aps ASSOCIATION FOR PSYCHOLOGICAL SCIENCE

Current Directions in Psychological Science
2022, Vol. 31(2) 131–138

DOI: 10.1177/09637214211049229
www.psychologicalscience.org/CDPS
SAGE

Toward 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. Understanding how children can acquire such a diversity of different languages has been a long-standing 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 outcomes, 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 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 a problem not only for language-acquisition research but also for psychology and cognitive science more generally. Henrich et al. (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 label WEIRD (Western, Educated, Industrialized, Rich, Democratic). The problem seems particularly acute in developmental psychology: Nielsen et al. (2017) found that 92% of all study participants in high-profile journals in this field were either from English-speaking countries (mostly the United States) or from European countries, 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[1] is unlikely to yield a complete understanding of how language acquisition works, even though it would increase the diversity of languages

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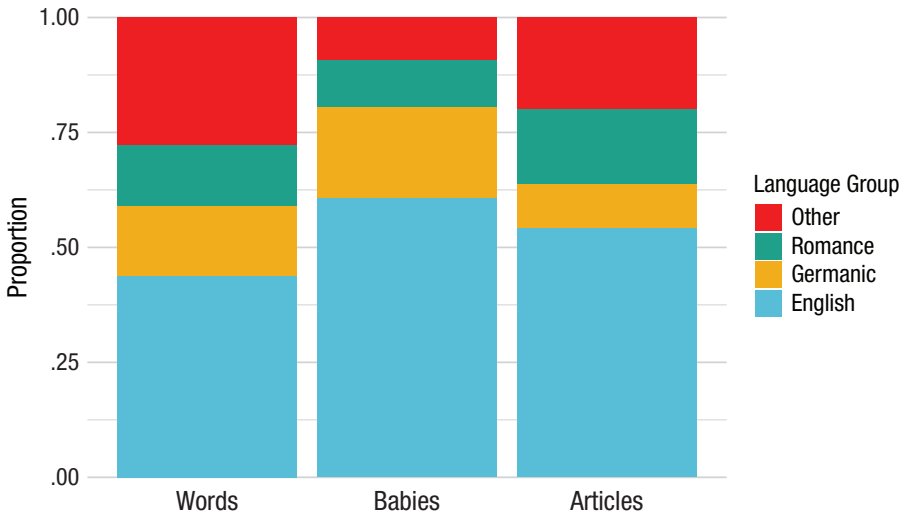

Fig. 1. The dominance of English (vs. non-English Germanic, Romance, and other languages) in the study of language acquisition as exemplified by (from left to right) the proportion of individual words from each language group in child-directed speech in the CHILDES database (MacWhinney, 2000), the proportion of babies acquiring a language in each group in the ManyBabies replication study of the effect of infant-directed speech (The ManyBabies Consortium, 2020), and the proportion of articles targeting a language in each group in four key language-acquisition journals (Kidd & Garcia, in press).

studied. 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 by comparisons between and within non-WEIRD languages but also through contrasts between and within WEIRD languages. In building our argument, we start by presenting data that illustrate the preponderance of studies of English-speaking populations in language-acquisition research and then outline 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 researchers 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 in which they grow up.

The Dominance of English in Language-Acquisition Research

English has become the lingua franca of modern science. The top journals in most scientific fields are in English, and journals focusing on language acquisition are no exception. But in the language sciences, English is often also the study target. To illustrate just how dominant English is in language-acquisition research, we assembled data from three different sources to gauge the involvement of English compared with 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 Fig. 1).[2]

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 relating to language acquisition. At the time this article was written, CHILDES contained 387 corpora covering 42 different languages. We computed the number of individual words in each language in the database.[3] English accounted for the largest percentage (44%) of the more than 55 million words in CHILDES; other Germanic and Romance languages were in distant second (15%) and third (13%) places, respectively. The remaining languages accounted for only 28% of all words.

The English-language bias is also evident when large teams attempt to replicate previously low-powered effects, as in the ManyBabies multilab study of children's preference for infant-directed speech over adult-directed speech (The ManyBabies Consortium, 2020). This study involved 2,850 infants between 3 and 15

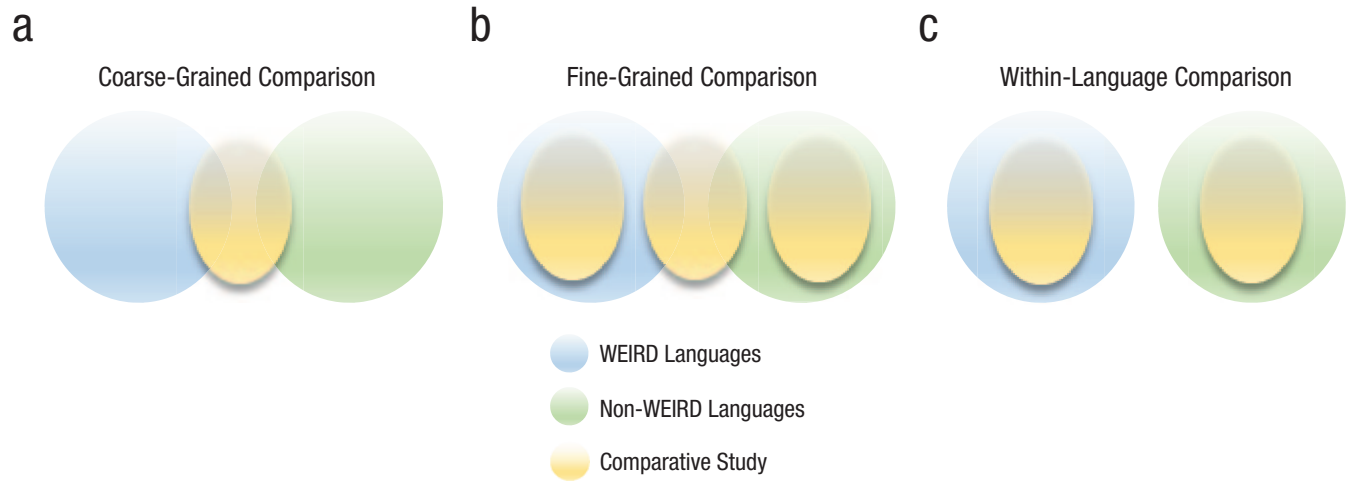

Fig. 2. Illustration of how the proposed three levels of comparative language-acquisition studies relate to the distinction between WEIRD and non-WEIRD languages: Coarse-grained comparisons between unrelated languages (a) may be particularly informative when comparing WEIRD and non-WEIRD languages, fine-grained comparisons between two or more similar languages (b) are useful independently of the WEIRD/non-WEIRD distinction, and within-language comparisons (c) can be informative independently of whether they are made within a WEIRD or a non-WEIRD language.

months of age, who were tested in 67 laboratories in North America, Europe, Australia, and Asia. Infants learning English accounted for 61% of the participants; other Germanic and Romance languages accounted for 20% and 10%, respectively, and the remaining languages accounted for a mere 9%.

Our final indicator comes from Kidd and Garcia's (in press) analysis of the target languages in all articles 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). These 2,830 empirical articles targeted 103 unique languages. English was a target language in 54% of the articles; another Germanic language was a target in 10% of the articles, a Romance language was a target in 16%, and other languages were the target in 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 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 comparing two or more languages and pointed out that of the 172 articles published between 2000 and 2006 in *Journal of Child Language*, only 20 compared two languages (and most used English as one of the two). They urged developmental language researchers to pay more attention to typological differences between languages, emphasizing that "typological descriptions of languages enable today's developmental psycholinguists to intelligently choose languages for comparison" (p. 215). Building on these considerations, we advocate for a three-level approach to the comparative study of language acquisition, according to which comparisons at the different levels provide evidence for different types of claims. Figure 2 illustrates how this proposed approach relates to the distinction between WEIRD and non-WEIRD languages.

Melissa Bowerman (personal communication, as cited 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 overly 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—an essential dimension considering that language is inherently social (e.g., Beckner et al., 2009). Thus, we propose a third, within-language, level of comparison: contrasting children's acquisition in different socio-communicative settings, such as different socioeconomic contexts.

Coarse-Grained Comparisons

Coarse-grained comparisons are fundamental when evaluating broad theoretical claims about how children acquire language. One example of this approach 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 children's language outcomes (e.g., Huttenlocher et al., 2010; Romeo et al., 2018). To determine whether these results generalize beyond WEIRD languages, researchers have conducted coarse-grained comparisons with non-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 et al., 2019; Shneidman & Goldin-Meadow, 2012). However, a more recent study comparing 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. (2021) analyzed the linguistic environments of children learning languages in WEIRD countries (English in North America and the United Kingdom) 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 with children learning English in North America and the United Kingdom, whereas children learning British English, Argentinian Spanish, and Tseltal heard the same amount of child-directed speech as those learning English in North America.

The correlation between quantity of adult linguistic input and language outcomes repeatedly observed with U.S. children would predict that children learning Yélî Dnye should be delayed in their language development due to their reduced child-directed speech input. Yet this does not seem to be the case. Indeed, Casillas et al. (2020) have shown that children who speak Yélî Dnye achieve key linguistic communicative milestones at the same time as children in the United States, Europe, and Japan: Canonical babbling starts around the age of 6 months, and children produce their earliest recognizable words around their first birthday and their first multiword combinations a few months later.

These findings illustrate how coarse-grained comparisons of language acquisition, such as comparisons between WEIRD and non-WEIRD languages, can support the progress of theory. 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 contrasts between related non-WEIRD languages (e.g., Pye & Pfeiler, 2014).[4] Indeed, when researchers have moved beyond considering the acquisition of English as representative of the acquisition of all WEIRD languages, it has become clear that considerable variation abounds within WEIRD languages and that this variation 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 their culture, socioeconomic context, and pedagogical practices (e.g., amount of time that preschool children spend in day care). Moreover, Danish, Norwegian, and Swedish children learn languages that are closely related both historically and typologically, and that are highly mutually intelligible, especially in written form. Surprisingly, however, substantial differences have been observed in children's language proficiency across the three countries: Danish-learning children are delayed in their acquisition of vocabulary and grammar compared with the two other groups up through the age of 8 years (e.g., Bleses et al., 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 et al., 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. These results suggest that the specific properties of individual languages, such as Danish, can lead to substantial cross-language differences in how people process their native tongue (i.e., a kind of processing-based linguistic relativity; Trecca et al., 2021).

Together, these Scandinavian language findings show that even between WEIRD countries where the linguistic environments 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 researchers rely only 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, within-language comparisons contrasting effects of specific dimensions of socio-communicative settings on learning outcomes can yield insights into language acquisition. A growing body of work has shown that speakers of a given language vary considerably in their linguistic ability, from speech processing and vocabulary learning to grammatical and pragmatic skills (see Kidd et al., 2018, for a review). However, this research has predominantly been conducted within a stereotypically WEIRD context (mostly within the United States 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 United States, where much of the WEIRD research traditionally has been conducted (Nielsen et al., 2017), Hart and Risley (1995) estimated that by age 4, children in low-income families had heard about 13 million words. By contrast, the estimate for children from high-income families was 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 4 years of age, children from high-SES homes knew twice as many words as their peers from a low-SES background. However, a more recent study using a larger sample of U.S. children has shown that the average gap between high- and low-SES income groups may be closer to 4 million words (Gilkerson et al., 2017). The 30-million-word gap thus appears to apply only to a comparison of the income groups in the top and bottom 2%.

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 apparent language gap has become a major focus of attention among researchers, policymakers, and educators alike. 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, in which parents function as "teachers" 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, including overheard speech, are considered, the language gap is no longer there. For example, Sperry et al. (2019) found that the total amount of linguistic input was actually higher for children from the poor Black Belt region of the United States than for their high-SES peers. Similarly, in a less WEIRD context, Stein et al. (2021) found that although low-SES children learning Argentinian Spanish received less child-directed speech than their counterparts from middle-SES families, the former were exposed to more linguistic input overall through overheard speech. It is important to bear in mind that both toddlers (e.g., Gampe et al., 2012) and older children (e.g., Silva et al., 2010) are able to learn language from overheard speech. Thus, contrary to the assumptions behind most interventions aimed at reducing the language gap, 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 such interventions (e.g., Suskind et al., 2015) is not helpful. The language skills they facilitate 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 U.S. 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 et al., 2018). The

same concern applies to generalizing language-gap interventions to non-WEIRD populations (e.g., Weber et al., 2017) on the assumption that there is a single fixed developmental pathway to language proficiency—and thus, a single way of supporting language acquisition—no matter the cultural context (see Morelli et al., 2018, for discussion). Thus, even investigating 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 studied but from systematic and theory-driven comparisons along specific dimensions of variation.

A Multipronged Comparative Approach

To fully understand the unique features of human communication abilities, researchers 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, 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 effort should be invested in 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 through coarse-grained, fine-grained, or within-language contrasts—but we must always keep in mind that the results should not be taken as representative for all languages.

Recommended Reading

Casillas, M., Brown, P., & Levinson, S. C. (2020). (See References). Reports data on the acquisition of Yélî Dnye, along with coarse-grained comparisons between Yélî Dnye and other WEIRD and non-WEIRD languages.

Christiansen, M. H., & Chater, N. (2022). *The language game: How improvisation created language and changed the world*. Basic Books. Situates the ideas expressed in this article within a comprehensive framework for understanding the evolution, acquisition, and processing of language.

Evans, N., & Levinson, S. C. (2009). (See References). Thoroughly reviews linguistic diversity and its theoretical implications.

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

Ochs, E., & Kremer-Sadl, T. (2020). Ethical blind spots in ethnographic and developmental approaches to the language gap debate. *Langage et Société, 170*(2), 39–67. https://doi.org/10.3917/ls.170.0039. Critically appraises the assumptions behind language-gap interventions from a cross-cultural and cross-linguistic perspective.

Trecca, F., Tylén, K., Højen, A., & Christiansen, M. H. (2021). (See References). Thoroughly reviews the unusual patterns of Danish language acquisition and processing through fine-grained comparisons with Norwegian and Swedish.

Transparency

Action Editor: Robert L. Goldstone
Editor: Robert L. Goldstone
Declaration of Conflicting Interests
The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.
Funding
This research was partially supported by Danish Council for Independent Research Grant DFF-7013-00074, awarded to M. H. Christiansen.

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Acknowledgments

We thank Steven Emlinger, Felicity Frinsel, Psyche He, Erin Isbilen, Cristian Rivera, Andreas Roepstorff, Serene Wang, and three anonymous reviewers for their helpful comments on earlier versions of this article.

Notes

1. For convenience, we refer to "WEIRD" and "non-WEIRD" languages 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 Bolivia).

2. The data used to generate Figure 1 can be found on GitHub, at https://github.com/contreraskallens/comparative-approach-acquisition. The repository also contains a figure reporting results of an analysis of other data sources that further demonstrate the

dominance of English in language-acquisition research. We do want to note that our analysis to some degree undercounts studies of non-English languages insofar as an unknown number of studies are reported in the relevant target languages (i.e., in non-English journals). Collaborating more with local scientists, as well as supporting them in publishing in the main journals, would help overcome such undercounting.

3. We thank Naomi Havron for suggesting this analysis. Using the *childesr* R package (Braginsky et al., 2021), we took all 18,986,517 utterances in the database, excluding utterances by "Investigator," "Uncertain," "Unidentified," "Narrator," and "Informant." The first language of the speaker in each utterance was taken as that speaker's native language. We calculated the percentage of words for each language by summing the number of words in all the utterances produced by a native speaker of that language across the database.

4. We note that in some cases, fine-grained comparisons may also be possible between closely related languages that straddle the WEIRD/non-WEIRD divide (e.g., between Brazilian Portuguese and European Portuguese).

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