

INVITED COMMENTARY

The acquisition of sign languages in rural contexts – what can we do when samples will always be ‘too small’?

Hannah LUTZENBERGER 

English Language and Literature, University of Birmingham, UK
E-mail: h.lutzenberger@bham.ac.uk

(Received 28 November 2022; accepted 05 December 2022)

Keywords: sign language acquisition; Kata Kolok; sample size

Our knowledge and theories about language acquisition are skewed towards urban languages, and primarily English (Kidd & Garcia, 2022). Cristia and colleagues convincingly show that studies on the acquisition of rural languages are scarce. The authors suggest that in rural settings, combining experimental and observational approaches is critical to testing and sharpening our theories about language acquisition. Nevertheless, they also acknowledge the numerous challenges that make it difficult to conduct, analyse and publish this type of work.

This bias towards urban languages is systematic and wide reaching: in the relatively new field of sign language acquisition, research stems primarily from a few urban sign languages used in the Global North (Edward, 2022; Lillo-Martin & Henner, 2021), with some additional work from urban centres of other parts of the world (e.g., Brazilian Sign Language: Karnopp, 2008; Hong Kong Sign Language: Lam & Tang, 2015; Pan & Tang, 2017; Nicaraguan Sign Language: Senghas, Kita, & Özyürek, 2004). Furthermore, some scholars have focused on various aspects of signing systems used by (individual) deaf children and their hearing families (e.g., Mexico: Haviland, 2022; Guatemala: Horton, 2018; Peru: Neveu, 2019). Research on the acquisition of sign languages used in rural communities with a high percentage of deafness is rare (but see de Vos, 2012; Hou, 2016; Lutzenberger, de Vos, Fikkert, & Crasborn, 2023; Nonaka, 2004). Given my personal experience, I focus on one such community in this commentary.

One reason for the sparsity of research in rural communities identified by Cristia and colleagues stems from challenges associated with sample size: attaining the common standards of ~40 children for an experiment requires disproportional time, travel, and financial efforts in rural communities. In signing populations, this is even more complicated as the participant pool is limited and heterogeneous (Lieberman & Mayberry, 2015; Morford, Nicodemus, & Wilkinson, 2015). For this reason, many experimental studies have either focused on children of deaf parents or deaf children with varying ages of sign acquisition as participants. The few studies that investigate how children acquire sign languages used by rural communities are based on observational data of a few children – none have studied acquisition experimentally (Lutzenberger, 2022 excepted).

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I study the acquisition of phonology in Kata Kolok, the sign language of a rural enclave in Bali, combining observational and experimental methods. Currently, ~35 deaf people reside permanently in the village of ~3,000 inhabitants. Kata Kolok has been used and acquired by at least six generations of deaf signers and a large proportion of hearing villagers has signing skills as well. Nevertheless, the number of deaf villagers remains small, limiting the number of ‘native signers’ who use Kata Kolok as their primary means of communication. Currently, only one eight-year old deaf child lives in the village; other deaf children have moved away for their parents’ job or to access deaf education elsewhere. The deaf child and some hearing children of similar ages acquire Kata Kolok from their deaf parents or deaf kin and form a signing peer group.

This situation is particularly interesting: although the number of deaf children is very small, children who acquire Kata Kolok receive signed input from many deaf and hearing interlocutors from birth. This input includes signing directed to the child (child-directed signing) and signing that does not directly address the child but available in the child’s environment (overseen signing). This makes the language acquisition setting of Kata Kolok critically similar to other (spoken) languages. At the same time, it differs markedly from most sign languages in the Global North where deafness occurs in 0.1% of the population (CDC, 2020) and most deaf children experience language deprivation (Hall, 2017; Hall, Levin, & Anderson, 2017) as only 5-10%, or less (Costello, Fernández, & Landa, 2008), are born to deaf parents who sign (Lillo-Martin & Henner, 2021; Mitchell & Karchmer, 2004). Small communities with relatively vibrant signing traditions into which children are born, like Kata Kolok, may make them even more worth studying – yet access is limited.

Clearly, the sampling challenge is aggravated in the case of Kata Kolok, yielding i) smaller sample sizes and ii) more heterogeneous samples. First, sampling happens from a much smaller pool than available in other signing or speaking populations; specifically, only very few deaf children (<5) and few hearing children with deaf caregivers (<15) presently live in the village. With less than 20 children who receive rich signing input from birth, sample sizes of 40 children for any experiment are unattainable. Second, sampling happens from the available pool of child signers who vary in their gender, age, language background, etc. For example, for a low-tech habituation paradigm targeted at phonological discrimination we were able to sample eight signing children between the ages of 0;4 to 4;0 years old, six of which were hearing and two deaf, and they varied as to whether they grew up with one or several deaf caregivers in their nuclear family (Lutzenberger, 2022). This group represents an exhaustive sample of the population of young signing children at the point in time when sampling was done.

This situation creates a challenge different from that of Cristia and colleagues: small sample sizes and uncertain populations that cannot be increased with more efforts; data collection is opportunistic and time-sensitive to whenever children are born into signing families, possibly coming at the cost of a ‘good’ sample size or extensive piloting of experiments. The biggest problem with small sample sizes is, as explained by Cristia and colleagues, the difficulty with common statistical analyses, and as a result, the interpretation and publication of results. Although Cristia and colleagues (2020, p. 7) argue for “mov[ing] away from statistical significance as the main criterion for judging noteworthiness and towards contextualized reading of the size of effects”, this remains difficult for work in rural signing communities; we may be able to sample most, if not all, relevant individuals in the population but traditional statistical analyses are

designed to generalise from a sample to the population rather than testing the entire population. It is therefore unclear how useful traditional analyses are for small samples.

If the sample size cannot be increased, as in my case, and robust statistical analyses do not seem to apply, the researcher needs to innovate. One way to deal with a small sample is a multi-method approach that aims to maximize data from individual participants (see also Cristia, Farabolini, Scaff, Havron, & Stieglitz, 2020) – for example, by extending testing sessions over multiple days, or by repeating the experiment at several occasions during a field visit. Multi-method approaches require the researcher to innovate and carry out multiple time-intensive tasks with the same individuals and during the same fieldtrip, risking fatigue of participants and/or caregivers and criticism from reviewers for imperfect experimental designs or set-ups.

Another way is to accrue data over time through incremental experimental designs that can be conducted longitudinally, and possibly involve community members (one such effort is the *Kata Kolok Child Signing Corpus*, 2021 where local research assistants collect observational data longitudinally). However, researchers carrying out on-the-ground work in rural communities are often Early Career Researchers employed by academic institutions in the Global North, and long-term funding may be too insecure to conduct longitudinal experiments. Given the challenges of adapting experiments to rural settings, yet another way is to innovate analyses and include, for example, behavioral measures to complement or even substitute traditional statistical analyses. Analytic innovation is necessary but, given that it diverges from traditional design and is still not likely to allow for robust statistics, publication of this work will continue to be at the mercy of reviewers – even more so if findings differ from the canonical ones that are based on urban sign languages and often published by senior researchers.

Although combining observational and experimental designs may help to gain better understanding of how children in different communities acquire language, this remains a great challenge in rural signing communities. The wealth of adaptations necessary to make field-based experiments a success is immense – and not often discussed in detail in publications. Conducting experimental studies in rural signing communities means innovating and pioneering in methods, research design, and analysis, which may be one reason why such research is not often undertaken. However, if experimental studies continue to be conducted only with urban populations, we miss the chance to learn about how diverse child language acquisition may be. This emphasizes the urgency to document and study situations like Kata Kolok; they offer the chance to directly compare natural language acquisition settings where deaf (and hearing) children experience rich and varied language input from birth – which is critically different from most cases of sign language acquisition in urban settings.

Acknowledgements. A special thanks to Rehana Omardeen and Paula Fikkert for very helpful discussions and comments on a previous draft. In addition, I am grateful for comments from the SignMorph team at University of Birmingham. This work was supported by a European Research Council Advanced Grant (ERC-ADG 885220 SignMorph) awarded to Prof. Adam Schembri.

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Cite this article: Lutzenberger H. (2023). The acquisition of sign languages in rural contexts – what can we do when samples will always be ‘too small’? *Journal of Child Language* **50**, 527–531, <https://doi.org/10.1017/S0305000922000757>