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The Cued Speech was not born ex-nihilo but is the result of a reasoning that has integrated the problem of oral language acquisition for deaf children and which has synthesized previous studies to overcome the unsuccessful attempts of the past.

This process is described in "The Cued Speech Resource Book for Parents of Deaf Children - R. Orin Cornett / Mary Elsie Daisey - National Cued Speech Association -

1992". The story begins in 1959 when Orin Cornett was appointed to the U.S. Department of Education, which oversees Gallaudet University, a university for deaf youth. He became vice-president of the university in 1965 and found that most of the students, although having a high intelligence quotient and having studied English for many years were not proficient in the English language.

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The first problem Cornett found for hearing impaired child is obviously communication. Sign language. But it is not enough to acquire good reading, lip-reading and speaking skills. Orin Cornett's primary goal for Cued Speech, is to enable deaf children to become good readers. Orin Cornett sums it up in one formula: "The failure to educate deaf children to become good readers is an unnecessary tragedy. Reading is the only means of learning for deaf children that is under their complete control.

The study of these problems leads him to understand that the lack of a clear mental model of oral language is the main cause of reading difficulties and limited lip-reading skills. During his research, he discovered that many people, including Alexander

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Graham Bell (end of XIX) or G. Dewey Coats (1930), have recommended and thought about the development of means to make oral language visible to deaf people. Alexander Bell was a professor of diction at Boston University, a specialist in speech. His mother and wife were deaf. His research led him to invent hearing aids, which resulted in his most famous invention: the telephone in 1876.

However, the resulting phonetic (sound-based) methods were too complex and did not include lip information. O. Cornett cites among others the Danish system developed in 1923 by Georg Forchhammer, and the language aid proposal from Baghcheban in 1928. These techniques used specific hand patterns and movements for certain sounds, making lip-reading unnecessary to identify sounds.

In 1930, Coats, who was himself deaf indicated that the ideal system of communication for deaf people should be based on syllables. But he added that developing such a system would be very complex because of the large number of syllables. He considered the possibility of a system that represents syllables as a combination of small units (phonemes or isolated sounds) and thus use only a reduced number of components.

Cornett used this principle to setup the Cued Speech which uses only twelve components (configurations and positions). Orin Cornett has a PhD in Physical Sciences and Applied Mathematics: his approach for the development of the Cued Speech was scientific and met the specifications that he described in a publication in 1967 (Cornett, R.O. 1967. Cued Speech. American Annals of the Deaf, 112,3-13).

Here are the six criteria identified by Cornett:

1- The system must be unambiguous and must make obvious all details of the spoken language. If all sounds had a different lip image, a deaf person could pick up these lip images and become proficient in the language through practiced lip reading. However, many words have lip look-alikes. Cornett gives as an example the small English words "met, bet, pet, mid, mean, ..." about sixty words having an identical or almost identical labial image.

2- This system must be based on the oral language, with a consistent use and dependence on the information visible on the lips. The Cued Speech signals (digital pattern and position) alone do not identify sounds or syllables. Each sound must be read from the lips with the help of the hand. (NdA: Virginie Attina's thesis published in 2005 reverses this conception, without affecting its efficiency!) The hand is used to identify a group of sounds or syllables that have different lip images.

3- Any information added to available one with lip-reading must be compatible with what is being said (with the rhythm of the speech, the meaning, etc.).

4- This system must be learnable by a very young deaf child via a language bath (i.e. a regular exposure process) at home.

5- This system must be learnable by hearing parents of standard intellectual capacity who are willing to make a reasonable effort to help their child.

6- This system must be usable at a standard speech rate, at a distance up to six meters.

To meet these criteria, it was required to develop a technique that makes each syllable and each sound visually distinct from all others. The Cued Speech makes it possible to differentiate each sound, each syllable by using a combination of eight digital patterns and four positions performed synchronously with speech. The combination of these signals with lip reading results in different visual patterns for all sounds and syllables of the oral language. The syllables that have the same lip image differ by hand; syllables that share the same hand signal have a different lip image. Thus, a deaf child can always see a difference, in the same way that a hearing child can hear a difference between two sounds or two syllables of the oral language.

Every day one can admire this communication system that is relatively simple to learn, easy to use, and free! Let's make a small summary, not exhaustive, of scientific studies that have looked at Cued Speech. First, we will see that speech perception is audio-visual, and that Cued Speech works! Then we will review the benefits associated with Cued Speech and how successful is the Cued Speech - Cochlear Implant duo!

Speech perception naturally associates hearing and visual (lip reading).

Cotton, J. C. (1935); Sumby, W.H., & Pollack, I. (1954)

Fun but not so silly experiment: lip information can modify auditory perception. Inconsistent stimuli induce a perceptual illusion: a majority of people perceive /da/ in response to a /ga/ on the lips associated with the sound /ba/.

McGurk, H., & MacDonald, J. (1976)

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The average gain brought by the vision is estimated at 11 dB. In a noisy environment like a restaurant, this makes a difference.

Summerfield, Q. (1987)

For a deaf person using Cued Speech, speech perception incorporates a 3rd element : the hand.

Bayard, C. (2015)

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Speech intelligibility increased by visual information is explained by :

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>> The complementarity of information  
Summerfield, Q. (1987)

>> The synergy of auditory and visual flows  
Robert-Ribes, J., Schwartz, J.-L.,  
Lallouache, T., & Escudier, P. (1998)

>> The precocity of visual information that puts people " in the context"  
Schwartz, J.-L., Berthommier, F., &  
Savariaux, C. (2004)

With Cued Speech, this visual information is reinforced by the hand that codes near the face.

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But lip reading obviously does not offer the same gain as hearing: on average for a given language, lip reading allows a recovery of 40 to 60% of the phonemes (sounds).

Owens, E., & Blazek, B. (1985)

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and from 10 to 30% of the words.

Intensive training allows to improve these scores.

Bernstein, L. E., Tucker, P. E., & Demorest, M. E. (2000); Nicholls, G. H., & Ling, D. (1982)

Cued Speech is integrated into the mechanisms of speech perception by complementing lip reading to optimize intelligibility.

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Cued Speech works! After 1 year of use, tests have shown that the comprehension of simple sentences increased from 23% à 62% with Cued Speech.

Clarke, B. & Ling, D. (1976)

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On the other hand, tests carried out over 2 years (1975-1976) indicate that the benefits of LfPC increase with the duration of exposure to LfPC.

The absence of sound does not diminish the benefits of LfPC. Hearing aids and cochlear implants are not necessary to perceive a message.

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LfPC also fits complex messages: comprehension increases from 25% to 84% when the oral message becomes more complex.

Other studies point in the same direction.

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One study in particular has shown that the more difficult sentences are to identify on the basis of lip-reading, the greater the benefits of Cued Speech, especially in the case of early exposure.

The earlier one use Cued Speech, the better it is!

Cued Speech at an early age makes it possible to offer deaf children the same “language bath” as hearing children, and to draw the same benefits.

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Cued Speech usage has benefits that go beyond speech perception.

By specifying all the phonological contrasts in the language and presenting it as a succession of phonemes, the Cued Speech enables the deaf child to construct precise phonological representations.

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Cued Speech usage will improve the morphosyntax development. Indeed, the full perception of the spoken chain will allow the child to integrate the rules of construction and combination of words in the sentence.

This will improve read learning, spelling development.

The use of Cued Speech also promotes the development of the lexicon.

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Speech reading and lip-reading skills are enhanced by Cued Speech via an improved ability to phonologically decode visual articulators.

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Cued Speech is also mentioned to ease social integration at the same time as it makes tangible deafness, even when the deaf person is an oralist one.

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The Cochlear Implant – Cued Speech duo shows a benefit in the reception of oral language, even more with Cued Speech exposure prior to implantation.

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The joint use of Cochlear Implant and Cued Speech brings benefits in the acquisition of phonological representations and syntactic structures and promotes the development of reading processes.

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Cued Speech has been adapted in more than 50 languages and was designed to complement lip reading. However, a study has shown that the manual gesture occurs earlier than the lip movement, and that it is the lip reading that will disambiguate the gesture. The deaf person will therefore be able to anticipate the lip reading thanks to the movement of the hand which will be slightly ahead of the lips.

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This can be compared to the fact that a gesture or an expression can say a lot about a person's intentions even before he or she opens his or her mouth to speak... the gesture "anticipates" the word.

Above all, Cued Speech enables easy interaction in English, without simplification, in all its richness and diversity. One of the keys to success is to cue in all everyday situations, without pressure, and at an early age! Of course, using Cued Speech requires an effort from the parents: learning the keys, passing the fluency milestone, but also learning to slow down

speech rate in order to code fluidly, speaking - cueing with complete sentences, positioning oneself in front of a child at a reasonable distance and at his or her height... but these are only rules of good practice for a person with a hearing impairment, and a key stage in the acceptance of deafness.

The benefits of Cued Speech, clearly underlined by numerous scientific studies, some of which have been relayed here, contribute to a good construction of the language. The results are in some cases at the level expected for hearing people. As researchers in the language sciences describe it, Cued Speech is a successful cognitive graft: the Cued Speech integration occurs naturally in the brain.

May this little book encourage cueing to give deaf children the same opportunities as hearing children!