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The Role and Place of Sign Language in Deaf Youth's Access to Literacy: Contributions of a Cross-Review of ASL-English and LSF-French Research

Laurence Beaujard† *and Marie Perini**†

Department of Language Sciences, University Paris 8 & CNRS, Saint-Denis, France

In this mini-review, we investigate the role sign language (SL) might play in the development of deaf learners' reading skills. Since Stokoe's recognition, in the 1960s, of American Sign Language (ASL) as a language in its own right, the ASL has been progressively included in the research on the development of reading in the deaf, but with different statuses. Two contrasting paradigms can thus be identified in the literature. The first considers that sign language (SL) plays an indirect role in the development of reading skills. In line with the dominant psycholinguistic model of reading acquisition in hearing children, the authors consider that deaf children must first develop phonological representations in order to learn to read, like their hearing peers. For the authors of the second paradigm, SL plays a direct and central role in deaf children's access to reading as long as an appropriate visual (rather than phonological) mediation is made between the SL and the written language. We propose to present an overview of studies in both paradigms, in the American and French contexts. Then, we defend the idea of a "deaf norm", operating both in SL structuring and in information processing in general, justifying the central position that SL must have in any learning by deaf people. We will conclude by outlining some promising avenues for teaching reading to deaf learners.

Keywords: sign language, literacy acquisition, deaf children, phonological awareness, visual methods, deaf norm

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****Correspondence:***
Marie Perini
marie.perini@gmail.com;
laurencebeaujard@free.fr

†These authors have contributed equally to this work

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INTRODUCTION

The importance of a sign language (SL) for a true social inclusion of deaf people is now well recognized in major international texts[1]. However, the interest of using SL in the schooling of young deaf people and in particular for teaching them writing and reading is strongly discussed. Can SLs, as visual-gestural and multilinear languages, provide access to an alphabetic type written language, which is based on the matching of graphic and phonetic units?[2]

[1]International Classification of Functioning, Disability and Health, or ICF for short (WHO); Convention on the Rights of Persons with Disabilities (UN).

[2]the issue is different for other graphic systems, like Chinese (see for instance Gabrielle Jones' Ph.D. dissertation: http://hdl.handle.net/2142/44319).

Many authors consider deaf students' phonological skills in spoken language to be a prerequisite to their access to literacy, thus minimizing the role of SL in this process. In contrast, some other authors have shown that SL skills would be a stronger predictor of literacy skills (e.g., Goldin-Meadow and Mayberry, 2001; Mayberry et al., 2011; Humphries, 2013). The key question, then, is whether deaf people learn to read in the same way as hearing people. Should "mainstream" models of learning to read be a single standard, to which all learners, regardless of who they are, must conform? Or should specific models be proposed to best account for deaf-specific pathways to reading? The place given to SLs in models of learning to read among the deaf is indicative of this dichotomy between following or breaking away from a majority model. It should be noted here that for us, learning to read does not stop at identifying words; we prefer the concept of literacy which include, according to Barré-de Miniac et al. (2004), not only reading and writing, but also their function and use in multiple contexts.

After an overview of recent representative American and French studies on this issue, we highlight recent lines of inquiry supporting our hypothesis of a deaf norm, i.e., a specific cognitive processing of information related to deafness (Garcia and Perini, 2010; Perini, 2013), which could contribute to the recognition of SLs as a key vehicle for deaf access to writing.

HIGHLY CONTRASTING ENGLISH-LANGUAGE STUDIES

Research on the acquisition of written English by deaf children has led to very divergent theoretical models. A first and dominant approach consists in considering that deaf children follow the same acquisition paths as hearing children. For both, mastery of phonological skills in English is the main prerequisite for the development of literacy skills. The difficulties of the deaf are therefore attributed to their more fragile access to spoken language phonology. The Simple View of Reading (SVR) is a model that describes the process of reading development in most learners (Gough and Tunmer, 1986; Kilpatrick, 2015) and provides an explanation for some reading difficulties such as dyslexia. In this model, reading comprehension (R) results from the interaction of two components: word recognition or decoding (D) and language comprehension (C). These two components are absolutely necessary: the deficiency of one element leads to the deficiency of the outcome (R). Trezek and Mayer (2019) consider the SVR formula ($R = D^*C$) to be a strong hypothesis for explaining reading development in the deaf, based on the premise that deaf people differ from hearing people only in the hearing ability. Depending on their level of face-to-face English proficiency, deaf children may show deficits in either the two components or in D alone. For them, SL plays no role. Another model designed specifically for the deaf, the QSH (Qualitative Similarity Hypothesis: see Paul, 2009; Paul et al., 2013; Andrews and Wang, 2015), also considers that deaf and hearing learners go through qualitatively similar processes, while acknowledging that skill development may be quantitatively delayed in the deaf. According to both models, while SL is considered beneficial in cognitive terms for deaf children due to its visual-gestural modality, it is not considered to contribute in any way to learning to read, as it does not provide access to phonological skills in the spoken language.

A part of the American research argue on the contrary in favor of deaf-specific literacy pathways. Some authors, while convinced of the importance of phonological skills in learning to read, temper the QSH hypothesis, arguing that these essential phonological skills are not necessarily linked to the auditory modality (Allen et al., 2014). Good abilities in ASL phonology may be sufficient, as argued by McQuarrie and Parrila (2014)—finding a positive correlation between phonological skills in ASL and reading proficiency in Deaf children. Few teaching programs have been proposed to exploit this hypothesis, including the noteworthy Cripps (2008) and Supalla (2017) on the reading of ASL as a transitional means to access the reading of English. Others, like Mayberry et al. (2011) and Miller and Clark (2011), suggest that deaf people's difficulties are due to a lack of early access to a SL (see also Cummins, 2007). Allen and Morere (2020), in a study involving deaf signing children aged 3–6, show that these children's identification of words and letters is better when they have had early access to ASL, even if they do not have deaf parents. That's why, for Caldwell-Harris (2021), ASL must be sufficiently established by the time the child begins formal reading instruction. Indeed, without a fluent language of instruction, the written language cannot be finely explained to the deaf student. Hoffmeister and Caldwell-Harris (2014), Hoffmeister et al. (2022) similarly propose a model describing the learning of written English in three stages: the deaf child initially relies heavily on word-sign connections, gradually breaks away from this strategy and implements new ones to acquire increasingly complex written structures. The experience of communication and discourse in ASL is therefore fundamental to understanding increasingly long texts. Kuntze et al. (2014) propose a model based on the observation of strategies employed by deaf parents and teachers and on the natural tendency of deaf people to learn in a visual mode. Their "visual model" has five components: ASL acquisition and visual engagement, emergent literacy, adult mediation *via* written English, knowledge of Deaf culture, and finally support of visual media such as video. Rooted in a sociocultural view of literacy, their concept of "Multiliteracy" allows them to take into account the role of deaf children's multilingual and multicultural skills in learning to read and write. Recalling that the deaf child, in learning written English, is learning a new language, the authors aim to take into account developmental factors that contribute to reading acquisition, such as the early linguistic and literary skills that emerge as early as birth. They show how these early skills can be acquired through the five components identified above.

French studies give to LSF (French Sign Language) more or less importance in the teaching of writing to deaf children, strongly depending on the field.

A PART OF FRENCH RESEARCH: MINIMIZING THE ROLE OF SL IN ACCESS TO LITERACY

SVR is the dominant model adopted in the majority of French studies in cognitive psychology. They presuppose a common development in hearing and deaf people and have a restricted conception of reading, which consists mainly of converting graphemes into phonemes. The experiments aim to demonstrate the major role of phonological awareness in the acquisition of efficient written word recognition processes (Colin, 2004; Colin et al., 2007, 2013). For this purpose, the authors emphasize visual strategies for accessing the phonological structure of spoken language (lip reading, Cued Speech), as a means of compensating for the auditory deficit (Leybaert et al., 2018), which they call "Visual (or amodal) Phonology". These authors, who have so far overlooked any possible link between SL and written language (the D and C components of the SVR formula only play their role with a spoken language), have recently been considering the interest of using SL at two levels. On the one hand, because it allows for the natural development of the C component (Colin, 2004); on the other hand, because of the complementary role it can play for the R component, alongside Cued speech and lip reading. Indeed, according to Leybaert et al. (2018), (p. 90), SL allows "the exercise of segmentation, categorization and regularity detection skills". It is then mainly mentioned for the possibilities SL would offer to establish formal correspondences between its units and those of the written language. However, SL and spoken language being quite different, these correspondences are limited to the configurations of the initialized signs and the dactylological units. It is noteworthy to note that (Courtin Cyril, 2005) is the only French psycholinguist to recognize the potential of SLs to support the development of good writing skills, with or without oral parallel education.

Some French researchers, however, take into account SL in the educational curriculum of the deaf, but through the perspective of bimodal bilingualism. In a similar vein as Swanwick (2016), (Mugnier, 2016, 2021) defined bimodal bilingualism as the simultaneous use of all linguistic resources available to deaf children (signs, spoken and written language). This approach wants to be as close as possible to the linguistic reality of deaf students, who in fact come mostly from hearing families, in which communication is mainly vocal. She thus insists on the importance of the use of signs and speech at the same time in the classroom, as a pragmatic solution to the linguistic variety of deaf students. Indeed, (Esteve, 2011) proposes a "reasoned pedagogy of code switching" which lets bimodal interactions develop freely. Nonetheless, for now, no well-defined proposals are made concerning bimodal teaching strategies for reading and writing French. As a matter of fact, "there is no real agreement in the international literature regarding what comprises a bimodal bilingual teaching approach and so it is difficult to compare and contrast strategies or draw firm conclusions about efficacy" (Swanwick, 2016, p. 42). Furthermore, considering the bimodal bilingualism propositions, some professionals seem to fear the risk of relegating the SL to a simple communication tool and to further weaken an already minority language (Swanwick, 2016).

In these two fields of French research, which admittedly have different perspectives, the fact that the majority of deaf children are born to hearing parents seems to justify not giving a central role to SL in access to literacy. The importance of early access to SL is little discussed, whereas it is well documented in the American literature presented above. The reference to the hearing norm is omnipresent in these works as well as in the SVR and QSH models. However, we believe to be essential to explore the hypothesis that the predominance of the visual in the deaf could influence their learning to read. This question is important in that a better understanding of deaf "functioning" could lead to a more appropriate written language instruction.

A DEAF NORM HYPOTHESIS AND ITS IMPLICATIONS

North American studies on proficient deaf sign readers/writers have recently revealed specific cognitive functioning and strategies for deaf people. The study of eye movement during reading in proficient deaf adult readers and young deaf children aged 6–12 (Bélanger et al., 2012, 2018; Bélanger and Rayner, 2015) showed that all of them have a more developed visual span than hearing readers, allowing them to process more visual information within a single fixation (when reading, the reader moves his eyes alternating short saccades and longer fixations). They also perform fewer re-fixations and backtracking when reading a text. No evidence of phonological procedures was found in the panel of deaf readers, suggesting that word identification in deaf readers is more likely based on visual recognition of whole words or word fragments. This hypothesis of a global word identification process is supported by analysis of the early writing of deaf preschoolers who are ASL or LSF signers: these "invented spellings" demonstrate a variety of visual strategies, which, it should be noted, rely heavily on the SL (Cripps, 2008; Herbold, 2008; Williams and Mayer, 2015; Beaujard and Garcia, 2020).

Other studies, this time from the social sciences, have also revealed cognitive specificities in deaf people and confirm, in a completely different way, the hypothesis of a global grasp of words in reading, and this, *via* a SL. Interviews with expert deaf readers were conducted and analyzed with a qualitative method, whose interest is to provide a holistic view of the processes of literacy acquisition in deaf people, and also to take into account the different contexts of acquisition. Adults interviewed by Silvestri and Wang (2018), and Mounty et al. (2014) report visual thinking "like a movie", reading strategies that directly link signs and written words, and understanding texts as "a whole, like a picture". In the panel studied by Silvestri and Wang (2018), as in the French panel of Garcia et al. (2007), the criterion distinguishing the most successful readers was the use of SL, at home and then at school. The most proficient were also the ones

who most readily recalled the teaching activities performed in the classroom. Caldwell-Harris (2021) explains this through the presence of ASL in teaching allowing for a full understanding of the learning. Other interviews with deaf signers show a clear link between good reading skills and early access to a SL (Morere et al., 2012; Wang et al., 2016).

The analysis of deaf writing provides yet another perspective on acquisition strategies that are thought to be unique to the deaf. Charrow and Fletcher (1974) were the first to suggest that the written language of American deaf people would be partly comparable to that of L2 learners (see also more recently Stokoe, 1960; Koulidobrova et al., 2018; Howerton-Fox and Falk, 2019). However, work on Quebec deaf written French conducted by the *Groupe de recherche sur la LSQ et le français sourd* at UQAM has revealed a number of particularities encountered only in deaf written productions. These include a disruption of syntax aiming at organizing utterances according to a visual logic (e.g., "la chambre du lit de l'oreiller", instead of "l'oreiller du lit de la chambre"). With her panel of deaf adults, Perini (2013) highlights specific details that deaf people use to mention in their text. For example, for the action of hanging a picture on the wall, Deaf people often describe the tools used and the actions performed, compared to hearing people: avec un clou frappe marteau pour crochet (Simon); Il a tapé la pointe sur le mur avec le marteau (Charles). The fact that these particularities are found in both deaf signers and non-signers suggests a processing of information specific to deafness prior to the linguistic processing in either language.

Based on these distinct studies with regards to both discipline and methodology, it appears that deaf people access literacy through specific pathways. The innovative hypothesis of a deaf norm as proposed by Garcia and Perini (2010) and Perini (2013) emerges, evoking the "cognitive common core" mentioned by Cuxac (2000) as the basis of any SL. Such a cognitive common core could indeed, to a lesser extent, be at work in deaf writing. Research on emergent SLs (e.g., Fusellier Souza, 2006, 2012; Martinod, 2019), conducted within the framework of the Semiological Approach (e.g., Garcia and Sallandre, 2014, 2020) has indeed shown the relevance of deafness in the structuring of sign languages. This would imply that SLs, as deaf creations, would best reflect the deaf-specific cognitive processing of information and would for this reason be the most likely to support successful cognitive development of the deaf child, whether he has deaf or hearing parents. We therefore hypothesize that SL is the best metalanguage for deaf access to literacy.

SOME PROMISING AVENUES

None of the studies presented proposes a specific method of teaching written language through SL. This is, more broadly, one of the major gaps in the work on written language acquisition in the deaf population (Hoffmeister and Caldwell-Harris, 2014). Nevertheless, the studies presented in this section allow us to identify a number of avenues that could guide the formalization of more effective pedagogical approaches. They show indeed that it is possible to learn to read and write *via* a SL. This simply requires early exposure of deaf children to a SL in the family, and then formalization of its learning in schools, so that it becomes a rich and fluid language for the child. Considering the written language of the deaf as a second language also makes it possible to specify the status of SL in access to literacy: a first language, that is to say a face-to-face language capable of playing the role of reference language in all school acquisitions.

Another important avenue, which goes beyond the question of the choice of first language for the deaf child, concerns the way in which written words are identified. In the majority model for hearing people, word identification is done through a phonological process. However, it seems that for deaf people this identification is done in a visual way, i.e., by global recognition of the word. Several authors exploit the idea of morphological awareness instead of phonological awareness (Gaustad, 2000; Clark et al., 2011; Perini, 2013; Beaujard, 2015). The study of orthographic regularities and word formation (radicals, lexical and grammatical affixes) would allow deaf people to improve word identification and extract meaning more easily. Some feedback from pedagogical experiments with adults (Marçot, L., and Perini, M., Marçot, L., and Perini, M.) and children (e.g., Duhayer, 2005; Kellerhals, 2005) describes the process by which deaf teachers and learners use SL to construct meaning in written language (see also Humphries and MacDougall, 1999). However, the processes by which deaf children acquire written language using SL as a metalanguage still need to be described in more detail in order to understand the cognitive strategies that are put in place and to exploit them for teaching.

CONCLUSION

The inclusion of all people in society requires a rethinking of what is traditionally understood as part of the norm. Every human being is now considered normal, not in spite of their differences but with their differences. If states adhere to this concept of inclusion, through the ratification of major international texts, schools must also welcome all ways of being in the world, including language. We consider that there are different paths to literacy and that the hearing majority model alone does not explain how it works.

The differences between "assimilative" approaches and approaches that deviate from a dominant model are very profound, touching on the way in which the written word and the deaf public themselves are viewed. Researchers adopting the assimilative view have a reductionist approach to writing, which is primarily understood in terms of its smallest units and how they are combined (Perini and Garcia, 2022). Most of these authors rely on experimental research based on the comparison of performance between deaf and hearing people. This both presupposes and reinforces a vision of the deaf public as being deficient, inevitably lagging behind hearing people in terms of

the quality of phonological representations. The only foreseen solution is then to reduce the gap with the supposed norm (improve hearing) and to compensate for it with visual tools (cued speech for example). Researchers calling for a move from the mainstream model take a broader and more qualitative view of literacy, encompassing its linguistic, cognitive, sociological and cultural dimensions. They conduct more general studies of good deaf writers to identify success factors. This broader and less prescriptive view allows access to writing to be seen as a complex and multifactorial process and to consider the deaf public in all its diversity. Although no generalizable pedagogical solution has been proposed to date, the studies presented here, even though still essentially descriptive and partly programmatic, allow us nevertheless to highlight avenues for teaching writing to the deaf that meet their specific cognitive and attentional needs.

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All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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