

Three Hypotheses to Explain Pai Origins

Don Laylander

Abstract

According to most analysts, the Pai branch of the Yuman linguistic family consists of two languages: Paipai, which is spoken in northern Baja California, and Upland Yuman, spoken by the Yavapai, Walapai, and Havasupai of northwestern Arizona. Historically, the territories of the two groups were separated by a gap of about 200 km, occupied by Yumans who belonged to other branches of the family. When, how, and why did the Pai separation arise? Did the ancestors of the Paipai migrate south into Baja California from Arizona? Did Upland Yumans move in the opposite direction, from Baja California to Arizona, or did both groups arrive at their historic homes from an intermediate location in the Colorado River delta or in the Salton Basin? Culture history cannot yet offer definitive answers. However, several lines of investigation, including archaeology, linguistics, history, oral traditions, comparative ethnography, physical anthropology, and paleoenvironmental studies may provide evidence bearing on the relative probabilities of the competing hypotheses.

Introduction

The ethnographic distribution of languages belonging to the Pai branch of the Yuman family poses an interesting puzzle for regional culture history. A gap of about 200 km separates the two regions in which the languages were spoken: northwestern Arizona and northern Baja California (Figure 1). Understanding the circumstances that produced the two groups' separation may provide important clues to key events in the region's late prehistory. Definitive answers as to when, where, and why the separation occurred are not yet forthcoming, but it is possible to find clues in a variety of different sources.

The discussion that follows will attempt to describe and evaluate the presently available evidence. It will

look at three hypotheses that might plausibly account for the distribution of the Pai languages: (1) the ancestors of the Paipai migrated from northwestern Arizona south into Baja California; (2) the ancestors of the Upland Yumans migrated north from northern Baja California to Arizona; and (3) the ancestors of both groups spread out from and abandoned a common center in the Colorado River's delta or in the Salton Basin.

Linguistic Evidence: Genetic Affiliations

Yuman is one family within the still controversial Hokan phylum, a collection of language families and isolates that may be, or may not be, very remotely related to each other. At the time of European contact, Hokan languages were scattered around the periphery of California and in Mexico. The Yuman family constituted the largest group within the Hokan phylum, considered in terms of the number of its languages, the size of its aboriginal territories, and its population numbers. Whether or not Hokan is a valid genetic grouping has been questioned (e.g., Campbell 1997:290–296), but Yuman is unmistakably related to one sister linguistic family or language isolate, Cochimí, which was spoken throughout the central portion of the Baja California peninsula (Mixco 1978, 2006).

Within the Yuman family, four branches are generally recognized (Kendall 1983; Campbell 1997; Mithun 1999). Kiliwa seems to be the most strongly differentiated from the others, and therefore it is presumably the one longest separated from the others (e.g., Kendall



Figure 1. Native languages of the Yuman region.

1983:4; Laylander 1997a:62, 66). The remaining three branches, which constitute Core Yuman, are Pai, River, and Delta-California Yuman. Pai is now generally recognized by linguists as consisting of two languages: Upland Yuman (spoken in several dialects by the Yavapai, Walapai, and Havasupai) and Paipai (Kendall 1983:4; Goddard 1996:7; Campbell 1997:127; Mithun 1999:577). Golla (2011:118) treated Paipai and Upland Yuman as separate Yuman branches, apparently based solely on their geographical separation. The geographical anomaly is that these

two languages were separated from each other at the time of European contact by a gap of about 200 km that extended through territories occupied by speakers of River and Delta-California Yuman languages. This pattern seemed so odd to some early researchers that they questioned whether the Pai branch was a true linguistic unit; perhaps the Upland Yuman and Paipai languages were merely particularly archaic forms of Yuman that happened to share a common conservatism rather than a common specific descent (Kroeber 1943; Joël 1964). However, the consensus

among linguists now is that the Pai branch is real and that these peoples did indeed share with each other a common linguistic heritage not shared with the other Yumans.

Can linguistics give any indication of when the separation between Upland Yuman and Paipai occurred? The chronological distances between the three branches of Core Yuman—that is, between Pai, River, and Delta-California Yuman—would set an upper limit on the time depth of the subsequent division within Pai. Glottochronology has been offered as a comparatively objective, albeit controversial, means of estimating the time depths of linguistic separations. Many linguists now dismiss glottochronology as invalid, while many others continue to employ its results. According to various glottochronological calculations, the split of Core Yuman into its River, Delta-California, and Pai branches may have occurred around 100 BC–AD 700 (Robles 1965), 1500–700 BC (Ochoa 1982a, 1982b), or AD 200–700 (Laylander 1997a). Kenneth Hale and David Harris (1979:172) thought that the time depth of Core Yuman must be less than 2,000 years. A date of ca. AD 500 seems to be a reasonable guess. So far, there seems to have been no attempt to use glottochronology to assess the distance between Paipai and Upland Yuman.

At the short end of the linguistic time scale, Werner Winter (1967:376) suggested that the Paipai and Yavapai languages were so close that the two groups had been separated “for probably less than a century.” However, Judith Joël (1998) noted that Paipai and Upland Yuman do not share Spanish loanwords, as would be expected had their separation occurred at such a late period. A key linguistic distinction with chronological implications is the one between separate languages, which are largely unintelligible to their separate speakers, and mere dialects of a single language, which are mutually intelligible. As a rule of thumb, about 1,000 years is the time needed for a unified language to break into multiple, mutually unintelligible languages. Are Paipai and Upland Yuman

separate languages, as the generally accepted classification suggests, or are they merely two dialects of a single Pai language? There is contradictory testimony concerning tests of mutual intelligibility among the Pai speakers from northern Baja California and western Arizona who have come into contact with each other again in recent decades. Mutual intelligibility between Paipai and Yavapai has been asserted (Alan Shaterian, personal communication 2003, cited in Mixco 2006:31; see also Winter 1967), and it has also been denied (Kendall 1983:8). As noted above, most linguists currently accept Upland Yuman and Paipai as separate languages, rather than mere dialects of a single Pai language. This may imply that the separation is at least 1,000 years old, although it is probably not much older than that. As a provisional estimate, the separation between the two languages might be dated to sometime between AD 500 and 1000 (Laylander 2010).

Among the other ways in which studies of genetic linguistic relationships might shed additional light on the problem of geographical origins, an approach that probably will not be fruitful in this case is what has been called the “center-of-gravity” argument (Foster 1996:64–65). At first glance, western Arizona might seem to be strongly favored as the Pai homeland. The Upland Yumans occupied a territory about five times as large as that of their Paipai kinsmen. The pre-contact population of the Upland Yumans was probably also larger than that of the Paipai, although not by as wide a margin; the density of aboriginal settlement within Upland Yuman territory was evidently very low. Upland Yumans were divided into at least three major groups, the Yavapai, Walapai, and Havasupai, and the Yavapai themselves were further divided into three groups: Yavepe (Northeastern Yavapai), Tolkapaya (Western Yavapai), and Kewevkapaya (Southeastern Yavapai). On the other hand, Paipai may have had only a single dialect, or perhaps two dialects, if the western group known as the Yakakwal is counted as separate (Mixco 1977). However, the

greater territorial extent and linguistic complexity of the Upland Yumans is not a valid argument in favor of an Arizona homeland for the Pai. Center-of-gravity arguments must be based on the location of the highest level of linguistic kinship, not on the subsequent territorial extent, population size, or degree of lower-level internal differentiation. It is reasonable to assume that the ancestral community that spoke a single proto-Pai language was fairly small and that its highest-level linguistic split (between Upland Yuman and Pai) occurred as it enlarged and expanded territorially. If Paipai and Upland Yuman are the two coequal languages of the Pai family, that pattern does not give a preference to any one of the three geographical hypotheses discussed here.

Linguistic Evidence: Borrowing

Consideration of linguistic borrowings might reveal additional information about Pai origins. One would expect the Paipai language to contain some words borrowed from its historic-period neighbors, Kiliwa and Delta-California Yuman, and perhaps from Cochimi farther south. Similarly, Upland Yuman would be expected to contain borrowings from River Yuman, Numic, Hopi, Athapaskan, and Piman peoples (see Figure 1). However, if Paipai were found to contain recognizable borrowings from the Arizona languages that are not also shared by the Yuman family in general, this would be a strong argument in favor of a Pai homeland in western Arizona. Similarly, if Upland Yuman were found to contain unique borrowings from the Baja California languages, this would be a strong argument in favor of a Pai homeland in northern Baja California. Borrowings from the Takic languages of southern California (which include Cahuilla, Cupeño, Luiseño, Gabrielino, Serrano, and Kitanemuk) into one or both of the Pai languages might similarly support an intermediate Pai homeland in the Lake Cahuilla area, where Takic but neither of the Pai languages was spoken historically.

The linguistic investigations necessary to evaluate these possibilities apparently have not yet been undertaken. Kiliwa, Cochimi, Delta-California Yuman, and River Yuman all have similarities to Pai because of their shared relationships within the Yuman family, and consequently it may prove difficult to recognize borrowings from them within the Pai languages. On the other hand, borrowings from Numic, Hopi, Athapaskan, or Piman languages within Paipai, or from Takic languages within either of the Pai languages, might stand out.

Evidence of borrowing that involved some but not all of the dialects of Upland Yuman might also provide clues concerning regional culture history. If Paipai and Upland Yuman are accepted as coordinate offshoots of proto-Pai, and if Paipai shares linguistic elements with one of the Upland Yuman dialects (for instance, Yavapai) but not with the others, a likely explanation for that sharing would be that it resulted from close contacts between the speakers of Paipai and of the Upland Yuman dialect. This would have occurred during a period after Paipai and Upland Yuman had split apart and after the basic dialect divisions within the Upland language had already begun to emerge.

Winter (1967) presented evidence for much stronger lexical agreement between Paipai and Yavapai than between Paipai and either Walapai or Havasupai. If the picture suggested by this evidence is correct, it implies that Paipai and Yavapai speakers were still living in proximity to each other at a period substantially after the breakup of the proto-Pai community and after significant dialect differences had developed between Yavapai and Walapai-Havasupai. Arguably, this would favor a northern or central homeland for Pai over a southern one in Baja California; two separate Upland Yuman migrations out of the peninsula to western Arizona would be required under the latter scenario.

Linguistic Evidence: Toponyms

Another set of linguistic clues to culture history may be found in place names. Newcomers moving into a region tend either to take over foreign place names from the territory's previous occupants or to coin descriptive place names. However, with the passage of time, the descriptive place names of long-established groups tend to become reduced to uninterpretable proper names whose original meanings have become obscured and forgotten.

Some Paipai place names have been collected together (Laylander 1997a; Bajacalifology 2013), and at least half have evident descriptive meanings. However, there is little linguistic analysis of either Paipai or Upland Yuman toponyms. An exception is a study by Mauricio J. Mixco (2006:31–32), who suggested that two Paipai place names had been borrowed from prior Kwatl (i.e., Kumeyaay) inhabitants of historically Paipai territory. Mixco argued that *Jamau* appeared to be Kumeyaay *xa=maaw*, “no water.” The negative element *maaw* was not found in Paipai. The form *xa*, “water,” is proto-Yuman, with cognates in Kumeyaay, Kiliwa, Paipai, and Upland Yuman; it was also used in other Paipai place names. Other sources attest to the use of the name *Jamau* by the Kiliwa (see Meigs 1939:68; Hohenthal 2001:332) A second supposedly borrowed place name designates a hill near Santa Catarina known as *wi=starr*, *wi* being “hill” plus *starr*, which is untranslated (but cf. *‘Ui’s tar*, San Miguel, reported as a Paipai place name in Hohenthal [2001:54]). The form *wi*, “hill,” is used in many other Paipai place names for locations both within and outside of Paipai territory. Mixco’s arguments would favor a late arrival of the Paipai in their historic home, but the evidence adduced in support of that view is not as yet very compelling.

Potential Evidence from Physical Anthropology

Physical anthropology, particularly DNA studies, may offer another set of clues to the specific origins and

affiliations of Pai speakers. Linguistic and genetic affiliations do not necessarily coincide, but they often tend to be closely interrelated, particularly in the case of small-scale, hunter-gatherer societies, such as the prehistoric Paipai and Upland Yumans. The genetic record of the affiliations of the Upland Yumans and Paipai has almost certainly been obscured or complicated by two centuries of demographic decline and new patterns of interaction, both with other Native American groups and with immigrants from other continents. Genetic studies of modern populations may nonetheless be meaningful. Cara Monroe and her associates (2013) assembled mitochondrial DNA samples from most of the Yuman populations, including Paipai (n=14), Yavapai (n=127), and Walapai (n=76), and analyzed them in terms of haplogroups and haplotypes. They concluded:

The absence of this lineage [B2a] in Pai speakers also support[s] the suggestion that the Pai split from other Upland Yumans earlier than previous hypothesized (Mixco, 2006; Laylander, 1997[a], 2010). This would favor a migration of fissioning Upland Yuman groups northward into the Southwest rather than a Pai Pai migration back into Northern Baja [Monroe et al. 2013:12].

DNA studies of prehistoric skeletal remains within the Yuman region might offer even more important insights into the changing populations that occupied different portions of the region. However, the late prehistoric practice of cremation, as well as some modern Native American sensitivities concerning scientific studies of skeletal materials, may limit this potential.

Evidence from Oral Traditions

Do the oral traditions of the Paipai and the Upland Yumans contain credible records of their separation and migration? Some researchers have suggested that they may. Winter argued:

It is perfectly reasonable to accept as reflecting historical facts a tradition (reported in 1956) by an older Yavapai from Fort McDowell: “The Akwa?ala [i.e., Paipai] emigrated from Superstition Mountain. Whether his further comment: “The young people wanted to marry their cousins; the law forbade it; so they emigrated,” is also justified, or whether perhaps rather a band of Yavapai drifted south at the time of the white man’s conquest of the Apache, remains an open question [Winter 1967:375].

Martha B. Kendall cited and elaborated on this same account:

Winter ... alluded to a Yavepe Yavapai tale concerning tribal fission in recent historic times. This tale is about a man and a woman who were forbidden to marry because they were cousins. Angry and frustrated, they marshaled such kinsmen and friends as they could and decamped from Arizona, heading west. If this tale refers to the origin of the Paipai, it receives a small boost from the fact that the word *paya* in Yavepe Yavapai refers to the children of one’s mother’s brother or the children of one’s father’s sister, that is, to cross-cousins. This would mean that the word Paipai comes from *paya* “cross-cousin” and *?pay* “people,” so that the Paipai would call themselves “people who are cross-cousins” or “cousin people” [Kendall 1983:8].

Mixco (2006:31) also seemed to allude to a similar unpublished Yavapai account.

A comment from a Paipai informant in 1929 also lends some support to a scenario of north-to-south migration. José Domingo Castro said that “the people [meaning the Paipai] came from Apache land [probably meaning the land of the Yavapai, who have also

been known as the Mohave Apache] before the coming of the Spanish” (Meigs 1977:19).

As noted above, Winter favored the view that Paipai and Upland Yuman had separated very late in the historic period. This would make the preservation of memories of such an event plausible, but this very late chronology does not appear to be supported by most linguistic evidence. Superstition Mountain (Avikwame, Wikami), mentioned in the story, was usually identified with Newberry Mountain in southern Nevada, within historic Mohave territory. It was identified as the original home of all humanity, from which the various ethnic groups had diverged shortly after mankind’s beginning, according to most Yuman creation myths (Dobyns and Euler 1976:4–5; cf. Laylander 2001a). Consequently, a story of an ethnic movement out from that location more likely belonged to the context of the creation myths rather than a specific factual memory of a later migration.

Another issue is whether an authentic historical memory of events so far back in time as the Pai schism would have been preserved. It has been argued elsewhere that recognizably factual information in Native California traditional narratives does not seem to extend back any farther than a few centuries (Laylander 2006a). If this is correct, and if the Paipai-Upland Yuman split occurred more than 1,000 years ago, traditional narratives are unlikely to shed light on it. On the other hand, if some phase of the process did occur very late in prehistory—for instance, a migration of the already distinct Paipai south from the Lake Cahuilla basin or the Colorado River delta at the time of the lake’s final cycle in the seventeenth century—then orally transmitted accounts of that event might still be recoverable.

Evidence from Historical Records

A key issue concerns the period during which the Upland Yumans and Paipai reached their historic

homelands. As noted above, Winter (1967) thought that the Paipai had separated from the Yavapai and entered Baja California very recently, as late as the early nineteenth century. Present linguistic evidence makes this seem improbable, but this issue does suggest another line of investigation: examination of explorers' accounts and mission records to establish when the Paipai and the Upland Yumans may have entered their historic territories.

Written accounts of the Yuman region extend back nearly five centuries. However, the earliest historical reports typically offer few solid clues to the linguistic identities of the Native peoples that were encountered.

The first portion of the Yuman region visited by Europeans was the lower Colorado River and its delta. In 1540 Hernando de Alarcón sailed up the Colorado River at least as far as present-day Yuma (Hammond and Rey 1940). Later in the same year, Melchior Díaz reached the river overland from Sonora. Alarcón's account suggests the presence of many different Native groups in the delta, but it is not clear whether all these groups were linguistically distinct from each other. At least two different languages were spoken, and groups apparently identifiable with the later Kahwan and Halyikwamai (both, perhaps, Cocopa speakers) were encountered (Laylander 1997a:44–45). The next visit to the region was by Juan de Oñate in 1604–1605, arriving overland from New Mexico (Laylander 2004). Between the Bill Williams River and the head of the Gulf of California, Oñate came into contact with groups recognizable as the Mohave, Halchidhoma, Kahwan, Halyikwamai, and Cocopa, as well as with the non-Yuman-speaking Osera at the junction with the Gila River, in an area later occupied by the Quechan (Yuma). Between the Osera and the Mohave, in what would subsequently become Halchidhoma and then Chemehuevi territory, Oñate met the Bahacecha. The identity of the Bahacecha is uncertain; it has been variously suggested that were Quechan, Halchidhoma, or Yavapai. The lower Colorado River was repeatedly

visited during the eighteenth century by Eusebio Francisco Kino, Jacob Sedelmayr, Juan Bautista de Anza, Francisco Garcés, and others; their reports seem not to suggest Pai presence on the river. In 1826 a British naval officer, R. W. H. Hardy, encountered a group he termed "Axua" in the delta, and in 1828 the American adventurer James Ohio Pattie heard of "Pipi" living in that area (Hardy 1829; Pattie 1833). These Axua and Pipi may plausibly, but not conclusively, be identified with the Paipai (Akwa'ala), although whether they were permanent residents or only visitors to the delta is not clear. In general, there is no persuasive evidence that either the Paipai or the Upland Yumans were based on the Colorado River as late as the historic period, although that possibility cannot be entirely excluded.

Early European entries into Upland Yuman territory in northwestern Arizona arrived overland, primarily from New Mexico. Visitors included García López de Cárdenas in 1540, Antonio de Espejo in 1583, Marcos Farfán de los Godos in 1598, and Juan de Oñate in 1604–1605. The problem of matching specific Upland Yuman groups with the names that were used in the early historic records was examined in detail by Albert H. Schroeder (1952, 1974) and others. These studies suggest that the various Upland dialect groups were probably already present in Arizona as early as the seventeenth century.

European visits to historic Paipai territory in Baja California may have begun as early as 1542, when Juan Rodríguez Cabrillo sailed up the western coast of Baja California. More certainly, Sebastián Vizcaino stopped in the Cabo Colnett area during his similar voyage in 1602. The accounts of these visits do not seem to provide a basis for firm ethnic identifications (Wagner 1929). More intensive interaction in the region only began much later, in 1769, with the overland Portolá-Serra expedition to Alta California, but even the abundant documentation from that expedition contains few linguistic clues. During the 1770s, 1780s, and 1790s, Spanish soldiers and Dominican missionaries

explored the region and established missions in or near Paipai territory, including San Vicente (1780) and Santa Catarina (1797), and the Dominicans produced one detailed ethnographic description (Sales 1960). The linguistic picture remains unclear, although the evidence makes any extensive ethnic displacement as late as the second half of the eighteenth century appear to be improbable.

In sum, the documentary evidence seems to be compatible with the argument that Paipai and Upland Yuman speakers were already in their historic homelands at the time of the earliest European contacts. However, there may be a potential for more detailed studies of those records to confirm or modify this conclusion.

Evidence from Ethnographic Traits

In addition to linguistic evidence, other synchronic ethnographic patterns can be brought to bear on the problem of Pai origins. One approach that has not yet been explored in any depth might be to look at the degree to which the various Pai groups had adapted to their specific geographical settings and to interpret this as a relative index of the length of their local residence. For instance, it might be possible to evaluate the range of endemic plants that were used as medicinal resources by the Paipai and the Upland Yumans or to assess the degree to which the Paipai exploited the possibilities that were afforded by their coastline.

Another use of ethnographic evidence that may be implemented more immediately would involve examining cultural similarities between different ethnolinguistic groups. Such similarities may serve, like linguistic traits, as markers of past connections. Very close similarities between the cultures of the Upland Yumans and the Paipai could indicate that their separation was recent or that their cultures were highly conservative. On the other hand, if the similarities are found to be strongest between each of the two Pai groups and their current neighbors rather

than between the two groups themselves, that would suggest either long residence within their historic territories or rapid diffusion and adoption of new cultural traits across ethnic boundaries. As in the case of linguistic borrowing, of particular interest would be evidence of cultural borrowing represented by sets of traits that the Paipai may have shared with the present neighbors of the Upland Yumans, or that the Upland Yumans shared with the Paipai's neighbors, or that either group shared with the Takic cultures of southern California.

To measure cultural similarities and differences in a fairly objective and comprehensive way is not an easy nor a straightforward task. However, the results of one previous attempt to do so are available, and examining those findings may help to evaluate the potential usefulness of this line of investigation. That previous study is Joseph G. Jorgensen's (1980) *Western Indians: Comparative Environments, Languages and Cultures of 172 Western North American Indian Tribes*. Jorgensen used statistical methods to construct dendrograms displaying the relative similarities in cultural traits among most of the aboriginal groups in western North America. The study's methodology may be open to challenge in several respects: the ways in which the traits to be analyzed were selected, the adequacy of the ethnographic data that were used, and the statistical techniques that were employed in the analysis. Nonetheless, Jorgensen provided an extensive and a relatively objective set of data to consider.

Five Pai groups were included in Jorgensen's study: the Havasupai, Walapai, Northeast Yavapai, Southeast Yavapai, and Paipai (the latter being termed Ak-wa'ala by Jorgensen). His analysis included both an assessment of overall cultural similarities between the groups of western North America and a series of comparisons for each of seven major cultural categories (Table 1). The number of individual traits that were compared within each category ranged from 26 to 67.

Table 1. Relative Cultural Similarities between Pai Groups and Other Groups in Western North America (Data from Jorgensen 1980).

Cultural Category	Pai Group	Groups Found to be Most Similar at the First Level	Groups Found to be Most Similar at the Second Level
All Categories	Havasupai, Walapai, NE Yavapai, SE Yavapai	Navajo (2), Apache (10)	Papago, Pima, Kamia, Maricopa, Cocopa, Mohave, Quechan
	Paipai	Kiliwa	Kumeyaay (3), Cahuilla (3), Cupeño, Luiseño, Serrano
Technology	Havasupai, Walapai, NE Yavapai, SE Yavapai	Apache (9)	Navajo (2)
	Paipai	Kiliwa	Gabrielino, Salinan
Subsistence Economy	Havasupai	Papago	Apache (4), Navajo (2)
	Walapai	Southern Paiute (1)	NE Yavapai, SE Yavapai
	NE Yavapai, SE Yavapai	Walapai, Southern Paiute (1)	Shoshone (2), Southern Paiute (1), Apache (2)
	Paipai	Salinan, Pomo (1)	Shoshone (4), Apache (1), Northern Paiute (2), Yokuts (4), Tubatulabal, Luiseño, northern California (16), Kawaiisu
Economic Organization	Havasupai, Walapai	Navajo (2)	NE Yavapai, SE Yavapai
	NE Yavapai, SE Yavapai	Havasupai, Walapai, Navajo (2)	Puebloan (12), Hopi, Zuni, Papago, Pima
	Paipai	Kiliwa	Kumeyaay (3), Serrano, Cahuilla (3), Cupeño, Luiseño
Social Organization	Havasupai	northern California (1)	NW coast and interior (20), northern California (19)
	Walapai	Papago	NW coast and interior (1), Shoshone (4), Ute (3), Apache (5)
	NE Yavapai	Shoshone (1)	Southern Paiute (2), Shoshone (1)
	SE Yavapai	Paipai, Kiliwa	Quechan, Mojave, Maricopa, Kamia, Cocopa
	Paipai	Kiliwa	SE Yavapai
Political Organization, Sodalities, and Warfare	Havasupai	northern California (1)	Serrano
	Walapai, NE Yavapai	NW coast and interior (1)	NW coast and interior (1)
	SE Yavapai	northern California (1), Ute (3)	Apache (7)
	Paipai	northern California (1)	northern California (1)
Ceremonialism	Havasupai, Walapai, NE Yavapai, SE Yavapai	Cocopa, Yuma, Mohave, Maricopa, Chemehuevi	Papago, Pima, Apache (10), Navajo (2), Kamia
	Paipai	Kiliwa	Cahuilla (3), Serrano, Kumeyaay (3), Luiseño, Cupeño, Gabrielino

Table 1. Continued.

Cultural Category	Pai Group	Groups Found to be Most Similar at the First Level	Groups Found to be Most Similar at the Second Level
Spirits and Shamanism	Havasupai	Serrano, Cahuilla (2), Cupeño, Luiseño, Northern Paiute (4), Shoshone (5), northern California (2)	Quechan, Mohave, Cocopa, NW coast and interior (1)
	Walapai	NW coast and interior (1)	Chemehuevi
	NE Yavapai	SE Yavapai, northern California (2), Apache (5), Hopi, Pima	Navajo (2)
	SE Yavapai	northern California (1)	Apache (5)
	Paipai	Yokuts (1), northern California (3)	Papago, northern California (3)

Note: Spelling of names for ethnic groups has been standardized. Numbers in parenthesis indicate the number of more specific ethnic groups that were distinguished within Jorgensen's sample.

To simplify Jorgensen's complex set of data for present purposes, only the first two levels of branching within his dendrograms of cultural similarity have been considered: the group or the set of groups rated most similar to each of the Pai groups, and the second most similar group or set. Table 1 summarizes the results of those comparisons.

Several conclusions emerge from these data. There is almost no evidence for any close cultural similarity between the Paipai and the Upland Yumans beyond what they share in common with other non-Pai inhabitants of the same broad region. This suggests a relatively early separation, or else openness to borrowing or innovation on the part of one or both groups. There is also little specific similarity between Paipai culture and the culture of the Upland Yumans' Arizona neighbors or between Upland Yuman culture and the northern Baja California cultures. Therefore this evidence does not lend support specifically to either the northern or the southern hypothesis for Pai origins. Paipai culture shows some similarities with Takic culture, possibly giving some support to the central hypothesis. However, perhaps such similarities would be expected in any case, given that the Takic groups were the Paipai's closest non-Yuman neighbors

in the sample and given the close mutual influences that are known to have occurred between the Takic groups (particularly the Luiseño, Cupeño, and Cahuilla) and the Paipai's Kumeyaay neighbors. In general, the closest similarities in Jorgensen's data seem to be attributable either to current geographical proximity or to random "noise" among geographically distant and linguistically unrelated groups

It might be suggested that some aspects of culture are more likely than others to preserve evidence of past relationships. Material culture and social organization are strongly constrained by the requirements of a group's adaptation to its contemporary natural and social environments, respectively. Ceremonialism and religion are much less constrained, and they are also domains in which a high premium has commonly been put on conservatism. However, these "conservative" categories are no more revealing in Jorgensen's data than the more adaptive ones. Similarities in ceremonialism seem to have been strongly conditioned by geographical proximity, while shared traits relating to "spirits and shamanism" show a high degree of geographical randomness. Likewise, in a previous study of mythology in the region (Laylander 2001b), no specific Paipai-Upland Yuman links were found

beyond traits that were common to the Yuman family and the region as a whole.

In sum, analyses of the ethnographic data have failed to reveal a cultural pattern paralleling the linguistic bond that was peculiar to the Paipai and the Upland Yumans. The data have also failed to reveal patterns strongly pointing toward any particular region as the most likely Pai homeland. Instead, they suggest that the cultures of the various Pai groups were quite fluid and that the Pai descendants had become thoroughly “at home” within their historic natural and cultural environments.

Evidence from Archaeology

Archaeological evidence for ethnic migrations can be sought in continuities or discontinuities in the local cultural sequences and in kinds of artifacts or practices that can be traced back to specific regions of origin. Unfortunately, the sorts of highly stylized artifacts and features that make good markers of these phenomena are relatively uncommon in the Yuman region. Basic technological innovations that stand out in the archaeological record, such as the bow and arrow and pottery, diffused too freely across ethnic boundaries to be diagnostic. Probably the best prospects for ethnic markers lie in the details of ceramic wares and rock art elements. As archaeological studies become more extensive, particularly in the Paipai area, archaeologists may investigate whether any distinctive characteristics are shared by Paipai and Upland Yuman sites but not by sites in intermediate areas, and if so, whether we can determine where those characteristics originated.

Pottery analysis may be a particularly promising line of inquiry. Pottery appears to have been introduced into the Yuman region during approximately the same time period as the split of the Pai branch (ca. AD 500–1000). If the proto-Pai speakers made pottery, they may have carried specific aspects of their craft with them during subsequent migrations.

Within northern Arizona, Tizon Brown Ware has been suggested as ethnically diagnostic of the Upland Yumans. For instance, Henry F. Dobyns and Robert C. Euler (1976:6) claimed that the presence of Tizon Brown Ware at Willow Beach on the Colorado River prior to AD 750 and at later Walapai sites argued for cultural stability in northwestern Arizona lasting 1,000 years. Tizon Brown Ware has also been found in northern Baja California, including historic Paipai territory. However, this ware had a considerably wider distribution among different Yuman groups. Indeed, its manufacture passed fairly freely into the lands of the linguistically unrelated Takic groups of southern California. Therefore, Tizon pottery is not diagnostic specifically of a Pai presence, either in Arizona or in Baja California.

If general wares are not ethnically diagnostic, it is possible that more specific ceramic traits, such as particular vessel forms, decorations, or manufacturing techniques, may yet be linked to the Pai. Such traits may cut across the divisions between wares; they may occur both in Lower Colorado Buff Ware, made from sedimentary clays in the lower Colorado Desert, and in Tizon Brown Ware, made from residual clays in the uplands of western Arizona and in the Peninsular Range of southwestern California and northwestern Baja California. The accelerator mass spectrometry (AMS) method of radiocarbon dating applied to individual sooted potsherds offers the potential of pinning down fairly precisely the chronology of particular ceramic practices in specific regions.

Rock art analysis may be more difficult to apply to the problem of Pai origins. The images are only moderately abundant. A more serious problem is the difficulty in assigning even approximate dates to most rock art. However, it may prove worthwhile to compare rock art elements in the Paipai, Upland Yuman, and lower Colorado River areas in order to see if any potential ethnic markers can be identified.

Explanatory Models

A different approach to the problem of Pai origins is to evaluate the different hypotheses in terms of the incentives and opportunities for ethnic migration that may have been created by major changes in the natural environment. The original Pai, wherever they lived, were surrounded by lands that had already been occupied by other groups for many millennia. What circumstances provided the opportunity for the Pai to expand into new territories, and what impelled them to do so?

One hypothesis worth considering is that circumstances created by climate change drew Pai groups into one or both of their historic territories. A period of marked warming between about AD 800 and 1300, known as the Medieval Climatic Anomaly, is documented in southwestern North America (Jones et al. 1999; West et al. 2007). In arid, marginal lands, such as northwestern Arizona and northern Baja California, the stresses introduced by this climatic change may have disrupted existing occupations, for instance, those of ancestral Puebloan peoples in northwestern Arizona, and opened opportunities for expansion from outside.

If climate change offered a possible “pull” for Pai migrations, the vagaries of prehistoric Lake Cahuilla offered a possible “push.” Lake Cahuilla was an extensive freshwater lake, about 180 km long and up to 50 km wide, filling the Mexicali, Imperial, and Coachella valleys of northeastern Baja California and southeastern Alta California (Wilke 1978; Laylander 1997b). The lake was created when the Colorado River shifted its course within its delta. Under modern conditions, it would have taken nearly two decades for the lake to fill its basin to an elevation of 12 m asl, at which point its waters would have overflowed south through the Río Hardy into the Gulf of California. When the river shifted its course back directly south toward the gulf, it would have taken at least six decades for the residual lake waters in the basin to evaporate. At least three cycles of lake filling and recession took place

between AD 1200 and 1700. Additional stands are also known to have occurred during earlier centuries, but their number and timing are poorly defined

Lake Cahuilla, when it was present, offered a considerable range of resources within an otherwise comparatively barren region. Freshwater fish, freshwater mollusks, water birds, and marsh plants are all documented archaeologically as having been exploited along its shorelines. An ongoing archaeological issue concerns whether these resources were the primary means of subsistence for communities that resided at the lake or whether they were only supplemental resources for groups that were based primarily away from the lake (e.g., Weide 1976; Wilke 1978; Schaefer 1994; Laylander 2006b; Schaefer and Laylander 2007). The lower delta of the Colorado River was the home of several different Native groups, with a population numbering in the thousands according to the early historical accounts. The delta provided the Cocopa with a considerable range of natural and agricultural resources according to the ethnographic evidence (Kniffen 1931; Castetter and Bell 1951; Kelly 1977). Arguably, a shift of the river away from the lower delta would have created a severe, decades-long period of stress for the region’s inhabitants, as the lower delta became desiccated and the rapidly rising Lake Cahuilla shoreline remained too unstable to offer sufficient compensation. Again arguably, the shift of the river back away from the lake would also have created severe stresses during the prolonged recession of the lake and the successive disappearance of its resources. Either of these episodes might have triggered ethnic displacements if delta or lakeshore groups fled their deteriorating homelands.

Conclusions and a Scenario

The evidence that has been collected and analyzed to date does not support a definitive solution to the problem of accounting for the origins and anomalous distribution of the Pai languages. However, some clues

have been provided through a considerable range of linguistic, physical anthropological, ethnographic, historical, and archaeological evidence. There is reason to hope that future investigations may make it possible to advance toward more conclusive answers.

One concrete scenario concerning Pai origins is offered here. The most that could be claimed on behalf of this scenario is that it fits the presently available evidence at least as well as any of the numerous competing scenarios. The value of such a scenario is that it provides a definite model that can be refuted, modified, or confirmed by the gradually accumulating data and analyses bearing on the subject. This proposed scenario follows:

1. Within the ancestral Yuman linguistic family, pre-Kiliwa and proto-Core Yuman may have differentiated from each other around 500 BC in northern Baja California.
2. As Core Yuman expanded territorially and demographically, around AD 500 it may have begun to differentiate into three languages: proto-Pai, in the area of the Colorado River's delta; proto-Delta-California Yuman, in the mountains and coastal areas to the west; and proto-River Yuman, farther north on the river.
3. As the Pai flourished within their relatively rich homeland, they may have begun their split into communities speaking pre-Paipai and pre-Upland Yuman languages around AD 800. Perhaps slightly after this, Upland Yuman may also have begun to differentiate into pre-Yavapai and pre-Walapai-Havasupai dialects.
4. After AD 1200 a sequence of radical hydrologic changes in the Colorado River delta and in the Lake Cahuilla basin may have driven the Pai groups, either simultaneously or in succession, to seek refuge in other areas: in the case of the Paipai, to

the southwest in Baja California, and in the case of the Upland Yumans, to the northeast in Arizona.

5. Soon afterward, when the Lake Cahuilla cycle again turned the basin or the lower delta into an attractive environment, the beneficiaries of this improvement may not have been any residual or returning Pai groups but rather Delta-California Yumans (ancestral to the Kamia and Cocopa) coming in from the west and perhaps also River Yumans coming from the north and east. Meanwhile, the Upland Yumans may have been able to expand across an extensive but lightly held territory in northwestern Arizona, and the Paipai may have become solidly rooted in the mountains, foothills, and coastal plains of the peninsula.

Again, it should be stressed that this is merely one possible scenario. Nonetheless, it and its competitors may be worthy of serious consideration and evaluation for what they can contribute to the understanding of prehistoric ethnic mobility and cultural adaptability among prehistoric hunter-gatherers, both within this region and in wider contexts.

References Cited

- Bajacalifology
2013 Native Place Names of Baja California. Electronic document, <http://www.sandiegoarchaeology.org/Laylander/Baja/index1.htm>.
- Campbell, Lyle
1997 *American Indian Languages: The Historical Linguistics of Native America*. Oxford University Press, New York.
- Castetter, Edward F., and Willis H. Bell
1951 *Yuman Indian Agriculture: Primitive Subsistence on the Lower Colorado and Gila Rivers*. University of New Mexico Press, Albuquerque.

- Dobyns, Henry F., and Robert C. Euler
1976 *The Walapai People*. Indian Tribal Series, Phoenix, Arizona.
- Foster, Michael K.
1996 Language and Culture History of North America. In *Languages*, edited by Ives Goddard, pp. 64–110. Handbook of North American Indians, William C. Sturtevant, general editor, Vol. 17. Smithsonian Institution, Washington, D.C.
- Golla, Victor
2011 *California Indian Languages*. University of California Press, Berkeley.
- Goddard, Ives
1996 Introduction. In *Languages*, edited by Ives Goddard, pp. 1–16. Handbook of North American Indians, William C. Sturtevant, general editor, Vol. 17. Smithsonian Institution, Washington, D.C.
- Hale, Kenneth, and David Harris
1979 Historical Linguistics and Archeology. In *Southwest*, edited by Alfonso Ortiz, pp. 170–177. Handbook of North American Indians, William C. Sturtevant, general editor, Vol. 9. Smithsonian Institution, Washington, D.C.
- Hammond, George P., and Agapito Rey (editors)
1940 *Narratives of the Coronado Expedition, 1540–1542*. University of New Mexico Press, Albuquerque.
- Hardy, R. W. H.
1829 *Travels in the Interior of Mexico, in 1825, 1826, 1827, & 1828*. Henry Colburn and Richard Bentley, London.
- Hohenthal, William D., Jr.
2001 *Tipai Ethnographic Notes: A Baja California Indian Community at Mid Century*. Ballena Press Anthropological Papers No. 48. Menlo Park, California.
- Joël, Judith
1964 Classification of the Yuman Languages. In *Studies in California Linguistics*, edited by William Bright, pp. 99–105. University of California Publications in Linguistics No. 34. Berkeley.
1998 Another Look at the Paipai-Arizona Pai Divergence. In *Studies in American Indian Languages: Description and Theory*, edited by Leanne Hinton and Pamela Munro, pp. 32–40. University of California Publications in Linguistics No. 131. Berkeley.
- Jones, Terry L., Gary M. Brown, L. Mark Raab, Janet L. McVickar, W. Geoffrey Spaulding, Douglas J. Kennett, Andrew York, and Phillip L. Walker
1999 Environmental Imperatives Reconsidered: Demographic Crises in Western North America during the Medieval Climatic Anomaly. *Current Anthropology* 40(2):137–170.
- Jorgensen, Joseph G.
1980 *Western Indians: Comparative Environments, Languages and Cultures of 172 Western North American Indian Tribes*. W. H. Freeman and Company, San Francisco.
- Kelly, William H.
1977 *Cocopa Ethnography*. Anthropological Papers of the University of Arizona No. 29. Tucson.
- Kendall, Martha B.
1983 Yuman Languages. In *Southwest*, edited by Alfonso Ortiz, pp. 4–10. Handbook of North

- American Indians, Vol. 10, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
- Kniffen, Fred B.
1931 *The Primitive Cultural Landscape of the Colorado Desert*. University of California Publications in Geography Vol. 5, No.2. University of California Press, Berkeley.
- Kroeber, A. L.
1943 *Classification of the Yuman Languages*. University of California Publications in Linguistics Vol. 1, No. 3. University of California Press, Berkeley.
- Laylander, Don
1997a The Linguistic Prehistory of Baja California. In *Contributions to the Linguistic Prehistory of Central and Baja California*, edited by Gary S. Breschini and Trudy Haversat, pp. 1–94. Coyote Press Archives of California Prehistory No. 44. Salinas, California.
1997b The Last Days of Lake Cahuilla: The Elmore Site. *Pacific Coast Archaeological Society Quarterly* 33(1 & 2):1–138.
2001a The Creation and Flute Lure Myths: Regional Patterns in Southern California Traditions. *Journal of California and Great Basin Anthropology* 23(2):155–178.
2001b The Question of Baja California's Prehistoric Isolation: Evidence from Traditional Narratives. *Camino Real Misionero de las Californias* 4:6–15.
2004 Geographies of Fact and Fantasy: Oñate on the Lower Colorado River, 1604–1605. *Southern California Quarterly* 86(4):309–324.
2006a California's Prehistory as a Remembered Past. *Journal of California and Great Basin Anthropology* 26(2):153–177.
- 2006b The Regional Consequences of Lake Cahuilla. *San Diego State University Occasional Archaeological Papers* 1:59–77. San Diego.
- 2010 Linguistic Prehistory and the Archaic-Late Transition in the Colorado Desert. *Journal of California and Great Basin Anthropology* 30(2):141–155.
- Meigs, Peveril, III
1939 *The Kiliwa Indians of Lower California*. Iberoamericana No. 15. University of California Press, Berkeley.
1977 Notes on the Paipai of San Isidoro, Baja California. *Pacific Coast Archaeological Society Quarterly* 13(1):11–20.
- Mithun, Marianne
1999 *The Languages of Native North America*. Cambridge University Press, Cambridge, United Kingdom.
- Mixco, Mauricio J.
1977 The Linguistic Affiliation of the Nakipa and Yakakwal of Lower California. *International Journal of American Linguistics* 43(3):189–200.
1978 *Cochimi and Proto-Yuman: Lexical and Syntactic Evidence for a New Language Family in Lower California*. University of Utah Anthropological Papers No. 101. Salt Lake City.
2006 The Indigenous Languages. In *The Prehistory of Baja California: Advances in the Archaeology of the Forgotten Peninsula*, edited by Don Laylander and Jerry D. Moore, pp. 24–41. University of Florida Press, Gainesville.
- Monroe, Cara, Brian M. Kemp, and David Glenn Smith
2013 Exploring Prehistory in the North American Southwest with Mitochondrial DNA Diversity Exhibited by Yumans and Athapaskans.

- American Journal of Physical Anthropology*.
Electronic document, <http://onlinelibrary.wiley.com/doi/10.1002/ajpa.22237/abstract>.
- Ochoa Zazueta, Jesús Angel
1982a *Baja California: diferenciación lingüística*. Universidad de Occidente, Los Mochis, Mexico.
1982b *Sociolingüística de Baja California*. Universidad de Occidente, Los Mochis, Mexico.
- Pattie, James Ohio
1833 *The Personal Narrative of James O. Pattie of Kentucky*. Cincinnati, Ohio.
- Robles Uribe, Carlos
1965 Investigación lingüística sobre los grupos indígenas del estado de Baja California, México. *Anales del Instituto Nacional de Antropología e Historia* 17:275–301.
- Sales, Luis
1960 *Noticia de la provincia de California 1794*. Colección Chimalistac No. 6. José Porrúa Turanzas, Madrid.
- Schaefer, Jerry
1994 Challenge of Archaeological Research in the Colorado Desert: Recent Approaches and Discoveries. *Journal of California and Great Basin Anthropology* 16(1):60–80.
- Schaefer, Jerry, and Don Laylander
2007 The Colorado Desert: Ancient Adaptations to Wetlands and Wastelands. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 247–257. Altamira Press, Lanham, Maryland.
- Schroeder, Albert H.
1952 A Brief History of the Havasupai. *Plateau* 25(3):45–52.
1974 *A Study of Yavapai History*. Garland, New York.
- Wagner, Henry Raup
1929 *Spanish Voyages to the Northwest Coast of America in the Sixteenth Century*. California Historical Society, San Francisco.
- Weide, Margaret L.
1976 A Cultural Sequence for the Yuha Desert. In *Background to Prehistory of the Yuha Desert Region*, edited by Philip J. Wilke, pp. 81–94. Ballena Press Anthropological Papers No. 5. Ramona, California.
- West, G. James, Wallace Woolfenden, James A. Wanket, and R. Scott Anderson
2007 Late Pleistocene and Holocene Environments. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 11–34. Altamira Press, Lanham, Maryland.
- Wilke, Philip J.
1978 *Late Prehistoric Human Ecology at Lake Cahuilla, Coachella Valley, California*. Contributions of the University of California Archaeological Research Facility No. 38. Department of Anthropology, University of California, Berkeley.
- Winter, Werner
1967 The Identity of the Paipai (Akwa'ala). In *Studies in Southwestern Ethnolinguistics: Meaning and History in the Languages of the American Southwest*, edited by Dell H. Hymes and William E. Bittle, pp. 371–378. Mouton, The Hague.