Towards A Comparative Approach to Language Acquisition

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Abstract

The world’s languages vary in almost every conceivable way, yet children readily learn their native language regardless of this variability. Understanding how children can acquire such a diversity of different languages has been a longstanding goal for psychological science—yet current acquisition research is dominated by studies of children learning one particular language: English. In this article, we argue that progress toward this goal will require systematic comparisons between different languages. We propose three levels of comparison: coarse-grained comparisons contrasting unrelated languages to confirm or refute broad theoretical claims; fine-grained comparisons between closely related languages to investigate the impact of specific factors on acquisition outcome; and within-language comparisons targeting the impact of socio-communicative differences on learning. This three-pronged comparative approach to language acquisition promises to provide new insights into the mechanisms and processes by which children acquire their native tongue under such varied linguistic and socio-communicative conditions.

Keywords: language acquisition, comparative approach, cross-linguistic variation, cultural diversity, WEIRD populations, socio-communicative environment
The spectacular diversity of the world’s more than 7,000 different languages has been argued to be a unique feature of human communication—perhaps setting it apart from all other animal communication systems (Evans & Levinson, 2009). From a cultural evolution perspective, the variety of human languages can be viewed as the outcome of thousands of natural experiments in human communication, each offering potentially new insights into language acquisition and use. Yet, most of these potential insights currently go undiscovered because the language sciences—and especially research on language acquisition—have focused their work on a relatively small number of languages spoken by people with very similar population-based characteristics (Slobin, 2014), typically without systematic cross-linguistic comparisons (Slobin & Bowerman, 2007).

Lack of diversity is not just a problem for language acquisition research but also for psychology and cognitive science more generally. Henrich, Heine, and Norenzayan (2010) argued that a key barrier to the generalizability of results in psychology is its systematic sampling bias in favor of a relatively small fraction of the total population of the planet, for which they coined the acronym WEIRD (Western, Educated, Industrialized, Rich, Democratic). The problem seems particularly acute in developmental psychology: Nielsen, Haun, Kärtner, and Legare (2017) found that 92% of all study participants in high-profile journals in the field were either from English-speaking countries (mostly from the US) or from Europe, even though they represent less than 15% of the world’s population. Increased recruitment of so-called non-WEIRD populations promises to revert this strong bias, enabling more robust inferences as to what underlies the commonalities of human behavior.
In this article, we argue that uncritically turning to non-WEIRD languages\textsuperscript{1}—while increasing linguistic diversity—is unlikely to yield a complete understanding of how language acquisition works. Coarse-grained comparisons, such as those between WEIRD and non-WEIRD languages, can illustrate the broad diversity in all aspects of language (Evans & Levinson 2009) that is incompatible with strong universalist claims (e.g., “all languages have X”). But understanding the cognitive underpinnings of language development will also require more fine-grained, theoretically-motivated comparisons focused on differences in specific linguistic features and socio-communicative environments. We propose that this objective can be achieved not only through comparisons between and within non-WEIRD languages but also between and within WEIRD languages. In building our argument, we start by presenting data that illustrates the preponderance of studies of English speaking-populations in language acquisition research, before outlining a three-level comparative perspective for the field. Representative examples are provided for each of the three levels. We conclude that only with a principled comparative approach can we hope to fully understand the processes and mechanisms through which children reliably acquire their native languages despite the variety of linguistic and socio-communicative contexts that children grow up in.

The Dominance of English in Language Acquisition Research

English has become the \textit{lingua franca} of modern science. The top journals in most scientific fields are in English, and the study of language acquisition is no exception. But in the language sciences, English is often also the study target. To illustrate just how dominant English is in

\textsuperscript{1} For convenience, we call languages “WEIRD” and “non-WEIRD” as a shorthand for languages spoken in countries commonly categorized as WEIRD and non-WEIRD, respectively, while acknowledging that some WEIRD languages (e.g., French and Spanish) are spoken in non-WEIRD countries (e.g., Senegal and Chile).
language acquisition research, we assembled data from three different sources to gauge the involvement of English compared to other WEIRD languages—represented by the non-English Germanic languages (e.g., German and Dutch) and the Romance languages (e.g., Spanish and French)—as well as the remaining languages that have been studied (see Figure 1).

Figure 1. The dominance of English in the study of language acquisition as exemplified by a) the number of words found in corpora of child-directed speech for each specific language in the CHILDES database, b) the number of babies acquiring a particular language in the ManyBabies replication study of the effect of infant-directed speech, and c) the number of articles involving a given target language in four key language acquisition journals.

As a first indicator, we analyzed data from the CHILDES database (MacWhinney, 2000), an open database that has been used widely in corpus analyses and computational modeling

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2 The data used to generate Figure 1 can be found on GitHub: https://github.com/contreraskallens/comparative-approach-acquisition. The repository also contains a figure reporting on an analysis of other data sources that further demonstrate the dominance of English in language acquisition research.
relating to language acquisition. CHILDES currently contains 387 corpora and covers 42 different languages. We computed the number of individual words\(^3\) in different language corpora and found that, of the over 55 million tokens, English accounted for the largest proportion (43.7%), with other Germanic and Romance languages in distant second (15.3%) and third (13.2%) places, respectively. The remaining languages account for only 27.7% of all words.

The English language bias is also evident when large teams replicate previously low-powered effects as in the ManyBabies multi-lab study of children’s preference for infant-directed speech over adult-directed speech (The ManyBabies Consortium, 2020). The study involved 2,850 infants between 3 and 15 months of age, who were tested in 67 laboratories in North America, Europe, Australia, and Asia. Infants learning English accounted for 60.7% of the participants, other Germanic languages 20%, Romance languages another 10.1%, and the remaining languages a mere 9.3%.

Our final indicator comes from an analysis by Kidd and Garcia (2021) of the target languages in every article published in four key language acquisition journals: *Journal of Child Language* (1974-2020), *First Language* (1980-2020), *Language Acquisition* (1990-2020), and *Language Learning and Development* (2005-2020). This study comprised 2,830 empirical articles and included 103 unique languages. English was a target language in 54.3% of the articles, other Germanic languages 9.59%, Romance languages 16.1%, and the remaining languages 20%.

Although recent decades have seen a slow but steady increase in the number of studies involving other languages, Figure 1 shows that language acquisition research is still dominated

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\(^3\) We thank Naomi Havron for suggesting this analysis. Using the *childes\* R package (Braginsky, Sanchez & Yurovsky, 2021), we took all 18,986,517 utterances in the database, excluding utterances by “Investigator,” “Uncertain,” “Unidentified,” “Narrator,” and “Informant.” The first language listed for each utterance was taken as the speaker’s native language and the number of word tokens for each language summed across utterances.
by English (and secondarily by other European languages). We suggest that the most productive way forward is not simply to study other individual languages but instead to adopt a principled comparative approach to language acquisition.

**Comparative Language Acquisition Research**

We are not the first to call for more comparative research on language acquisition. For example, Slobin and Bowerman (2007) noted the dearth of studies that compare two or more languages and pointed out that among the 172 articles published between 2000-2006 in *Journal of Child Language*, only 20 compare two languages (and most use English as one of the two). They urged developmental language researchers to pay more attention to typological differences between languages, emphasizing that “[t]ypological descriptions of languages enable today’s developmental psycholinguists to intelligently choose languages for comparison.” (Slobin & Bowerman, 2007, p. 215). Building on these considerations, we advocate for a three-level approach to the comparative study of language acquisition, as illustrated in Figure 2, with comparisons at each level providing evidence for different types of claims.

![Figure 2. Illustration of how the three levels of comparative studies relate to the WEIRD vs. non-WEIRD distinction: a) Coarse-grained comparisons may be particularly informative when comparing WEIRD and non-WEIRD languages, b) fine-grained comparisons between two or more similar languages are useful independently of the WEIRD/non-WEIRD distinction, and c) within-language comparisons can be informative independently of whether they are made within a WEIRD or a non-WEIRD language.](image-url)
Melissa Bowerman (as per personal communication in Plunkett & Strömqvist, 1992) distinguished between two different approaches to cross-linguistic comparisons. One option is for researchers to compare very different languages and look for commonalities (to establish general tendencies) or substantial differences (to counter too broad theoretical generalizations). Most of the previous cross-linguistic acquisition research has focused on such coarse-grained comparisons (e.g., Bates et al., 1984; Chouinard & Clark, 2003). A second alternative is to perform fine-grained comparisons between typologically related languages to reveal how specific linguistic differences might affect acquisition. As noted by Pye and Pfeiler (2014) in their study of the acquisition of two closely related Mayan languages, K’iche’ and Yucatec, only a few studies have employed such fine-grained comparisons despite their promise to provide a more controlled window into the acquisition process.

A dimension that has been largely ignored by previous proponents of the comparative approach is the communicative setting within which language development takes place, and which is essential considering that language is inherently social (e.g., Beckner et al., 2009). Thus, we propose a third level of comparison that can be employed within a given language by contrasting acquisition in different socio-communicative settings, such as between children from different socio-economic backgrounds. We want to stress that although comparisons with non-WEIRD languages may be particularly useful for coarse-grained comparisons, comparisons at the two other levels can be made equally well between and within WEIRD languages as between and within non-WEIRD languages (as also illustrated by Figure 2).
Coarse-grained Comparisons

Coarse-grained comparisons are fundamental when evaluating broad theoretical claims about how children acquire language. One such example relates to the role of linguistic experience in early language learning. Prior studies have suggested that the quantity and variability of caregiver-produced child-directed speech predicts individual differences in child language outcomes (e.g., Huttenlocher et al., 2010; Romeo et al., 2018). To determine whether these results generalize to children speaking languages other than English, researchers have looked at the acquisition of non-WEIRD languages to allow for coarse-grained comparisons with WEIRD languages.

Initial results suggested that children from WEIRD countries hear considerably more child-directed speech than children growing up in non-WEIRD communities (e.g., Cristia, Dupoux, Gurven, & Stieglitz, 2019; Shneidman & Goldin-Meadow, 2012). However, a more recent study comparing the linguistic environments across industrialized and indigenous communities has revealed a more complex pattern of similarities and differences that largely cuts across the WEIRD/non-WEIRD divide. Bunce et al. (2020) analyzed the linguistic environments of children learning languages in WEIRD countries (English in North America and the UK) and non-WEIRD countries (Spanish in Buenos Aires, Argentina, Tseltal Mayan in a small farming village in Southern Mexico, and Yélî Dnye on Rossel Island in Papua New Guinea). They found that children learning Yélî Dnye heard less speech directly from adults compared to children growing up in North America, whereas children learning UK English, Argentinian Spanish, and Tseltal heard the same amount of child-directed speech as those in North America.

The correlation between quantity of adult linguistic input and language outcomes repeatedly observed with US children would predict that children learning Yélî Dnye should be
delayed in their language development due to the reduced child-directed speech input. Yet, this
does not seem to be the case. Indeed, Casillas, Brown, and Levinson (in press) have shown that
Yélî Dnye-speaking children achieve key linguistic-communicative milestones at the same time
as children in the US, Europe, and Japan: Canonical babbling starts after about six months,
followed by their earliest recognizable words around their first birthday, and their first multiword
combinations a few months later.

These findings illustrate how coarse-grained comparisons in language acquisition, here
between WEIRD and non-WEIRD languages, can support theoretical progress. Specifically, our
example demonstrates that the relationship between linguistic input and language outcomes is
more complex than previous research conducted primarily with WEIRD English-speaking
children has been taken to suggest. Thus, coarse-grained comparisons can promote new insights,
for example by highlighting the potential impact (or lack thereof) of cultural differences on
language acquisition.

**Fine-grained Comparisons**

Fine-grained comparisons between closely related languages allow researchers to study the
impact of more subtle linguistic differences on children’s acquisition of their native tongue. For
such quasi-experimental studies, theoretically-motivated contrasts between marginally different
WEIRD languages (e.g., Plunkett & Strömqvist, 1992) can provide as much insight as between
related non-WEIRD languages (e.g., Pye & Pfeiler, 2014). Indeed, once we move beyond
considering the acquisition of English as representative for the acquisition of all WEIRD
languages, considerable variation abounds that warrants systematic fine-grained comparisons to
illuminate the source and effects of those differences.
A fitting example is offered by the fine-grained comparison of language outcomes in the three mainland Scandinavian countries, Denmark, Norway, and Sweden (Plunkett & Strömqvist, 1992). These three countries—arguably among the WEIRDest in the world—are highly comparable in terms of culture, socio-economic composition of the population, and pedagogical practices (e.g., amount of time that preschool children spend in daycare). Moreover, Danish, Norwegian, and Swedish children learn languages that are closely related both historically and typologically, and which are highly mutually intelligible, especially in written form. Surprisingly, however, substantial differences have been observed in children’s language proficiency across the three countries. The rate at which these children acquire vocabulary and grammar varies considerably across the three language groups, with Danish-learning children being delayed compared to the two other groups in the age span of 0-8 years (e.g., Bleses, Basbøll, & Vach, 2011).

Recent experimental evidence has suggested that these differences in language achievement are likely related to differences in how easy it is to process these languages in spoken form. Indeed, Danish stands out from the other Scandinavian languages for its phonetically underarticulated, thus indistinct, pronunciation, which has been shown to hinder processing even in children of Danish parents (e.g., Trecca, Bleses, Madsen, & Christiansen, 2018). There is also initial evidence that these inter-Scandinavian differences in early language acquisition may carry over into adulthood by affecting the organization of the learner’s language system in idiosyncratic ways. This suggests that the specific properties of individual languages, such as Danish, can lead to substantial cross-linguistic differences in how language users process their native tongue (i.e., a kind of ‘processing-based linguistic relativity’; Trecca, Tylén, Højen, & Christiansen, 2021).
These findings demonstrate that—even between two WEIRD countries where the linguistic environment and socio-communicative settings are relatively homogeneous—fundamentally different trajectories of language acquisition can be observed because of variation in language-specific properties. The impact of idiosyncratic properties on language acquisition may be overlooked if we only rely on coarse-grained cross-linguistic comparisons and blindly assume English to be representative of all WEIRD languages.

Within-language Comparisons

In addition to coarse- and fine-grained comparisons, insights into language acquisition can also be obtained within a language by contrasting the effects of specific dimensions of socio-communicative settings on learning outcomes. A growing body of work has shown that there is considerable individual variation among speakers of a given language in their linguistic ability, from speech processing to grammatical structure to pragmatics (see Kidd, Donnelly, & Christiansen, 2018, for a review). However, this research has predominantly been conducted within a stereotypically WEIRD context (mostly within the US and Europe), and its implications for language acquisition have primarily been viewed through the lens of socio-economic status (SES) rather than variations in socio-communicative settings.

In the US, where much of the WEIRD research traditionally has been conducted (Nielsen et al., 2017), Hart and Risley (1995) found that by age four, children in low-income families would have heard about 13 million words. By contrast, children from high-income families would have been exposed to around 45 million words. This difference in the amount of linguistic input—known as the “30-million-word gap”—was associated with variation in vocabulary size: by around four years of age, children from high-SES homes knew twice as many words as their
peers from a low-SES background. A more recent study using a larger sample of US children has shown that the average gap may be closer to 4 million words (Gilkerson et al., 2017). The 30-million-word gap only appears to apply to a comparison of the top and bottom 2% of the income groups.

Nonetheless, because vocabulary size has been found to predict subsequent language ability and even how well children do in school (e.g., Burchinal et al., 2011), figuring out how to bridge this gap has become a major focus of attention from researchers, policymakers, and educators alike in the US. Many of these efforts have focused on how parents and caregivers can increase the amount of speech directly addressed to children (e.g., Suskind et al., 2015), sidestepping potential underlying structural causes relating to systemic racism and poverty. That is, the focus has been on a particular approach to language acquisition, where parents function akin to “teachers” for the child within a nuclear family setting—a child-rearing practice characteristic of high-SES, predominantly white parents (Clancy & Davis, 2019).

However, when broader aspects of input are considered, including overheard speech, the linguistic gap is no longer there. For example, Sperry, Sperry, and Miller (2019) found that the total amount of linguistic input to children from the poor Black Belt community was actually higher than to their high-SES peers. Similarly, in a non-WEIRD context, Stein, Menti, and Rosenberg (2021) found that although low-SES children learning Argentinian Spanish received less child-directed speech than children from middle-SES families, the former were exposed to more linguistic input overall through overheard speech. Importantly, both toddlers (e.g., Gampe, Liebal, & Tomasello, 2012) and children (e.g., Silva, Correa-Chávez & Rogoff, 2010) are able to learn language from overheard speech. Thus, contrary to the assumptions behind the linguistic gap hypothesis, there does not appear to be a single “right way” to promote language acquisition.
This is not to say that the kind of parental teaching promoted by linguistic gap interventions (e.g., Suskind et al., 2015) is not helpful. The kind of language skills they provide are the main entry into the world of literacy and formal education in stereotypically WEIRD societies, where much of socialization takes place through language in preschools and schools. However, superimposing this perspective across socially diverse communities, as has been the norm within a US context, ends up prioritizing a particular style of learning at the cost of other ways of learning, such as through observation (Silva et al., 2010) or collaboration (Alcalá, Rogoff, & Fraire, 2018). The same applies to generalizing linguistic gap interventions to non-WEIRD populations (e.g., Weber, Fernald, & Diop, 2017) on the assumption that there is a single fixed developmental pathway to language—and thus, a single way of correcting it—no matter the cultural context (see Morelli et al., 2018, for discussion). Thus, even within-language diversity, embodied in this case by different socio-communicative contexts, can provide a deeper understanding of how language is acquired. Its potential comes not from the radical differences between the languages but from systematic and theory-driven comparisons along specific dimensions of variation.

**A Multi-pronged Comparative Approach**

To fully understand our uniquely human communication abilities, we need to take advantage of the many natural experiments in linguistic diversity afforded by the world’s languages (Evans & Levinson, 2009). Explaining how children are able to acquire such diverse linguistic systems and under such varied cultural and socio-communicative conditions will require careful comparative studies. Much needed studies involving non-WEIRD languages are likely to provide important insights into language acquisition, especially through coarse-grained comparisons. But the study
of WEIRD language acquisition still has much to contribute. Indeed, because many WEIRD languages are well documented, they lend themselves more readily for fine-grained comparisons. And although efforts should be put into developing culturally-sensitive non-WEIRD language acquisition research that also strengthens local scientific communities (Broesch et al., 2020), it is not feasible for all developmental researchers to adopt a non-WEIRD focus. This, however, does not entail that they cannot conduct comparative language acquisition research of equally high theoretical value. Both WEIRD and non-WEIRD populations offer many opportunities for comparative studies of language acquisition—whether in terms of coarse-grained, fine-grained, or within-language contrasts—as long as we keep in mind that the results should not be taken as representative for all languages.

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Recommended readings


Henrich, J., Heine, S. J., & Norenzayan, A. (2010). (see References). The original framing of the WEIRD/non-WEIRD distinction


[https://doi.org/10.3917/ls.170.0039](https://doi.org/10.3917/ls.170.0039) A critical appraisal of the linguistic gap hypothesis from a cross-cultural and cross-linguistic perspective.
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