Implications for language acquisition theories: a fresh look at the "genie case"

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Language is one of the classic examples of the sensitive periodicity of the brain. What it is known so far is that language has a critical period for learning. Babies and children are geniuses until they turn seven, and then there's a systematic decline in their ability to acquire languages. One of the most fascinating examples in this regards is the case of Genie, a young girl who for the first 13 years of her life underwent a degree of social isolation and experiential deprivation not previously reported in contemporary scientific history. A lot of laboratory work was done on this case, and linguists and scientists tries to address head-on hypothesis about language and human mind, however, new studies (2011-2015) indicate that early speech learning is not only limited by the critical period of the first years of life, but it is also severely limited in the absence of social interaction. Moreover, by the age of 5, prior to formal schooling, studies like Patricia Kuhl's (2011) show that brain activation in the brain areas related to language and literacy are strongly correlated with the social environment of the child's family. Therefore, scientifically speaking, more than anything Genie's case proved that complete lack of social interaction has a devastating impact on human language learning, to the extent that normal language skills are never acquired.

Keywords: language acquisition, Genie Case, neuroplasticity, critical period, social environment

During my childhood, one of the first books I got to love was *The Jungle Book* and by far my favourite character was Mowgli. It was, if I remember well, one of the first books I owned. If back then it seemed to be a funny, happy story, I realize now, a bit sad, that I will not be able to ever read it again the way I did before. And that happens because, while learning about the Genie case, although a much bitter story, the story of Mowgli, the feral child suddenly came into my mind. It is obvious that Rudyard Kipling was not acquainted or missed the mark that by all accounts, individuals raised by animals or rescued from circumstances similar to Mowgli's are never able to acquire the facility with language, social customs or even human understanding at the degree that his main character show.

One of the defining characteristic of humanity, of the Homo Sapiens is the ability to talk, to utter grammatically correct and logic sentences. Carl Linneaus in his System of Nature published in 1735, distinguished between Homo Sapiens and Homo Ferus (Wild Man), the latter lacking the ability to speak. In this category there may be included children who are



Patricia Kuhl
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reported to have undergone a significant period of their development alone in the wilderness or to have been reared with wild animals (Itard, 1962; Singh and Zingg, 1966).

Of the most intriguing, and scientifically fascinating case was the one of a young girl, who for the first 13 years of her life underwent a degree of social isolation and experiential deprivation not previously reported in contemporary scientific history.

What it is known so far is that language has a critical period for learning. Babies and children are geniuses until they turn seven, and then there's a systematic decline. After puberty, the time when Genie was found by the police, the scientists and linguists say that we, as humans, start to fall off in our abilities to acquire a language. Language is one of the classic examples of a "critical" or "sensitive" period in neurobiology (Lenneberg 1967; Johnson and Newport 1989; Newport et al. 2001; Knudsen 2004; Kuhl 2004; Bruer 2008). Scientists are in agreement with the decline in language acquisition but laboratories all over the world are trying to figure out why it works this way.

The Genie case was one of the most researched and tested case of feral children back then in 1970s. One of the scientists who became especially important to Genie was the linguist Susan Curtis. She, or any linguist, had never encountered a case such extreme as Genie's, so this represented a tremendous opportunity to address head-on, specific hypothesis about language and human mind. An important question for her was whether a child so socially, emotionally and nutritionally deprived could eventually develop into a 'normal' person. Moreover, a teenager who passed over her 'critical period' seemed to have missed her chance of ever speaking forever (Fromkin, Curtiss, et al., 1974). The concept of a "critical period" during which certain innately determined faculties can develop derived from experimental embryology. Lenneberg (1967) presents the most specific statement about critical periods in man as it concerns the acquisition of language. He starts with the hypothesis that language is a faculty deep-seated in human brain, that language acquisition is determined by the correct functioning of the neurological events and also by some minimal contact with speech and language. He suggested that this 'critical period' lasts from two years old to puberty and that language acquisition is impossible before two due to maturational factors, and after puberty because of the loss of "cerebral

elasticity" caused by the completion of the development of cerebral dominance.

Important to remember is that Lenneberg's hypothesis was stated in 1960', but given the current state of research in linguistics, an active and alive science, there is widespread agreement that humans do not learn equally well over the lifespan. The laboratory work of linguists consists, thus, in finding the answer to what accounts for the inability of adults to acquire a (new) language with the ease and ability of an infant. Lennerberg's idea was one of the pioneering, but more recent hypotheses take a different perspective. Newport (1990) raised a "less is more" hypothesis, which suggests that infants' limited cognitive capacities actually allow superior learning of the simplified language spoken to infants. An even more recent theory was raised by Patricia Kuhl, director of Institute for Learning & Brain Sciences at the University of Washington. She advanced the concept of neural commitment, the idea that neural circuitry and overall architecture develops early in infancy to detect the phonetic and prosodic patterns of speech.This architecture is designed to maximize the efficiency of processing for the language(s) experienced by the infant (Kuhl, 2004; Zhang, Kuhl, Imada, Kotani, and Tohkura, 2005; Zhang et al., 2009).

Nowadays, new data are being used to study the patterns of action between brain and behavioural measures. These studies employ high-tech equipment like Magneto-Encephalograph (MEG), Electroencephalograph (EEG), Magnetic Resonance Imaging (MRI), and diffusion tensor imaging (DTI) (Kuhl, 2004). In 2004, Kuhl advanced a new hypothesis—that in the earliest phases of language acquisition, infants combine a powerful set of domain-general computational skills with their equally extraordinary social skills to "crack" the speech code. Furthermore, she hypothesized that the social brain "gates" the computational mechanisms underlying learning in the domain of language (Kuhl, 2004, 843).

But just as we began to embrace this relatively new theory, experimental results tempered the computational conclusion. New studies indicate that early speech learning - at least in complex natural settings - is severely limited in the absence of social interaction, suggesting that something more than passive computation is required to explain infants' rapid language advancement in the firstyear of life (Kuhl, 2007). Moreover, by the age of 5, prior to formal schooling, studies show that brain activation in brain areas related to language and literacy are strongly correlated with the social environment of the child's family. The implication of these findings is that children's learning trajectories regarding language are influenced by their experiences well before the start of school (Kuhl, 2011).

This brings me back to Genie's case who, for her entire childhood, was inhumanly deprived of any social interaction. Scientifically speaking, more than anything this case proved that complete lack of social interaction has a devastating impact on human language learning. These data suggests that learning depends on a normal social interest in people and the signals they produce. This showed that social deprivation has a severe negative impact on language development, to the extent that normal language skill is never acquired. Therefore, early speech acquisition is closely connected to social factors. Susan Curtiss –the linguist who closely and intensely studied Genie -mentioned that even though she was "delighted by the world around her" (Curtiss, 2003) and she was learning the words for the new things she was seeing, having a wide vocabulary, she was not able to normally communicate. Strikingly, she possessed an early vocabulary very atypical with lots of concepts that don't develop until later in a child. But, because "language is not words, language is grammar" (Curtiss, 2003) Genie was deficient in the mental faculty that we call grammar, and thus, she was not able to properly communicate.

At the time Genie was tested, brain science was a young branch of medicine, but today we have a cleared picture of what happens in the brain in extreme cases of neglect such as Genie's. Neurologist Dr. Bruce Perry (2003) sustains that in Genie's brain, because she never heard any words and she was never spoken to, the left part, the cortex, that has the neuro-system responsible for the utterance of sentences, did not get stimulated and became smaller and ultimately the left part of her brain physically changed and was inactivated. However, Genie might have been an exception, and she might have had the right hemisphere responsible for the speech. The lateralization, might, therefore be different, the left hemisphere must perhaps be linguistically stimulated during a specific period of time for it to participate in normal language acquisition. If such stimulation does not take place during this time, normal language acquisition must depend on other cortical areas and will proceed less efficiently due to the previous specialization of these areas for other functions (Fromkin, Curtiss, et al., 1974). The brain possess the capacity of neuroplasticity, able to create alternative roads, synapsis in the brain, if one part is damaged, or inactivated from various reasons.

Therefore, even if Genie never acquired proper language, she never acquired proper syntax, in spite of intensive training she received from professionals, she was still able to utter words, perhaps owing to the right hemisphere of her brain.According to Susan Curtiss "Genie's vocabulary grew by leaps and bounds, but she was still not able to string words together into meaningful sentences. Normal children begin by learning to say simple sentences, like 'No have Toy'. Soon, they are able to say 'I not have toy'. Eventually they will

learn to say 'I do not have the toy', lately they will refine the sentence and say 'I don't have the toy'. Genie seemed to be struck at the first stage" (Curtis, 1977, 94). On the other hand, Genie's progress in language acquisition impressionistically seems to have far exceeded that of the other reported cases.

Although the case of Genie is still controversial (as every topic concerning human brain), it is important to notice that language involves inter-hemispheric interaction leading to the formation of cooperative neuronal assemblies in the two hemisphere (Friederici and Alter, 2004). The case of Genie represented a once-in-a-life-time opportunity for linguistics, neurologists, psychologists and many other scientists. All of them worked hardly hoping to develop some new theories concerning language acquisition or to clarify some debatable concepts. Unfortunately, many believed that their fervour to make some pioneering and revolutionary discoveries led to the ignorance of the real things that the girl truly needed. Her case left the world with many questions, as the main funder of the research - The National Institute of Mental Health - revoked funding in 1974 because of the discrepancies between her family's wishes and the ones of the research team; everything sadly ending up with the hospital and researchers being sued by Genie's mother for excessive testing.

Bibliography:

Bock, P. (2005). *The Baby Brain. Infant Science: How do Babies Learn to Talk*? Pacific Northwest: The Seattle Times Magazine.

Bruer, J.T. (2008). Building bridges in neuroeducation. In A.M. Battro, K.W. Fischer & P.J. Lena, The Educated brain: Essays in NeuroEducation, New York: Cambridge University Press, 43-58

Centre on the Developing Child at Harvard University. *Experiences Build Brain Architecture" and "Serve and Return Interaction Shapes Brain Circuitry,* videos, "Three Core Concepts in Early Development. [Video] Retrieved April 03, 2016, from "http://developingchild.harvard.edu/resources/multimedia/videos

Curtiss, S. (1977). *Genie: a psycholinguistic study of a modern-day "wild child",* Cambridge, Academic Press, 94

Curtiss, S. Genie, (2003) Video Interview. Retrieved May 23, 2016 from https://www.youtube.com/watch?v=zvu0MA2CF2A

Friederici, A.D., Ruschemeyer, S.A., Hahne, A., & Fiebach, C.J. (2003). *The role of left inferior frontal and superior temporal cortex in sentence comprehension: Localizing syntactic and semantic processes*. Cerebral Cortex, 13, 117–177

Fromkin, V., Krashen, S., Curtiss, S., Rigler, D., &Rigler, M. (1974). *The development of language in Genie: a case of language acquisition beyond the 'critical period'*. Elsevier Inc., 4-7

Itard, J.M.G. (1962). *The wild boy of Aveyron*. (G. Humphrey & M. Humphrey, Trans.). New York: Appleton-Century-Crofts.

Johnson, J.S. and Newport, E.L. (1989). *Critical period effects in second language learning: the influence of maturational state on the acquisition of English as a second language*, Cognitive Psychology

Knudsen EI, (2004). *Sensitive periods in the development of the brain and behavior*. J Cogn Neurosci 16, 1412–1425.

Kuhl, P. (2000). *A New View of Language Acquisition,* paper presented at the National Academy of Sciences colloquium "Auditory Neuroscience: Development, Transduction, and Integration," held May 19–21, 2000, at the Arnold and Mabel Beckman Center in Irvine, CA. Published by the National Academy of Sciences.

Kuhl, P. (2012). *Talk on "Babies' Language Skills." Mind, Brain, and Behavior* Annual Distinguished Lecture Series, Harvard University

Kuhl, P. K. (2015). *Early Language Learning and the Social Brain.* Cold Spring Harbor Laboratory Press;

Kuhl, P. (2011). *The Linguistic Genius of Babies*, video talk on TED.com, a TEDxRainier event. Retrieved April 25, 2016, from www.ted.com/talks/patricia_kuhl_the_linguistic_genius_of_babies.html

Kuhl, P.K. (2004). *Early language acquisition: cracking the speech code*. Nature Reviews Neuroscience, 5, 831–843.

Kuhl, P.K. (2007). *Is speech learning 'gated' by the social brain*? Developmental Science 10:1, pp 110– Blackwell Publishing Ltd USA. Language, 1, 81–107.

Lenneberg, E.H. (1967). *Biological foundations of language*, Wiley, New York

Newport, E. L., &Aslin, R. N. (2004). L*earning at a distance: I. Statistical learning of non-adjacent dependencies*. Cognitive Psychology, 48, 127–162

Newport, E.L. (1990). *Maturational constraints on language learning*, Cognitive Science 14, 11-28.

Singh, J. A.L. and Zingg, R. M. (1966). *Wolf-Children and Feral Man*, Archon Books

TLC Documentary, (2003). Genie Wiled. Retrieved April 24, 2016 from https://www.youtube.com/watch?v=VjZolHCrC8E

Zhang Y, et al. (2009) *Intrinsic histone-DNA interactions are not the major determinant of nucleosome positions in vivo*. Nat StructMolBiol, 847-852

Zhang, Y., Kuhl, P.K., Imada, T., Kotani, M., &Tohkura, Y. (2005). *Effects of language experience: neural commitment to language-specific auditory patterns*. NeuroImage, 26, 703–720