

A conversation with Prof. Nivedita Mani on recent perspectives in early word learning research, by Prof. Laura Bosch.

Dr. Nivedita Mani is Professor of Psychology of Language at Georg-August-Universität Göttingen. She received a DPhil from the University of Oxford in 2006. After two post-doctoral positions, first one at St Hugh's College, Oxford, and a second one at University College London on a British Academy fellowship examining phonological priming in infancy, she finally moved to Göttingen in January 2010 to set up the Psychology of Language Research Group and the associated infant language lab, *WortSchatzInsel*. She is principal investigator on a number of projects funded by the German Research Foundation (and the British Academy during her time in the UK). She has published extensively in her field, including the recent co-edited Volume *Early Word Learning*¹. Her work examines the factors underlying word learning and recognition in young children and views word learning as the result of a dynamic mutual interaction between the environment and the learner, with particular focus on the learner and what she knows, what she is interested in and, more recently, her motivation to learn.

<http://www.uni-goettingen.de/en/356789.html>

We recently met at the WILD 2019 workshop in Potsdam where you offered a talk with a suggestive title: *Why do children learn the words they do?* I would like to talk with you about this interesting topic so that the reader can get a more clear idea about the specific questions that are currently being addressed in this field and the novelty of your approach to early word learning.

(1) First word production is a crucial milestone in language development usually reached around the age of 12 months. This is the result of a long and complex process beginning several months before and involving developments in both the perception and production sides. To begin with, could you briefly describe the basic skills and the knowledge that is needed to successfully reach this crucial milestone?

Indeed, that first word around the age of 12 months and all the words that follow it are the result of a number of processes that have begun earlier on – even as early as in the womb – and will continue to develop well past the first year of life. On the language side, this requires the child to be able to comprehend and produce the component sounds associated with words in their language, discriminate these sounds from one another, recognize and produce them in coarticulatory contexts, i.e., surrounded by other sounds and words. At the same time, children need also to associate meaning with these words, that is either associate these words with some real world referents (in the case of concrete nouns) or accumulate a set of associations for these words, understand the contexts that these words can be used in (in the case of abstract nouns, verbs and function words).

Especially in the case of concrete nouns, which I focus on in my work, children also need to learn to categorize their visual world in order to be able to associate such words with particular objects in their environment. Thus, for instance, in learning the word dog, children need to know that this word applies not just to the dog that they have at home but also to other dogs they see on a routine basis and dogs that they encounter in the future that may not resemble the dog they first learned to associate this word with. Thus, a degree of cognitive development in terms of categorization, generalization, discrimination and

¹ WESTERMANN, Gert; MANI, Nivedita (ed.). *Early word learning*. Routledge, 2017.

identification of objects and sounds in their environment is a prerequisite on the path to that first word.

(2) Word learning must be considered something more than a mere label-object association or mapping. Successful word learning entails overcoming a number of problems typically occurring in word learning contexts. Can you highlight which are some of these problems for the young naïve learner?

Indeed. The situation I have described above – complicated as it may seem – is the ideal scenario. Infants and young children face a number of additional challenges when it comes to learning words. For instance, infants are exposed to a variety of inputs from different people in different contexts, spoken with different accents in different states of emotional and physical health. We know that all of these factors lead to subtle but important differences in the physical properties of the words that children hear on a daily basis. Children need to learn which of these differences can be ignored and which of these are functionally relevant; which of these could be retained to ease later word recognition despite it not being functionally relevant, e.g., retaining information pertaining to the accent of an oft-encountered speaker despite such accentual differences needing to be ignored when recognizing a word.

(3) Are there any biases that help explain children's rapid and successful word learning in spite of the above mentioned difficulties?

This depends on what you mean by biases, when and how you think they come into existence and whom you ask! If you ask me, there are definitely certain cognitive predispositions that children develop based on their experience with the world that may shape their attention to different sources, such that over time, children learn to attend to relevant sources of information in their environment helping them to filter out distractions.

(4) A closer look at the words individual children learn reveals great variability. Is the source of variability mainly dependent on the input characteristics (quantity and quality), as it has been traditionally considered?

For a long time, it was thought that the main source of variability in the number and kinds of words known to individual children at different ages was the quality and quantity of input that children received, i.e., what children hear and see will determine which words children will learn. Indeed, it is true that language is acquired knowledge. Children need to hear and see language being used in order to learn language.

However, more recently, studies suggest that children are not just passive recipients of the input that they receive but also that children may actively steer their learning by attending to particular kinds of input more than other kinds of input. This is based on studies showing that children regularly elicit information from people about objects they are interested in knowing more about, that they learn and retain information from certain kinds of people more than others, that differences in the degree of children's self-exploratory learning correlate with later vocabulary size, that they are in general selective with regard to whom they learn from, what they learn and when they elicit and retain new information. This suggests that there is an active child-directed component to learning that may equally contribute to the variability in the words that children learn.

(5) Your conceptual perspective on early word learning highlights the "active" role children play in this task: both children's knowledge and interests would be driving early word learning. Can you more explicitly describe this interesting perspective?

What factors may influence such active learning in children... As noted above, while it remains true that the input influences the number and kinds of words children learn, recent work suggests that there may be a number of other factors at play that may bias not just what children learn, but potentially also the input that children receive.

This includes for instance the knowledge that individual children possess. Thus, there are differences in the amount of information that children possess about particular words and particular kinds of words and what children know about particular words shapes the words they are likely to learn. For instance, children who already know a lot of animal names are likely to find it easier to learn a new animal name since they have a lot of knowledge about this category that they can leverage in learning a new word. Thus, for instance, this child might know that animals are animate, that they typically have eyes and often have noses, ears, mouths and legs and that they move. Now when a child is familiar with more animals, then this child has a greater variety of attributes stored with regard to what an animal is and has more certainty about attributes that are necessary or required for something to be an animal. This knowledge may make it easier for the child to quickly categorise the visual stimulus that it receives – upon being presented with a novel animal – and learn the label for this object. Equally, if a child knows many words that sound similar to one another, e.g., cat, rat, fat, mat, then it may be easier for a child to learn another word that sounds similar to these words because it is in possession of greater certainty with regards to the sounds that make up this word. In such cases, we suggest that children can use the knowledge they already have about particular words to learn new words that overlap on certain dimensions. Thus, children’s knowledge may steer which words are learned and retained to a considerable extent.

While this suggests that the words that children already know may influence the words they are likely to learn, this leaves unanswered why children know so many words in particular categories in the first place. Could this perhaps be indirectly related to the input that they receive or could there be other factors that influence their knowledge about the world? We suggest that one such factor is children’s interest in particular objects in the world around them. In particular, we suggest that there are likely to be differences in children’s interest in particular objects in their environment, e.g., some children are likely to be more interested in and fascinated by animals, while others may be more interested in vehicles. This interest, we suggest, may drive them to attend more to objects that they are interested in and learn and retain more information about such objects. Thus a child who is more interested in animals may learn and retain a new animal name with more ease than a child who is more interested in vehicles.

(6) In which way this perspective differs from other points of view in which the role of the environment and, more specifically, the role of the caregivers is more heavily weighted?

Pedagogical approaches to language learning suggest that children benefit from caregivers intuitively providing them with the optimal input that they require in order to learn. Thus, we and caregivers know how to talk to infants, what to talk to them about, when to talk to them and that the optimality of the input that we provide is instrumental in shaping learning. Without discounting the influence of caregivers’ input on learning, this active learning perspective suggests that what children know and what children are interested in will not only shape what children will learn but also what kind of input they receive, with caregivers being sensitive to the kinds of things that their children already know about and are interested in and providing more input of this sort. Thus, moving away from a unidirectional influence of input on children’s learning, this approach suggests that children may shape the input as well as being shaped by the kind of input that they receive.

(7) You have suggested a link between rapid word learning and reward-based processing (i.e. the motivation to learn, to put it in a different way). This is a suggestive idea, but how could it be addressed in infancy research?

Indeed. In some ways this is not a new idea. Right down from Aristotle to Piaget, philosophers and researchers have suggested that children may be intrinsically motivated to learn. That learning may be rewarding in and of itself. This may be a specific intrinsic motivation, with children specifically interested in acquiring information about some particular aspect of their environment, in which case it may overlap more with their curiosity about a particular topic, or it may be a more general intrinsic motivation to learn, i.e., that they want to learn in order to advance their knowledge but that this learning is not restricted to any one particular area. Curiosity in a particular topic and its influence on learning may be tapped into by examining children's interest in different topics and how it shapes learning (as described above). A general intrinsic motivation to learn may be more difficult to tap into. In adults, such studies have examined the extent to which the reward circuit in the brain, i.e., the ventral striatum, is activated during adults' word learning. This is more difficult in young children and may require less invasive techniques, including for instance, behavioural measures of reward-based processing, e.g., body posture or body valence, or neurophysiological measures such as pupil dilation or brain oscillations, to examine the extent to which children find learning, and word learning, in particular rewarding.

(8) Is this perspective useful to better understand and explain delays in word learning, as for instance those found in late talkers or even in children with a Developmental Language Disorder?

I think this perspective could be very useful not just to understand delays in word learning but also to foster improved learning in such populations. Identifying areas in which children are motivated to learn and using their motivation to learn in these areas to foster additional learning are techniques that the pedagogical literature has long focused on. There is considerable awareness that schooling success is closely related to whether children are interested in what is being taught and how long they persevere in particular tasks. There is currently no reason to suppose that a similar intrinsic motivation might not be useful to boosting learning in populations with language disorders. Equally, there is a possibility to consider that children with difficulties in language may be aware of their difficulties and may therefore show reduced affective motivation to learn, given that they conceive of themselves as being weaker in a particular area. Again, in the schooling literature, this notion of children's self-concept has been shown to influence not just how well children learn but also how long they persevere at particular tasks, leading to the possibility that such a self-concept in terms of one's difficulties at a particular task may lead to difficulties in learning and retention.