Conversely, it is likely that more information, at a faster pace, in connected speech, caused less accuracy (Cruttenden 2001:259).

5.3 Did Literacy Improve?

75% of subjects improved literacy skills, 25% showed no change, over the three months of CS-exposure (Tab.2-5).

5.3.1 Spelling

Though six-year-old TC (the youngest child, Appendix 7) scored zero on the spelling test an improvement was evident (Appendix 27-28). In the first spelling test TC drew a bag  for "bag" and the numeral "10"  for "ten" (Appendix 27) whereas in the second spelling test TC produced letters  possibly suggesting that the arbitrary link between sound-letter (phoneme-grapheme) has been achieved in the three months of CS-exposure (Appendix 28) (Frith 1980, cited in Frith 1980:504). Similarly, LJ's logical representations of "bag"  and "ten"  , as well as "mat"  and even "in" as the BSL sign for "in", one hand moving under another  (McCracken & Sutherland 1991:90) (Appendix 27), progressed to spelling "see"  and attempting "cut"  , "cu", three months after CS-exposure (Appendix 28). This shows that LJ has grasped the arbitrary spelling concept and also "cu" (a grapheme representation of the first two phonemes of the target) may indicate awareness of words being made of phonemes (building blocks). This is, possibly,

because CS demonstrates the link between speech (English phonemes) and spelling (grapheme), to an extent (Henderson & Chard 1980, cited in Frith 1980:92), dissimilarly to the unconnected leap from signs (McCracken & Sutherland 1991:90).

LJ's spelling improved by 100% (Fig.5). Stackhouse and Wells' (1997) model (Appendix 3) would suggest that this improvement is due to "orthographic program", the concept of the written word in the mind (an aspect of PA), developing subsequently to improved "peripheral auditory processing", because CS visually presents phonemes (Cornett & Daisey 1992:2). Both LJ and TC have therefore progressed from the initial stage of learning to write (spell), understanding the "sign concept", conveying meaning through pictures, to the "pre-phonic" stage (Bradley & Bryant 1983). TC, in the "pre-phonic" stage, has realised that letters are the convention of conveying a message in writing (spelling) and LJ has rote-learnt select adult-like words (Bradley & Bryant 1983).

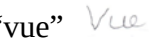
JB's spelling improved from the baseline to month four by 27.3% (Fig. 5). In the baseline spelling test JB wrote "hat" for both spelling number 6, which was meant to be "bag", and 8, which was "hat" (Appendix 27). This error was made despite signs and all phonemes places of articulation being distinct in these words, therefore they could not have been lip-read incorrectly (McCracken & Sutherland 1991:91). Instead, this error may suggest that the spellings were rote-learnt and consequently the order was muddled. Further, there appears to be no attempt to "sound out" words, for instance "with" is spelt "wnth"  , /ɪ/ in /wɪθ/ (with) is never represented by "n" in the English language (Appendix 27).

Conversely, three months after CS-exposure, JB produced phonetic spellings, sound-to-letter rules, indicating PA development (Henderson & Chard 1980, cited in Frith 1980:111). For instance, JB spells "mouth" as "mof"  , in which the /θ/ (dental fricative phoneme) is presented as "f", a common phoneme-grapheme error, in early development (Henderson & Chard 1980, cited in Frith 1980:111) (Appendix 28). Further, JB (similarly to LJ) may show awareness of words consisting of "building blocks" (PA) after CS-exposure through writing/spelling initial letters when the whole spelling is unknown, for instance "m"  for "might" and "p"  for "pie" (Appendix 28) (Bradley & Bryant 1985).

JB has, arguably, progressed from the "pre-phonic" stage of spelling, rote-learnt spellings, reflecting adult spellings but not actually comprehended (Bradely & Bryant 1983). However, in the second spelling test, JB displayed a mixture of "early phonic", some "phonetically sounded out" words such as "mof", with some rote-learnt spellings remaining, possibly suggesting that JB was between the "pre-phonic" to "early phonic" stages (Appendix 28).

KK also phonetically spelt words, for instance "with"  similarly had the phoneme-grapheme error, "f", (Appendix 27). However, unlike JB, this error occurs in the initial spelling test possibly suggesting that KK had PA prior to CS-exposure, unlike the other children (Henderson & Chard 1980, cited in Frith 1980:111). The "h" in this example may indicate that KK had rote-learnt the spelling to some extent realising that "f" for /θ/ is not correct (Henderson & Chard 1980, cited in Frith 1980:111). Therefore, KK may be in the "transitional spelling" stage in which a "sound error" or "word store error" produced "wifh" (Bradley & Bryant 1983).

Conversely, this stage typically is arrived at, in hearing children, by the age of seven, therefore as the spelling age that KK achieved was 5;6 according to the Schonell Spelling Test (Schonell & Schonell 1952, Appendix 11.a), it is more likely that similarly to JB, this error indicates the "early phonic" stage, typically reached by age five (Bradley & Bryant 1983). As this error could be produced in both the "early phonic" and the "transitional spelling" stage, the stages are therefore not as clear-cut as Bradley and Bryant (1983) suggest. This may be because the stages did not consider the deaf.

Since CS-exposure KK's spelling age increased to 9;4 (Appendix 27), thus improving by thirty-six months in three months of CS-exposure. KK's ability to spell irregular words such as "headache"  "ch" rather than the regular "k" to represent /k/ is combined with phonetically spelt words, for instance "view" spelt as "vue"  , a phoneme-grapheme error as /u:/ can also be represented as <ue>, such as "true", as well as the <iew> in this example (Frith 1980, cited in Frith 1980:497). This may suggest that KK reached the "orthographic spelling" stage in which increased word store and letter-sound strategies are present alongside irregular words awareness (Bradley & Bryant 1983). "Orthographic spelling" is typically achieved by age 9, therefore KK's spelling age, 9;4 (Schonell & Schonell 1952), supports the assumption that KK is in this stage (Bradley & Bryant 1983).

The findings above comply with Leybaert and Alegria's (1995) reports that CS-exposure improves spelling ability.

5.3.2 Reading

Considering the average of all of the children's progress, reading improved by 43.7% (Tab.3). This is 25.5% less than spelling's average improvement (Tab.5). This may be due to the phonological strategy (PA) for spelling, in non-disabled children, being acquired prior to the equivalent strategy for reading, thus three months of CS-exposure may have not developed PA enough to aid reading as much as it has spelling (Bradley & Bryant 1985). PA is relevant initially in spelling as PA spelling techniques are subsequently linked to breaking down print for reading (Bradley & Bryant 1983). This supports the assumption that CS-exposure develops PA as theorised in Chapter Two. Further, the development of PA in literacy similarly to hearing children may suggest that CS-exposure allows deaf children to develop literacy in similar phases as hearing children would (the deaf's literacy is developmental not deviant) (Atkinson & McHanwell 2002:205).

TC did not make any progress between the reading tests (Tab.3). KK improved by 44.4% (20 to 36 correct words) (Tab.2 and 3) and progressed from a reading age of 7;4 to 8;6 (Appendix 29-30). JB improved by 20.0% (8 to 10 correct words) (Tab.2 and 3) and progressed from a reading age of 6;7 to 6;9 (Appendix 29-30). Finally, LJ improved by 66.7% (1 to 3 correct words) (Tab.2 and 3) and progressed from a reading age of under 6;0 to 6;2 (Appendix 29-30). Therefore in three months of CS-exposure an average improvement of 4.5 months (average of all four children) is apparent (Schonell & Schonell 1952).

The overall improvement complies with the results found by Alegria et al (1989), that CS-exposure develops reading skills. Moreover, KK's score of 8;6 (equal to his chronological age) (Appendix 7.a) on a test designed for the hearing (Schonell &

Schonell 1952) indicates that CS-exposure improved reading ability to be equal to that of hearing peers, thus reflecting the findings of Wandel (1989). However, as the other three children were not reading to their chronological ages (Appendix 7.b-d), CS-exposure and reading equivalent to hearing peers cannot be generalised, contradicting Wandel (1989). Rather, Webster's (1986:200) suggestion that those with a profound hearing loss rarely read beyond the ability of nine-year olds, similarly to the statement by The Royal National Institute for the Deaf (RNID) that "The majority of deaf adolescents still leave school with a reading age of nine" (RNID 2007a), appears accurate, particularly as both JB and LJ were nine-years old at the time of the assessments (Appendix 7.b-c).

Overall CS-exposure did improve literacy (reading and spelling). Thus the findings are similar to Leybaert's (1993), Perier et al's (1988) and Leybeart and Charlier's (1996) results.

5.4 Did Phonological Awareness Improve?

Improvement of PA has been assumed in section 5.1-5.3. Over three months of CS-exposure phoneme perception improved by 14.0% (overall when CS was introduced) (Fig.1), utterance perception increased by 4.4% (when utterances were presented in CS) (Fig.10-13) and literacy improved by 42.0% (considering the average of all children and reading and spelling combined) (Tab.2-5). Therefore, speech perception improved alongside literacy leading to the assumption that PA improved (Stackhouse & Wells 1997). An assumption is made because PA development can only be shown through related skills (reading and spelling, for instance) as it is not directly observable (Bradely & Bryant 1983). PA development is further apparent considering that the greatest phoneme perception improvements were made by KK, with an

average score of 88.9% from 80.6% (Fig.2), and by LJ, with an average score of 86.1% from 66.7% (Fig.4), and that KK and LJ also improved the most in literacy skills (Tab.2-5) (Stackhouse & Wells 1997).

Leybeart (1993), Alegria et al (1989), LaSasso et al (2003) and Leybeart and Charlier (1996) similarly assumed that CS-exposure developed PA. Therefore, arguably, assuming that visual input can substitute auditory input as Cornett (1967) hypothesised (cited in Cornett & Daisey 1992:6). This is contrary to those that argue that PA cannot be developed in the deaf (Merrills et al 1994; Waters & Doehring 1990). Further, CS-exposure appears to not be necessarily needed to develop PA. Prior to CS-exposure KK seemed to have PA (Appendix 27). This was possibly because KK was the only non-congenitally deaf child (contracting meningitis at two days old) (Appendix 7.a). KK, therefore, had access to sound once unlike the others (McCracken & Sutherland 1991:14). Though KK's progress was more rapid than the others, PA is not necessarily needed to be able to learn CS (Appendix 14). CS-exposure, however, does appear to be required in PA development of the congenitally deaf; TC, LJ and JB (Appendix 7.b-c).

5.5 Did Emotional and Social Stability Improve?

In the teacher questionnaire (Appendix 31-32) the children's teacher perceived all of them to have made an improvement socially and emotionally over the three months of CS-exposure (Tab.6). Owen and Blazek (1985:389) indicated that the deaf regularly experience miscommunication causing frustration and aggression which triggers emotional and social difficulties. Therefore, it can be suggested that the developing PA causing less miscommunication, whether through improved speech perception (words or utterances) or literacy skills, is the catalyst of the perceived social and

emotional stability improvement. Therefore Dodd and Campbell's (1987:30) suggestion that speech perception (the auditory impairment of the deaf) extends to emotional and social difficulties is apparent; by alleviating the impairment with CS, emotional and social stability improved (Tab.6).

There does seem to be a link between speech perception and literacy, and emotional and social stability. Those that were emotionally/socially stable "nearly always" in the initial teacher questionnaire (before CS-exposure) had the best phoneme and utterance perception and literacy skills in the baseline assessments, KK and JB (Appendix 31). Those that had the lowest scores (TC and LJ) were less socially and emotionally stable (Appendix 31-32). Conversely, it may be that speech perception and literacy abilities of the children affected the teacher's perception (Appendix 31-32).

KK increased from "nearly always" socially stable to "always" and "sometimes" emotionally stable to "nearly always" (Appendix 31-32). JB was deemed "nearly always" emotionally and socially stable and then rose to "always" (Appendix 31-32). Comparatively, LJ and TC, prior to CS-exposure, were both marked at the lower end of the scale (Appendix 31), possibly indicating that Siever's (1997:270) and Bruce et al's (2006:58) proposal, that over half of UK deaf children feel socially excluded and unable to express emotions, is apparent. However, after three months of CS-exposure LJ increased from "rarely" emotionally and socially stable to "sometimes" stable, and TC increased from "never" socially stable to "sometimes" and from "sometimes" emotionally stable to "nearly always" (Appendix 31-32). This shows that there is a strong relationship between perceived social and emotional stability because answers are equal for the two stabilities for JB and LJ on each questionnaire and only one position on the scale different for KK (Appendix 31-32).

5.6 Summary

Over the three months of CS-exposure phoneme perception improved by 14.0% (across all modes of communication) (Fig.1) and utterance perception improved by 4.1% (when presented in CS) (Fig10-13) parallel to literacy improving by 42.0% (combined spelling and reading averages) (Tab.3 and 5). It has been assumed that the parallel improvements are due to the three months of CS-exposure developing PA (Stackhouse & Wells 1997). Subsequently, 100% emotional and social stability improvement (Tab.6) was assumed to be the result of improved phoneme and utterance perception and literacy skills (due to PA) (Stackhouse & Wells 1997).

These assumptions throughout are validated by LJ's progress in communicative ability (Appendix 14).

"LJ…has become more attentive. LJ is more confident in interaction with others in the past 3 months, and appears to be less introvert. LJ has progressed from not being able to understand the concept of spelling, to producing a few words"

This is because LJ has not improved any aspects of communicative ability prior to the three months of CS-exposure in her two years at the school (Appendix 7.c). CS-exposure is therefore likely to be the catalyst of improvement (Appendix 14).

Though Sutton-Spence (2007) would argue that CS is detrimental to BSL, the speech perception, literacy and social and emotional benefits for the deaf should not be ignored. This case study demonstrates that despite Maria Eagle's (former Secretary of State for Health) suggestion that the government cannot meddle in the communicative choices of parents and schools of the deaf (UK Council on Deafness 2007), CS should at least be considered in the education of the deaf in the UK.

Chapter Six: Conclusion and Future Work

This investigation assessed the effect that CS had on the communicative ability (speech perception and production, literacy, and social and emotional stability) of deaf primary school children in the UK. The study fulfilled the aims by assessing CS's effect on the children's phonological awareness (PA) (whether speech perception and, subsequently, literacy, and speech production, were affected by CS) through combining tests of phoneme and utterance perception with The Schonell reading and spelling tests. Further a teacher's questionnaire assessed whether CS benefited the children socially and emotionally (the second aim). Therefore, overall the communicative ability of the four children was assessed satisfying the final aim of whether UK deaf schools could introduce CS to their curriculum.

The investigation's results comply with Cornett's (1967) assumption that the presentation of phonemes visually (CS) would diminish effects of an aural disability, such as speech perception and production, literacy, and social and emotional (communicative) difficulties (cited in Cornett & Daisey 1992:6). This is because the current investigation found that CS-exposure improved phoneme perception by an average of 14.0% and, though utterance perception declined by an average of 2.4%, subsequent literacy skills improved by an average of 42.0%, demonstrating improved PA, as hypothesised in Chapter One (3.a) (Stackhouse & Wells 1997). It was further found that social and emotional stability improved in all of the children, as further hypothesised in Chapter One (3.b) (Owen & Blazek 1985:389). Therefore, these results of improved communicative ability (phoneme perception, literacy and, social and emotional stability),

on the whole, led to the conclusion that CS could be introduced to UK deaf schools' curriculum, as finally hypothesised in Chapter One (3.c).

The investigation's findings conform to Emmorey and Lane's (2000:282) results in that phoneme perception improved with CS-exposure. Leybaert's (1993) and Leybaert and Charlier's (1996) results were reflected in that literacy skills improved with CS-exposure and also similarly these studies correlated literacy improvements with PA development. Regarding social and emotional stability, the investigation's findings agreed with Owen and Blazek's (1985:389) statement that miscommunication triggers emotional and social difficulties as improved phoneme perception (reduced miscommunication) through CS-exposure correlated with improved social and emotional stability in all of the children in this investigation.

However, this study was not long enough to allow all children to be fluent in CS as they were only CS-exposed for three months. A follow-up study is required to assess whether, with a longer period of CS-exposure, improved communicative ability continues (perhaps literacy will improve for all of the children to be equal to their chronological age, for example). Also whether or not CS has a detrimental effect on BSL could be investigated. Moreover, a future study of a larger sample group, geographically dispersed, is necessary as the findings of this case study of only four children cannot be generalised to the majority of UK deaf primary school children. This study could address the problem of the deaf having lower literacy levels than their hearing peers on a national (and worldwide) level, for instance (Ewing 1960; Dodd 1977; Conrad 1979; Dodd & Campbell 1987). However, whether the deaf want CS will have to be considered (Sutton-Spence 2007).

Furthermore, a larger, more varied sample of children (or adults) could discover when it is best (depending on BSL proficiency, age, deafness, aids of hearing and so on) to introduce CS.

Chapter Seven: Limitations

The limitations of this investigation are listed below:

- Case studies produce difficulties when generalising findings (Glattonhorn 1998:37). Results may be specific to the four children (small sample size), their class, their school, their region or their country.
- The children are from a residential deaf school therefore findings may not apply to the deaf in mainstream schools.
- The time-scale (three months of CS-exposure) was limited in this investigation.
- The correlation between CS-exposure and improved communicative ability was assumed. The improvement may be a result of general school progress and/or maturation.
- There was not a control group.
- Phonological awareness (PA) can only be monitored by associated skills. It cannot be directly observed.
- TC was absent for month three's assessment.
- The "Word to Picture" and "Picture Interaction" tests focused on speech perception (and comprehension). Speech production elicitation in these tests was not the main focus, possibly affecting results.
- There was some ambiguity due to synonymy in the "Word to Picture" test. For instance, in month four, section C, question two, though the /k/ phoneme was the target, JB said "hat" (/hæt/) instead of "cap" (Appendix 22) as the SSE sign for

"hat" and "cap" are identical and the picture could have represented either noun (McCracken & Sutherland 1991:91).

- The teacher's perception of the children's social and emotional stability may not be accurate. Firstly, the teacher's perception may be inconsistent with the child's actual feelings of social and emotional stability. Secondly, the teacher may be biased towards CS.

Total Word Count: 10, 328

Chapter Eight: References

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Appendices

Appendix 1
Key Term Definitions

> **Source:** Crystal, D. (1995). *The Cambridge Encyclopaedia of the English Language*. Cambridge: The University Press.

British Sign Language (BSL): BSL is the sign language used in the UK. A sign language is a language which uses manual communication instead of sound to convey meaning, simultaneously combining hand shapes, orientation and movement of the hands, arms or body, and facial expressions. Similarly to spoken language, sign language differs regionally and nationally, for example American Sign Language (ASL) is used in the USA (equivalent to BSL in the UK), though there are countless variations between states. Although each spoken word may have a corresponding signed gesture, the usage, grammar and even the rate of communication of sign language can differ from local oral languages. BSL is the first (or preferred) language of approximately 65,000 people.

Communicative Ability: Communicative ability, here, refers to a combination of speech perception, speech production, literacy (reading/spelling), as well as emotional and social stability. It excludes abilities regarding sign systems/languages and body language/gesture use and drawing.

Cued Speech (CS): CS is a system of communication representing traditionally spoken languages through a small number of hand shapes (representing consonants) in different locations near the mouth (representing vowels). CS supports lip-reading (it is an oral system). CS is used with people with a variety of language, speech, communication and learning needs. (See Appendix 1 also).

Emotional Stability: Emotional stability, here, refers to the ability to successfully communicate feelings and express oneself. Communication of emotions is a human

need, and often a lack of ability to express emotions can have detrimental psychological effects.

Lip-reading: Lip-reading is a technique of understanding speech by visually interpreting the movements of the lips, face and tongue with information provided by the context, language, and any residual hearing.

Literacy Skills: Literacy skills traditionally are considered to be the ability to read and write. Here, it more specifically means the ability to read and spell (an aspect of writing).

Phoneme(s): A phoneme is the smallest unit of sound within a word. It is a sound of a language as represented (or imagined) without reference to its position in a word.

Phonological awareness (PA): PA is the conscious sensitivity to the sound structure of language. It includes the ability to distinguish parts of speech, such as syllables and phonemes. Children usually develop phonological awareness through verbal communication.

Sign Supported English (SSE): SSE is a manually coded system used as a teaching tool rather than a sign language. SSE presents BSL signs in English word order, with the addition of signs to show aspects of English grammar. The key words are signed.

Social Stability: Social stability, here, refers to the ability to successfully communicate (in what ever means to portray a message) with peers, teachers and classroom assistance for instance. Social stability also refers to the feeling of social inclusion.

Speech Perception: Speech perception, here, is the ability to successfully interpret the spoken language of an interlocutor.

Speech Production: Speech production, here, is the ability to produce spoken language, to phonetically convey words or utterances.

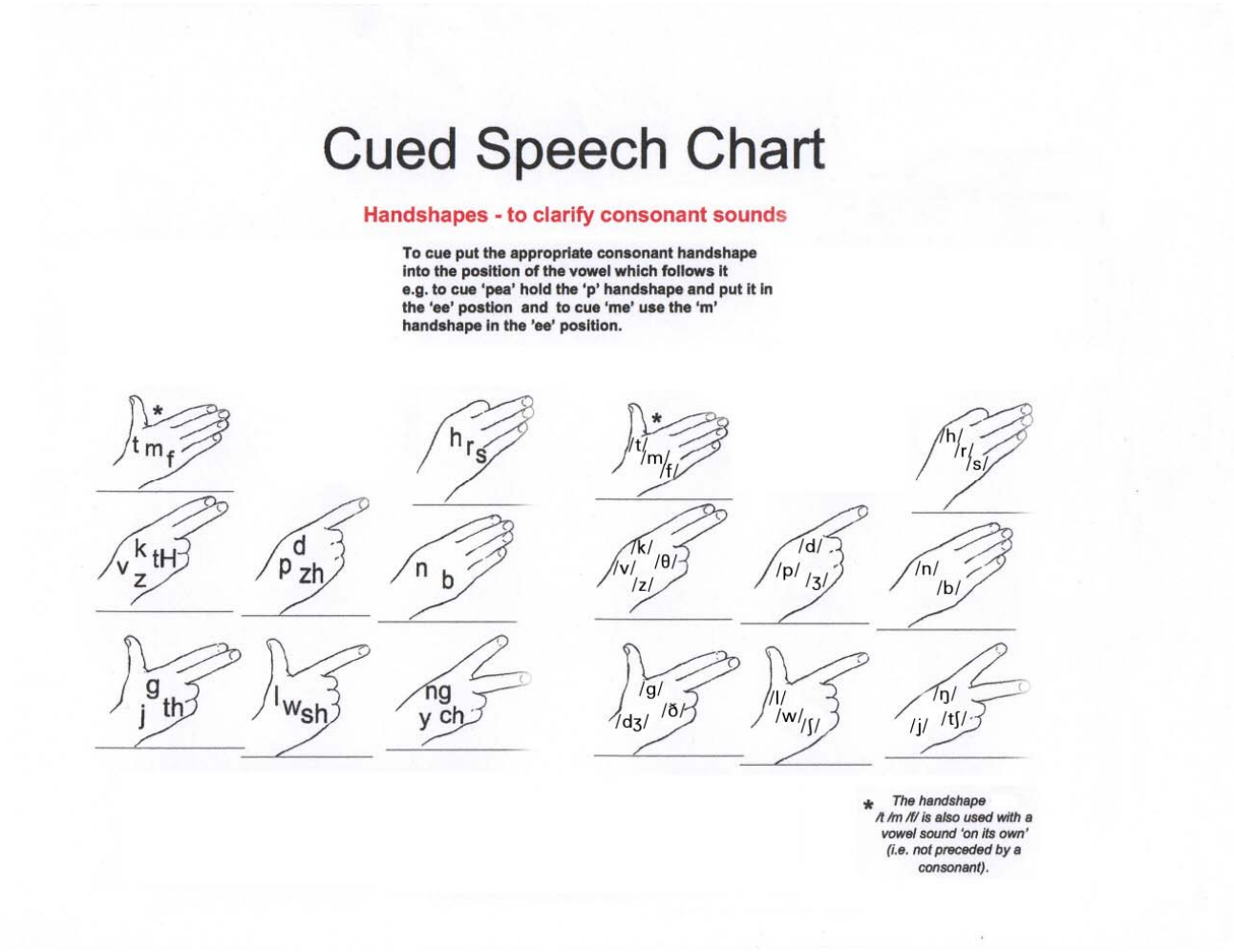
The deaf/Deaf: The deaf refers to those that are medically hearing impaired without considering themselves to be part of the Deaf community or culture. Whereas, the Deaf refers to the hearing impaired who are part of the Deaf community and culture, only communicating through BSL, for instance.

Utterance: An utterance is a complete unit of speech in spoken language.

Appendix 2
Cued Speech Illustrations

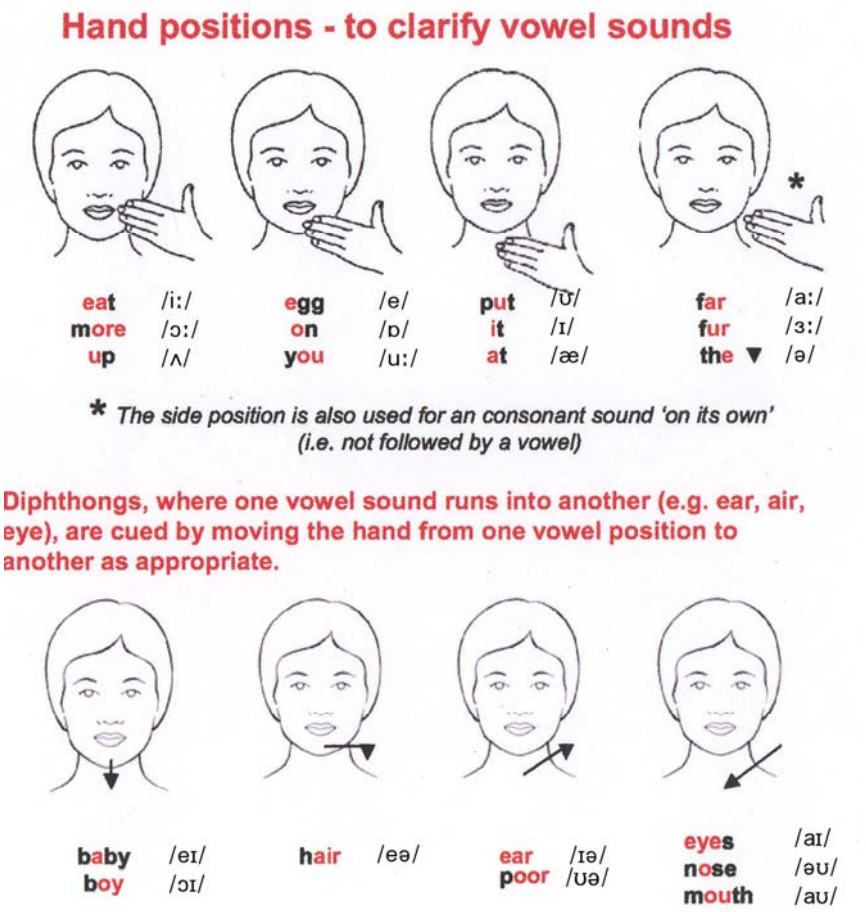
Source: The Cued Speech Association. (2007). The Cued Speech Association. (2007). *Learn to Cue*. http://www.cuedspeech.co.uk/learn/learn.htm. Accessed 2nd February 2007.

Appendix 2.a
Hand Shapes



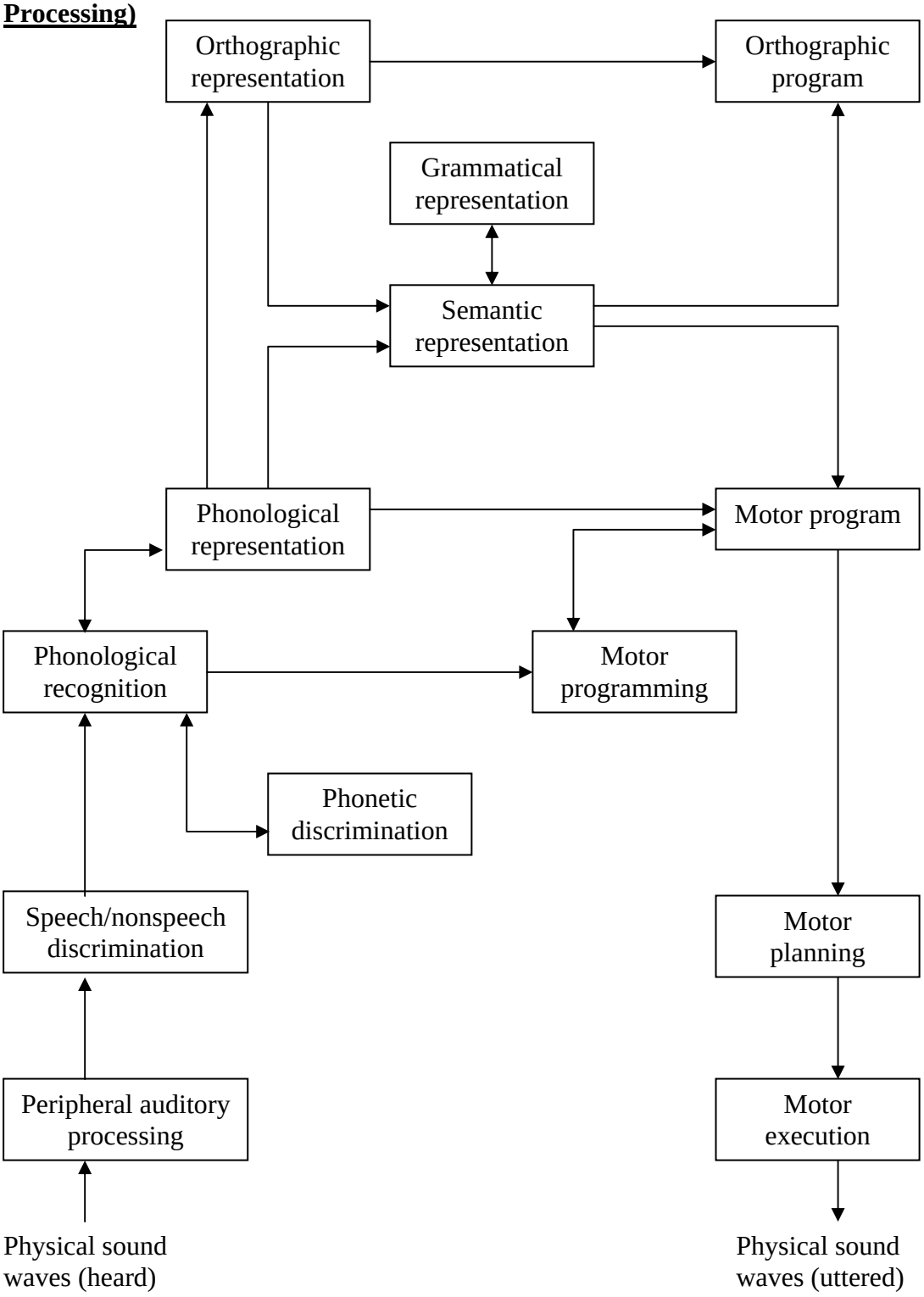
Cued Speech System to Represent Phonemes of the English Language: **consonant hand shapes**

Appendix 2.b
Hand Positions



Cued Speech System to Represent Phonemes of the English Language: **vowel positions**

Appendix 3
Stackhouse and Wells' (1997) Model of Language Development (and Processing)



Source: Stackhouse, J. and Wells, B. (1997). *Children's Speech and Literacy Difficulties*: *A Psycholinguistic Framework*. London: Whurr.

Appendix 4
Pilot Study Transcriptions

Contextualisation

What follows are two transcriptions from a twenty-eight minute interaction between a Deaf reception class child (KK) and an Administrator (AR) (03.11.06). These speakers are completing the Pilot Study's "Spontaneous Speech" (Transcription One) and "Exercise Questions" (Transcription Two) tasks (Appendix 15). The time of the transcription/utterances is indicated at the beginning of the Transcript (and in the "Comments" column, Transcription Two) illustrating the distance into the Pilot Study DVD (not appended for confidentiality). The dialogue takes place in the School Library. KK is playing with Lego (building a 'house' and its surroundings) during the dialogue, as instructed in the Pilot Study's "Instructions for the Administrator" (Appendix 15).

As KK's speech and sign (communication) is the focus, his signed language is transcribed on a separate line to his simultaneous (in most instances) spoken language, which is broadly transcribed using the International Phonetic Alphabet (IPA) symbols. AR's speech is represented orthographically as phonetic and signed detail is not necessary (not the focus). Where appropriate, for both speakers, further notional symbols (Key) are used and comments are noted. The first line of KK's utterances is his voice, the second is his Sign and the third is for an alternative type of sign, if used. The "MOT" (Method of Transcription) column is present to demonstrate how KK's communication has been transcribed. "**P**" indicates phonetic transcription of KK's voice (oral communication), "**S**" indicates KK's BSL signed utterances/words, and "**F.S**" illustrates Fingerspelling on the "alternative sign" line. The "Sign Language Transcription Conventions" according to "The Communication Skills Development Transcription System" could have been used, for example transcribing lines 3 and 4 (Transcription One) as "sharks", indicating that the word was both said and BSL signed. However, the complexity of this system, using various underlining and bracketing to indicate speech with/without BSL or Fingerspelling sign for instance, is not as favourable in this case, rather the detailed

phonetic, yet simpler sign representation system seems more effective in illustrating the phonological speech and modes of communication that KK chooses to use (McCracken&Sutherland 1991:90).

Transcription One is a four minute forty-five second selected transcription of the ten minute and forty-nine second "Spontaneous Speech" interaction. AR is following the initial guiding questions from the Pilot Study's "Spontaneous Speech" section and their subsequent "probes" (Appendix 15). KK has been instructed to "tell as much as possible" and to use his voice, and most comfortable sign, as much as possible. AR has read the instructions to KK using BSL and her voice prior to the transcription's commencement. An initial question of dislikes is delivered by AR using BSL and voice as are the subsequent "questions", "probes" and "feedback".

Transcription Two is a selective transcription of the eleven minute sixteen second completion of the Pilot Study's "Exercise Questions" (Appendix 15). AR is following the Pilot Study's "Exercise Questions" (Appendix 15) delivering these in BSL and using her voice. KK has been instructed to use his voice, and sign, when giving one of the two possible answers that he believes to be correct. AR has read the instructions to KK using BSL and her voice prior to the transcription's commencement. The transcription begins at the example of how to choose an answer (0:17:24). The utterances do not directly follow, however they are chronological.

Transcription One: (0:04:45 – 0:09:40)

Line Number	Speaker	MOT	Utterance	Comment
1	**AR**		want you to <↑tell me↓> about (·) something >that you< (.hhh)	
2			↑don't li:ke=	**rallentando**
3	**KK**	**P**	=ʃɑː	
4		**S**	shark	
5	**AR**		sha:rks (·) (.hhh) o:h ri:ght (·) no:w why (·) ◦why◦ don't you like	**AR notes answer**
6			sha:rks	**crescendo**

7	**KK**	**P**	bi: cʌ (1.0) kɪ mə fæ hɜ: æ æməl	**KK watches AR in pauses**
8		**S**	because (1.0) kill favourite pet	
9	**AR**		(0.5) ↑kills your favourite anima:l↓ (0.5) oh↑ri:↓ght (3.0) k (.hhh)	**staccato**
10			(1.5) ok (·) can you <u>tell</u> me then >about the <<u>a</u>nimals> that< you	**KK plays with toys**
11			<u>do</u>: like↓	**AR writes accelerando**
12	**KK**	**P**	(1.5) ((mouth shape no sound or sign)) sɑ: (·) fiʃ=	**KK puts down toy to sign**
13		**S**	star fish=	
14	**AR**		↑star↓fish (·) oh ↑I: ↓like starfish ↑↓too (·) yea:h they're	**lento**
15			↑↓<beautiful> aren't they↓(·) ↑starfish (·) anymore↓ (·) any<u>more</u>	**staccato**
16			>animals that you like↑<	
17	**KK**	**P**	(.hhh) lɒ=	**KK has toys in hand whilst signing**
18		**S**	lots	
19	**AR**		=>what's ↑that<=	
20	**KK**	**P**	=lɒ	
21		**S**	lots	
22	**AR**		(·) >don't ↑know what that is↓< (1.0) can you ↑ex↓plai:n (·)	
23			>explain a bit mo:re< I don't under↑stand↓=	**legato**
24	**KK**	**P**	=lɒ wi (·) li:pʌ-li:pɜ:	**KK puts down toy**
25		**S**	long with (·) spots	
			[	
26	**AR**		↑<u>le</u>opard↓(·) ↑<u>le</u>opard↓=	
27	**KK**	**P**	=lɛpʰ pʌ	**KK mouths leopard**
28	**AR**		◦leopard ok:◦ (·) any↑ any↓mo:re↑	
29	**KK**	**P**	(.hhh) ((claps)) bɪ: cæ (.h)	
30		**S**	cat	
31	**AR**		↑<u>b</u>ig <u>c</u>ats ri:ght (1.0) >that's< the same as <u>me</u> >they are< my:	**accelerando**
32			↑favourite (·) the big ((blows)) ((strolling)) >the cats I like the:<	
33			↑li:↓ons (·) >I like the↓< (·) ↑ti:↓gers (·) yeh (0.5) right (·)	

34			↑<u>di</u>fferent ↑quest↓ion no:↑w (·) >can you <u>t</u>ell me↑< about ↑<u>foo:d</u>↓	**KK stands up staccato**
35			(·) that you like↓	
36	**KK**	**P**	(9.0) fruː	**KK starS**
37		**S**	fruit	
38	**AR**		<fruit ↑right↓ o↓↑k> (·) any: <u>di</u>fferent >↑food that you ↑like<	
39	**KK**	**P**	(5.0) vɛʃʌbəlz	**allegro**
40		**S**	vegetable	
41	**AR**		↓<u>veg</u>etables↑ (·) ooh >that's nice and <u>heal</u><-thy↓ >veg<u></u>etables< yeh	**accelerando**
42			(1.0) >do you like↑< (·) >do you like< ↑<u>fish</u> ◦ye:ah◦↓ (1.0) what	
43			was in your (·) you:r ↑<u>pack</u>ed ↓<u>lu:nch</u> >yesterday< what was	**rallentando**
44			<u>in</u>↑side↓	
45	**KK**	**P**	(1.0) dʒiː sæəʊɪʒ	
46		**S**	cheese sandwich	
47	**AR**		cheese ↓sandwich↑ ↑ri:ght↓(2.0) >what <u>else</u>< (·) >◦what <u>el</u>se◦<	**diminuendo**
48	**KK**	**P**	(2.0) əʊ ə	
49		**S**	packet of crisps	**KK no eye contact with AR**
50	**AR**		↑<u>crisp</u>s	**crescendo**
			[	
	KK			
51		**S**	crisps	
52	**AR**		◦<u>crisp</u>s >ok<◦ () >↓didn't you have a< ↑<u>pu</u>dding as well↓ (0.5)	
53			>◦thought you had◦ a< <u>pu</u>dding with the oth- you got-	**KK shakes head**
			[	
54	**KK**	**P**	aɪ hə wə pʌli	
55		**S**	I have one pudding	
56	**AR**		(0.5) o:h >you <u>had</u> the< ↑<u>schoo:l</u> pudding <u>did</u>n't you:↓	**KK nods slightly**
57	**KK**	**P**	duː (1.0) æpuːl (·) æ ərm ɑː (·) æpuːlz (·) æ mʌ=	
58		**S**	listen two (0.5) first (0.5) apple (0.5) second (0.5) school	
59	**AR**		=>what was it↓< >was it< (·) <u>le</u>mon↓=	**crescendo**

60	**KK**	**P**	=lɛmʌnʰ=	
61	**AR**		=<le↑mon pudding↓ ↑wasn't ↑it↓>=	**diminuendo**
62	**KK**	**P**	=lɛmʌn baɪ paɪ pʌ=	**crescendo**
63		**S**	lemon pie	**KK reaches for toys**
			[ ]	
64	**AR**		<lemon pie:>	
65	**AR**		=yeah↓ (3.0) <◦ok◦> ri:ght >different question ↑no:w↓< can you	**staccato**
66			tell me:↓ about the ↑>colours< <that you ↓like> (1.0) >what are	
67			you:r< ↑fa:vourite ↓colours (1.0) >you ↓know< (·) >you know	
68			when you were wri:ting↓< the ↑ca:rd↓ for <Mrs> (…) >who's	**accelerando**
69			↑↓i:ll< >at the ↓mo↑ment< what ↑col↓our (·) did you choose (·)>to	
70			↑write ↓in< (2.0) <I ↓chose purple> (1.0) >↑which colour↓< >did	
71			you< ↑↓choose	
72	**KK**	**P**	aɪ ɛh dɪ wɪv bəʊsɪl	
73		**S**	I do with pencil	
74	**AR**		>oh you wrote in< ↑pencil↓(·) ↑↓no: it ↑↓wasn't pen ↓ ci:l ↑	
75	**KK**	**P**	jɑː lɑː mɛ=	
76	**AR**		=↑↓>was it< (·) ↑↓>◦was it< (·) ↑↓green◦	
77	**KK**	**P**	gwiːnʰ	
78		**S**	green	
79	**AR**		>◦think it was◦< (·) >think it was< gree:n↑(·) but >↑which are<	**staccato**
80			you:r (·) >favourite< colours↓(·) >what about your< bedroo:m (·)	**KK leans across table**
81			at >home what< (·) colours your ↑bed↓roo:m	
82	**KK**	**P**	mə bʌruːm wɑː sliːb	**KK taps AR**
83		**S**	home my room orange	
84	**AR**		↑orange (·) ◦yea:h◦	
85	**KK**	**P**	hɑː həwɑː hɑː reɪbəʊ	
86		**S**	there red there rainbow	

87	**AR**		↑<u>rain</u>bo:w (·) ri:- <oh <u>h</u>ow ↑lo:vely:↓> (·) >so your< <u>bed</u>room ↓ is	**KK mouths rainbow**
88			<u>or</u>a:nge: (·) <u>red</u> (·) and ↑<u>rai:n</u>bo:w↓(0.5) <o<u>k</u>:>	**KK reads notes**
89	**KK**	**P**	rʌm piː rɑː wɑː ræm pɑː rɑː dæ rʌm piː rɑː dʌ dæ dæ	
90			dæ =	
91		**S**	((unintelligible sign))	
92	**AR**		>↑whats that↓<	**KK looks at toys, AR interrupts with tap**
93	**KK**	**P**	mə bɛrɑː=	
94		**S**	my bedroom	
95	**AR**		(0.5) ◦↑uh huh◦ ><u>gosh</u><	

<u>Transcription Two</u>: (0:17:24 – 0:27:50)

Line Number	Speaker	MOT	Utterance	Comment
1	**AR**		>so< (·) when you ↑a:ns↓wer↑(·) I'm ↑<u>ho</u>:ping that <u>you</u> >are	**(17:24) staccato**
2			gonna< ↑speak (·) yea:h ↓not <u>just</u> sign but >s<u>p</u>eak↑ as ↓well↑<	**KK looks in toy box then sits**
3			(·) k <u>try</u>:↓ (3.0) (.hhh) so >↑this is an ex<↓a:mple (1.5) >you	
4			know ↑the< (.h) >you know the wo:↓rd< <u>pi:g</u> (·) <u>pi:g</u>=	**accelerando**
5	**KK**	**P**	=piː=	**KK nods**
6	**AR**		=<↓<u>pig</u>> =	
7	**KK**	**P**	=piːj=	
8	**AR**		=yeah↓	**lento**
			[	
9	**KK**	**P**	piːj	
10	**AR**		(.hhh) ↑no:w↓(·) <<u>you</u> have to ↑thi:nk↓> (1.0) >the next ↓word	
11			is-< (·) pi:↑pe (·) pi:↑pe (1.5) <u>o:r</u> (·) ↑<u>mea</u>:t (1.0) ↑which ↑word	
12			↓ (0.5) <u>sta</u>:rts (.hhh) >with the< <<u>s</u>a:me> >◦speech sound◦< a:s	
13			(.hhh) ↑<u>pi</u>:g↓	

14	**KK**	**P**	paɪp	
15	**AR**		↑pi:pe (.h) <well do↑ne↓> >you ↑are< ↑so: <cle:ve:r> (·) ↑yea:h	**KK leans on table hands on face (18:20)**
16			it does↓	
			(…)	
17	**AR**		>now we've ↑◦got◦< men↓=	**(20:01)**
18	**KK**	**P**	=mənʰ	
19	**AR**		>◦lots of them< (.h) lo:ts↓ of-◦ (·) me:n↓ (3.0) ↑↓oo:h (·) a	**accelerando**
20			<mi:↑ll↓> (.h) >like ↑< (.h) >where they< <↑ma:ke> (·)	
21			flou:r↑>for↑< brea:d↓(·) a mi:ll↓(·) o:r (·) tooth↓(.hhh) which ↔	
22	**KK**	**P**	[ ] mə	
23		**F.S**	M	
24	**AR**		↔ one starts (·) with the sa:me as men (.h) is ↑it-	
25	**KK**	**P**	[ ] mɪlʰ	
26	**AR**		↑<yea:h> >it's the< ↑mi:ll↓	
27	**KK**	**P**	wæz lə fɑ:	**KK points at page**
28		**S**	there	
29	**AR**		>tha:t's↑ it< (.h) >that's↑the wo:rd↓<its <mi:ll↓> (.hhh)	**KK leans in reads AR's script (20:34)**
30			<◦where they ↑make◦> flou:↑r↓	
			(…)	
31	**AR**		no:w↓ >◦thinking abo:↑ut the◦< (·) end↓>of a wo:rd< (1.0)	**(21:16) staccato KK puts Lego board in front of his face**
32			(.hhh) so:↓(·) >we've got the wo↑:rd↓<(·) gra:pe↑(·) (…)	
33			((laugh)) >come on put this down< >you↑ know the< frui:t↓(·)	
34			grape↓where you (·) >◦pick a gra:pe◦<	
35	**KK**	**P**	gweɪp	**KK leans in attempts to read script**

36	**AR**		>yeh< gra:pe (.hhh) so:↑ (1.0) >◦we've got↑◦< troo:p↑ (0.5) like	**accelerando**
37			<lo:ts and lo:ts> of so:↓ldiers↑(·) troo:p ↑ o:r bi:↑rd ↓(·) >which↑	**legato**
38			has the same↓< ending↓	
39	**KK**	**P**	bə	
40	**AR**		gra:pe (0.5) troo:p↑ (0.5) bi:rd ◦which◦ (3.0) >◦whi↑ch do you	**staccato**
41			think↑↓◦<	
42	**KK**	**P**	tru:p	
43		**S**	troop soldier	
44	**AR**		troo:p↑ (·) ye:ah↑ well ◦do:↑ne↓◦	**(22:03)**
			(…)	
45	**AR**		<no:w the↑ wo:rd ↓> i:s↑ (·) ca↑:ve↓ (.hhh) >◦you kno:w↓ ↔	**(22:04)**
			[ ]	
46	**KK**	**P**	ə	**KK leans hands on chin**
47	**AR**		↔ when you↓◦< >go with the light↑< ca:ve >◦it's a bit◦< da:rk↓	**KK nods**
48			cave (1.0) (.hhh) a:nd↓ the↓- >is it↑ a< sie:ve (·) >you know	
49			◦when you've got◦< li:↑ke the peas >and you've got all the ↑ <	**staccato**
50			wa:ter↑ (1.0) >◦pour it through◦< (·) sieve (0.5) o:r ↑ (1.0) back	
51			(1.0) ca:ve ↑ (0.5) sieve (·) or ba:ck	
52	**KK**	**P**	>si:v^{h}<	**diminuendo**
53		**S**	sieve	
54	**AR**		yea:h↑↓	**KK looks at AR writing**
55	**KK**	**P**	((yawns)) ə	**KK looks into camera**
56		**S**	((unintelligible sign))	
57	**AR**		(3.5) ((laughs)) >I've got↓ a< fla:n=	
58	**KK**	**P**	=flæ	**KK leans back on chair**

59	**AR**		fla:n bit↑ li:ke a (·) pie↓ >◦but a◦< fla:n↓ (.hh) ok↑>◦maybe a◦<	
60			frui:t fla:n↑ (.hhh) (3.0) ooh↓(1.0) these↑ >are↑ diff ↑icult↓	
61			wo:rds↓< >you're just↑ going to↑ ha:ve to:↑< lip-rea:d↑(·) its	**diminuendo**
62			>difficult< to >explai:↑n↓< the:res ta:rn ↑ (.hhh) o:r (·) cob ↓	
63	**KK**	**P**	tɑ:lə (·) tɑ:lərlʌ	**KK looks into toy box**
			[	
64	**AR**		◦ta:rn ↑ yes <we:ll done ↓ >◦	**(23:12)**
			(…)	
65	**AR**		>is it< ↑ lau:gh ↑ (·) o:r ↑ (·) NI:T (.hhh) which has ↑ the s-	**(23:19)**
			[	
66	**KK**	**P**	lɑ:	
67	**AR**		(.hhh) <reme:mber↑>(·) <you're thi:↑nking↓ abou:t↓ the> end of	
68			the↑ word >so we've got↑< fee:t↓ (1.0) feet↓(.hhh) >is it↑<	**staccato**
69			lau:gh↑ or (·) ni:t↓	
70	**KK**	**P**	lɪʰ	**KK leans back on chair**
			[	
71	**AR**		hmm↑	**(23:44)**
			(…)	
72	**AR**		a:re you:↑ gue↑ssi:ng↓(·) ((laughs)) whi:ch↑ >is it<↓	**(27:14)**
			[	
73	**KK**	**P**	hʊd	**KK rustle toys**
74	**AR**		hoo:d >◦ok yea:h◦↓<↔	
			[ ]	
75	**KK**	**P**	ə (·) ə	
76	**AR**		(3.0) >going to do:↑ a little bit↑< mo:re↓ (.hhh) because↑ loo:k	**KK looks through papers**
77			(10.0) ((mouths)) >have you had↑enou:gh↓< I:↑ <think you've	
78			done↑ rea:lly> we:↑ll↓	**(28.05)**

Key of Notational Symbols

utterance	extra emphasis on utterance/lexeme/phoneme
UTTERANCE	loud utterance/lexeme/phoneme
°utterance°	quiet utterance/lexeme/phoneme
>utterance<	faster utterance/lexeme/phoneme
<utterance>	slower utterance/lexeme/phoneme
(·)	brief pause less than 0.5 seconds
(0.5)	timed pause, greater than 0.5 seconds
:	preceding vowel sound is lengthened
=	immediate latching from previous speakers utterance
[ ]	overlapping utterances ending at the right bracket
[	overlapping utterances that continue
(( ))	paralinguistic features
↑	marked rise on intonation on proceeding utterance/lexeme/phoneme
↓	marked fall on intonation on proceeding utterance/lexeme/phoneme
↔	same speaker continuation
-	stuttered utterance/lexeme/phoneme
(.hhh)	inhalation
(.h)	exhalation
(…)	omitted section of dialogue

Appendix 5
Teacher Questionnaire

Instructions:

Please answer these ten questions (page one to four)

There are five options to give as an answer with each question
These range from "always" to "never"
Circle the answer that you feel is appropriate

There is a section at the end (page five to eight) to allow you to
a) comment on the questions
b) elaborate on any questions
And/Or
c) state anything else that you feel relevant to the child's language, communication, education or socialisation

……....

- **Date: ……/……/……**
- Give the **first name** of the child of which these answers apply: **……...**

Question One: Do you feel that this child actively participates in lessons?

Always	Nearly Always	Sometimes	Rarely	Never

Question Two: Do you feel that this child successfully communicates with peers…

a) in the classroom?

Always	Nearly Always	Sometimes	Rarely	Never

b) in the playground?

Always	Nearly Always	Sometimes	Rarely	Never

Question Three: Do you feel that this child successfully communicates with you…

a) in work?

Always	Nearly Always	Sometimes	Rarely	Never

b) in play?

Always	Nearly Always	Sometimes	Rarely	Never

Question Four: Do you feel that this child successfully communicate with…

a) other classroom assistants?

Always	Nearly Always	Sometimes	Rarely	Never

b) teachers?

Always	Nearly Always	Sometimes	Rarely	Never

Question Five: Do you feel that this child would be able to communicate with a stranger?

Always	Nearly Always	Sometimes	Rarely	Never

Question Six: Do you feel that this child understands…

a) general instructions?

Always	Nearly Always	Sometimes	Rarely	Never

b) general conversation?

Always	Nearly Always	Sometimes	Rarely	Never

c) that words have ‘building blocks’ (phonemes) and, therefore, words can be built by or broken into these building blocks?

Always	Nearly Always	Sometimes	Rarely	Never

Question Seven: Do you feel that you understand this child?

Always	Nearly Always	Sometimes	Rarely	Never

Question Eight: Do you feel that this child conveys…

a) emotions?

Always	Nearly Always	Sometimes	Rarely	Never

b) thoughts?

Always	Nearly Always	Sometimes	Rarely	Never

c) feelings?

Always	Nearly Always	Sometimes	Rarely	Never

d) imagination?

Always	Nearly Always	Sometimes	Rarely	Never

Question Nine: Do you feel that this child is…

a) emotionally stable?

Always	Nearly Always	Sometimes	Rarely	Never

b) socially stable?

Always	Nearly Always	Sometimes	Rarely	Never

Question Ten: Do you feel that this child relies on…

a) speech to express themselves?

Always	Nearly Always	Sometimes	Rarely	Never

b i) sign to express themselves?

Always	Nearly Always	Sometimes	Rarely	Never

b ii) specify the type of sign that this child uses.

……..

c) lip-reading to understand others?

Always	Nearly Always	Sometimes	Rarely	Never

d i) sign to understand others?

Always	Nearly Always	Sometimes	Rarely	Never

d ii) specify the type of sign that this child uses.

……..

c) hearing to understand others?

Always	Nearly Always	Sometimes	Rarely	Never

- **Write as many points as possible about the current abilities of this child:**

(some ideas are given but are only present to initiate thoughts and should be used as a guide to elaborate from. Headings do not have to be followed simply note thoughts as they arise)

- **Give as many <u>examples</u> as possible with your points.**

<u>Consider:</u>

- **Comments on any questions**
- **Elaborations on any questions**
- **Statements of anything else that you feel is relevant to the child's <u>language</u>, <u>communication</u>, <u>education</u> or <u>socialisation</u>**
- **Literacy Skills**: **Reading:** have there been any instances if the child sounding out new words to pronounce them, for instance showing that they understand a word (new or familiar) can be broken up (into phonemes/graphemes), please give these examples whether they reach the correct word/pronunciation or not.
  Spelling: does the child break down sounds of a word (new or familiar) to spell it? Do they make sensible attempts based on phonemes? Do they use you lip-reading of a word to aid them in spelling it?
  Writing and **Speaking/Signing**
- **Phonology**: Which sounds are harder/easier for the child to understand/produce? Does the child understand that intonation/tone/rhythm/(facial expression) can alter the meaning of what is being said? Are sounds substituted by others for instance saying/signing "dat" instead of "that"?
- **Grammar**: How complex are the sentences that the child produces? Do they understand/produce speech/writing in the present/past/future? Are tenses formed with the correct endings, for instance is "-ing" added to indicate present tense and "-ed" for past tense? Are pronouns used (if so, are they used as an adult would use them) "I"/"he"/"she"/"we"/"you" and "my"/"mine"/"yours"/"theirs".
- **Lexis**: Are words generalised to their whole category for instance "apple" for every round fruit and "dad" for every man, or really specific "dark green granny smith apple"? Can the child use more than one word for items for instance "cat"/"toffee"/"pet", "Board game"/"Cluedo" or activities "cooking"/"baking", "playtime"/"break"? Are words that are understood/produced limited by the sounds within them, for instance are words beginning with a particular sound preferred over others? Or, does the amount of syllables that a word has effect use? Does the child prefer to talk about one topic in particular?
- **Morphology**: Are word endings and beginnings produced/understood such as "**re**open", "**un**do", "**anti**clockwise", "pay**ment**", "us**age**".
- **Syntax**: Are sentences comprehendible/structured/full?
- **Semantics**: Does the child understand the difference between instructions/questions/statements/commands? Are they able to produce instructions/questions/statements/commands? Do they correctly interpret what

you mean when you speak to them? Do you correctly interpret what they mean when they talk to you?

- **Pragmatics**: Are meanings in a sentence correctly interpreted/produced. Does the child get frustrated because they are not being understood/they do not understand? Are sentences produced in the correct context? Does the child speak appropriately in all situations? Does the child speak differently to you/classmates/siblings/the head teacher/shop assistants? Does the child understand more/less clearly in these contexts?
- **Speech/Lip-reading/Hearing/Sign/Facial Expression/Gesture/Body Language**
- **Does the child say things that strike you as odd or which are different from what you say?**

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