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Interaction, social identity, agency and change during Middle Horizon San Pedro de Atacama (northern Chile): A multidimensional and interdisciplinary perspective

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ABSTRACT

In the present paper we discuss different levels of social identities operating simultaneously in the social landscape of San Pedro de Atacama (northern Chile) during the Middle Horizon (ca. 500–950 AD). Complementary lines of evidence are approached from an interdisciplinary perspective in order to identify distinct patterns of affiliation and differentiation which were played out by local agents. We propose these patterns reflect different levels of social integration, whereby the local community of San Pedro de Atacama reinforced its corporate identity in spite of growing social differences and integrated into a higher-level organization of nested hierarchies making up the Tiwanaku state.

Introduction

The study of identity and ethnicity has gained renewed interest during the last decades in the social sciences and particularly in archaeology (see for example Amundsen-Meyer et al., 2010; Banks, 1996; Díaz-Andreu et al., 2005; Emberling, 1997; Eriksen, 1993; Fernández-Götz and Ruiz Zapatero, 2011; Hernando, 2002; Hu, 2013; Jones, 1997; Meskell, 2001, 2002; Reycraft, 2005a; Shennan, 1989; Stovel, 2013; Vermeulen and Govers, 1996; among many others). The work of Barth (1969) has been fundamental in this process, bringing anthropological attention on ethnicity, as well as challenging former "essentialist" approaches on social identities.

Three important conclusions arise from Barth and his colleagues' edited volume which have been especially relevant to archaeologists: (i) ethnic categories are not fixed social "molds", but rather subjective categories of adscription centered around the organization of cultural differences; (ii) social agents strategically ascribe themselves to such subjective categories in particular social, ecological and political contexts; (iii) cultural differences are managed in scenarios of cultural interaction so that ethnic identities are not defined by their intrinsic cultural content, but rather by the mobilization of differences between an "us" and an "other". The consequence of such a claim is that social identities (ethnic or otherwise) are formed through a process of construction and reproduction of differences in the context of situated practices of individuals and groups. Practice theory thus seems especially relevant to address issues of identity and community formation in archaeology (i.e. Bentley, 1987; MacSweeney, 2011, among others), inasmuch as it transcends the dichotomy between concepts of social identity as "a passive reflection of similarities and differences in the cultural practices and structural conditions in which people are socialized" (Jones, 1997: 90) or as merely a product of strategic social interaction "where epiphenomenal cultural symbols are consciously manipulated in the pursuit of economic and political interests" (Jones, 1997; see also Hu, 2013). Yaeger has further explored the application of practice theory to the understanding of group identity formation, analyzing the ways in which practices and/or discourses "of affiliation" which represent affinities and commonalities among individuals, explicitly define (and contest) community membership and boundaries across social landscapes (Yaeger, 2000: 125).

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From this perspective, social identity is not an independent variable which explains individual and social behavior, but rather a complex and multidimensional phenomenon that needs to be researched and understood on its own (Comaroff, 1985; Pauketat, 2000). It is because of this that anthropology is in need of a comparative ethnology of the diverse strategies through which social identities are formed and transformed within specific contexts of interaction (Barth, 1969: 14; see also Stovel, 2013: 4). Archaeology occupies a privileged position to contribute to this agenda, given its long-duration perspective (Hu, 2013) and ample spatial analytical scale. However, the material record has evident limitations and thus the archaeological identification of social identities is a complex task. Moreover, to infer if these social identities are ethnic, political, economical or otherwise, and also how they intersect with individual identities related to gender or age, may prove problematic (MacSweeney, 2011; Meskell, 2002).

We follow Emberling (1997), Jones (1997), Hu (2013) and Stovel (2013), among others, and contend these limitations can be overcome to a certain extent. In order to do this we have attempted to: (i) study social identities from a diachronical perspective (Stovel, 2013), which emphasizes the process through which social boundaries are defined and reproduced; (ii) identify the discourses and practices of affiliation through which these social boundaries are produced and recreated by local society in specific sociohistorical circumstances (Yaeger, 2000; MacSweeney, 2011); (iii) employ a multidimensional strategy applied at differing spatial scales (Reycraft, 2005b; Stovel, 2013) in order to observe how differing patterns of affiliation are produced and reproduced through concrete material mobilization, stylistic (iconographic) boundaries, bodily modifications and ritual activities; and (iv) complement standard typological and stylistic approaches to artifact variability with archeometric techniques applied within an interdisciplinary research strategy.

In this paper we have employed such an approach in order to understand the formation and transformation of social identities in San Pedro de Atacama (northern Chile) during the Middle Horizon (MH), ca. 500–1000 AD (Fig. 1). This period is characterized by intense interregional interaction and influence by the Tiwanaku state in San Pedro de Atacama (SPA). We focus on a multidimensional analysis of ten different biocultural markers (see below) and explore how these create boundaries, similarities and differences across the social landscape of the MH. These markers were selected because they have been considered relevant for defining social identities in the Andes (i.e. textiles, artificial cranial deformation, metals, among others), and due to their state of preservation and ubiquity in the archaeological collections housed at the Museo R.P. Gustavo Le Paige, in SPA. After presenting the results on the analysis of these markers, we discuss them in the light of the "practices and discourses of affiliation" concept, in order to understand group identity construction and reproduction during the MH in SPA.

San Pedro de Atacama in (pre)historical perspective

San Pedro de Atacama is a group of 13 small oases or *ayllus*[1] clustered in the highlands of the Atacama, the driest desert in the world (Fig. 2). Even though the area has been inhabited for more than 10,000 years, it was only during the Late Formative Period (ca. 100–400 AD) that permanent settlements were established in all of these oases. Local society during this period based its economy in camelid herding, small-scale agriculture and collection of local fruits of chañar [*Geoffroea decorticans* (Gillies ex Hook. & Arn) Burkart] and algarrobo (*Prosopis alba* Griseb.). In relation to previous periods, a demographic increase is suggested during the Late Formative by the appearance of dense habitational settlements with or without architecture (Agüero and Uribe, 2011; Barón, 1986; Llagostera et al., 1984; Uribe, 2006), various cemeteries (Le Paige, 1964; Llagostera and Costa, 1999) and complementary smaller settlements on adjacent ravines (Agüero, 2005; Agüero and Uribe, 2011; Núñez, 2005). Ceramics, textiles, basketry, architecture and mortuary ritual exhibit a marked local tradition during this period, which have prompted scholars to propose the formation of a common group identity for the inhabitants of the oases (Adán and Urbina, 2007; Agüero and Uribe, 2011; Llagostera et al., 1988; Orellana, 1985; Stovel, 2002; Tarragó, 1989; Torres-Rouff, 2008). At the same time, SPA communities were part of an extensive and complex network of interacting polities through which raw materials, goods, produces, people and ideas circulated throughout the South-Central Andes (Browman, 1980; Goldstein, 2000; Llagostera, 1996; Núñez and Dillehay, 1979; Stanish, 2002; Tarragó, 2006). Some authors contend that SPA played a relevant role in this network (Berenguer et al., 1980; Berenguer and Dauelsberg, 1989; Llagostera, 1996, 2006a, 2006b; Núñez, 2007; Núñez and Dillehay, 1979; Tarragó, 2006), enjoying a privileged social position at least in part due to its strategic location, connecting the extreme north of Chile, the Bolivian altiplano, northwestern Argentina, north-central Chile and the Pacific coast (see Stovel, 2008; Thomas et al., 1985 for critical positions). Other researchers have added that the Tiwanaku state, whose urban capital was located some 800 km north of SPA, played a key role in local prosperity and regional importance of SPA (Benavente et al., 1986; Berenguer, 2004; Berenguer and Dauelsberg, 1989; Llagostera, 1996; Thomas et al., 1985). However, unlike other Tiwanaku colonies, such as Arica, and especially Moquegua, in SPA there is no evidence for Tiwanaku administrative or religious architecture, there are no mixed ceramic styles and no Tiwanaku cemeteries have yet been reported. Hence, most scholars agree that Tiwanaku influence in SPA was different from that in Arica or Moquegua, the former an ideological influence on local elites, the latter a direct colonial occupation (see Berenguer, 1998; Berenguer and Dauelsberg, 1989; Berenguer et al., 1980; Goldstein, 2007; Uribe and Agüero, 2004).

Whatever the specific relation with Tiwanaku, the fact remains that the peak in social complexity and affluence of SPA communities was achieved during the MH, which encompasses the local Quitor (ca. 400–700 AD) and Coyo phases (ca. 700–950 AD) (Berenguer and Dauelsberg, 1989). The cultural apogee of SPA society (Berenguer and Dauelsberg, 1989; Llagostera, 1996; Núñez and Dillehay, 1979; Torres-Rouff, 2008, 2011, amongst others) is best seen archaeologically through a demographic increase, a diversified economy, the local availability of prestige objects coming from distant regions (Llagostera, 1995, 1996, 2006a, 2006b), unique Tiwanaku contexts in some of the cemeteries (Le Paige, 1961; Stovel, 2001; Tamblay, 2004), the overall wealth of the tombs (Le Paige, 1964; Llagostera, 2006a, 2006b; Tarragó, 1989), the presence of SPA ceramics in far-off communities and the leading role of SPA in interregional networks (Tarragó, 2006). Furthermore, SPA's inclusion in a network of interaction among populations inhabiting areas with different ecological contexts and economical specialization would have had as a consequence a dietary shift in the atacameño populations, which experienced an improvement of nutrition and health in general (Neves and Costa, 1998; Costa et al., 2004). However, according to some authors, this increasing prosperity in the oases would have created the basis for social inequality and conflict as well (Hubbe et al., 2012a, 2012b; Tarragó, 1989; Torres-Rouff, 2008, 2011).

We are interested in understanding the process of social identity formation in SPA during the MH, a period characterized by increasing social complexity, intense regional interaction and the

[1] In the Andes, an *ayllu* is a social unit of affiliation usually associated with a corporate kin group with access to common resources. In SPA, the term refers also to each of the 13 oases, which seem to have been social units in the past.

Fig. 1. Map of northern Chile and San Pedro de Atacama.

ideological/political expansion of the first South-Andean state: Tiwanaku.

Local communities in San Pedro de Atacama during the Middle Horizon

Recent research has provided a more complex view of MH SPA and the relation between the local community and the Tiwanaku state. Firstly, it has been recognized that Tiwanaku objects are not abundant in the funerary record of the far-periphery oases (Berenguer, 2004; Nielsen, 2013; Thomas et al., 1985), and they are invariably associated with dominant local materiality and burial practices (Llagostera, 2006a, 2006b; Stovel, 2001; Uribe and Agüero, 2004). On the other hand, Tiwanaku was not the only polity with which SPA was interacting during the MH, since objects from other social groups are also present in the oases, including Potosí, Tarija, Quebrada de Humahuaca and, most noticeable, Aguada (Berenguer, 1984; Llagostera, 1995, 1996; Tarragó, 1989, 2006). Furthermore, links between Tiwanaku and SPA might not

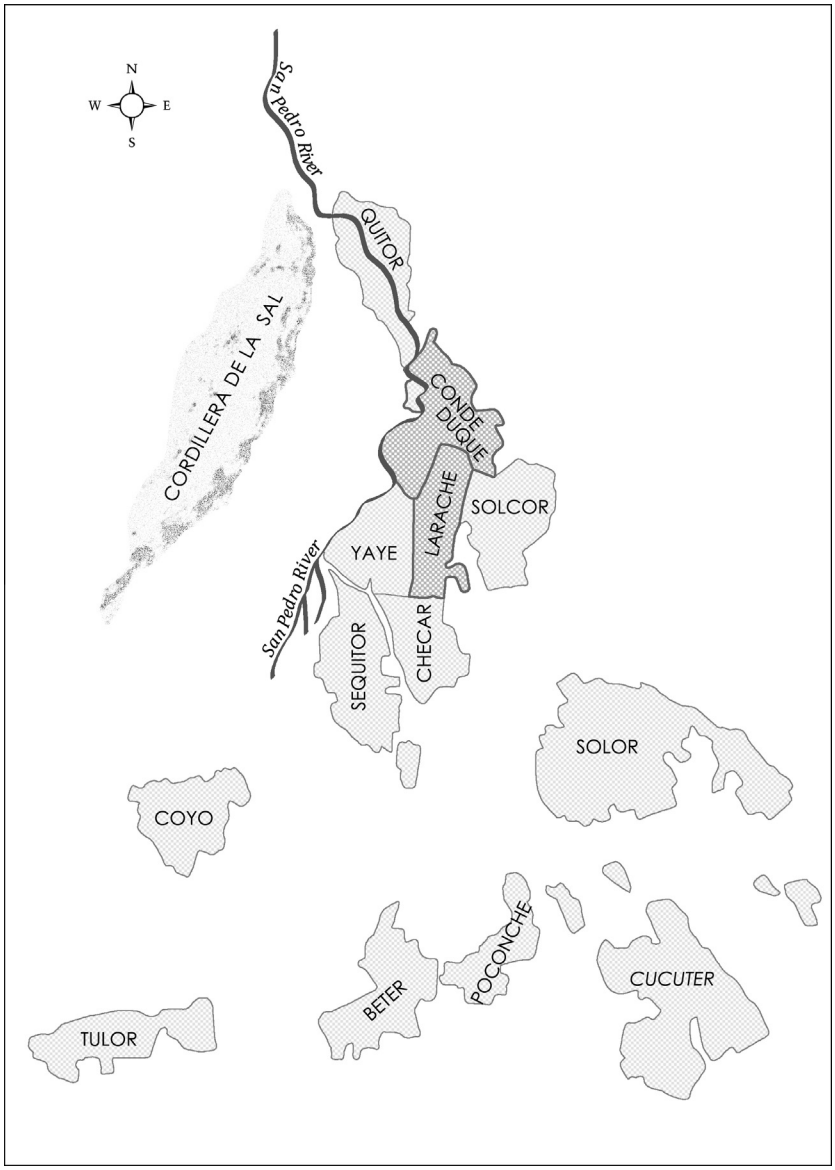

Fig. 2. San Pedro de Atacama's *ayllus*.

have been as direct as previously suspected, since they may have been mediated by secondary centers such as Cochabamba (Uribe and Agüero, 2001) or Potosí-Chuquisaca (Thomas et al., 1985). The active role of local communities in the interaction between SPA and Tiwanaku has also been increasingly considered. This latter shift in the understanding of the period is mostly the outcome of new theoretical approaches to the political organization of Tiwanaku (i.e. Albarracín-Jordán, 1996; Goldstein, 2007; Janusek, 2004; Stanish, 2002) and the understanding of colonial interactions (Stein, 2002), as well as the recognition of identity as a political construction (Berenguer, 1994; Stovel, 2002, 2005). The latter approach was pioneered in SPA by Uribe and Agüero (2001, 2004; see also Berenguer and Dauelsberg, 1989) and has received important support from contributions by Stovel (2001, 2002, 2005) and more recently by Torres-Rouff (2008) and Nado et al. (2012) from a bioarchaeological perspective.

Recent studies have thus placed more emphasis on the character of the local community during the MH, as opposed to previous research more interested in understanding the chronology and nature of Tiwanaku influence in SPA (Berenguer, 1998; Berenguer et al., 1980; Berenguer and Dauelsberg, 1989; Benavente et al., 1986; Oakland, 1992; Orellana, 1985; Thomas et al., 1985; Torres and Conklin, 1995, among others). Results from these more recent investigations have shown that the cultural apogee of SPA brought about changes in the social organization of the local community, most notably in the increase in hierarchical differences as well as social tension (Berenguer and Dauelsberg, 1989; Lessa and Mendoça de Souza, 2004; Llagostera et al., 1988; Neves et al., 2006; Tarragó, 1989; Torres-Rouff, 2008). Clear differences may be observed in the amount and quality of funerary goods in MH SPA cemeteries, both between individual tombs within cemeteries, and between different contemporary burial sites. For example, non-local prestige items, including Tiwanaku objects, occur only in certain tombs (Berenguer et al., 1980; Llagostera, 1996), while metal artifacts are also unequally distributed throughout the oases (Llagostera, 1996; Tamblay, 2004). Recent bioarchaeological research has identified increasing social tension during the MH. Torres-Rouff and Costa (2006), for example, found an increase in osteological markers of violence during this period as compared to the previous Late Formative Period. Torres-Rouff (2011) has further explored these data, finding significant differences in injury patterns and frequency between cemeteries with more or with less

evidence of Tiwanaku objects and overall wealth. Hubbe et al. (2012a, 2012b) showed differences between sexes in dental ware and also different carious rates between elite and non-elite individuals, most likely due to differential access to food resources.

However, as these social differences were being emphasized in mortuary ritual, material culture and body modification show an increased homogeneity between individuals and sites during the MH, suggesting the formation of some sort of local social identity (Berenguer and Dauelsberg, 1989; Tarragó, 1989; Torres-Rouff, 2007). This has been seen in the standardized production of pottery – especially a black ware made for funerary contexts and known locally as *Negro Pulido* (Llagostera, 1996; Stovel, 2002, 2005; Tarragó, 1976, 1989) – mortuary ritual (Torres-Rouff, 2008), bodily modifications (Torres-Rouff, 2008) and textile decoration and technology (Agüero, 2000, 2003).

Given these data, today we seem to be in a better position to enquire about the configuration of social identities in SPA during the MH, its relation with increasing inequality and long-distance regional interactions, as well as the active role that both the Tiwanaku state and the local community might have played in these processes. Until now some of these issues have been addressed, but with only a few markers, most of them not adequately contextualized. We now summarize our most recent data bearing on the identification of group identity formation during MH SPA and its relation with regional interaction and local agency.

New results on the understanding of local agency and group identity formation

Social groups cannot be conceived as lists of traits, and it seems now clear that there are no universal material markers that distinguish ethnicity or other forms of community identity in every historical situation (Barth, 1969; Jones, 1997; Stovel, 2013; Sutter, 2005; among others). In order to address this problem, Emberling (1997: 311) has suggested that archaeologists should first of all "identify which characteristics would have been socially meaningful in a particular social situation, and which were unimportant". This means attempting to identify which patterns of the archaeological record can be considered as reflecting and/or representing practices or discourses "of affiliation" (*sensu* Yaeger, 2000) and which patterns result from individual identities or other social phenomena such as economic specialization. Even though Yaeger does not seem to distinguish between discourses and practices of affiliation, we propose these concepts deal with different social processes. We use the former to denote an intentional assertion of social identities, while we reserve the latter for those unintentional demonstrations of affiliation which contribute to the reproduction of social identities.

We have already stated our conviction that the archaeological study of discourses and practices of affiliation demands a multidimensional and interdisciplinary analytical strategy, aimed simultaneously at several material and bioarchaeological markers, and considering their spatial and contextual variation at differing scales. In the present case study we have focused on certain materialities and markers which ethnohistorical and ethnographic records have shown as being significant for the formation of group identities in Andean societies (textiles, iconography, cranial deformation, ritual practices, economic activities and metals), assuming they may have had this significance during the MH as well. We have also considered locally produced objects which previous research has shown relevant for the mobilization of social identities in prehistoric SPA, namely pottery (Stovel, 2002, 2005) and copper mineral beads (Núñez et al., 2006; Rees, 1999). We have not considered domestic architecture (Reycraft, 2005b; Aldenderfer and Stanish, 1993) in this study, because there are no known remains of MH habitational sites with architecture in SPA; we have neither considered tomb design nor mortuary ritual (Reycraft, 2005b; Sharrat, 2010) for lack of adequate contextual information (most excavation of MH tombs was made during the 1960s and 1970s without standardized record and measurements).

Overall, we sought to analyze different sets of material and bioarchaeological markers looking for spatial and contextual patterning within and between the diverse materialities under study. Most samples were selected after considering the cultural association in the tombs, thus trying to minimize chronological bias arising from the fact that most cemeteries include burials from more than one period. Whenever possible, we included samples from the Late Formative and/or the Late Intermediate Period in order to identify shifting patterns of the material record from a diachronical perspective (Stovel, 2013). Needless to say, we have relied on a thorough examination of published data as well as the unpublished notes of Gustavo Le Paige in order to put our results in historical context.

Our research studied bodily modifications in skulls from burial sites in SPA (Püschel and Manríquez, submitted for publication), as well as from Lake Tiwanaku and Lake Poopó in Bolivia; we classified all available artifacts associated to hallucinogenic practices in order to discriminate Tiwanaku from non-Tiwanaku styles (Horta, submitted for publication; Horta Tricallotis, 2012; Niemeyer et al., 2014); we addressed the taxonomic identification of the wood of the snuff trays (Niemeyer, 2013; Niemeyer et al., 2013; Riquelme-Toro and Niemeyer, submitted for publication) and searched for hallucinogenic substances in the hair of potential consumers (Echeverría and Niemeyer, 2013); we made morphometric and compositional analysis of copper mineral beads (Carrión, 2014), as well typological and compositional studies of metal objects (Salazar et al., 2011; Cifuentes, 2013); we identified dyes in textiles, technological styles in non-funerary pottery (Echeñique, 2012) and finally, searched for biological markers of economic activities (López-Barrales et al., 2014). These markers were considered relevant for our case study, since they have been recognized as playing important roles in ethnic and/or social distinctions in the Andes both in prehistoric, historic and ethnographic contexts. Besides, their ubiquity in MH tombs in SPA regardless of age and gender suggests they do not represent individual identities but rather discourses of social affiliation.

Results from all these analyses present a more complex picture of MH SPA than hereto considered. We will first synthesize our main findings, and then discuss their implications for understanding MH social dynamics and group identity formation in SPA.

Bodily modifications: intentional cranial deformation

Intentional modification of the cranial vault is one of the oldest cultural practices for modifying body proportions, consisting in the instalation of a deforming device on the newborn's head to get an idiosyncratic and permanent change of skull vault shape. It has been recognized as a marker of identity, and/or social status in different populations around the world (Dingwall, 1931; Gerszten and Gerszten, 1995), having the highest frequency in the Americas (Morton, 1839), particularly in the South-Central Andes (Blom, 2005; Cocilovo and Varela, 2010; Dembo and Imbelloni, 1938; Pérez, 2007; Soto-Heim, 1987; Torres-Rouff, 2002, 2003, 2007; Weiss, 1961). Previous research on the population in prehistoric SPA has shown that artificially modified skulls represent between 45% of skulls from the Late Formative Period to almost 70% from the Late Intermediate Period (Torres-Rouff, 2007). In order to avoid the problems inherent to typological systems of classification, we attempted to complement previous results by applying standard Geometric Morphometric Methods (GMM) (revs. Adams et al.,

2013; O'Higgins, 2000; Slice, 2007) to a collection of 493 skulls from SPA, 237 of which showed artificially modified vaults. We performed the analyses using MorphoJ package (Klingenberg, 2011) v. 1.05f, for vault landmark data obtained from lateral photographies in Frankfurt plane at standard light and distance conditions. After a preliminary classification of the skulls carried out in situ by two observers, we corroborated it through discriminant analysis. Before excluding a skull not matching with its group, we carefully checked and reevaluated it using the corresponding 3D models available in our 3D surface scanning collection of artificially modified skulls.

To avoid chronological bias arising from the fact that all cemeteries in SPA show occupations from various periods, we considered only those skulls with identifiable cultural association within specific tombs, allowing us to assign them to a specific period. Our final study sample consisted of 37 skulls from SPA, including individuals from the MH and the Late Intermediate Period, and 17 skulls from the Altiplano used for comparative purposes. This last sample is housed at Musée de l'Homme, Paris, and was obtained near Lake Titicaca (sites Caleria and Tiahuanaco) and Lake Poopo (sites Tocari, Río Pasagua), in Bolivia, by Sénéchal de la Grange during 1903 (Créqui de Montfort and Sénéchal de la Grange, 1904).

Fig. 3 shows the distribution of SPA and Altiplano skulls in the morphometric space defined by shape factors having the highest contribution to the overall variance of shape change (CV1 + CV2 = 75.3%). The first factor of shape variation (CV1 = 44.8% of overall shape variance) clearly separated SPA specimens and Altiplano samples, including Tiwanaku. These differences were statistically significant (permutation tests with 10,000 rounds for Mahalanobis distances between Tiwanaku and MH SPA, $p < 0.001$, and between Tiwanaku and Late Intermediate Period SPA, $p = 0.0033$). When we analyzed the Tiwanaku and MH SPA samples alone, hence excluding the Late Intermediate Period individuals, the shape differences between these two groups (foreign annulars vs. local verticals) were statistically highly significant, both in their shape (Procrustes ANOVA; $F(12,444) = 3.89$, $p < 0.001$) and size (t-test for centroid size: Tiwanaku = 22.13 ± 1.51 cms, SPA = 20.51 ± 0.81 cms, $t = -4.2796$, $p = 0.00013$) components of form change. The Late Intermediate Period skulls of SPA fell inside the shape space occupied by the skulls from MH SPA, showing a total superposition between both periods in the central region of the dispersion. The absence of statistically significant differences between Late Intermediate Period and MH skulls in terms of shape [Procrustes ANOVA, LI + MH SPA: $F(24,612) = 1.12$, $p = 0.3205$; only MH SPA: $F(24,420) = 1.25$, $p = 0.7123$] and size components [Procrustes ANOVA, LI + MH SPA: $F(2,51) = 0.00$, $p = 0.9985$; only MH SPA; $F(2,35) = 1.84$, $p = 0.1723$], corroborated this observation.

These data confirm earlier claims regarding a local "style" of artificial cranial deformation in SPA from the Late Formative Period until the Late Intermediate Period (Costa et al., 1998; Torres-Rouff, 2002, 2007, 2008). The local "style" is associated with the contraction of the occipital bone, resulting in skulls with an evident vertical or erect shape, while the altiplanic sample occupies the opposite morphometric space defined by the first shape factor (CV1 > 0) and is related with the flattening of frontal and occipital bones. After Neumann (1942), who does not consider the type of deforming device in his classification, SPA skulls correspond to occipital and Tiwanaku to paralello fronto-occipital types of vault modification, which are equivalent to the erect and annular types commonly used in the literature. The second shape factor (CV2 = 30.5%) reflecting changes defined by the type of deforming device (circular in CV2 > 0, and tabular in CV2 < 0) does not allow to discriminate among groups, SPA and altiplano skulls being equally distributed along the y axis. A more detailed visual description of the main differences between both conditions is shown in Fig. 4.

Interestingly, our method allowed us to identify extreme variants of the local "style" of artificial cranial deformation, all of which corresponded to MH individuals (Fig. 3) and resulted from the effect of an additional supraoccipital force vector on the parietal region. These data could suggest a deliberate intention of SPA individuals to reinforce the local style, while at the same time creating an explicit differentiation with foreign groups, especially Tiwanaku (see Stovel, 2002, 2005; Torres-Rouff, 2008). However, these patterns may not necessarily result from a reaction to Tiwanaku influence, since some of the individuals deformed in the extreme-local "style" include Tiwanaku pottery in their tombs, while in some collective burials both individuals with the extreme local "style" and a Tiwanaku "style" of cranial deformation were interred (e.g., individuals 832–834, from the Tchécar site). These data could also indicate internal social tension within the SPA community, since some individuals could be reacting to an imposed social identity (local "style" artificial cranial deformation implanted at early age) and later affiliating to Tiwanaku during adulthood. If this hypothesis were supported by independent evidence in the future, it would demonstrate how social identities were negotiated even within an individual's lifetime, and also how individuals and groups were active agents in these processes. However, the association between local-style artificial cranial

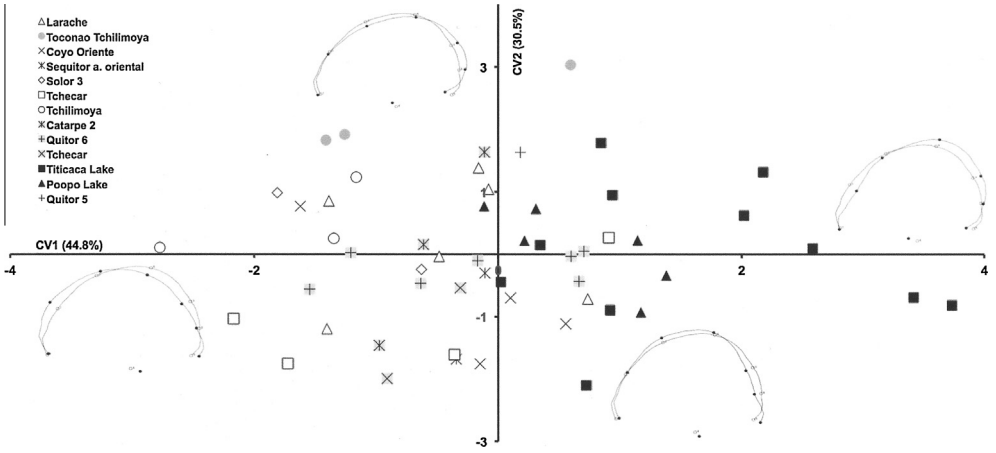

Fig. 3. Distribution of SPA and Altiplano skulls in the morphometric space defined by shape factors having the higher contribution to the overall variance of shape change (CV1 + CV2 = 75.3%).

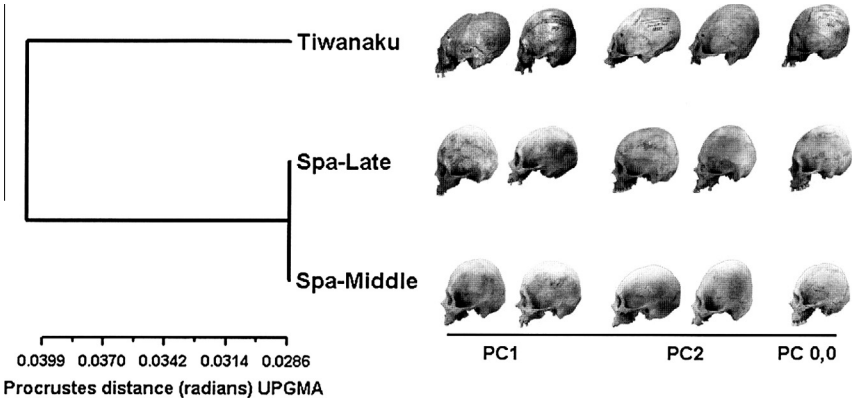

Fig. 4. Visual description of the main differences between SPA and Tiwanaku skulls.

deformation and Tiwanaku pottery could also be interpreted as reflecting social incorporation of the SPA social identity into higher-level affiliations linked to the Tiwanaku state, as we will claim later.

In any case, it is interesting to note that we also identified intra-group variability in a few individuals from other local sites. In the cases of Quitor 6, Quitor 5, Larache, Coyo Oriente and Tchecar some individuals showed a pattern of deformation falling in the Tiwanaku morphospace, albeit in a "moderate" situation (Fig. 3; 0 > CV1 < +1.0). This could indicate foreign individuals present in local tombs or local "imitation" of foreign styles of deformation.

Iconography, ritual practices and the hallucinogenic complex

The hallucinogenic complex has been one of the most recurrent themes in MH SPA research (Berenguer, 1998; Berenguer and Dauelsberg, 1989; Echeverría and Niemeyer, 2013; Horta Tricallotis, 2012; Llagostera, 2006b; Torres, 1984, 1986, 1987a, 1987b, 2004, among others), most likely on account of the high frequency of appearance of elements of the hallucinogenic complex in the tombs of this period. It is related to iconography and ritual practices, two variables considered relevant for the definition of group boundaries and identity.

In MH SPA, the archaeological record shows a gradual substitution of smoking pipes by snuffing trays (Llagostera, 1996; Thomas et al., 1984; Torres, 1998), thus indicating important changes in practices linked to shamanism, sanation, altered states of conscience and ritual practices. Changes in religious practices and beliefs have implications in the reproduction of social identities (cf. Beckford, 2003), thus the importance of documenting them in more detail. The change in the mode of consumption of psychoactive substances has been related to the Tiwanaku polity, since some of the earliest trays (as well as those throughout the MH) show state iconography, a feature having being previously considered an active element of Tiwanaku ideological expansion into SPA which legitimized asymmetrical relations between the altiplanic state and its far-off periphery (Berenguer, 1998; Llagostera, 1996; Uribe and Agüero, 2004).

However, trays with Tiwanaku iconography add up to only ca. 10% of the total number of trays found at SPA cemeteries (Llagostera, 2006b; Niemeyer et al., 2014); if Tiwanaku style in trays is extended to encompass all trapezoidal-hyperbolic trays with a plain appendix and sharp top corners (Berenguer, 1985, 1987), then this figure increases to ca. 21% (Niemeyer et al., 2014). Clearly, a majority of trays are not strictly related to Tiwanaku in their style, yet have received little scholarly attention. Our research precisely on these materials has shown the occurrence of two additional styles in the snuff trays, namely the *San Pedro* style, which mainly includes undecorated largely rectangular trays and trays with volumetrically carved human figures (Horta, submitted for publication), and the *Circumpuneño* style, which frequently shows volumetric carvings depicting anthropomorphic and zoomorphic figures involved in ceremonial activities (Horta Tricallotis, 2012).

Occurrence of snuff trays in the *Circumpuneño* style is restricted to the Late Intermediate Period, according to material associations within the tombs. However, it is noteworthy that during the MH and maybe even since the Late Formative Period, *San Pedro* style trays coexist with Tiwanaku style trays (Fig. 5). The latter also coexist with snuffing tubes in the Tiwanaku style. Given that we have considered the *San Pedro* style of a local nature (Horta, submitted for publication), we suggest members of the local community of SPA were manufacturing their own snuffing trays and, what is even more important, they were decorating some of them with a local iconography early in the development of this mode of consumption of hallucinogens. Trays with Tiwanaku iconography continue to appear in the archaeological record, most likely imported as an item of prestige (Llagostera, 2006b). We may conclude that at the same time that Tiwanaku trays were imported

Fig. 5. Snuff trays: San Pedro style and Tiwanaku style trays.

into SPA and presumably were playing a role in ideological integration, a local style developed which provided consumers with a relatively larger number of these artifacts. Once again this local style does not seem to oppose the foreign Tiwanaku trays and tubes, since they coexist in some of the tombs.

A further insight into this topic can be gained by identifying the origin of the wood employed in the manufacture of trays. We addressed this question using two approaches. The first involved the determination of wood density, a character which can be used to limit the range of possible species, either by conventionally measuring weight and volume (Niemeyer, 2013) or by using computed tomography (Niemeyer et al., 2013); the second involved the microscopic observation of orthonormal thin histological sections of the trays and their comparison with a reference collection of corresponding sections made from woody species from SPA and neighboring areas (Riquelme-Toro and Niemeyer, submitted for publication). The density data showed that a large proportion of snuff trays were made with wood imported to SPA. On the other hand, although the number of trays submitted to histological studies was rather low ($N = 21$), results also showed that most trays were manufactured with foreign wood, including *Cinnamomum porphyrium* (Lauraceae), *Juglans olanchana* (Juglandaceae), *Myrica pavonis* (Myricaceae), *Juglans* sp., *Hedyosmum* sp. (Chloranthaceae) and *Polylepis* sp. (Rosaceae) from the Yungas forests to the east of the Andes. In spite of the large availability of different species in the forests across the Andes, the data suggests the use of only a few taxa. Most surprisingly, a large proportion of local San Pedro style trays were manufactured using wood from species growing only on the eastern slopes of the Andes. This implies that during the MH the local community not only was locally manufacturing hallucinogenic paraphernalia (trays and tubes), but to achieve this they relied on wood arriving through long-distance interactions with polities other than Tiwanaku, especially those residing in what is today Northwestern Argentina. It has been claimed that this area could also be providing the substances themselves being consumed. In fact, even though the substances being consumed and the identity of the effective consumers have hardly been addressed archaeologically in northern Chile, Torres et al. (1991) proposed the use of dimethyltryptamine-containing seeds of cebil [*Anadenanthera colubrina* (Vell.) Brenan var. cebil], a tree species from Northwestern Argentina and Bolivia, based on the finding of these compounds in the powder contained in a leather pouch which was part of the snuffing paraphernalia of a MH tomb in SPA. In order to determine whether the diverse and shifting patterns detected in snuff tray features and abundance were related to the hallucinogenic substances consumed and/or the identity of effective consumers, we performed research aimed at the direct identification of hallucinogens in the potential consumers rather than in residues in the paraphernalia involved in consumption. Using gas chromatography coupled with mass spectrometry, we analyzed hair samples of 56 mummies of SPA from different cultural periods and found nicotine, presumably from species of the genus *Nicotiana*, in over 60% of them (Echeverría and Niemeyer, 2013). Although dimethyltryptamines were not found in any of the samples, their use cannot be discarded because these substances are rapidly metabolized by the body and do not end up in measurable amounts in the hair follicle (in fact, a current user of cebil did not show dimethyltryptamines in his hair). The results showed a continuous consumption of nicotine from the Late Formative to the Late Intermediate Periods, even though pipes disappeared during the MH. Thus, although pipes were abandoned in SPA at the onset of Tiwanaku influence suggesting a transformation in ritual practices, the local community did not relinquish the consumption of tobacco. Nasal consumption of tobacco became more popular within the SPA community, presumably in part because drugs administered nasally may reach targets in the brain faster and to a higher extent than through other routes of administration (Illum, 2004), thus enhancing the hallucinogenic effects of the drug. In fact, Torres and Repke (2006: 22) document ethnographic cases of nasal consumption of tobacco. The *Nicotiana* species consumed in SPA could not be ascertained due to lack of appropriate markers; although several species grow locally, it is plausible, as in the case of wood, that Northwestern Argentina was the source of tobacco since it is one of the areas where its cultivation was began in prehistory (Pérez Gollán and Gordillo, 1993).

Dyes in textiles

Archaeological, ethnohistorical and ethnographical studies agree in pointing to structure and design of textiles as one of the most significant markers of group identity in Andean populations (Agüero et al., 1999; Cassman, 2000; Murra, 1962; Wallace, 1975). Previous studies on textiles in MH SPA have shown the coexistence of local and foreign styles (Agüero, 2000, 2003; Oakland, 1992, 1994; Oakland and Cassman, 1995), the local textile tradition being much more frequent in funerary contexts. Furthermore, it has been suggested that local Atacamenian textiles shared some technological and decorative traits with other traditions such as those of the Lípez and Cochabamba areas (Fig. 1). Agüero has defined the *circumpuneño-valluno* style to include these similarities (Agüero, 2003). Given that textile styles have been well studied in SPA, we sought to complement previous research not by analyzing technology or decoration of the garments, but rather by identifying the raw materials used. Specifically, we have addressed the identification of the organic substances employed in textile dyeing.

Our work has focused on red and blue fibers since the dyes responsible for these colors can be associated with a narrow range of chemicals whose botanical origin is known (as opposed, for example, to yellow dyes which can be traced to a wide variety of sources). Using high performance liquid chromatography coupled to a UV–visible diode array detector, we analyzed a set of textiles found in SPA tombs exhibiting different styles, mainly local and Tiwanaku. Purpurin was the only dye found in the extracts of all red fibers, and indigo, as indigotin and indirubin, were present in all blue fibers, independent of the technological or iconographic styles of the textile. Purpurin is a reliable chemotaxonomical marker of the plant genus *Relbunium* (Rubiaceae) (Dutra Moresi and Wouters, 1997; Schweppe, 1986; Thomson, 1971), distributed along the Andes from the Guianas to southern Peru, in southern Chile and in the hills of southeastern Brazil and northeastern Argentina (Dempster, 1990). Main sources of indigo in South America are plants of the genera *Indigofera* (Fabaceae), *Eupatorium* (Asteraceae) and *Yangua* (Bignoniaceae) (Cardon, 2007), neither of which grow in the area around SPA. Thus, the red and blue dyes used in textiles found in SPA came from sources exogenous to SPA, being imported either as raw dye or as dyed fibers.

These results present a similar picture to that seen before in relation to artificial cranial deformation and snuffing trays: during the MH the local community in SPA is producing textiles with characteristic local technological and iconographic styles that coexist with imported textiles, including garments from Tiwanaku (Niemeyer and Agüero, 2014). The local tradition is producing most of the textiles that accompany individuals in funerary rituals and presumably in social life. Yet, local and imported textiles may coexist within individual tombs, suggesting that exogenous objects were received by local communities rather than belonging to foreign individuals interred at SPA. It is worth noting, however, that in order to produce local garments in *San Pedro* style, raw materials from other regions were being systematically brought to SPA. Thus, the production of local textiles required a systematic access to these dyes (raw materials and/or fibers) through interregional interaction.

Emblems of group identity: the production of beads and pottery

In anthropological literature beads and body ornamentation in general have been traditionally considered as media for conveying social information, especially concerning identity and status (Kuhn and Stiner, 2007; Sørensen, 1997; Bednarik, 2008). In SPA, copper mineral beads were produced regularly during the Late Formative Period (Rees, 1999; Rees and De Souza, 2004; Núñez et al., 2006), both as personal ornamentation for individuals from the local community as well as for trade with other regions such as the Pacific coast, Northwestern Argentina and the Bolivian Altiplano. During the MH, they are commonly found in graves, with no apparent relationship with gender, age or status. Their ubiquitous presence in mortuary ritual suggests they are conveying information on group rather than individual identities.

In order to identify production patterns in these objects during the MH we performed morphometric analysis of more than 2000 individual beads coming from tombs from three different cemeteries in SPA (Solor 3, Coyo Oriente and Solcor 3). These tombs were assigned to specific periods either through available radiocarbon dates directly from items in these tombs, or through consideration of cultural associations (Carrión, 2014).

Results indicate high standardization in the morphology and size of these objects as opposed to what is observed on Late Formative cemeteries from the Loa River Basin (i.e. Topater) as well as Late Intermediate Period sites from SPA (i.e. Catarpe, Yaye). However, standardization was not limited to the morphometry of the beads. We performed EDXRF analysis of 144 haphazardly selected beads, representing around 5% for each of the three sites mentioned above. Results showed that more than 95% of them were made of turquoise, a copper and aluminum phosphate mineral infrequent in the southern Andes. Copper mineral beads used as inlays of snuff trays were also analyzed in order to compare them with those found as necklaces in the tombs. For this purpose we used density measurements based on computed tomography which showed that at least 80% of them were also made with turquoise (Niemeyer et al., 2013).

Up to now it was usually considered that minerals used to produce beads were malachite or chrysocolla, mainly because these are two very abundant copper ores in the Atacama Desert. Unlike these, turquoise deposits are uncommon and thus not readily available for SPA inhabitants. Current data suggests there are six known turquoise deposits in northern Chile, northwest Argentina and central Bolivia (Coquinot, 2013), three of which show direct evidence of prehispanic exploitations during the MH. High levels of arsenic and sulfur in our samples (as seen from EDXRF results) seem to suggest the turquoise used in SPA came from Chuquicamata, some 120 km to the northwest. Having other copper ores locally available which could be used to make copper beads of similar colors (i.e. malachite, chrysocola, azurite), the distant exploitation of turquoise could indicate some level of control of raw material acquisition, production and distribution, which could be coherent with the increased standardization observed. However, the operational chain inferred from our analysis showed internal variability (Carrión, 2014), thus suggesting that there were different producers during this period, using different technological sequences, but at the same time sharing a common and rigid concept about the final shape and size the artifact should have, and the raw material it should be made of. During the Late Formative Period these objects were produced at different sites and mostly at a household level, (e.g., Rees, 1999; Agüero, 2005). There are virtually no habitational sites from the MH to determine if this pattern was still in operation during these period, but the variability in the operational chain suggests the organization of production could have remained unchanged during this period, despite the standardization of the finished goods produced.

Given that these beads seem to be related to some sort of group or social identity, its standardization during the MH seems to indicate a social discourse emphasizing group cohesion. A similar interpretation was previously offered by Stovel (2002, 2005) regarding pottery production. But even though Stovel's research has shown a clear standardization in the size and shape of ceramic vessels coming from funerary contexts in MH SPA, the possibility that this reflects a specialized organization of production rather than a conscious discourse on group identity cannot be ruled out.

In order to contribute to this last topic, we analyzed as part of our project a sample of burnished wares coming from the only domestic context known for MH (Coyo Aldea). We performed preliminary petrographic and electron microprobe analyses on 60 sherds corresponding to different vessels of the black, grey and brown wares (Echeñique, 2012). Results showed that 59 of these sherds were manufactured following the same technological pattern, based on a single paste recipe with high mineralogical homogeneity and lack of added materials or decoration in the surface treatment of the vessels (Echeñique, 2012). The data seem to support the possibility that pottery production was indeed specialized during the MH, at least concerning the first stages of the operative chain. However, differences among the types were expressed in terms of surface color, which was presumably the result of differing firing atmospheres. It still remains unclear whether differing firing atmospheres reflect different producers or different technological options by the same producers.

Metals and social hierarchies in SPA

Metal objects are associated in the Andes with social complexity, ritual paraphernalia and religious and secular power (Lechtman, 1980, 2003; González, 1997, 2004). The appearance and distribution of these materials has been traditionally considered a marker of wealth and political status, thus being relevant for understanding local social complexity in SPA during the MH and intra-community social identities. The significant increase in the amount of metals found during the MH in SPA, as compared to both the Late Formative (ca. 100–400 AD) and the Late Intermediate (ca. 950–1450 AD) periods is indicative that in fact this materiality played an important role in social processes during the MH (Berenguer and Dauelsberg, 1989; Llagostera, 1996, 2006a, 2006b; Núñez, 2006).

We analyzed 243 metal objects coming from tombs assigned to the MH according to ceramic and/or textile associations, and classified into 19 types considering traditional morpho-functional typologies in the area (Cifuentes, 2013) (Fig. 6). We performed elemental compositional analyses on 45 artifacts using XRF, PIXE and ICP-OES analytical techniques (Cifuentes, 2013; Salazar et al., 2011). Our compositional data, together with data first gathered by Lechtman (1996, 1997) and Lechtman and Macfarlane (2005, 2006), suggest that nearly 45% of the artefacts studied were made of a typically Tiwanaku alloy (copper–arsenic–nickel), which has been found in the capital of the state as well as in its main colony in the Moquegua Valley, southern Peru (Lechtman, 2003). It has been demonstrated that this alloy is not local, being likely produced in the Altiplano or northwestern Argentina and redistributed regionally by Tiwanaku (Lechtman, 2003). Bronzes (copper–tin) were also represented in the metal objects of SPA (30%). These tin-containing artifacts seem to be also of foreign origin, considering their typology, the absence of locally available tin, and the isotopic results obtained by Lechtman and Macfarlane (2005, 2006) on bronze axes. However, it is not yet clear if they arrived at SPA from Tiwanaku or from somewhere in northwestern Argentina. The fact remains that exogenous copper-based metals make up nearly 75% of the total metal objects available, the most ubiquitous object being axes, a symbol of political power in the area (Llagostera, 2006a, 2006b), as well as personal ornaments.

Fig. 6. Local and exogenous metal artefacts from MH San Pedro de Atacama.

We also found unalloyed copper among the objects studied (24%). Its presence is particularly interesting because this is very unusual in metallurgical traditions both in the Bolivian altiplano and northwestern Argentina during this period. We believe this was a local metallurgical tradition coexisting with imported metal artifacts. That unalloyed copper was made locally is corroborated by its presence in Late Formative sites (Figueroa et al., 2010), and especially the presence of metallic prills and metal fragments of unalloyed copper found in tombs from M SPA, as well as on the surface of some sites dated to this period (Cifuentes, 2013; Salazar et al., 2011). Unalloyed copper was mainly used to manufacture domestic instruments such as chisels and awls, but also some prestige items have been found such as *T*-axes and circular mazes which resemble those stone artifacts used to signal political power in the local community during the Late Formative Period and the MH (Llagostera, 1996, 2006a, 2006b).

Our data thus demonstrates that most metal objects marking social differences within the local community of SPA during the MH were imported from other metallurgical centers, most noticeable Tiwanaku. These goods created social differences among members of the local community since not everyone appeared to have access to them. In this context, it is interesting to consider the development of a local metallurgy coexisting with the imported goods, both for manufacturing domestic objects and some prestige items. This could indicate that some local members of the community were able to mobilize raw materials, knowledge and people to produce their own metal objects, with independence of interregional interactions. If Berenguer et al. (1980) and Llagostera (1996, 2006b) are right in claiming that reproduction of social differences had to do mainly with the control of long-distance trade networks, then the appearance of this local metallurgy could imply an intentional strategy by some members of society to subvert this pattern and have access by independent means to metal items which reproduced internal social differences and micro-identities inside the local community.

Economic activities as inferred from bioarchaeological data

Since repeated activities leave traces on the human skeleton, various osteological indicators have been used to infer life style of ancient populations, and their adaptive responses to varying natural and cultural environments (Armelagos and Goodman, 1991; Goodman and Martin, 2002; Goodman et al., 1988; Larsen, 1997). Shared economic activities are also an important variable for our study because of its relation to either social differentiation and/or group identity (i.e., Sutter, 2005). In order to approach this issue, we concentrated on vertebral osteophytosis, a marker of physical strain during daily activities specially related to the degeneration of the intervertebral disk due to the mechanical load on that structure, but also to age and genetic factors (Adams, 2012; Bridges, 1992, 1994; Jurmain and Kilgore, 1995).

We analyzed 154 individuals from sites or sectors within sites ascribed to the Middle and the Late Intermediate Periods. The results indicated that while age indeed affected the etiology of the condition (Jurmain and Kilgore, 1995), important age-independent differences were found which suggest that during the Late Intermediate Period populations were exposed to less physical stress than in the MH, presumably due to changes in the type or intensity of physical activities (López-Barrales et al., 2014). We found no differences between groups of different social status during the MH – i.e., associated or not associated with metals or Tiwanaku objects – suggesting that economic or political status was not related to differences in physical activities. Thus, it can be argued that Tiwanaku contributed to population segmentation but not to overall changes in life style.

An interesting case is that of Coyo 3, a MH site which showed a particularly high level of osteophytosis of the cervical portion of the column. We propose that these individuals were engaged in mining activities since: (i) live individuals engaged in mining activities show higher degrees of osteophytosis than individuals performing other activities or office work (Kellgren and Lawrence, 1952), (ii) the *ayllu* of Coyo has provided the only mining hammerstones yet discovered in MH SPA ($N = 52$) (Costa and Llagostera, 1994; Figueroa et al., 2013; Llagostera et al., 1988; Núñez, 1999; Salazar et al., 2011), and (iii) the analysis of individuals from the nearby Coyo Oriente site also suggests that osteoarthrosis conditions found could be related to mining activities (Arriaza, 1990). The data are interesting because, when complemented with overall contexts, suggest that there was an inter-*ayllu* differentiation during the MH not necessarily associated with wealth accumulation, but rather with economic specialization.

Discussion

The wealth of information presented in this paper provides a complex picture of the process of construction and reproduction of similarities and difference between agents during MH SPA. Some patterns were identified in most of the data analyzed: for example, the coexistence of Tiwanaku and other foreign "styles" with local "styles" during the MH, which we recognized in artificial cranial deformation, snuffing paraphernalia iconography and metals, as well as in other materialities such as textiles and ceramics according to previous research. However, while in some cases foreign objects were few, in other cases they make up most of the collections from the MH (i.e., metals). On the other hand, our data showed that local crafts and "styles" either emerged during the MH (local styles in hallucinogenic paraphernalia, emblems of authority made in unalloyed copper), showed evidence of increased standardization (copper mineral beads) or explicitly emphasized local features (artificial cranial deformation) during this period, but at the same time share the mortuary space with foreign goods, and most noticeable with Tiwanaku objects.

Most of these objects and practices have been shown to be relevant to the construction of identities in the past. Accordingly, in this section we attempt to interpret the coexistence of local and foreign styles and objects as discourses of affiliation which created and recreated different social identities within the local community. As noted previously by Yaeger (2000), practices/discourses of affiliation can operate at different social and spatial scales at the same time, thus defining simultaneously diverse and overlapping social identities for local agents. From our data together with previously published information, we can infer at least five levels of social or group affiliation played out simultaneously during the MH. Three of these are operating at a local level and two at a regional level. We begin this discussion focusing on local level discourses of affiliation.

Affiliation and social identity at a local level

It is worth noting that even though social differences in SPA were identified within Late Formative Period cemeteries, these are dramatically extended during the MH and included both intra-*ayllu* and inter-*ayllu* variability. The first and perhaps most evident expression of inter-*ayllu* differentiation is the location of the *ayllus* themselves. Some sort of social distinction must have been responsible for this spatial distribution of households and cemeteries within the SPA oases.

Our data has shown that during the MH craft specialization could be correlated at least partially to this inter-*ayllu* differentiation. The case of Coyo seems quite evident, being the only *ayllu* where mining hammerstones have been found and where there is higher frequency of pathologies associated with this activity (Costa and Llagostera, 1994; Figueroa et al., 2013; López-Barrales et al., 2014; Núñez, 1999; Salazar et al., 2011). On the other hand, we found that metal chisels and awls, made either of unalloyed copper or bronze, have only been found in three *ayllus*: Solor, Solcor and Quitor (Cifuentes, 2013). Prior research has suggested this kind of tool may have been related to wooden craft (Gluzman, 2007). If this were the case, then it is likely that in the abovementioned three *ayllus* resided those in charge of making snuffing trays with local iconography (Cifuentes, 2013). Metallurgical activities were also spatially segregated during MH SPA, because remains of metal production during this period (prills, ingots, etc.) have only been reported for the *ayllus* of Solor, Solcor and Coyo (Salazar et al., 2011). In Solcor 3, an individual was even buried with this kind of remains, suggesting he could have been a metallurgist (Cifuentes, 2013). If, as we suspect, ceramics were also produced by craft specialists in this period, then we would expect that in the future pottery production centers will be found only in a few of the 13 *ayllus* clustered around SPA.

Inter-*ayllu* differentiation may have provided members with some sort of social identity derived from shared economic activities, spatial identification and presumably common memories. However, it is interesting that these diverse identities were not consciously expressed through material mobilization, style or bodily modifications during the MH. The only exception is the elite burials found at Larache and Casa Parroquial, the central oases of the SPA cluster.

The burials from Larache (Le Paige, 1961; Barón, 2004; Stovel, 2001) and Casa Parroquial (Téllez and Murphy, 2007) show anthropomorphic *kero* vases and diverse personal ornaments made in gold and silver which are unique to elite tombs and only comparable to findings reported in Cochabamba and Pariti, two well known Tiwanaku enclaves in Bolivia (Money, 1991; Korpisaari et al., 2011) and to a lesser degree in Doncellas and Tilcara, in Northwestern Argentina (Tarragó et al., 2010). These exclusive burials have not been reported from the more extensively excavated cemeteries located in the lateral and marginal *ayllus*, such as Quitor, Coyo,

Solor, Sequitor or Solcor (Fig. 2), all of which had one or more cemeteries during the MH. Therefore, in SPA there seem to be in operation discourses which distinguish two main affiliations at the local level, the political elite of SPA buried in the central oases and the rest of the population buried in the lateral *ayllus*. In the latter case, internal differences related to power and authority were also expressed in mortuary ritual, and here lies the second level where discourses of affiliation are operating at the local scale. However, these discourses are now operating on an intra-*ayllu* and not an inter-*ayllu* level.

We showed that in the oases surrounding the central and high-ranked *ayllus* of Conde Duque and Larache, a few individuals did have access to gold or silver objects, even though these objects never reached the size, variety and complexity of the ones found in the central *ayllus*. Yet, a few of these precious metal objects can be found in the tombs of cemeteries such as Solcor-3, Coyo Oriente and Solor 3, among others, creating internal divisions within these *ayllus*. Furthermore, a greater number of individuals from these lateral and peripheral cemeteries had access to copper-based artefacts (ternary copper alloys, bronze or unalloyed copper). Burials containing these kind of objects mark a clear difference from those in which the individuals were buried without any metal artifacts, expressing social differences within the *ayllus* (Tamblay, 2004).

The mobilization of metal artifacts in mortuary ritual seems to operate as discourses of affiliation both at an inter-*ayllu* and an intra-*ayllu* level which express commonalities and differences between four social categories of individuals buried in the SPA cemeteries of the MH (see also Tamblay, 2004). First, the elite burials of the central oases, associated with exclusive gold and silver artifacts. Secondly, individuals buried in the lateral *ayllus* of the SPA area with access to gold and silver artifacts, but in smaller quantities and less elaborate forms than the ones found in the central oases. Third, also in the lateral and peripheral oases, individuals who had access to copper-based artifacts, which included symbols of power (mazes and axes) and personal ornaments. Lastly, some individuals who lacked any metal association whatsoever.

Funerary data thus shows that during the MH the local community of SPA was organized in different social units, spatially differentiated (*ayllus*) and possibly economically specialized, each one with its own local leader bearing metal ornaments and emblems of authority in funerary contexts. However, again it is interesting to bear in mind that intra-*ayllu* social differences seem not to be related to distinct economic activities, since our data from Coyo shows that individuals had similar activity-derived pathologies irrespective of their association with metal objects.

We believe this reinforces our interpretation that metal distribution is part of explicit discourses of affiliation, which distinguishes individuals according to power hierarchy, yet not necessarily correlated to recognizable differences in life-style. It is unfortunate that poor preservation did not allow us to examine the skeletons of those individuals buried in the central oases of Larache and Casa Parroquial.

At the same time as practices and discourses of affiliation are creating boundaries within SPA according to power status both at an intra-*ayllu* and an inter-*ayllu* level, other practices and discourses are representing a sense of community and belonging common to all the *ayllus*, providing the local community with social cohesion and the reproduction of some sort of group identity that undermines internal social differences.

These discourses of affiliation include bodily modification and material mobilization as seen through artificial cranial deformation, the expansion of a local style in the decoration of the snuffing paraphernalia, the use of standardized copper mineral beads and local headdresses (Oakland, 1992) as well as sharing a textile (Agüero, 2003) and ceramic (Stovel, 2005; Echeñique, 2012) technological style, and common burial patterns (Torres-Rouff, 2008). In fact, even though during the MH we see the clearest expression of internal social differences within SPA's history, some discourses making these differences explicit, many of the local crafts show even greater standardization and homogeneity when compared to Late Formative or Late Intermediate times (i.e. artificial cranial deformation, copper beads, pottery). In some cases standardization could be related with craft specialization and may not necessarily be an explicit political discourse on a shared group identity (see Emberling, 1997), but this cannot be said for copper mineral beads or for artificial cranial deformation. If copper mineral beads and artificial cranial deformation were in fact symbols of social identity, then the standardization in the type and size of beads and the extreme cases of deformation in the "local style" during MH SPA, seem to show an intentional discourse emphasizing a homogeneous group identity, which is also seen in pottery, textile styles and burial practices, as seen above. The fact that a local affiliation is being materially reproduced during the MH is further demonstrated by the appearance of the *San Pedro* style in the decoration of the hallucinogenic complex coexisting with Tiwanaku iconography.

It is interesting to note in this regard that the elite tombs of the central *ayllus* do not include local *Negro Pulido* ceramics, while this type is frequent in burials with or without metals in the lateral oases. Yet the individuals buried in the central oases did express an affiliation with the local community as suggested by burial type, the presence of the typical San Pedro style "headdress" (Stovel, 2001; see also Oakland, 1992), copper mineral beads that follow standardized local patterns and artificial cranial deformation which with but one exception, fall into the local morphospace (Fig. 3).

We can therefore conclude that during the MH, discourses of affiliation in SPA are creating and reproducing at least four distinct social identities: one common to all members of SPA, which probably constituted a community or corporate identity; one common to what seems to be the sociopolitical elite of the community buried in the central oases of the cluster; one common to certain individuals within the lateral *ayllus*, representing most likely local leaders of each oases; and one common to the rest of the inhabitants of the lateral oases, which was not expressed through material mobilization but rather through its absence.

Affiliation and social identity at a regional level

Tiwanaku seems to have played a key role in promoting the institutionalization of the local elite in MH SPA (Berenguer and Dauelsberg, 1989). Even though SPA interacted with many other polities, the influence of the altiplanic state cannot be underestimated since precious metals and most of the copper-based metals were introduced through the Tiwanaku connection. In fact, there are no known metals coming from La Aguada (in Northwestern Argentina), where impressive emblems of political authority and prestige were produced at the time, even though La Aguada textiles, pottery and other craft have been found in SPA (Berenguer, 1984; Llagostera, 1995).

We contend that the fact that local leaders are using metal emblems of authority distributed by Tiwanaku is not simply the outcome of dominant economic relations, but on the contrary it is an explicit material expression of affiliation of these local leaders to the Tiwanaku state. Local leaders while maintaining clear affiliations with the SPA community, at the same time created differences with the rest of the community by expressing affiliations at a regional scale with the Tiwanaku polity. Snuffing paraphernalia decorated with Tiwanaku iconography also seem to express this affiliation. It is noteworthy that Llagostera (2006a) has suggested an association between bearers of metal axes and Tiwanaku-style snuffing trays.

In this context it is interesting to consider the development of a local metallurgy during the MH not only aimed at producing tools,

but also a few emblems of political power both in the local "style" (mazes) and resembling the exogenous "style" (a few *T*-axes made of unalloyed copper). These cases could indicate local leaders trying to further their authority and influence through the direct production of altiplanic emblems or even through producing traditional (Late Formative Period) symbols of authority, though their scarcity in the cemeteries shows these strategies were ineffective in the long-term.

In any case, it is worth noting that affiliations at a regional level were not restricted to local leaders and Tiwanaku. One interesting result from our work is the fact that many of the local crafts and styles used to reinforce the local identity were in fact made using imported raw materials. This is the case with the copper mineral beads, made from turquoise brought from Chuquicamata, 120 km to the northwest of SPA. Also, some of the bronze chisels and awls found could have been made locally through tin imported from Northwestern Argentina and/or the Bolivian altiplano as metal ingots. Most significantly, the wooden trays made with *San Pedro* style were extensively produced using foreign woods, the hallucinogenic substances consumed came from the other side of the Andes, while local textiles of the *San Pedro* style used imported dyes, either as raw material or as dyed fibers.

These results prove that long-distance exchange was not limited to prestige items, but included raw materials as well, which were later used by local craftsmen to make objects that reproduced the local identity. The fact that some of these or similar raw materials were available locally (i.e. woods, copper minerals, metals), and that local technologies were capable of using them, shows that these exchanges were not only fostered by a need to access non-locally available materials. There seems to be a deliberate social intention in producing local artifacts with non-local raw materials. Interestingly enough, the objects produced are the very ones that signal the SPA community as a social identity within the kaleidoscopic cultural scenario in which it was situated. But why were foreign materials used to produce emblems of local identity? In the Andes, economic exchange of raw materials, produces or objects cannot be separated from social ties and relationships (Alberti and Mayer, 1974; Goldstein, 2013; Martínez, 1998; Murra, 1980; Rostworowski, 1977). So the pattern of intense exchange of objects and raw materials seen during the MH in SPA suggests that economic interactions were an aspect of deeper social bonds which integrated distant communities. Furthermore, different authors have claimed that in the Andes raw materials and technological processes may be fundamental in an object's symbolic meaning (i.e. Lechtman, 1984; Nielsen, 2007; Torres and Repke, 2006). As Nielsen (2007) aptly shows, the raw material of an emblem may reinforce links between its owner and the original source of this raw material. In this context, we propose that the extensive use of exogenous raw materials to elaborate local artifacts in SPA was the result of conscious discourses of affiliation and social integration with distant communities, which were considered integral to the reproduction of a local community or corporate identity.

This social integration was not only reproduced through the material exchange of objects and raw materials, but in some cases it was also explicitly represented through the creation of common technological styles, such as the *circumpuneño-valluno* technological tradition in textiles (Agüero, 2003). Most likely, social integration was constantly being reproduced through marriage alliances as well, as supported by bioarchaeological data. In fact, Nado et al. (2012) recently showed an increase in the presence of non-local individuals buried in SPA during the MH as compared to the Late Formative Period, supporting previously analyzed independent data sets (stable isotopes, genetics and linear features) pointing in the same direction (Cocilovo et al., 2011; Torres-Rouff and Knudson, 2007; Varela and Cocilovo, 2000). Interestingly enough, some of these individuals of foreign origin are buried in contexts which are representing a local identity (see Berenguer, 1994: 26).

We may thus conclude that interregional affiliations played a key role in the definition of the local identity of the SPA community during the MH and that these affiliations were not restricted to local authorities but to most if not all members of the *ayllus* forming the SPA cluster. Through practices of economic exchange and marriage alliances and by sharing technological styles and elaborating local objects with exogenous raw materials, local inhabitants of the SPA *ayllus* established and reproduced regional affiliations during the MH with South-Central Andean polities other than Tiwanaku, most likely from Northwestern Argentina and the Bolivian altiplano. This social integration seems to play a different role than affiliation with the Tiwanaku state, the former integrating the community as a whole with distant polities, the latter creating social groupings which segregated the local community.

This pattern clearly reflects that Tiwanaku did play a very special role for the local SPA community in interregional interactions during the MH (Berenguer and Dauelsberg, 1989). But we disagree with Stovel's (2002, 2005) claim that strengthening the local identity in SPA during the MH was a local reaction to Tiwanaku influence. Afterall, it was through the integration to Tiwanaku that social differences reached its historical maximum during this period and local leaders could reinforce their local authority. Furthermore, many of the emblems of the local identity (copper mineral necklaces, cranial deformation and "headdress") were extensively used by individuals highly ranked in SPA social organization and linked to Tiwanaku materials. And even some individuals seem to have tried to emulate emblems of authority distributed by Tiwanaku by producing them locally.

We contend that SPA is creating and reproducing discourses of local affiliation (local group identity) precisely as a strategy of incorporation into wider social networks including peer-polities on the one hand and the Tiwanaku state on the other. These two discourses and practices of affiliations may have operated simultaneously to represent two different social levels of integration at a regional level, and thus two different levels of political authority in a hierarchical yet segmentary political organization.

Future research is needed to obtain a better understanding of this topic. However, our hypothesis is that the different regional alliances and affiliations seen during MH in SPA eventually could have integrated different local communities, each with its own group identity, into higher levels of social organizations headed by the Tiwanaku state. Here might lie the origin of the ethnohistorical model of Aymara sociopolitical organization (Platt, 1987), used previously to interpret the Tiwanaku state during the MH (Albarracín-Jordán, 1996; Goldstein, 2007).

In this scenario, the covariation of material objects and markers at different spatial scales that the archaeology of SPA shows during the MH could be viewed as the outcome of long-standing "discourses/practices of affiliation" which defined, reproduced and eventually transformed social identities in the local community and integrated them into a regional nested hierarchy. The Tiwanaku state could have been the highest level of such a social integration, albeit not including all the local communities of the South-Central Andes. Some SPA local leaders (for example those buried in the central oases of the cluster) would have been privileged members in this complex nested hierarchy of group identities, probably as representatives of the local community in the highest levels of sociopolitical integration, creating differences with the rest of the local community. After the disintegration of the Tiwanaku state, only lower levels of this pan-regional organization persisted, and SPA may have lost some of its prestige and privileged status within the MH web.

Conclusions

The archaeological study of group identity is a difficult task because of the multidimensional, contextual and fluxing nature of identity construction processes (Berenguer, 1992; Emberling, 1997; Stovel, 2013) and the fact that these do not necessarily leave discernible material traces. We have attempted to overcome this limitation by assuming that understanding the manipulation of specific biocultural markers at different social and spatial levels over a period of time, may disclose the processes through which group identities were historically defined, negotiated and transformed. Stovel (2013: 8) has aptly stated that in order to study ethnicity archaeologically, we should "identify previous practices, the impact of changing conditions, and the selection of specific material to represent and participate in group cohesion". Such an approach requires a multidimensional and interdisciplinary perspective that takes into consideration different lines of evidence at diverse spatial scales and which uses robust, reliable data. Through this kind of research strategy we may aspire to deal at least partially with the independence and security criteria that Wylie (2002) suggests need be at the base of archaeological reasoning and inference building. The interdisciplinary nature of such a research strategy needs to be emphasized, since the approach requires the creative search for appropriate methods and analytical techniques. Furthermore, we need to be able to interpret correctly archaeometrical results and to enrich the research by including different perspectives that question the data from more than one point of view. Notwithstanding, it is also important to have in mind that such an archaeometrical research strategy needs to be targeted towards the understanding of anthropological problems of broad significance, such as the process of group identity formation. Only thus can we overcome the known limitations of archaeometric studies in archaeology and their alleged lack of theoretical development (Lechtman, 1994; González Ruibal, 2012; Jones, 2004).

In the present paper we have presented results of an interdisciplinary work aimed at understanding the processes of group identity formation in SPA during the MH, and the role that the local community, interregional interaction and Tiwanaku integration played in this process. We have suggested that during the MH the local community of SPA created and reproduced social boundaries and affiliations at different levels simultaneously. During the MH, SPA is facing increasing social differentiation due both to economic specialization and institutionalization of political hierarchies at a local level. However, only political hierarchies seemed to be explicitly signaled in mortuary ritual, and this signaling occurs through discourses of affiliation which link local leaders to the Tiwanaku state at a regional level. At the same time, many members of the local community are integrated during the MH into wider social fields (Stovel, 2008), building permanent social bonds with distant polities other than Tiwanaku. Through the constitution of a social fabric during the MH people, ideas, goods and raw materials moved throughout the South-Central Andes. The network required building social links beyond face to face relations, and establishing alliances with other polities which were reproduced through practices of affiliation such as common styles, economic exchange and marriage alliances.

At the same time, SPA is strengthening discourses and practices which create and reinforce a local identity. We suggest that it was through signaling the distinctiveness of the local community as a whole (through practices/discourses of affiliation at the local level), that SPA sought and achieved its integration into higher levels of social and political organization, which were in turn reproduced through practices/discourses of affiliation operating at a regional level and through different social resources in relation to the local practices of affiliation.

Local agents in SPA chose thus to enhance their distinctiveness in the culturally diverse MH of the South-Central Andes, precisely in order to integrate the local community into a hierarchical organization of polities forming the Tiwanaku state (Albarracín-Jordán, 1996; Janusek, 2004; Goldstein, 2007). It was this integration into a nested hierarchy of affiliations which demanded a clear definition of boundaries between the diverse groups and social categories that made up the Tiwanaku state's overall sociopolitical structure. In other words, community or corporate identity formation during M SPA was probably the result of a growing consciousness of self within a politically integrated diverse cultural context during the MH (Comaroff and Comaroff, 1991) as well as the need of the Tiwanaku state itself to organize this diversity in hierarchical social and political structures.

Given that regional interaction and negotiation with a state society have been considered key conditions for the origin and transformation of ethnic identities (Emberling, 1997; Shennan, 1989), it is possible to suggest that during the MH the corporate identity of the SPA community was of a predominantly ethnic character. This historical context could explain the ethnic differences as well as the interethnic affiliations characteristic of the Late Intermediate Period and the Aymara political organization as reconstructed by Platt (1987).

The fact that during the MH we see the most dramatic social differentiation in the history of the local community is probably the outcome of having local leaders representing different hierarchical levels within this sociopolitical structure buried in SPA. The burials in the central oases of Larache and Conde Duque were undoubtedly for those in the highest ranking within the local *ayllus*. Prestige objects such as those recorded in these cemeteries have been found in very few places throughout the South-Central Andes during the MH, so it seems clear they were local individuals highly ranked in the overall sociopolitical structure of the state, probably affiliated to the local elites of Tiwanaku or its colony in Cochabamba (Uribe and Agüero, 2004), and eventually heading a vast area in the circumpuna area (Berenguer and Dauelsberg, 1989; Tarragó, 2006). Individuals such as those bearing gold emblems in the peripheral oases and/or copper-based metal axes and personal ornaments, could correspond to lower-ranked local authorities, with influence and prestige either at a local or a subregional scale.

In spite of these growing internal hierarchies, we propose that the local identity of the SPA community was reinforced as they integrated higher levels of sociopolitical organization. And at the same time, each of these levels of integration was materialized through the exchange of raw materials, goods, prestige items and people, or through the development of shared styles and practices, thereby producing interethnic group identities and affiliations.

Some of the nested social identities built through this historical process in the South-Central Andes continued way after the dissolution of the altiplanic state of Tiwanaku (the *circumpuneño* style in the snuff trays of the Late Intermediate Period seems a good example; see Horta Tricallotis, 2012) and may well have functioned at least partially during the Inca expansion and even during Colonial times (Martínez, 1998). But by then, the 13 small oases of SPA had long lost their regional prestige. In fact, when the Inca empire conquered the circumpuna region and incorporated it into a provincial organization, SPA was indeed a society holding a local group identity incorporated into larger affiliations. But due to different state interests, different alliances and agency by the local communities, it seems other groups such as the Yavi-Chicha of the southern Bolivian altiplano and Northwestern Argentina were more favored by this organization, and stood higher than SPA in the new hierarchy of nested identities and provincial organization.

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