

# The consequences of very late exposure to BSL as an L1\*

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Mayberry and Kluender (2017) make an important contribution to our understanding of the CPL, reporting the striking differences in regions of brain activation in Martin, a deaf man with very late exposure to an L1, compared to other deaf individuals, when processing single signs of ASL. They conclude: “The unique effects of AoA ... suggest that the hierarchical structure of language and the architecture of the brain language processing system arise from their interaction over the course of early childhood when brain maturation and language acquisition are temporally synchronized.”

This commentary describes a case study of another deaf person with very late exposure to L1, who exhibits difficulties with hierarchical structure in both phonology and syntax, despite over 25 years exposure to British Sign Language (BSL) at the time of testing (Woll & Atkinson, 1999), providing evidence to support Mayberry and Kluender’s claim and indicating the profound differences between M and deaf individuals with exposure to BSL in childhood either as an L1 or L2. It will be interesting to compare Martin and M in the future.

M was born and grew up in East Africa, with no access to education or contact with other deaf individuals before arriving in the UK in his late 20s. He works as a van driver and is a member of the local Deaf community. Data were collected in the context of a legal case.

## Cognitive assessments

M’s score on Raven’s Standard Progressive Matrices (Raven, Court & Raven, 1987) placed him between the 25<sup>th</sup> and 50<sup>th</sup> percentile of the general population; his score on the WAIS III (1997) Block Design Subtest, was at the 16<sup>th</sup> percentile; and on the WAIS III Picture Completion Subtest, at the 37<sup>th</sup> percentile. These scores

indicate relatively unimpaired general intellect despite linguistic deprivation.

## Formal linguistic assessments

Single sign comprehension was tested using the Sign-to-Picture Matching Test from the BSL Aphasia Assessment Battery. A sign has to be matched to one of 5 pictures: the target, and semantic, phonological, visual and unrelated distractors. There are 40 items: 20 highly iconic and 20 non-iconic, with iconicity previously rated by hearing non-signers and deaf and hearing signers (Atkinson, Marshall, Woll & Thacker, 2005).

The mean score for Deaf controls was 39.15 (SD = 0.81). Aphasic signers scored an average of 16/40. M also scored 16/40. However, his pattern of errors was very different from the aphasic signers. They showed no effect of iconicity, scoring equal poorly on iconic and non-iconic signs, while M scored 11/20 on iconic signs, but only 5/20 on non-iconic signs. His scores are comparable to the scores (10/20 for iconic signs, and 3/20 for non-iconic signs) of hearing non-signers.

In the Sign Production (Naming) Task (BSL Aphasia Assessment Battery), pictures of 30 high familiarity items (e.g., moon, tree) and 30 low familiarity items (e.g., mushroom, butterfly) are presented. On high familiarity items, M scored 15/30. His errors included 7 gestures, and 7 incorrect (idiosyncratic) signed responses (for example, NIGHT SUN for moon, GREEN BIG-UPRIGHT-OBJECT for tree). His performance was poorer on low familiarity items (12/30). The results indicate that despite many years of interaction with BSL users, M has a limited BSL vocabulary.

The Sign Comprehension (BSL Receptive Skills Test) was originally developed (Herman, Woll & Holmes, 1999) to assess BSL grammar in children. M passed the vocabulary pre-test, indicating that he had sufficient vocabulary to undertake the test. Each of the 40 test items consists of a BSL sentence presented on video. The subject has to select the correct picture from four

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choices. The average score for a native signing deaf 12-year-old is 36/40. M scored a total of 20/40, comparable to the average score for a 5-year-old deaf native signer. However, his pattern of errors was strikingly different, scoring particularly poorly on negation (1/9 correct) and on verb structure (9/18).

### Other linguistic data

We also analyzed around 10 hours of video-recorded forensic interviews with M. The problems identified in the BSL assessments were even more evident in his spontaneous communication: phonological errors; idiosyncratic vocabulary; grammatical errors; poor time referencing; difficulties with negation, etc. Several examples are discussed below.

In both signing and fingerspelling (a system representing English orthography manually), M uses handshape inconsistently. He fails to maintain contrasts in fingerspelling handshapes: for example, where signs are derived from abbreviated fingerspelling to represent place names, he sometimes correctly uses 'l-c' for Leicester (dominant index finger contacts non-dominant palm for -l-), but sometimes index and middle fingers contact the palm: 'n-c', (which means Newcastle); and at other times index, middle and ring fingers contact the palm: 'm-c' (Manchester). He also shows inconsistency in order, for example, both 'j-s' and 's-j' for the supermarket J. Sainsbury.

As with fingerspelling, M is inconsistent in handshape use, for example, sometimes producing (tell-a)-LIE (extended index finger) with extended thumb (NICE). He has difficulties with maintaining required contrasts in other parts of BSL phonology as well, for example, not maintaining the required location distinction between MISTAKE (chin) and WHEN (ipsilateral cheek). He also often fails to use correct hand orientation, for example inconsistently distinguishing GIVE (palm up), from (to)-POST (palm down).

It is also often very difficult to assign semantic or grammatical roles to M's utterances. For example, his production of ASK WANT SON GIVE-LIFT HOME could mean "I asked if you want your son to give you a lift home", "my son asked if you want a lift home", etc.

These errors, and his difficulties in correctly producing negation, are indicative of difficulties with hierarchical structure.

As Mayberry and Kluender indicate, research with deaf individuals provides a unique opportunity to explore core areas of linguistic and cognitive theory. For many deaf children, a spoken language is the only language they are exposed to during the CP, in the belief that simultaneous exposure to a sign language will have a negative impact on their acquisition of a spoken language, and in the belief that sign language can be easily acquired at any age. For a child who, even in the context of early intervention, does not acquire a spoken language, the danger is that they will never have native-like mastery of any L1. Research in this area thus provides an important contribution to policy in relation to language development of deaf children and a unique perspective on bilingualism: the importance of providing deaf children with early exposure to both a signed and spoken language.

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