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The Classification of South American Languages

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Abstract

With some 108 independent genealogical units, South America is the linguistically most diverse region of our planet and presents a particular challenge to linguists seeking to understand the genealogical relationships among human languages. Recent years have seen a resurgence of interest in the internal classification of South American language families, and this article provides a critical overview of research in this very active area, focusing on the seven largest language families of the continent: Arawakan, Cariban, Jê, Panoan, Quechuan, Tukanoan, and Tupian. The strengths and weaknesses of major classification proposals are examined, and directions for future research discussed. Several long-distance relationship proposals that South Americanists are actively debating, including Tupi-Cariban, Pano-Takanan, Quechumaran, TuKaJê, and Macro-Jê, are also examined.

1. INTRODUCTION

1.1. Overview

South America is the most linguistically diverse region of the world, exhibiting some 108[1] independent genealogical units, or one-quarter of the world's linguistic diversity, which encompasses some 420 living languages (Campbell 2012) and corresponds to some 574 languages that existed when Europeans arrived in the Americas (Seifart & Hammarström 2017). This diversity both inspires and challenges efforts to understand the genealogical relationships among these languages, in terms of developing both internal classifications of well-established genealogical units and proposals for long-distance relationships among languages whose genealogical relatedness is less certain. The accurate classification of South American languages is of paramount importance not only for linguistics, for which a better understanding of genealogical relationships among these languages underpins research into novel processes of language change and contact (Epps 2009), but also for fields such as anthropology, archaeology, and ethnohistory that draw on genealogical classifications and the products of historical linguistic research for insights into the deep social and cultural history of the continent.

This article provides an overview of the state of the art in the classification of South American languages, with the goal of equipping readers to engage critically with this literature. For reasons of space, I focus on the seven largest language families[2] and do not provide exhaustive classifications of any of these families, referring readers instead to recent works that do so (e.g., Campbell 2012) (for specific families, see Sections 3.1–3.7). I similarly do not address the history of classification of the families I examine, which in some cases runs to several centuries in length, but instead focus on major modern works.[3]

I begin in Section 2 with a brief overview of the types of classifications found in the literature, the methodologies they employ, and an evaluation of their relative strengths and weaknesses and then turn to a critical overview of extant classifications in Section 3. Of the 108 units identified by Campbell (2012), 53 are isolates, and 48 are families with 6 or fewer members, leaving seven larger families: Quechuan, Arawakan, Tupian, Cariban, Macro-Jê (MJ), Panoan, and Tukanoan. Sections 3.1–3.7 are devoted to these languages, in this order.

It is worth noting that some of the most interesting recent changes to our understanding of the classification of South American language families have involved careful application of the comparative method (CM) to determine that certain long-recognized language families actually need to be split into distinct language families, as the earlier erroneous classification resulted from misleading similarities arising from language contact. This includes Makúan (cited, e.g., in Campbell 2012), which Epps & Bolaños (2017) argue needs to be split into at least two, if not three, distinct language families, and Witotoan, which Seifart & Echeverri (2015) argue needs to be split into a narrow Witotoan family and Boran.

Works such as this cast an interesting light on recurrent efforts to attempt to reduce the apparent genealogical diversity of South America—perhaps inspired by expectations regarding diversity influenced by experience with more genealogically homogeneous regions of the world—through

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[1]This number of course varies somewhat depending on the judgments of particular scholars and advances in the historical linguistics of the continent.
[2]Chibchan, a family distributed across Central America and northwestern South America, is not included, as the proposed Proto-Chibchan homeland and the majority of its members are found in Central America (Constenla-Umaña 2012).
[3]Campbell (2012, pp. 63–67) presents a historical overview of large-scale classifications of South American languages from the earliest Jesuit classifications through the present, while Adelaar (2012a) presents a similarly broadly gauged overview of research on the languages of the continent.

long-distance classification proposals of varying degrees of daring. The fact that increasingly careful historical work on South American languages has in some cases resulted in increased, rather than decreased diversity, should encourage caution and careful evaluation of intriguing long-distance proposals such as Adelaar's (2000) Katukinan-Harakmbut proposal, and Pache's (2016) Pumé-Chocoan proposal.

1.2. A Note on Language and Language Family Names

Many South American languages and language families appear in the scholarly literature with more than one name. One source of variation is linguists taking greater care in recent decades to use language names preferred by the speakers of those languages and to avoid pejorative names for languages and language families, such as in the cases of the Naduhup family [formerly Makú, from the Arawakan term meaning without language (lit. tongue) (Epps & Bolaños 2017)] and the Chicham family [formerly Jivaroan, from Spanish *jíbaro*, a term with pejorative connotations (Deshoullière & Utitiaj Paati 2019)]. Differences also arise due to different family naming conventions among Anglophone and Iberophone linguists, with the former group often using family names bearing the adjectival suffix *-an* and the latter not (e.g., Panoan versus Pano). This article follows the Anglophone practice, except in cases in which it is typically eschewed even by English-speaking linguists, such as with (Macro-)Jê, which is much more common than (Macro-)Jêan.

2. TYPES OF CLASSIFICATIONS

There are four major types of linguistic classification, distinguished by the methods they employ, given here in order of their typical reliability: (*a*) classification based on CM, (*b*) classification based on computational phylogenetic methods (CPMs), (*c*) expert classifications, and (*d*) those based on mass comparison.

CM employs long-established methods to reconstruct linguistic features of protolanguages (Rankin 2003, among others). Such reconstructions allow linguists to identify shared innovations among daughter languages, which serve as the only reliable basis for identifying subgroups. Critical to CM is its reliance on (*a*) systematic sound correspondences as evidence for cognacy, which distinguish cognates from borrowings or chance resemblances, and (*b*) the directionality of sound change to reconstruct protosounds and thereby protoforms. These features make CM the only reliable means for evaluating hypotheses of genealogical relatedness among languages (Campbell & Poser 2008, among others).

CPMs encompass a variety of quantitative methods for classifying languages and fall into two major classes: character-based methods and distance-based ones (for overviews, see Dunn 2015, Michael & Chousou-Polydouri 2019, Nichols & Warnow 2008). Character-based methods produce classifications by evaluating how well different trees account for the distribution of a set homologous linguistic features [i.e., features shared by virtue of descent from a common ancestor (e.g., exhibiting members in a given cognate set)] among a group of genealogically related languages, in light of some optimization criterion (e.g., minimizing the number of independent innovations). Rooting phylogenetic trees (i.e., identifying the ancestral node of the entire tree) results in classifications based on shared innovations, making character-based CPMs compatible with the basic insight of CM. Distance-based methods classify languages based on overall similarity metrics, conflating shared innovations, shared retentions, and parallel innovations, meaning that distance-based classifications cannot be interpreted as genealogical classifications. Most applications of CPMs in linguistics have been based on lexical data, but these methods can be applied to any set of homologous features. Note that CPMs can yield plausible classifications in cases in

which CM cannot yet do so, due to the innovations identified by particular applications of CM being too common to be reliably treated as shared innovations.

Expert classifications are based on a scholar's deep knowledge of a family but are distinguished from the preceding methods by the lack of an explicit methodology and, typically, the lack of presentation of explicit evidence or argumentation (see examples in sections below). Expert classifications are difficult to evaluate when they conflict with each other or when they conflict with classifications based on explicit methodologies.

Mass comparison is intended as a method for identifying distant genealogical relationships among languages (Greenberg 1987). The method consists of considering morphemes in different languages with similar forms and (loosely) similar meanings to be cognate, which serves as evidence for relatedness among the languages in question. Mass comparison has been extensively criticized for abandoning CM's reliance on sound correspondences as evidence for cognacy, and Greenberg's proposed long-distance relationships among the languages of the Americas have won little support among Americanists (see Campbell 1997, pp. 210–13; Campbell & Poser 2008, pp. 266–79; and works cited therein), and are not discussed further here.

3. CLASSIFICATION OF MAJOR FAMILIES

3.1. Quechuan and Quechumaran

3.1.1. Quechuan. At their greatest extent, Quechuan languages were spoken throughout much of the habitable Andes and extended into both the Pacific coastal and Amazonian lowlands (Adelaar 2004, pp. 168–70). With 8.5–10 million speakers (Adelaar 2004, p. 168), the languages of this family are among the largest indigenous languages of South America.

The most influential classifications of the Quechuan varieties stem from the work of Torero (1964, 1970, 1983) and Parker (1963, 1969a–d, 1971), who reconstructed Proto-Quechuan (PQ) phonology and many aspects of PQ morphology, allowing them to propose internal classifications based on a combination of phonological and morphological innovations (Cerrón-Palomino 1987). The classification of Quechuan languages has been complicated by contact among different Quechuan varieties and with Aymaran languages.

Torero and Parker distinguished two major branches: Quechua I (QI), which occupies the central Peruvian Andes, and Quechua II (QII), which brackets QI, extending north to Ecuador and Colombia and south to Bolivia, Chile, and Argentina.[4] Even at this early stage of investigation, challenges arose for a purely arboreal classification (Cerrón-Palomino 1987, pp. 223–24; Parker 1971, pp. 45–47; Torero 1968, p. 291), since many innovations useful for defining subgroups form complexly partially overlapping isoglosses across distinct varieties and dialect continua within each branch. The consensus that has emerged is that of the three putative subgroups of QII (i.e., QIIA, B, and C), QIIA is not defined by shared innovations that group it decisively with either QII or QI (Adelaar 2004, p. 186). Similar observations are made regarding Pacaraos Quechua, leading to the suggestion that these varieties might form branches coordinate with QI and QII (Adelaar 2004). Some scholars have even argued that the distinction between QI and QII is untenable (e.g., Heggarty 2005, Landerman 1991, Mannheim 1991, Pearce & Heggarty 2011), although Quechuanists have generally found the argumentation of these critiques unconvincing (Adelaar 2013, pp. 58–62).

Despite the increasing availability of descriptive material on Quechuan languages, there has been relatively little CM-based work since the pioneering efforts of Torero and Parker, suggesting

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[4]Parker (1963, among others) referred to these two branches as Quechua A and B, respectively.

the time may be ripe for new comparative work on the family. Clarifying the status of the varieties that are not clearly members of QI or QII is an obvious priority, and since the innovations used to argue for some major subgroups do not form entirely consistent isoglosses, character-based phylogenetic analyses may prove useful, since they permit objective assessments of competing subgrouping evidence.

3.1.2. Quechumaran. Quechuan and Aymaran languages have enjoyed a long history of mutual influence, leading to significant convergences in their phonology, morphosyntax, and lexicon (Adelaar 2012b). Similarities among these languages have inspired the hypothesis that Quechuan and Aymaran families are related as subgroups of a larger Quechumaran family, while the effects of contact have complicated its evaluation. The Aymaran family consists of Aymara, with over 1.5 million speakers in Bolivia, Chile, and Peru, and two small languages found in Southern Peru: Jaqaru and Kawki.

A former consensus that Quechuan and Aymaran are related was significantly undermined by Torero's and Parker's reconstruction of PQ as lacking the three-way contrast between ejective, aspirated, and plain stops found in Aymaran languages and the neighboring major Quechuan languages, especially Bolivian and Cuzco Quechua (Cerrón-Palomino 1987, pp. 351–74). In defense of the Quechumaran hypothesis, Orr & Longacre (1968) reconstructed precisely this three-way contrast for Proto-Quechumaran, but this conclusion met with significant skepticism (Campbell 1995, Cerrón-Palomino 1987). Critics observed that the Quechuan data were mostly drawn from QII varieties adjacent to Aymaran languages and thus biased toward the small number of Quechuan languages exhibiting the three-way contrast in question and those most likely to have been influenced by contact with Aymaran. Furthermore, no effort was made to exclude the vast number of loanwords between Aymaran and Quechuan languages.

As Campbell (1995; 1997, pp. 273–83) observes, however, the justified criticisms of Orr & Longacre's (1968) reconstruction and the evidence of abundant grammatical and lexical borrowing between Quechuan and Aymaran languages do not rule out a genealogical relationship between the two families; rather, they indicate the importance of carefully selecting the languages to compare and weeding out borrowing in the comparative dataset (Adelaar 1986). Emlen & Adelaar (2017) made significant progress on the latter front, additionally providing reconstructions of forms that can be safely traced to PQ or Proto-Aymaran, while Emlen & Dellert (2020) clarified how PQ roots were modeled on Aymaran forms. Given the importance of the Quechumaran hypothesis for understanding the history of the Andean region, we can hope that renewed interest in Aymaran-Quechuan language contact (e.g., Emlen 2017) will serve as a rigorous basis for its evaluation (Cerrón-Palomino 1987, pp. 374–75).

3.2. Arawakan, Macro-Arawakan, and Arawakan Linguistic Matrix Hypothesis

3.2.1. Arawakan. Arawakan is the largest language family of the Americas, with its about 80 historically attested members being dispersed across a vast region extending from the Caribbean to the Argentinean Pampas and from the Atlantic coast of Brazil to the eastern Andes (Aikhenvald 1999a, Ramirez 2001). Taino, the Arawakan language of the Greater Antilles and Bahamas, was the first indigenous language of the Americas encountered by Europeans and is the source for many Spanish flora, fauna, and cultural terms specific to the Americas (e.g., *maíz* 'maize, corn,' *iguana*, and *cacique* 'indigenous chief').

Consensus on the delimitation of the Arawakan family and its low-level subgroups was reached by the 1990s, as summarized in Payne's (1991) comparative study, which reconstructs the segmental inventory of Proto-Arawakan (PA) and 203 PA etyma. This delimitation included

the recognition that two small language families, Harakmbut and Arawan, are not Arawakan, although they exhibit lexical borrowings from their Arawakan neighbors (for Arawakan-Arawan borrowings, see Facundes & Brandão 2011), and the recognition that two languages, Yanesha' and Resígaro, are Arawakan, despite their affiliation being obscured by contact with their Andean and Boran/Witotoan neighbors, respectively (for Yanesha', see Adelaar 2007, Wise 1976; for Resígaro, see Payne 1985).[5]

The most influential classifications of Arawakan have been expert ones (Kaufman 1994, Aikhenvald 1999a), which have overall exhibited much similarity. In general, the lower-level subgroups of the family are obvious, but higher-level relationships among them are unclear, which is reflected in expert classifications positing relatively flat classifications. One noteworthy exception to this general caution is their positing a top-level split between Northern and Southern branches (with some variation in the structure and names of the branches).

Several classifications using CPMs have been developed for the family, with Payne's (1991) and Ramirez's (2001) being the empirically best-grounded distance-based ones and Walker & Ribeiro (2011) being the sole character-based one. As already mentioned, distance-based CPMs exhibit inherent weaknesses, but Payne and Ramirez furthermore do not employ principled clustering methods, leading to some arbitrariness in subgrouping decisions. Walker & Ribeiro's (2011) Bayesian phylogenetic analysis of root-meaning sets is methodologically sounder, but its reliance on a short concept list (100-word Swadesh list for 60 Arawakan languages) means that most higher-level nodes exhibit low posterior probabilities, such that their classifications are effectively rake-like near the root. These works generally recover the low-level subgroups posited in expert classifications, but none find evidence for a top-level Northern-Southern split, although Walker & Ribeiro (2011) intriguingly find the Palikur-Marawan subgroup emerging as sister to the rest of the family. Their analysis also yields some intriguing mid-level subgroups, such as the Waraiku-Marawa subgroup forming a subgroup with the well-established Caribbean subgroup, and finds reasonably strong support for a large subgroup consisting of most northeastern Arawakan languages.

An obvious priority is improving lexical phylogenetic analyses of the family by increasing the size of concept lists and rooting techniques employed. Stark (2018) showed that increasing the size of the comparative concept list from 100, used by Walker & Ribeiro (2011), to 726 dramatically increased the posterior probabilities in the analysis of the Caribbean subgroup, and similar improvements can be expected elsewhere. Improvements can also be made in rooting the tree. Since no out-group exists for Arawakan, Walker & Ribeiro (2011) rooted their tree with a clock, but both their choice of evolutionary model (a Yule prior) and the lack of either internal calibration points or tip date points raise questions about the accuracy of the rooting (for a discussion, see Michael & Chousou-Polydouri 2019). Addressing these issues would contribute to a more trustworthy tree root and classification.

3.2.2. The Arawakan linguistic matrix hypothesis. It has been observed that many peoples speaking Arawakan languages share certain cultural practices—an Arawakan matrix (Santos-Granero 2002)—including an avoidance of endo-warfare and a tendency to form regional trade and political networks. The Arawakan linguistic matrix hypothesis (ALMH)[6] is a linguistic hypothesis inspired by these observations and posits that PA was a trade language or lingua franca spoken in much of lowland South America whose diversification was inhibited over this large area

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[5] Payne (2005) also makes a compelling case that the now-extinct Apolista is Arawakan.
[6] I adopt this term to distinguish the theory relating specifically to PA and the diversification of its daughter languages from more general observations about a shared Arawakan ethos.

until relatively recently by a continent-spanning, Arawakan-dominated trade network (Eriksen 2011, Hornborg 2005). The ALMH is articulated most clearly by Eriksen & Danielsen (2014) (see also Danielsen et al. 2011), who propose that PA began to diversify only after the breakup of the trade network sometime after 600 CE.[7]

The ALMH thus posits that the time depth of Arawakan is similar to that of Romance, which is highly implausible, given that the internal lexical and grammatical diversity of the family is comparable to language families like Tupian, which is commonly assumed to have a time depth of 5,000 years (Rodrigues & Cabral 2012). In this light, it is worth noting the linguistic evidence presented to support the ALMH is quite weak—namely, that the NeighborNet network for a set of grammatical typological features is star-like in shape. Beyond the general weakness of distance-based methods for developing internal classifications, there is little reason to suppose that the best explanation for the lack of clear higher-level subgrouping structure in the NeighborNet is the language contact scenario posited by the ALMH, rather than, say, that the chosen features are simply insufficiently informative for higher-level classification purposes.

Note that although evidence adduced for the ALMH may not be compelling, this does not entail that theories regarding the Arawakan ethos are flawed, but simply that the Arawakan ethos was not underpinned by linguistic uniformity.

3.2.3. Macro-Arawakan.

During the twentieth century, several individual languages and small language families were considered to be related to what we now consider the Arawakan family. These include the Arawan, Guahiban, Timotean, Tiniguan, and Harakmbut languages as well as the Andean language Puquina and the Amazonian isolate Yurakaré (e.g., Payne 1991, p. 365; Kaufman 1990, p. 58). Following Kaufman (1990), I refer to this variable penumbra of languages, together with Arawakan, as Macro-Arawakan.

None of the above proposals have significant support among Arawakanists now, and they appear to have arisen from suggestive but misleading morphological similarities or by lexical borrowings that were not identified as such. De la Grasserie (1894, p. 10), for example, declared Puquina to be "incontestably connected to the great Maypure [i.e., Arawakan] family" principally on the basis of the similarity of its first- and second-person nominal and verbal person markers: *no-* and *po-*, respectively, to *n-* and *p-*-initial first- and second-person markers in most Arawakan languages. We now know that the *n-/p-* first-/second-person pattern has a circum-Pacific distribution (Nichols & Peterson 1996, Zamponi 2017) and cannot be considered compelling evidence for an Arawakan affiliation.

The delimitation of Macro-Arawakan has also generated some confusion and controversy in the literature regarding the terms Arawak and Arawakan. The family I here call Arawakan was first known as Maipure or Maipur(e)an, with the names Arawak and Arawakan additionally coming into use as synonyms toward the beginning of the twentieth century (Brinton 1891, Chamberlain 1907). However, when the membership of the family was clarified in the 1980s, Payne (1991, p. 363) suggested that set of indisputably related languages be called Arawak (here: Arawakan) and the larger set of more dubiously related languages be called Arawakan (here: Macro-Arawakan). Payne's proposal has been more honored in the breach, however, with the undisputedly related set of languages being variably called Arawak, Arawakan, and Maipur(e)an in the literature. Although there has been some vigorous defense of Payne's original terminological proposal (e.g., Aikhenvald

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[7] Proponents of the ALMH do provide a precise date for the breakup of PA, but Eriksen (2011, p. 272) suggests that the "Arawak regional exchange system" was at its height between 200 and 600 CE, while Eriksen & Danielsen (2014) claim that the "Arawakan matrix" reached its maximum extent by 800 CE (p. 170) and that the "Arawak cultural matrix" was dominant in South America until 1000 CE (p. 172).

2012, p. 23), the actual onomastic practice of linguists is sufficiently inconsistent that it seems clearest to use the term Macro-Arawak(an) when referring to the larger, more speculative grouping and to countenance the above-mentioned terms as synonyms when referring to the smaller set of indisputably related languages.

3.3. Tupian, Tupi-Cariban, and TuKaJê

3.3.1. Tupian. The Tupian family is second in size only to Arawakan in South America, with its approximately 70 member languages located in Brazil and in adjacent areas of Argentina, Paraguay, Bolivia, Peru, and French Guyana (for an overview, see Rodrigues & Cabral 2012). Significantly, about 45 of these languages belong to a single subgroup, Tupi-Guarani (TG), which includes Paraguayan Guarani, one of the national languages of Paraguay, with almost five million speakers, and the now-extinct Tupinambá, the language spoken along much of the Brazilian Atlantic coast when Europeans arrived and an important source for words denoting neotropical flora, fauna, and foodstuffs in European languages.

Although in recent years phylogenetic methods have been applied to both Tupian and TG, expert classifications of both groups have been very influential. And while the phonological inventories and parts of the lexicon of both groups have been reconstructed, they have not played a significant role in developing classifications, since the sound changes involved are generally too common to serve as a basis for subgrouping (for Tupian, see Rodrigues & Cabral 2012; Rodrigues 2005, pp. 35–46; Rodrigues 2007, p. 11; reconstructions for TG are not presented explicitly but are implicit in Rodrigues 1984–1985 and Rodrigues & Cabral 2002). The Tuparí subgroup is among the best-studied non-TG Tupian subgroups, with Moore & Galucio (1994) reconstructing Proto-Tuparí phonology and lexical items and Galucio & Nogueira (2011) extending this reconstruction, arguing on the basis of morphological innovations that Makurap was the first language in the subgroup to branch off.

The most conservative expert classification of the Tupian family is due to the Tupi Comparative Project, based at the Museu Paraense Emílio Goeldi, which posits a rake-like organization of seven subgroups at the highest level of the family, including the Mawetí-Tupí-Guaraní subgroup, with TG successively embedded under Awetí and then Mawé (Galucio et al. 2015). Rodrigues & Cabral (2012), in contrast, propose that Tupian is composed of two symmetric branches, an Eastern one and a Western one, each consisting of five successively nested subgroups. The Western one contains TG as its most deeply nested subgroup, followed by successively larger subgroups, including additional subgroups in this order: Awetí, Mawé, Mundurukuic, and Jurunan. Significantly, Galucio and colleagues' (2015) distance-based phylogenetic analysis of Tupian lends some support for Rodrigues & Cabral's (2012) proposed structure for the Western clade, although the support for the Jurunan subgroup forming a clade with the remaining languages is somewhat weak. However, Galucio et al. (2015) find no evidence for a distinct Eastern subgroup, and support for nodes above that correspond to Rodrigues & Cabral's (2012) Western branch is in general rather weak, meaning that much uncertainty remains about the higher-level organization of the family. Given this uncertainty, an obvious medium-term priority for South American historical linguistics is to develop a robust character-based phylogenetic classification of the family.

The languages of the TG subgroup have been an important focus of historical and descriptive work on South American languages, with Rodrigues's (1984–1985) rake-like expert classification of the TG family into eight *subconjuntos* ('subsets', rather than *subgrupos* 'subgroups') having been particularly influential. Rodrigues's deliberately cautious choice of *subconjunto* over *subgrupo* reflects the often underappreciated fact that while Rodrigues identifies certain sound changes associated with each subset, he is explicit that this classification is not a genealogical one (Rodrigues 1984–1985, p. 48) but one based on perceived similarity (i.e., it is an expert classification). Significantly,

the sound changes in question are in general neither probative for subgrouping (since many are extremely common ones), exclusive to particular subsets, nor shared by all members of a subset.

Slight modifications of the eight *subconjuntos* have been proposed by Mello (2000, 2002) and Rodrigues & Cabral (2002), where the latter classification also proposes additional higher-level structure, grouping the eight *subconjuntos* into three major branches. Some arguments are provided for this higher-level structure on the basis of sound change and morphology, but in general the evidence is weak, consisting either of shared retentions or of extremely common sound changes (O'Hagan et al. 2019). Lemle (1971) represents an earlier attempt to develop a TG internal classification using reconstructions based on data from 10 members of the family but is likewise hampered by the scarcity of informative sound changes. Similarly, neither Schleicher's (1998) TG phonological reconstruction nor Jensen's (1998) reconstruction of TG morphosyntax clarify the internal structure of the subgroup.

The most detailed classification of TG is Michael and colleagues' (2015) lexical phylogenetic classification of the family, which yields considerable, well-supported, high-level structure for the family. This classification recovers five of Rodrigues's (1984–1985) eight *subconjuntos* as proper subgroups and one as a paraphyletic group,[8] with only two of the *subconjuntos* not being confirmed in some way. They identify Kamayurá as sister to the rest of the family, which they dub Nuclear TG, which itself splits into three major branches, two smaller northern Amazonian ones, and a third that embeds all the southern TG languages as a monophyletic subgroup.

3.3.2. TuKaJê and Tupi-Cariban.
Rodrigues has advanced two long-distance genealogical relationship hypotheses involving the Tupian family: the TuKaJê hypothesis positing that the Tupian, Cariban, and Jê languages are related (Rodrigues 2009) and the Tupí-Cariban hypothesis that only the Tupian and Cariban languages are related (Rodrigues 1985).

The TuKaJê hypothesis rests principally on the observation that languages of all three families exhibit relational prefixes, a set of putative prefixes analyzed as indicating whether or not a head is preceded by its associated complement (e.g., a possessum by its possessor in a possessive NP, or a transitive verb by its object). Recent work, however, calls into doubt the validity of the relational prefix analysis in TG languages (Meira & Drude 2013), where they have been best studied, and these arguments are equally troubling for the relational prefix analysis in other putative TuKaJê languages. In brief, Meira & Drude (2013) observe that so-called relational prefixes are an artifact of treating morphophonological root-initial segment alternations as if they were morphological alternations, which involves segmenting the alternating segment off from the rest of the root, and attributing meanings of contiguity (when preceded by a complement) and non-contiguity (when not) to the two alternants. Crucially, they show that comparative data from Mawé and Awetí, which together form the Mawetí-TG clade, reveal that the supposed relational prefixes are simply the initial segments of Proto-Mawetí-TG roots, where the segmental alternations are conditioned by the presence or absence of preceding heads. As Meira & Drude (2013, p. 10) observe, this behavior resembles patterns of initial consonant mutation in Celtic languages, *raddoppiamento sintattico* in certain Italian dialects, and *sandhi* in Sanskrit. From this vantage point, it appears that what Tupian, Cariban, and Jê languages share is not a set of relational prefixes but rather a morphophonological process, namely root-initial segmental alternations conditioned by the morphosyntactic environment. While suggestive, this is relatively weak evidence for a genealogical relationship among the three families.

More recently, Nikulin (2015) has argued that lexical evidence supports the TuKaJê hypothesis, comparing reconstructed forms for Proto-Tupian (PT), Proto-Cariban (PC), and Proto-Macro-Jê

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[8]Paraphyletic groups are those that consist of only a subset of the daughters of an ancestral language.

(PMJ). The validity of the reconstructed forms is somewhat unclear, however, as the phonological and lexical reconstructions are presented somewhat telegraphically, and many of the putative TuKaJê cognate sets are not entirely convincing, since they do not yield systematic sound correspondences between PT, PC, and PMJ. Despite these difficulties, the basic strategy Nikulin adopts is precisely the one to pursue in decisively evaluating the TuKaJê hypothesis in the future: reliable reconstructions of PT, PC, and PMJ forms and reconstruction of TuKaJê protoforms on the basis of regular sound correspondences among cognate sets built from these reconstructed PT, PC, and PMJ forms.

The evidence for Tupí-Cariban is somewhat more promising. Rodrigues (1985) presents 121 possible cognate sets and extracts sound correspondences from them, making an effort to identify loans between TG languages and Nheengatú on the one hand and northern Amazonian Cariban languages on the other hand, as well as loans from Wayana (Cariban) into the neighboring Wayampi (TG). Unfortunately, Rodrigues does not compare reconstructed PT forms with reconstructed PC ones but instead compares forms from three Tupian languages (Mundurukú, Tuparí, and Tupinambá) with those from eight Cariban languages (plus Island Carib, an Arawakan language with a large number of Cariban loanwords). This procedure leaves the door wide open for undetected loanwords and especially *Wanderwörter* (Haynie et al. 2014), a doubt that is magnified by Rodrigues's suggestion of similarities with forms in certain Jê languages. In addition, Rodrigues does not use his correspondence sets to reconstruct Proto-Tupi-Cariban phonology and etyma, leaving doubt as to whether or not the correspondence sets yield coherent reconstructions.

Given the importance that establishing a genealogical link between Tupian and Cariban would have for our understanding of lowland South American linguistic and social history, an evaluation of the Tupi-Cariban hypothesis that compares reconstructed PT and PC forms is an obvious priority.

3.4. Cariban

Approximately 50 Cariban languages were spoken when Europeans first arrived in the Americas, with 25 languages spoken by 60,000–100,000 individuals today (Gildea 2012, p. 441). These mainly lie in a broad band centered on the border region between Brazil and the Guyanas and Venezuela and extending to the Caribbean littoral, with the exception of a string of languages distributed southwards toward central Brazil, mainly in or near the Xingu River basin, and Carijona, which is spoken in central Colombia.

Cariban classification has been marked by sharply differing proposals even at the level of relatively low-level subgroups (Gildea 2012), with historical phonology having played an important role in overturning previous expert classifications. The PC phonological inventory was first reconstructed by Girard (1971a), who proposed 14 low-level subgroups on the basis of shared phonological innovations, most of which have proved robust. This reconstruction was revised by Meira & Franchetto (2005), who, observing that much of Girard's (1971a) data were problematic, developed comparative lists with modern data for eight languages. More recent advances include the reconstruction of PC /ô/ (a central or back unrounded mid vowel) and its subsequent evolution (Gildea et al. 2010) and the reconstruction of a stem-initial ablaut process conditioned by a third-person marker and a putative relational prefix (Meira et al. 2010) (see Section 3.3.2).

The two most recent classifications of Cariban are Gildea's (2012) state-of-the-art classification and Meira, Birchall & Chousou-Polydouri's (2015) phylogenetic classification, which are useful to juxtapose. The former is a "somewhat speculative expert" classification that is significantly informed by results stemming from CM, when available, and reflects the current consensus among Caribanists. It is rake-like near the root, positing five major branches (in decreasing

order of confidence): Parukotoan, Pekodian, Venezuelan, Nahukwa, and Guianan, plus a residue group. The phylogenetic classification presents a Bayesian analysis of lexical data from 34 Cariban varieties, based on 100-word Swadesh lists, and is likewise effectively rake-like near the root, exhibiting relatively low posterior probabilities for most higher-level nodes, quite possibly due to the shortness of the comparative concept lists used (Michael & Chousou-Polydouri 2019). Only Parukotoan and Pekodian, the two highest-confidence groups in the expert classification, are recovered by the phylogenetic analysis, with Venezuelan, Nahukwa, and Guianan failing to emerge as monophyletic. These phylogenetic results correlate with the support that each subgroup in the state-of-the-art classification receives from CM results.

Parukotoan, for example, is defined by a clear sound change: PC **jô > Proto-Parukotoan *jo (Meira et al. 2010). Similarly, Pekodian was first proposed by Meira & Franchetto (2005), who evaluated the validity of a Southern branch posited in expert classifications of the family (Derbyshire 1999, Durbin 1977, Kaufman 1994). They found multiple shared phonological innovations that split the putative Southern languages in two groups—Pekodian (Arara, Ikpeng, and Bakairi) and Nahukwa (Kuikuro and several codialects)—but no innovations that define Southern as a whole.

Venezuelan, as proposed by Gildea (2003), is defined by the unconditioned split of PC **o > *o, ə, and one morphological innovation. Unconditioned splits, however, are generally viewed skeptically, except where they are seen as the outcome of incomplete lexical diffusion (e.g., Guy 2008), casting doubt on this proposed shared phonological innovation.[9] The proposed morphological innovation consists of the replacement of the PC third-person possessive marker **y- by *it- for vowel-initial nouns in Proto-Venezuelan, but as Gildea (2003) observes, the reconstructed PC form itself is not uncontroversial, raising the question of which form is in fact innovative. Given the preceding observations, and that Venezuelan does not emerge as a subgroup in Meira, Birchall & Chousou-Polydouri's (2015) analysis, Gildea's (2012) characterization of Venezuelan as an untested hypothesis is suitably cautious.

Guianan, consisting of Taranoan (reconstructed by Meira 2000), Wayana, and Kari'nja, the most widely spoken Cariban language, is identified on the basis of several shared features (Meira 2005). The fact that the Meira, Birchall & Chousou-Polydouri's (2015) analysis does not return this group, however, raises the question of how many of these are in fact shared innovations.

Caribanists have made significant strides in phonological and morphological reconstruction in comparison to colleagues working with many other South American families (for an overview, see Gildea 2012), providing a valuable foundation for future work. Since it appears that sound changes may not be capable of providing a fine-grained classification of the family, morphological reconstruction and further phylogenetic work with larger comparative lists are promising avenues for improving the classification of the family.

3.5. Jê and Macro-Jê

3.5.1. Jê.
Jê is a family of approximately 17 historically attested languages spoken near the eastern edge of the Amazon basin and adjacent areas outside the Amazon basin proper. Many of the languages spoken closer to the Atlantic coast became extinct during the colonial period and are only fragmentarily attested.

Empirically grounded classifications of Jê languages date to Davis's (1966) reconstruction of Proto-Jê (PJ), which, although based on a modest quantity of lexical data from only five languages,

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[9]Doubts about lexical diffusion as a significant pathway for sound change have mounted in recent years, however (e.g., Labov 2020).

supported the previously uncertain inclusion of Kaingang in the family. The latter language is one of two living members of the Southern branch in Rodrigues's (1986, 1999) expert classification of the family into Northern, Central, and Southern branches. Davis did not seek to classify the Jê languages, and both his cognacy judgments and analytical decisions were subsequently criticized (Nikulin 2016, Ribeiro & van der Voort 2010), but only relatively recently have scholars resumed investigations into historical Jê phonology. Jolkesky (2010) provides a phonological and lexical reconstruction of Proto-Southern Jê. Nikulin (2016) provides a reconstruction of Proto-Northern-Jê phonology, and Nikulin (2017) provides a reconstruction of Proto-Cerrado (a proposed subgroup consisting of Northern and Central Jê) phonology. Given the importance that PJ reconstructions have for evaluating the membership of Macro-Jê (MJ) (see the next section), these recent advances are particularly important. It will be critical for transparency and verifiability of these reconstructions for future works to explicitly and systematically present cognate and correspondence sets and provide explicit argumentation for segmental and lexical reconstructions.

Jolkesky (2010) and Nikulin (2017) provide distance-based classifications of Southern Jê and Northern Jê, respectively. Reanalysis of the extant cognate sets used in these analyses using character-based methods is obvious low-hanging fruit that could yield important insights into the internal classification of Jê.

3.5.2. Macro-Jê. MJ is a linguistic family of about 30 historically attested languages that has the Jê family as its largest subgroup (Ribeiro 2006, Rodrigues 1999). The precise membership of MJ is the active focus of current research, with certain subgroups having been decisively shown to be members of the family only relatively recently. Note that there is some ambiguity in the use of the term MJ, as it can be employed in different contexts, which may be limited to the smaller core set of languages that a given author posits to be related or may also include the larger penumbra of possibly related languages; it is typically clear from context which sense is intended.

Evidence that ranges between compelling and suggestive has been presented for six first-order subgroups in MJ, in addition to Jê proper: Aimorean, Maxakalian, Jabutian, Karajá, Ofayé, and Rikbaktsa. Davis (1968) provides comparative evidence for the inclusion of Maxakalí and Karajá by presenting forms from these languages that are cognate with PJ forms and identifying regular sound correspondences between Maxakalí, Karajá, and PJ. Ribeiro (2012a) strengthens the case for the inclusion of Karajá by providing additional phonological and morphological correspondences with Jê languages. Maxakalí is the sole surviving member of a larger group of modestly historically attested related languages, as discussed by Ramirez et al. (2015), who present additional lexical evidence for its MJ affiliation (see also Nikulin & da Silva 2020 and Ribeiro 2012b).

Evidence for the inclusion of Aimorean was initially due to a brief work by Seki (2002) that compares forms in Krenak, the best-attested of the Aimorean languages, with Davis's (1966) PJ forms, identifying several generally modestly attested correspondences, but providing neither phonological or lexical reconstructions. Recent work by Nikulin & da Silva (2020) significantly strengthens the case for the MJ affiliation of Aimorean and furthermore provides evidence that Maxakalian and Aimorean languages form a subgroup within MJ by reconstructing proto-Maxakalí-Krenak phonology and lexical items and proposing some shared phonological, lexical, and grammatical innovations for the subgroup.

The inclusion of Rikbaktsa in MJ is based on comparative work by Boswood (1973), who identifies regular sound correspondences with Davis's reconstruction of PJ, while the inclusion of Ofayé is based on a brief work reconstructing Ofaie-Jê on the basis of sound correspondences between Ofayé and, again, Davis's reconstruction. Ribeiro & van der Voort (2010, pp. 546–48) express methodological concerns about both works, suggesting that it would be timely to revisit this early comparative work.

Finally, Ribeiro & van der Voort (2010) employ CM to decisively demonstrate that the small Jabutian language family, consisting of Arikapú and Djeorimitxi, both spoken near the Brazilian-Bolivian border, is MJ, despite it not figuring in several expert classifications as MJ, including Rodrigues (1999).

Beyond these subgroups, for which some compelling comparative evidence has been presented, Rodrigues's (1999) expert classification of MJ additionally lists Bororoan, Guató, Kamakã, Karirian, Purian, and Yatê as possible MJ subgroups under a broader conception of MJ that he characterizes as a working hypothesis. In general, as the relationships of these linguistic groupings to MJ have come under greater scrutiny, an MJ affiliation has come to seem less credible.

Ribeiro (2012a, p. 263) is pessimistic about the MJ status of Guató, observing that while "the evidence presented by Greenberg (1987) and Rodrigues (1986, 1999) was rather superficial and inconclusive, a recent study...(Martins 2011), purporting to present additional evidence based on a perusal of the entire corpus available of Guató, fails to provide any convincing new arguments."

Ramirez et al. (2015) examine several poorly attested languages of eastern Brazil, including Kamakã varieties, Puri-Coroado, and Koropó, and seek to clarify their relationships with each other and languages of the Maxakalí and Aimorean subgroups of MJ. Turning first to the Purian family, they argue that there is little evidence for distinguishing Puri and Coroado as distinct languages, and then turning to a comparative list of 90 Puri-Coroadan items, they find an insufficient number of possible cognates with either Krenak or Maxakalí to permit them to identify regular sound correspondences between Puri-Coroado and a more reliably MJ language. On the basis of significant lexical data, they argue the third language treated as Purian by Rodrigues (1999), Koropó, is not related to Puri-Coroado but is rather a Maxakalian language with a large number of Puri-Coroado loans. Ramirez et al. (2015) thus cast significant doubt on Purian as an MJ language. Interestingly, they find evidence for a close relationship between Kamakã varieties and Maxakalí, leading them to propose that they form a subgroup of Maxalian and are thus members of MJ, but not as an independent subgroup.

One language that is not included in Rodrigues's (1999) expert classification but that several MJ specialists have come in more recent years to consider a plausible candidate for inclusion in the MJ family is Chiquitano, due to suggestive morphological and lexical similarities to Jê languages (Adelaar 2008, Santana 2006). Ribeiro (2011) also argues that relational prefixes in Chiquitano and several reliably MJ languages appear to have a common source and that they appear on roots that are "very probably cognate" (p. 117). Regardless of the ultimate validity of relational prefix analyses more generally (see Section 3.3.2), Ribeiro's optimism regarding cognacy is a call to action to evaluate this hypothesis by rigorously employing CM.

With the exception of Nikulin & da Silva's (2020) proposal that Maxalian and Aimorean form a subgroup and Ramirez and colleagues' (2015) suggestion that the Kamakã varieties belong to the Maxalian subgroup, MJ is generally treated as having a rake-like structure below the root.[10] As is clear from this overview, the solid delimitation of MJ awaits the careful and systematic application of CM within and among its major candidate subgroups.[11] Such an effort may yield an internal classification, in addition to successfully delimiting the family, but in the likely eventuality that sound changes will not fully resolve the MJ tree, the application of phylogenetic methods will be essential.

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[10]Nikulin (2015, p. 46) presents a relatively articulated MJ tree based on lexicostatistical methods without an explicit clustering method.

[11]Nikulin (2015) provides a preliminary reconstruction of PMJ phonology and lexicon, although the brevity of the presentation makes the reconstructions difficult to evaluate.

3.6. Panoan and Pano-Takanan

3.6.1. Panoan. Panoan is a family of some 33 languages spoken in eastern Peru, northeastern Bolivia, and adjacent areas of western Brazil, of which some 25 are still spoken (Fleck 2013; Valenzuela & Guillaume 2017; P. Valenzuela & R. Zariquiey, submitted manuscript). Panoan languages exhibit some marked similarities in grammar and lexicon with the Takanan languages of Bolivia, leading to the hypothesis of a Pano-Takanan family.

As Oliveira's (2014) cogent critical overview makes clear, the literature on Panoan internal classification has been dominated by expert classifications (e.g., Fleck 2013, Loos 1999) and problematic quantitative studies (e.g., d'Ans 1973, Ribeiro 2006). An important exception is Shell's (1965) phonological and lexical reconstruction of Reconstructed Pano,[12] based on seven languages. On the basis of shared phonological innovations, Shell proposes a classification consisting of three first-order groups: Headwaters (Amawaka, Cashinawa, and Marinawa), Mainline (Chákobo, Shipibo-Konibo, and Kapanawa), and Western (Kashibo). Oliveira (2014) and Valenzuela & Guillaume (2017) summarize work reconstructing aspects of Proto-Panoan, including Oliveira's (2014) extension of Shell's (1965) reconstruction by including data from 19 languages, including northern Panoan languages. These reconstructions do not in general contribute to an improved understanding of the internal classification of the family, however.

The most recent work on Panoan internal classification is a distance-based phylogenetic study (P. Valenzuela & R. Zariquiey, submitted manuscript) of 200-item Swadesh lists for 20 Panoan languages (plus five Takanan languages that serve as out-group languages to root the Neighbor-Net network). The authors tentatively propose three major branches: (*a*) Northern, consisting of Matses/Mayoruna, Kulina, Korubo, and Matis; (*b*) Southeastern, consisting solely of Kasharari; and (*c*) Central-Southern, which contains the remainder of the family. The authors appear to have been guided by the rough consensus in previous influential expert classifications in inferring subgroups from the NeighborNet visualization. An obvious next step for advancing the classification of Panoan languages is to employ character-based CPMs to analyze the valuable cognate set information to be found in these authors' work.

3.6.2. Pano-Takanan. Takanan is a family of five languages spoken in Bolivian Amazonia (Guillaume forthcoming) that have long been speculated to be genealogically related to the languages of the Panoan family (Valenzuela & Guillaume 2017). Key (1968) presented potential Panoan and Takanan cognates and sound correspondences, but Girard (1971b) remains the sole application of CM to evaluating the Pano-Takanan hypothesis. Girard identified a significant number of regular sound correspondences from cognate sets of reconstructed Proto-Panoan and Proto-Takanan forms and reconstructed 166 Proto-Pano-Takanan etyma. Most of the correspondences are supported by only one or two cognate sets, however, and Girard himself remarks on the modest number of cognates that support the correspondences and identifies some inconsistencies in the sound correspondences. This result is clearly promising, but specialists have split, with some regarding the Pano-Takanan relationship as very likely or certain (e.g., Campbell 1997, 2012; Kaufman 1990) and others expressing doubt (e.g., Fleck 2013, Loos 1999).

Supporters of the Pano-Takanan hypothesis have in recent years been encouraged by some striking grammatical similarities that have been identified between languages of the two families, including in their associated motion (Guillaume 2017), transitivity harmony (Valenzuela 2017), and ditransitive alignment systems (Zariquiey 2017). Whether these similarities reflect a

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[12]Since Shell was unable to include data from northern Panoan languages, she cautiously declined to characterized her results as a reconstruction of Proto-Panoan per se.

genealogical relationship or contact at an early stage in the diversification of the two families remains an open question whose resolution will ultimately depend on further systematic application of CM to the large quantity of high-quality lexical and grammatical data that have become available for both Panoan and Takanan languages since the appearance of Girard (1971b).

3.7. Tukanoan

Tukanoan is a family of some 29 languages (Chacon 2014) that are spoken in two areas: one centered on the Vaupés River border region of eastern Colombia and northwestern Brazil and another centered on middle Putumayo River, spanning parts of the border areas of Ecuador, southern Colombia, and Peru. Most of the languages of the former area participate in a system of obligatory linguistic exogamy (Jackson 1983, Grimes 1985, Sorensen 1967, Stenzel 2005), which has driven linguistic convergence among these languages in ways that are pervasive (Aikhenvald 1999b, 2002) but still not well understood.

Distance-based phylogenetic (Waltz & Wheeler 1972) and expert (Barnes 1999, among others) classifications of the Tukanoan family were the most influential until Chacon's (2014) reconstruction of the Proto-Tukanoan (PTk) consonant inventory and internal classification of the family based on shared phonological innovations. Most significantly, Chacon's (2014) classification identifies a two-way top-level split between Eastern Tukanoan (ET) and Western Tukanoan (WT) branches, in contrast with many earlier classifications, which additionally posit a Central branch that includes Kubeo (e.g., Waltz & Wheeler 1972) and sometimes other languages as well [e.g., Letuama/Returã and Tanimuka, according to Barnes (1999)]. Chacon's (2014) classification also differs in important ways from earlier classifications in the organization of lower-level subgroups.

The complex distribution of sound correspondences across the family, reflecting the fact that Tukanoan languages have experienced both sound changes as shared innovations and wave-like diffusions of sound change, complicates the use of sound changes for purposes of internal classification (Chacon 2014, Chacon & List 2015, Malone 1986). First, this complexity has led to quite divergent reconstructions of PTk phonology, generating different distributions of sound changes and, thus, classifications. For example, whereas Chacon (2014) reconstructs a series of voiceless laryngealized stops, others such as Waltz & Wheeler (1972) and Malone (1986) reconstruct voiced stops; correspondingly, Malone's (1986) classification is markedly different from Chacon's (2014). In this light, a clear priority is to extend the empirically well-grounded reconstruction efforts pioneered by Chacon (2014) by reconstructing PTk vowels and supersegmental features such as nasality and tone. Second, the complex set of sound changes resulting from any given reconstruction allows for a variety of different subgrouping proposals. In response to this challenge, Chacon & List (2015) applied parsimony-based phylogenetic methods, with transition networks modeling sound change tendencies, to sound change characters derived from Chacon (2014). The most successful model yielded a classification that preserved the basic ET/WT split but differed in several ways from Chacon (2014), perhaps most strikingly in placing Kubeo and Tanimuka in a subgroup that was sister to the remainder of ET. Chacon & List (2015) conclude by presenting a conservative tree where, on the basis of knowledge of language contact among Tukanoan languages, they manually undid some of the subgroups yielded by the phylogenetic methods employed. This last point highlights the importance of both continuing to study Tukanoan language contact and turning to sources of evidence that may prove reliable as evidence for subgrouping in the context of intense language contact, such as morphological innovations. In this light, it is significant that the position of Kubeo as branching at the ET root, identified by Chacon & List (2015), is supported by Chacon & Michael's (2018) account of the development of ET past/perfective verbal subject

agreement, which shows that ET, to the exclusion of Kubeo, experienced certain nasal harmony processes in the development of its past/perfective suffixes.

4. CONCLUSION

Recent decades have seen a flowering of documentation and description of South American languages, which puts South Americanist historical linguists in the best position yet to clarify the complex genealogical relationships among the languages of the continent. It is now feasible to move beyond expert classifications, which, as helpful as they were in the past, leave much to be desired from empirical and analytical standpoints. Methodologically, future progress will depend on judicious use of classical CM and CPMs, where the latter are especially valuable for groups of languages in which sound changes are incapable of yielding internal classifications. As Michael & Chousou-Polydouri (2019) argue, however, specifically character-based phylogenetic methods should be employed, since distance-based methods conflate shared retentions and shared innovations in producing classifications. Morphological reconstruction will also likely prove critical for identifying shared innovations capable of informing classifications in cases where sound changes are not informative.

Also critical for progress will be sustaining and strengthening the collaborations between scholars and Indigenous communities in documenting and describing South American languages. For purposes of language classification, support for lexical documentation, which is often not valued in academic circles but is often valued by Indigenous communities, is critical. Work on the classification of some language families is indeed significantly hampered by the lack of adequate lexical documentation. Similarly, support for language description, and not simply the development of annotated corpora, as valuable as they are, will be essential in the longer term for the refinement of internal classifications and evaluation of long-distance proposals. Finally, the investigation of genealogical relationships in South America must proceed in tandem with the study of language contact and areality, which loom large as factors complicating our understanding of language relationships in South America (e.g., Epps & Michael 2017).

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