

Inferring Relationships Between Indigenous Baja California Sur and Seri/Comcáac Populations Through Cultural Traits

SHANE J. MACFARLAN

Washington State University, Department of Anthropology VMMC 202, 14204 NE Salmon Creek Ave., Vancouver, WA 98686
shane.macfarlan@email.wsu.edu

CELESTE N. HENRICKSON

University of California, Berkeley, Department of Anthropology, 2251 College Building, Berkeley, CA 94720-9637
celestenicole@berkeley.edu

Cultural relationships between historic Baja California Sur indigenous groups are poorly understood, despite the presence of historical accounts of these peoples. Relationships between groups largely have been reconstructed through linguistic attributes recorded by Jesuit missionaries. Non-linguistic cultural traits derived from historical accounts also can be used to determine relationships between groups. We use content analysis to systematically organize cultural trait information from historical explorer accounts, Jesuit missionary documents, and academic research pertaining to three Lower California groups: the Pericú, Guaycura, and Cochimí, as well as the Seri/Comcáac Indians of the Gulf of California and Sonora. Reliability analyses reveal considerable cultural homogeneity between the Cochimí and Guaycura, and cultural dissimilarity between all other groupings. Hierarchical cluster analysis reveals the Guaycura and Cochimí comprise a distant, but natural grouping with the Seri/Comcáac, while the Pericú are isolated. Several hypotheses are presented to explain these patterns.

In general, simplicity and crudity of workmanship increases from north to south, attaining in Southern and Lower California the greatest degree of primitiveness, a condition which was undoubtedly due to the area being marginal to its ancestral hearth and farthest removed for many centuries from the points of ingress of foreign influence [Rogers 1945:168].

If we are too quick to assume marginality from a reading of privileged documentary sources, or an emotional response to places which to us seem remote...we are in danger of destroying the history and lives of the people we purport to study [Horning 2007:374].

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THE CONCEPT OF PENINSULAR ISOLATION is deeply rooted in the study of Baja California prehistory. The cultural geography of the Baja California peninsula is often described using terms like “cul-de-sac” (Massey 1966), “population trap” (Tuohy 1978), or “refuge” (Gonzalez-José et al. 2003). These phrases imply a cultural core rooted near the northern base of the peninsula and an increasingly marginalized or isolated periphery moving toward the southern tip. This imagery can influence our interpretations of the past (Horning 2007) and lead to simplified concepts of peninsular history, including the manner in which

peninsular geography constrains emigration and the consequent flow of peoples into and within the region. Indeed, the geographic ruggedness of Baja California, which hampers access to many areas today, has facilitated its characterization as culturally marginal both in the past and within modern research frameworks of North America (e.g., Aschmann 1967; Dalton 2005; Gonzalez-José et al. 2003; Massey 1966; Rogers 1945). Much of the discussion about marginality is reinforced by geographic patterns involving the distribution of cultural traits in the south of the peninsula—for example, the retention of atlatls (Laylander 2007), distinctive cave burials (Massey

1955), and a notable absence of indigenous pottery (Massey 1966). Imagery of Baja California Sur (hereafter referred to as BCS) cultural isolation also is exacerbated by missionary accounts that expressed feelings of isolation, fear, and the remoteness of living so far from mainland Mexico and Europe (e.g., Baegert 1952). A superficial reading of these accounts could allow one to conflate missionary experiences of isolation with the historical cultural relationships between indigenous groups. The extent to which a region or people are marginal or isolated is an academic matter that requires empirical testing through inferential statistics. As a peninsula of culturally heterogeneous groups, an important first step towards positioning Baja California within a wider North American prehistory is to understand the relationships between the BCS groups themselves and with their neighbors.

Missionary accounts and archaeological data suggest that considerable cultural heterogeneity existed between immediate groups within BCS (Laylander 2000). From north to south, the groups discussed here are the Cochimí, Guaycura, and Pericú (Fig. 1). To date, archaeological excavations and historic accounts indicate these groups were small-scale, mobile foragers who existed within diverse ecosystems that traversed extreme gradients from coast to coast (Ashmann 1967; Hugo and Exequiel 2007; Hyland 1997; Ritter 2006). At the time of contact, Pericú territory included the peninsula's southern cape, as well as the four islands of Espíritu Santo, La Partida, San José, and Cerralvo. Directly to the north of the tropical cape were the Guaycura, who inhabited the southern Sierra de la Giganta and the Magdalena coastal plain. To the north of the Guaycura were the linguistically diverse Cochimian groups. Additionally, the Seri are included here, a group located beyond the peninsula on the west coast of mainland Mexico, who currently refer to themselves as the Comcáac (Bowen 2000). Oral histories (Bowen 1976, 2000) and archaeological research (Bowen 1976; Foster 1984) suggest the Seri/Comcáac had cultural contacts during the historic period with peoples from the Baja California peninsula.

Relative to other regions in North America, sociocultural interactions among historic, indigenous groups in BCS are not well understood, despite the existence of a variety of ethnohistorical accounts of the region dating from the sixteenth century onward.

Several factors contribute to this situation, including (1) the absence of widespread, well-dated archaeological sites; (2) disagreements between ethnohistorical accounts regarding the number of linguistic groups present and their associated territories (e.g., del Barco 1981; Massey 1949); and (3) ethnohistorical accounts that confound linguistic with group affiliation (Massey 1949). Also, like many regions in North America, it is difficult to correlate prehistoric sites with historic indigenous populations. These problems have been compounded by the effects of disease vectors (Aschmann 1967; Cook 1937), forced missionary relocation programs (Jackson 1983, 1984), and the possibility of historical demographic shifts and the geographic displacement of indigenous populations due to indigenous agency (Mathes 1975) — although it should be noted that the latter factor has been called into question (cf. Laylander 1997:16). A final variable confounding the interpretation of relationships between historic BCS indigenous populations involves the question of whether one examines linguistic or material culture attributes.

Missionary letters and reports are the most productive source of information for illuminating cultural relationships between Baja Californian groups (Aschmann 1986). These historical documents provide demographic, linguistic, and cultural trait information pertaining to specific indigenous groups. Of these, linguistic attributes are overwhelmingly preferred for reconstructing prehistoric relationships; however, multiple interpretations exist as to the appropriate clustering of historic groups. Massey (1949, 1966) proposed the presence of two language families (Yuman and Guaicurian) subdivided into four linguistic groups (the Peninsular Group or Cochimí, Guaycura, Huchiti, and Pericú). Gursky (1966) and Swadesh (1967) suggested that Guaycura was best placed within the Hokan language stock, while Fernandez de Miranda (1967) and Campbell (1997) disagreed. Kroeber (1931) considered Cochimí to be related to Yuman, but did not afford it full membership status, while Troike (1976) and Mixco (1978, 2006) suggested that Cochimí and Yuman were genetically related but should be considered two distinct families. Mixco (2006) has stated that the Guaycuran and Cochimian languages are probably unrelated. Regardless of how the linguistic relationships are characterized, a purely linguistic appraisal by no means provides

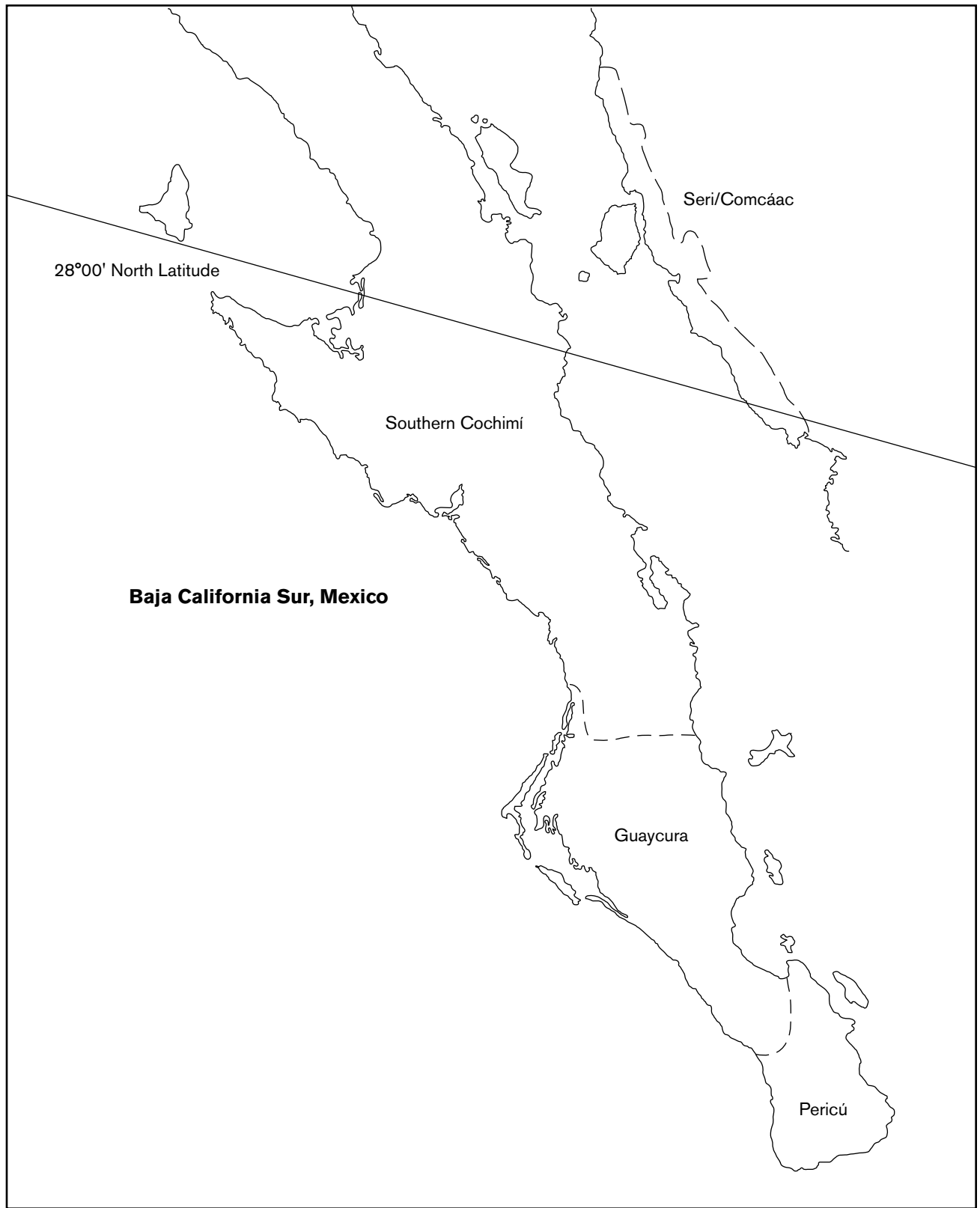


Figure 1. Cultural groups discussed in the text..

definitive answers to the cultural relationships between populations, given that linguistically distinct groups often have considerable cultural contact (e.g., as in northern California — see Jordan and Shennan 2003; O’Neil 2008). The same documents used to reconstruct linguistic relationships also can be used to reconstruct cultural relationships between groups, if one focuses the analysis on cultural traits — that is, on institutional structures (e.g., marriage patterns, residence rules) that organize societies or ethnic markers (arbitrary, visual expressions of group membership that are thought to facilitate within-group social action) (Brown 2008). According to McElreath, Boyd, and Richerson (2003), ethnic markers such as adornment, dress, or hairstyle allow people to identify those individuals who share a common underlying normative framework for behavior; they also facilitate mutually beneficial social interactions while simultaneously excluding outsiders.

Treating historical documents as ethnographies can be problematic (Mathes 1981); however, these documents are the only firsthand accounts of historical groups from BCS. Missionaries and explorers lived amongst these indigenous groups for periods ranging from several days to upwards of 30 years. Combined, their reports represent over 250 years of direct observations of past ecosystems, landscapes, and cultural behavior. The record, at times, describes in detail the cultural inventories of several distinct social and/or linguistic groups, such as the Pericú, Guaycura, Cora, and Cochimí (e.g., Baegert 1952; del Barco 1981; Napolí 1970). Included in this inventory are ritual practices, watercraft technology, and the clothing styles and toolkits of men and women (for reviews, see Laylander 2000 or Mathes 2006). Archaeologists and ethnographers use this information to contextualize sites and case studies (e.g., Aschmann 1967, 1986; Bowen 1976, 2000; Kroeber 1931; Massey 1966). Recently, archaeologists (e.g., Laylander 1997, 2000) and historians (Mathes 2006) have compiled these cultural inventories into several fine works of scholarship (and to which the authors are greatly indebted).

Although cultural traits have been used in the past for reconstructing cultural relationships within Baja California (e.g., Massey 1947, 1966), and between Baja California and other cultural regions of North America (e.g., Kroeber 1931), none has employed inferential statistics. Massey (1947:346), for example, suggested

that the Pericú and Cochimí were culturally dissimilar, while the Guaycura shared cultural features with both, based on the distribution of a limited number of such cultural elements as the presence/absence of reed boats, atlats, fishing technology, and basketry. Although Massey was an expert on the ethnohistoric record and peoples of Baja California, he did not formally analyze the distribution of cultural trait data to test these relationships. Therefore, his suggestions should be considered simply the opinions of an expert and propositions worthy of further empirical testing.

Kroeber (1931) summarized the distribution of cultural traits among the Guaycura, Cochimí, and to a lesser extent the Pericú (as well as several other non-peninsular groups), utilizing the Jesuit missionary accounts of Johann Jacob Baegert, as well as research by Miguel Venegas and Francisco Xavier Clavijero (1789), in order to determine their relationships with the Seri/Comcáac. Kroeber tentatively suggested that (1) the Guaycura had a greater cultural affinity to the Seri/Comcáac than did the Cochimí; and (2) the cultural groups of lower California as a whole were less culturally similar to the Seri/Comcáac than the Gila Pima or Walapai-Havasupai. His analysis involved the addition of the number of traits each group shared with the Seri/Comcáac subtracted from the number of traits they did not share; however, he did not use the same cultural trait distributions to measure all relationships. Instead, the number and kind of traits used to determine relationships differed for each pair-wise grouping with the Seri/Comcáac. As a result, there is no way to meaningfully interpret the nature and magnitude of the differences between groups, as each was measured on a separate metric. When inferences of group similarity are based on the presence or absence of cultural traits, and information on those cultural traits is missing for some groups, both Type I (incorrectly concluding that a difference exists between groups when none is present) and Type II (incorrectly concluding that a similarity exists between groups when in fact they are different) errors are inflated, causing a distorted picture of relationships to emerge. Although it was a valiant first attempt, the paucity of data and the lack of statistical controls render any interpretation difficult. Bowen (1976:102) echoed similar concerns about the interpretation of Kroeber’s data, but suggested that

the overall pattern was likely correct. Additionally, he suggested that Kroeber's trait list be revised and expanded to discern relationships between BCS groups and the Seri/Comáac. To our knowledge, no one has yet attempted that task.

In this paper we introduce a method, content analysis, which can render the anecdotal nature of historical documents into systematic cultural trait distribution lists. Once constructed, cultural trait data allow hypotheses to be tested about macro-level social interactions between groups (Ryan and Bernard 2000). We use reliability and hierarchical cluster analysis to determine cultural relationships within BCS populations, and between them and the Seri/Comáac. Because there is a dearth of both theory and data to aid in predicting relationships between cultural groups in southern BCS, our analysis is largely exploratory. Based on our analyses, it appears that (1) the historic Guaycura and southern Cochimí were culturally very similar; (2) the degree to which the Guaycura and southern Cochimí shared cultural traits was much greater than any other grouping; (3) the Seri/Comáac formed a distant but natural grouping with the Guaycura and the southern Cochimí; and (4) the Pericú were culturally distinct.

METHODS

This study utilizes classical content analysis (Ryan and Bernard 2000) to investigate relationships between three historical BCS cultural groups: the Pericú, Guaycura, and the southern Cochimí, as well as the Seri/Comáac of the Gulf of California and Sonora Mexico (Fig. 1). Content analysis uses messages (e.g., texts), rather than behavior or artifacts, as the unit of study (Neuendorf 2002). Although content analysis involves a range of techniques, the basic premise is the same—researchers convert qualitative texts into quantitative data, which can then be used to test relational hypotheses (Ryan and Bernard 2000). Content analysis requires (1) selecting texts for analysis; (2) defining the variables to be coded; (3) applying those codes systematically to a set of texts; (4) testing the reliability of coders when more than one is present; (5) creating a unit-of-analysis-by-trait matrix from the texts and codes; and (6) hypothesis testing using statistical methods (Bernard 2002). The traits we examined are institutional structures and ethnic markers

identified by historical explorers and Jesuit missionaries, as well as by cultural anthropologists, archaeologists, and historians who have examined or translated the ethnohistoric documents.

There are multiple ways to derive lists of cultural traits. Archaeologists derive them from the material record; cultural anthropologists generally use ethnographies. Cross-cultural anthropologists commonly employ distribution lists of cultural traits to test relational hypotheses about the ecological, historical, or social correlates of human behavior (e.g., Barry and Schlegel 1980). There are drawbacks to this type of research (also termed holocultural research). For example, cultural trait lists generally are based on a few descriptive sentences about the presence or absence of a particular trait in a particular culture at one given time. Additionally, coding the presence or absence of a trait for a cultural group based on information from a limited number of consultants masks all of the variability that often exists *within* a culture (Hewlett and Macfarlan 2010), particularly with regard to age, gender, and status. Given these limitations, however, holocultural research can still be useful for determining broad patterns between cultures.

Two reviewers (the authors) developed a list of cultural traits based on four classes of source material: (1) translated historical documents related to explorations of Baja California spanning the period of A.D. 1539–1721 (Cooke 1992; de Alarcón 1992; de Atondo y Antillón and Kino 1992; de Cardona 1992; de la Ascensión 1992; de la Nava 1992; de Lucenilla 1992; de Ortega 1992; de Ulloa 1992a, 1992b; Porter y Casanate 1992; Shevlocke 1992; Vizcaíno 1992a, 1992b); (2) translated Jesuit missionary accounts of Baja California Sur groups spanning the period of A.D. 1683–1768 (Baegert 1952; Burrus 1984; del Barco 1981; Nunis 1982); (3) Seri/Comáac ethnographic accounts (Bowen 2000; Felger and Moser 1991; Kroeber 1931; McGee 1898) and archaeological research in Seri/Comáac territory (Bowen 1976); and (4) peer-reviewed academic research pertaining to historical BCS (Aschmann 1967; Heizer and Massey 1953; Kroeber 1931; Laylander 2007; Massey 1947, 1949, 1961, 1966; Mathes 1992, 2006). As an initial exploration of a method involving time-consuming research, we chose not to include information from groups living north of the 28th parallel in the peninsula, since this approximates the northern boundary of the southern Cochimí language

(Laylander 1997; Mixco 2006), and groups below this boundary had had definite, documented contacts with Europeans since A.D. 1539 (Mathes 1981). We chose to exclude the Cora and Monqui because insufficient data existed for a separate trait analysis, and their group and linguistic affiliations were ambiguous.

Assigning Traits to Groups

A list of 88 potential cultural traits was derived from initial readings of Baegert (1952), del Barco (1981), Burrus (1984), and Nunis (1982). These traits largely describe Guaycura and southern Cochimí culture, and (to a lesser extent) that of the Pericú. Cultural traits pertaining to the Seri/Comcáac were easily derived, as trained ethnographers and linguists have researched these groups since the pioneering work of McGee (1898). Pericú cultural traits were the most difficult to code due to a lack of data; however, historical accounts from explorers spanning the period of A.D. 1537–1712 were vital for purposes of reconstruction. This process resulted in our final data set being reduced to 51 cultural traits, grouped into five categories: (1) male headdress; (2) female dress; (3) religious practices/marriage; (4) child-carrying devices; and (5) technology (see Table 1).

We used a presence/absence dichotomy in assigning cultural traits to groups. Because we did not want to bias our sample, we chose to use a trait only if sufficient information existed for all four groups. Our rationale was that if an account identified a trait for one group but no information was recorded concerning the other groups, marking this trait as absent could inflate the similarity of the other groups when statistical analyses were run. Some traits were recorded as “not present” when an alternative version was present and the author made no claims about the trait’s absence.

We used a two-tiered system to reconcile instances where accounts/authors differed on the presence/absence of a trait. If a trait was suggested by one account to be absent, but another recorded its occurrence, we sided with the author who reported the presence. Our rationale was that it is easier to mistakenly identify a trait as being absent than as being present. Secondly, we gave more weight to accounts from authors who had spent a greater amount of time with a group than we did to those from authors who had never visited the peninsula or visited only briefly. We felt that the former should have

more accurate cultural knowledge about the groups they discuss.

RESULTS

Due to human error (e.g., an incorrect reading of texts or data coding), it is important to evaluate inter-coder agreement or reliability (Ryan and Bernard 2000). Reliability is determined by whether or not a measuring procedure yields the same results on multiple trials (Carmines and Zeller 1982), and it is evidence that a coded theme has some external validity (i.e., is not a figment of the researcher’s imagination) (Ryan and Bernard 2000). Therefore, a reliability analysis was used to determine the degree of accuracy between raters. Conventions in reliability analysis are varied; however, many authors agree that coefficients greater than 0.7 are sufficient for exploratory research to be followed by subsequent analyses (Landis and Kosh 1977). High inter-rater agreement was achieved for the traits assigned to the four cultural groups (Pericú: Cohen’s $K=0.95$, $N=51$, $p<0.001$; Guaycura: Cohen’s $K=0.8$, $N=51$, $p<0.001$; southern Cochimí: Cohen’s $K=0.92$, $N=51$, $p<0.001$; Seri/Comcáac: Cohen’s $K=0.92$, $N=51$, $p<0.001$). When disagreements occurred regarding a trait’s proper coding, the primary source material was reviewed and the appropriate scheme determined through consensus. Thus, the consensus-building process eventually resulted in perfect agreement between the raters for all of the traits for all four cultures.

Reliability and hierarchical cluster analyses were employed to determine data structure. Reliability analysis determines a set of items’ internal consistency when measured with Cronbach’s alpha (Vogt 2005). When items are cultural traits, reliability analysis determines the extent to which groups share a culture. High reliability coefficients (e.g., >0.7) indicate that groups share a common culture. Low reliability coefficients indicate that groups are culturally distinct from one another. A low reliability coefficient was attained when all four cultural groups were examined simultaneously (Cronbach’s $\alpha=0.40$; $N=51$). A second set of reliability analyses were run examining three cultures simultaneously; these resulted in moderate to extremely low reliability coefficients (Guaycura-southern Cochimí-Seri: Cronbach’s $\alpha=0.47$; $N=51$; Pericú-Guaycura-southern

Table 1
CULTURAL TRAIT LIST (1=PRESENT; 0=ABSENT)

Category	Cultural Trait	Pericú	Source	Guaycura	Source	Southern Cochimí	Source	Seri	Source
Male Headdress	Pearl Knotted in Hair	1	del Barco 1981:37	0	*del Barco 1981:37	0	*del Barco 1981:38	0	McGee 1898:101
	Long Hair	1	Cooke 1992:295; Porter y Casante 1992:249; de Atondo and Kino 1992:167; del Barco 1981:37	1	Ulloa 1992b:79; Kroeber 1931:43; Baegert 1982:139, photos; Baegert 1952:88	0	del Barco 1981:38	1	Kroeber 1931:43; McGee 1898:photos
	Hair Top Knotted	1	Porter y Casante 1992:249; de la Ascensión 1992:167; Mathes 2006:51	0	*del Barco 1981:37	0	*del Barco 1981:38-39	0	McGee 1898:101; Kroeber 1931:44
	Crown	1	del Barco 1981:39	1	Ulloa 1992b:82	1	del Barco 1981:38	1	Felger and Moser 1991:146; McGee 1898:101 disagrees
	Net Worn on Head	0	*Mathes 2006:52	1	del Barco 1981:37; Ulloa 1992b:82	0	*del Barco 1981:38-39	0	Kroeber 1931:44
	Mother-of-Pearl in Hair	1	Mathes 2006:51; Shelvocke 1992:320	1	del Barco 1981:37	1	del Barco 1981:38-39; de Atondo and Kino 1992:33	0	*
Female Dress	Palm Skirt	1	del Barco 1981:40	0	*del Barco 1981:43-44; Baegert 1952:62	0	*del Barco 1981:43	0	*
	Mammal Leather Use for Skirt	1	Cooke 1992:294	1	Baegert 1952:62	1	del Barco 1981:69	1	Cardona 1992:102 (island).216; Felger and Moser 1991:45; Hardy 1977:298; McGee 1898:86, 92
	Bird Hide Skirt	1	Cooke 1992:294	0	*	0	*	1	McGee 1898:92; Kroeber 1931:22
	Agave Fiber Skirt	0	*del Barco 1981:40	1	del Barco 1981:43-44; Baegert 1982:138	1	del Barco 1981:42	0	*
	Two Part Skirt	1	del Barco 1981:40	1	Baegert 1952:62; Kroeber 1931:43; del Barco 1981:43 disagrees; Baegert 1982:138	1	del Barco 1981:42	0	Kroeber 1931:43
	Reed Beads Skirts	0	*	1	de Salvatierra 1971:107; del Barco:1981:43; Baegert 1952:61	1	del Barco 1981:42	0	Kroeber 1931:43
	Leather Skirt on Back Only	0	*	1	Baegert 1952:62; Baegert 1982:138	1	Kroeber 1931:43	0	Kroeber 1931:43
	Long Hair	1	del Barco 1981:41	0	Baegert 1982:140-141, photos; Baegert 1952:88	0	Ulloa 1992a, 1992b; Mathes 2006:52	1	McGee 1898:139; Kroeber 1931:43
	Bird Hide used in Clothing	1	Shelvocke 1992:323	0	* Baegert 1952:62; Baegert 1982:138	0	*del Barco 1981:41-42	1	McGee 1898:86; Felger and Moser 1991:149
Cape/shirt, everyday wear	1	Shelvocke 1992:323; de la Ascensión 1992:168; del Barco 1981:40	0	Baegert 1952: 61-62	0	del Barco 1981:41-42	0	McGee 1898:86, 92; Kroeber 1931	

Table 1 (Continued)
CULTURAL TRAIT LIST (1=PRESENT; 0=ABSENT)

Category	Cultural Trait	Pericú	Source	Guaycura	Source	Southern Cochimí	Source	Seri	Source
Religious Practices/ Marriage	Polygynous	1	del Barco 1981:49; Mathes 2006:58	1	de Antondo and Kino 1992: 275; Baegert 1952:73; del Barco 1981:49; Mathes 2006:58	1	del Barco 1981:49	1	McGee 1898:279; Bowen 2000:21, 471; Kroeber 1931:8, 24, 43 disagrees
	Shaman Human Hair Cape	1	Kroeber 1931:44	1	Kroeber 1931:43; Baegert 1952:88	1	Aschmann 1967:114; Kroeber 1931:44	0	Kroeber 1931:43, 44
	Shaman Sucking Implement	0	*	1	Kroeber 1931:43; Baegert 1952:78	1	Aschmann 1967:113	0	Kroeber 1931:43
	Face/Body Painting	1	de la Ascensión 1992:168; Mathes 2006:51; Porter y Casante 1992:249	1	Ulloa 1992b:83; Baegert 1952:62	1	Mathes 1974:103, 105	1	Kroeber 1931:40
	Face paint is non-Ritual	1	Mathes 2006:51; Shelvoke 1992:323	0	Baegert 1952:62	0	*	1	DiPeso and Matson 1965:51-52; Felger and Moser 1991:144,152; Kroeber 1931:27
	Shamans Tablas	0	*	1	Mathes 2006:65	1	Aschmann 1967:115-116	0	Kroeber 1931:44
	Shamans Use Caves	1	Kroeber 1931:42	1	Kroeber 1931:42; Mathes 2006:65	1	Kroeber 1931:42	1	Kroeber 1931:42, 43
	Hair Cut in Mourning	1	Ortega 1992:243	1	Kroeber 1931:43; Baegert 1952:88	1	Mathes 1974:105	1	Kroeber 1931:43
Child Carrying Device	Net/Bag	0	Kroeber 1931:44	1	Baegert 1982:142; del Barco 1981:71-72	1	Kroeber 1931:44; del Barco 1981:71-72	1	Felger and Moser 1991: 139
	Tray/Turtle Shell	1	del Barco 1981:72	1	Kroeber 1931:41; Baegert 1952:63,74; Baegert 1982:142	0	*	0	Kroeber 1931:41, 42
	Stick Cradle	0	*	0	*	0	*	1	Kroeber 1931:40; McGee 1898:226
	Attached to Forehead	1	del Barco 1981:72	1	Baegert 1982:142	1	del Barco 1981:71-72	0	Kroeber 1931:44
	Attached to Pole/Yoke	0	*	0	*	1	Mathes 2006:55, 59	1	Felger and Moser 1991:190
Technology	Fire Hardened Poles	1	Laylander 2007:15-17	1	Laylander 2007:15-17	0	*	1	McGee 1898:190
	Lances/ Javelins	1	Ortega 1992:230; Laylander 2007:15-17	1	Ulloa 1992b:79; Laylander 2007:15-17	1	Laylander 2007:15-17	0	*
	Harpoons	1	Ortega 1992:230; Laylander 2007:15-17	0	*	0	*	1	Kroeber 1931:43
	Fishing Spear	1	Laylander 2007:15-17	1	Laylander 2007:15-17; Baegert 1952:176	0	*	1	Felger and Moser 1991:128; Kroeber 1931: 19, 40; McGee 1898:193
	Fishing Nets/ Traps	1	Ortega 1992:230	1	Aschmann 1967:73; Mathes 2006:55; Laylander 2000:127	1	Kroeber 1931:44; Massey 1966:54; Laylander 2000: 128	0	Kroeber 1931:19, 44; McGee 1898:194
	Atlatl	1	Massey 1961	0	Massey 1961	0	Massey 1961	0	*

Table 1 (Continued)

CULTURAL TRAIT LIST (1=PRESENT; 0=ABSENT)

Category	Cultural Trait	Pericú	Source	Guaycura	Source	Southern Cochimí	Source	Seri	Source
Technology (Continued)	Bow and Arrow	1	Cooke 1992:295; Porter y Casante 1992:249; Ortega 1992:230	1	de Salvatierra 1971:120; Baegert 1952:63	1	Aschmann 1967:66	1	Felger and Moser 1991:126
	Arrow foreshaft is cane reed	1	Cooke 1992:296	1	Kroeber 1931:43; Baegert 1952:64; Ulloa 1992b:78; Mathes 2006:55	1	Mathes 2006:56	1	Kroeber 1931:40
	Long bows	1	Cooke 1992:295	1	Kroeber 1931:43; Baegert 1952:64; Baegert 1982:139; Ulloa 1992b:78	1	Mathes 2006:50	1	Kroeber 1931:40; McGee 1898:200
	Non-Ritual Roofed Housing	1	Cooke 1992:294; Cardona 1992:224; del Barco 1981:45	0	del Barco 1981:46; Baegert 1952:59; Baegert 1982:142	1	Laylander 2000:154	1	Felger and Moser 1991:118-120; Kroeber 1931:43; Bowen 1976:45; McGee 1898:221-224
	Unroofed Rock Windbreak	0	*	1	Kroeber 1931:42	1	Aschmann 1967:108-110	1	Felger and Moser 1991:119-120; Kroeber 1931:40
	Basketry	1	Ortega 1992:230	0	Massey 1966:56	1	Massey 1966:54	1	Felger and Moser 1991:180; Kroeber 1931:40; McGee 1898:208
	Coiled Basketry	0	*	0	*	1	Aschmann 1967:62; Massey 1966:54	1	Kroeber 1931:40; McGee 1898:208
	Pottery	0	*	0	Massey 1966; Aschmann 1967:38	0	Massey 1966; Aschmann 1967:38	1	Felger and Moser 1991:9; Kroeber 1931:40
	Agriculture	0	*	0	*	0	*	0	Kroeber 1931:47
	Female Head Carrying	0	Kroeber 1931:40	0	Kroeber 1931:40; Baegert 1952:88	0	Kroeber 1931:40	1	Felger and Moser 1991:139; McGee 1898:149; Kroeber 1931:16
	Agave Fiber Nets	1	Mathes 2006:54	1	Kroeber 1931:41; Baegert 1952:68	1	Aschmann 1967:73	1	Kroeber 1931:40
	Second Harvest of Pitahaya	1	del Barco 1981:77	1	Baegert 1982:144	1	del Barco 1981:77	1	Kroeber 1931:40; McGee 1898:209
	Shell for Adornment	1	Shelvocke 1992; Mathes 2006:52	1	del Barco 1981:37	1	del Barco 1981:38-39	1	McGee 1898:173
	Reed Balsa Boat	1	Heizer and Massey 1953	1	Baegert 1952:82; Kroeber 1931:42; Massey 1947	1	Heizer and Massey 1953; Massey 1947	1	Felger and Moser 1991:131; Kroeber 1931:40; McGee 1898:216-219; Ulloa 1992b:78

Table 1 (Continued)**CULTURAL TRAIT LIST (1=PRESENT; 0=ABSENT)**

Category	Cultural Trait	Pericú	Source	Guaycura	Source	Southern Cochimí	Source	Seri	Source
Technology (Continued)	Log Boats	1	Cooke 1992:295; Ortega 1992:229; Massey 1947	0	Heizer and Massey 1953:290	0	Heizer and Massey 1953:290	0	Heizer and Massey 1953:290
	Double Bladed Paddle	1	Cooke 1992:295; Heizer and Massey 1953; Massey 1947	1	Heizer and Massey 1953; Massey 1947	1	Heizer and Massey 1953; Massey 1947	1	Kroeber 1931:40; McGee 1898:219

Cochimí: Cronbach's $\alpha=0.47$; $N=51$; Pericú-Guaycura-Seri: Cronbach's $\alpha=0.15$; $N=51$; Pericú-southern Cochimí-Seri: Cronbach's $\alpha=0.17$; $N=51$). A final set of reliability analyses examined pairs only. High internal reliability was reached for the Guaycura and southern Cochimí (Cronbach's $\alpha=0.77$; $N=51$); however, extremely low or negative reliability coefficients were derived for all other pair-wise groupings (Table 2). Negative reliability coefficients are indicative of small sample sizes or the evaluation of multiple constructs (Krus and Helmstadter 1993)—i.e., different cultures. Although the sample is moderately small, it appears that multiple cultures were examined simultaneously. Given the high cultural trait agreement between southern Cochimí and Guaycura, the additional constructs being evaluated are the Pericú of the Cape Region and the Seri/Comcaac cultures of mainland Mexico.

Table 2**PAIR-WISE RELIABILITY COEFFICIENTS
BASED ON CULTURAL TRAITS**

	Pericú	Guaycura	Southern Cochimí	Seri
Pericú	—	0.13	-0.09	0.24
Guaycura	—	—	0.77	-0.08
Cochimí	—	—	—	0.17
Seri	—	—	—	—

Due to the moderate reliability estimates for the Guaycura-southern Cochimí-Seri and Guaycura-southern Cochimí-Pericú groupings, we sought to determine whether deeper structures existed within the data. Researchers, including anthropologists (e.g., Maxwell et al. 2002), employ cluster analysis when the

natural classification of a set of objects is unknown and taxonomic order is desired (Aldenderfer and Blashfield 1984). Hierarchical cluster analysis is one clustering technique that places single entities into increasingly homogeneous groupings using an iterative process. Although standards vary, many scholars agree that hierarchical cluster analysis is a preferred clustering method for small sample sizes (e.g., <250 cases), with a minimum requirement of no less than 2^k cases (k =number of variables) (Dolnicar 2002). Hierarchical clustering requires a similarity metric to assess distances between groups and a link-function to hierarchically organize them. It is vital to have a justification for selecting one similarity metric and one link-function over others, as output is determined by these choices (Aldenderfer and Blashfield 1984). We chose a *Phi 4-point correlation* similarity metric and a *within-groups* link function. The *Phi 4-point correlation* procedure was selected over other binary data similarity measurements because of its ease of interpretability (it is equal to the Pearson product moment correlation coefficient for binary data), and it gives equal weight to the joint presence and absence of traits to calculate similarity. Because we selected traits where the joint absence of a trait was as meaningful as its presence, this metric was more appropriate than those that exclude joint absences from computation (Aldenderfer and Blashfield 1984). The within-groups link function was selected because it was designed for the specific purpose of determining homogeneity within clusters by an examination of both inter- and intra-cluster pairs (Garson 2009). This resulted in two clusters: (1) the geographically adjacent southern Cochimí and Guaycura of the south-central peninsula form a distant yet single group with the Seri/Comcaac of mainland Mexico; while (2) the Pericú of the southern peninsular

tip were isolated. Identical results were obtained using other similarity metrics (i.e., Lambda, Anderberg's D, and Yule's Q).

DISCUSSION

The present study was performed to systematize cultural trait information from ethnohistoric documents from BCS and to formally analyze cultural relationships between the Pericú, Guaycura, southern Cochimí, and the Seri/Comáac populations through inferential statistics. The former was accomplished through content analysis, while the latter was carried out through reliability and hierarchical cluster analysis. Based on the traits identified, it appears that (1) the historic Guaycura and southern Cochimí shared a similar culture; and (2) the Seri/Comáac formed a more natural grouping with the Guaycura and southern Cochimí than did the Pericú. Although largely exploratory in nature, these analyses support some assumptions about how certain historical BCS groups were culturally related to one another, while weakening others. First, we reinforce Massey's (1947) assumption that the Cochimí and the Pericú were culturally distinct from one another. Secondly, we reinforce the assumption that the Pericú were culturally distinct from nearly all other groups. We reject Massey's (1947) assumption that the Guaycura were as culturally similar to the Pericú as to the Cochimí. Finally, we reject Kroeber's (1931) interpretation that the Guaycura had a greater cultural similarity to the Seri/Comáac than the Pericú or Cochimí. Our results are discussed below with reference to analytical limitations and historical processes.

Analytic Limitations

Several data-level and analysis-related features require attention before giving full consideration to the historical and cultural mechanisms affecting inter-group relationships. First, we sought to create a cultural trait list that was sufficiently large to test relationships between groups; however, the list is not exhaustive. Documents that have not been translated were not analyzed, some historical documents were inaccessible because of their location (e.g., in remote repositories), and archaeological investigations are ongoing. Therefore, it is likely that additional traits will be identified in the future. When cluster analyses are run on small samples (like ours),

cluster stability can become problematic. If new traits are identified and added to our list, it is possible the groupings we identified will no longer be meaningful. Thus interpretations must proceed with caution.

Second, one may question the utility of the particular cultural traits identified. Many were based on observations by people with no ethnographic training. Additionally, sparse data exist for Pericú institutional elements (e.g., descent rules, marriage patterns), which are exactly those traits preferred for analysis by cross-cultural anthropologists (e.g., Barry and Schlegel 1980). However, many of the traits we identified appear to be ethnic markers (e.g., style of hair and dress). These can be desirable data points because they are maximally arbitrary; thus when groups share these traits it represents some shared cultural schema for behavior (Brown 2008; Strauss and Quinn 1997).

Finally, the characterization of each cultural group is a composite picture formed by accounts spanning time, geographic locations, and levels of cultural contact with Europeans. Thus the trait list derived for each group is unique in some way. Traits identified for the Seri/Comáac are derived from ethnographic source materials spanning three locations (Isla Tiburón, Isla San Esteban, and Coastal Sonora) from the late nineteenth and early twentieth centuries. Pericú and some Guaycuran traits were retrieved from historical accounts spanning the early sixteenth to eighteenth centuries. Jesuit missionary accounts provided many traits for the Guaycura and southern Cochimí, but proved more difficult to use for identifying Pericú traits (e.g., Napolí 1970). In general, these accounts are not as complete as those that originate north of the cape region. Consequently, one must ask whether the close associations found between the southern Cochimí and Guaycura, and the more distant associations of the Pericú and the Seri/Comáac, are simply a byproduct of the temporal periods when the traits were recorded. One might reasonably ask, if Jesuit missionaries had recorded as much cultural information for the Seri/Comáac during the seventeenth and eighteenth centuries A.D. as they did in the peninsula, would the Seri/Comáac appear to be more similar culturally to the Guaycura and southern Cochimí? Despite these limitations, this is the most complete picture derivable for these cultural groups at this time and we consider it appropriate to directly

assess the implications of our findings through several cultural processes, discussed below.

Cultural Processes

This is the first study that we are aware of that has formally evaluated the direction and magnitude of cultural similarities and differences within historical BCS cultures, and between these groups and Seri/Comcáac populations, through inferential statistics. The Guaycura and the southern Cochimí appear to have been culturally homogeneous, if one uses a composite of cultural traits derived from historic accounts spanning the sixteenth through eighteenth centuries. They had more in common with one another than they did with the Pericú or the Seri/Comcáac. Although hierarchical cluster analysis suggests a natural grouping with the Seri/Comcáac, reliability coefficients suggest the Seri/Comcáac and the Pericú were virtually equidistant culturally from the southern Cochimí and Guaycura. This pattern could be the result of at least three processes: (1) the Guaycura and Cochimí descended from a similar linguistic stock and shared an historical trajectory, so that their cultures were more similar to each other than either was to any other group; (2) their descent was ambiguous; however, their shared ecology and forager lifestyle constrained their cultural repertoires to develop in parallel, without cultural contact; or (3) their descent was ambiguous, but recent cultural diffusion had caused them to appear culturally homogenous.

The first potential process seems unlikely, given recent linguistic evidence suggesting that the Guaycura and Cochimí languages are not genetically related (Mixco 2006). Even if these groups shared a common linguistic history, as suggested by Gursky (1966) and Swadesh (1967), it would likely be in the remote past, as an extension of inclusion in a larger Hokan language stock. That deep linguistic ancestry is unlikely to have produced the cultural similarities between the Guaycura and southern Cochimí that existed during the historic period.

If the Guaycura and Cochimí did not share a common linguistic heritage, it is possible that the shared desert environment and foraging economy resulted in their cultures becoming similar through convergent mechanisms. This process has the additional benefit of explaining why the Pericú and Seri/Comcáac are

dissimilar to the Guaycura and southern Cochimí. The mixed marine/terrestrial foraging economy of the southern Cochimí and Guaycura was distinct from the largely aquatic foraging economies and coastal habitat of the Seri/Comcáac (Bowen 2000) and Pericú. However, convergent processes are insufficient, as they explain only ecologically salient traits.

The third process is plausible, given the pattern of European and indigenous actions on the Baja California peninsula during the historic period. Explorers prior to the mission period were enlisted by the Pericú to attack the Guaycura on several occasions (de Ortega 1990; Massey 1966;). Indeed, many accounts explicitly state that the Pericú and Guaycura were at war, possibly due to an incursion of the Guaycura into the Cape Region of BCS in order to gain access to its preferential resource base (Massey 1966) around A.D. 1670 (Mathes 1975) or earlier; however, Laylander (1997:16) disagrees with this interpretation. The low reliability coefficients derived for the Guaycura and Pericú indicate considerable cultural differentiation despite their geographic proximity. Because ethnic markers signal in-group membership, warfare may have caused these groups to diversify along these dimensions. Guaycura peoples may have sought cultural contact with southern Cochimian groups, in light of the Pericú's enlistment of European person- and fire-power to resist intrusion.

Interestingly, the Guaycura and southern Cochimí share all religious and female dress traits. This suggests females may have moved exogamously between groups, thus possibly sharing religious ideas and female attire. Three pieces of information provide tangential evidence regarding this question: (1) missionary reports suggest that only Cochimí men could make basketry (del Barco 1981); (2) there is no indication either archaeologically (Massey 1966) or historically (Baegert 1952) that the Guaycura made basketry; and (3) female shamans were present during the historic period among the Guaycura and possibly the southern Cochimí (Baegert 1952; Massey 1966). Aschmann (1967) suggests the Cochimí were patrilocal. If males remain amongst their natal kin throughout life, male traits are less likely to be shared between groups. As a consequence, male traits, such as Cochimian basketry construction, would not have been shared with the Guaycura. Additionally, females are known to have performed religious functions

among the Guaycura (Baegert 1952). If females moved exogamously between groups, one would expect the southern Cochimí and Guaycura to share religious elements and ethnic markers related to femininity. On face value this proposition is appealing; however, it will require archaeological data for confirmation. It seems plausible that convergent cultural evolutionary and diffusionary processes could have been working in tandem to produce these patterns.

Hierarchical cluster analysis revealed that the Guaycura, southern Cochimí, and Seri/Comáac formed a more natural grouping with one other than any other hierarchical grouping with the Pericú. This suggests at least two processes might have been at work: (1) the Guaycura, southern Cochimí, and Seri/Comáac shared a similar linguistic history, with the Seri/Comáac being very distantly related, while the Pericú were relatively distinct culturally; or (2) the southern Cochimí and Seri/Comáac shared a distant history, and the Guaycura were recently engaged in sustained contact with the southern Cochimí, while the Pericú were culturally distinct. The first process is unlikely, given the limited linguistic evidence. Although evidence suggests the Cochimí, Seri/Comáac, and Yuman groups shared ancient linguistic features (Kroeber 1931; Mixco 1978, 2006), it is unlikely the Guaycura were related (Mixco 2006). Even if Guaycura were related to Cochimí and Seri/Comáac through a shared Hokan language family affiliation, it would not explain the negative reliability coefficient between the Guaycura and Seri/Comáac, unless selection pressures shaped cultural traditions in radically different, yet locally relevant ways.

The second process appears more likely. Some linguistic evidence supports the idea that Cochimí and Seri/Comáac were distantly related (Kroeber 1931; Mixco 2006). Thus these groups might have shared an ancient history. Indeed, some interpretations of Seri/Comáac oral history place their origins in central Baja California (Bowen 1976; Moser and White 1968). Additionally, Seri/Comáac oral traditions (Bowen 2000:23–25) suggest contact with coastal, central Baja California peoples. Although our analysis suggests the Guaycura and Seri/Comáac populations were culturally dissimilar, both shared traits with the southern Cochimí. It seems possible that the Seri/Comáac shared a distant history with the southern Cochimí, but developed unique

cultural features via mechanisms of innovation and/or drift (Neiman 1995), while the Guaycura more recently came into contact with the southern Cochimí.

Questions regarding the relationships between the Pericú and other Native American groups have been the subject of academic discourse since the late eighteenth century (Massey 1947). The debate centers on whether the Pericú represent a remnant or separate population of early migrants into the New World (González-Jose et al. 2003), one that remained isolated into historic times (Massey 1966) via a culturally marginalizing “peninsular effect.” Our data suggest that the Pericú were culturally distinct from the Guaycura and southern Cochimí during the period of historic contact. However, this does not address the issue of the antiquity of the Pericú, as cultural mechanisms can cause groups to diverge quickly, especially when population sizes are small (Neiman 1995). Contemporary academic use of the term marginality is relative, and it is often employed without contextual reference to a core (cultural, political, economic, or geographic) (Turner and Young 2007). Our data do not address Pericú origins; however, if marginality is defined as involving distinct boundaries between cultural groups, it is likely that a cultural boundary, in conjunction with a phytogeographic boundary, existed between the Pericú and the Guaycura during the historic period that hampered contact, while such a distinct cultural boundary did not exist between the Guaycura and the southern Cochimí.

CONCLUSIONS

This paper builds on a program of research that was started by Kroeber (1931) and expanded upon by Massey (1947), Laylander (1997, 2000), and Mathes (2006), a program that involves deriving cultural traits from historic documents in order to infer group relationships, both between cultures in historical BCS and with cultural groups outside the region. This paper’s contribution lies in the fact that it has tested assumptions about cultural relationships between groups through inferential statistics rather than through intuition alone. Cultural traits comprise an important set of evidence that can independently reinforce linguistic research in the investigation of inter-group contacts. Archaeologists and historians will play a vital role in creating larger, more meaningful cultural trait distribution lists for BCS

indigenous populations. Articulating these datasets with information from cultural groups in the northern half of the peninsula, southern Alta California, and mainland Mexico will be fundamental in reconstructing the prehistory of these regions. Constructing cultural trait distribution lists through written and material records, in conjunction with linguistic data, allows one to test hypotheses about cultural or ecological marginality and core/periphery relationships, rather than simply assuming their applicability to the Baja California peninsula.

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