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Rock art and social networks among hunter gatherers of north-central Chile

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ABSTRACT

This paper discusses the relationships between rock art and the production of social networks among hunter-gatherers from the Late Holocene in central-northern Chile. Despite the low visual integrity of the paintings under study, the use of D-Stretch software allowed us to digitally improve the images, and conduct formal and quantitative analyses at different levels of variability. The comparison between two areas of the region showed two systems of visual communication that structure themselves along divergent principles. Such results point to the existence of two different social network systems due to social complexity processes and the increasing spatial demands of the communities living in the area. The very existence of rock art is interpreted in the light of these historical processes. The results we present help expanding the discussion on rock art and social networks considering the multiscalar nature of the networks as well as by weighing the role of history and environment in such a process.

1. Introduction and theoretical background

In this paper we discuss the process of constitution and the characteristics of social networks between hunter-gatherer groups of Central north Chile (30° Lat. S) during the Late Holocene, through the study of the variability of rock art paintings. The Late Holocene saw important transformations in the way of life of the hunter-gatherer communities, evidenced in the archaeological record, due to the demographic increase, conflict, and intensification in the exploitation of the environment. These new trends have been interpreted in association to processes of social complexity, territoriality, and to a reorganisation of social relations characteristics of hunter-gatherer populations, if compared to previous times (Schiappacasse and Niemeyer, 1964, 1965–1966; Ampuero and Hidalgo, 1975; Castillo, 1986; Quevedo, 1998; Castelletti et al., 2012; Méndez and Jackson, 2006).

As in other parts of the world, paintings in our region are extremely deteriorated, which made it difficult to record them with the naked eye and therefore to analyze them. For this reason, we took digital photographs of the motifs and painted blocks and then digitally enhanced them using the Decorrelation Stretch plug-in (D-Stretch) to Image J software, which is widely used in rock art studies (Gunn et al., 2011; Ritter et al., 2011; Brady and Gunn, 2012; Caldwell and Botzojorns, 2014, among others). This software enabled us to recover a rich corpus of motifs from across the region, which was then formally and quantitatively analyzed, in order to identify differences in regional distribution, on multiple levels. These differences are discussed in light of social network dynamics and the formation of territorial systems.

Social networks are a central element in the constitution and social reproduction of hunter-gatherer communities. (Jochim, 1976; Conkey, 1980; Kelly, 1995; Whallon, 2006, 2011; Hamilton et al., 2007; Apicella et al., 2012; Aubry et al., 2012). Through them, different family units dwelling in a particular landscape create bonds of cooperation, communication, integration, and segregation, in what Whallon (2011) has defined as safety nets, crucial for the social endurance. The constitution and characteristics of these networks are closely related to the social organization and to the territorial systems of these groups (Braun and Plog, 1982; Kelly, 1995; Whallon, 2006; Hamilton et al., 2007; Apicella et al., 2012; Aubry et al., 2012). On the one hand, they allow the union of different mobile units through solidarity and cooperation bonds, surpassing the family unity (cohesive power), and on the other, they allow the creation of barriers to exchange and communication with other social groups (disruptive power) (Hamilton et al., 2007). Thus, to comprehend the characteristics and nature of these networks would allow us to move forward in the understanding of the territorial and cooperation dynamics of these groups

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(Wobst, 1977; Jochim, 1976; Scheinsohn, 2011; Mc Donald and Veth, 2011; Aubry et al., 2012).

Due to their relevance of in social and economic reproduction, one would expect that these networks would have been unfolded in every landscape inhabited by the hunter-gatherer groups, but with different degrees of connectivity (Braun and Plog, 1982). Regarding this, it has been proposed the existence of a close relationship between connectivity of these networks and the environmental uncertainty of the landscapes (Gamble, 1982; Whallon, 2006, 2011; Scheinsohn, 2011). Particularly, the previously referenced authors have argued that the higher the environmental risk, networks would be more open, favouring cooperation and associativity between the different mobile unites. Nevertheless, and as has been pointed out by Braun and Plog (1982, see also David and Cole, 1990), even though the environment is a relevant factor, historic dynamics and ways of social organization of the hunter-gatherer groups are also significant elements to understand the structuration of the social networks. This consideration makes it possible to acknowledge the variability and the particular historic trajectories displayed around the construction of social networks between these groups in similar or homogenous environments.

A central element in the constitution of these networks is the flow of information (Wobst, 1977; Gamble, 1982; Whallon, 2006, 2011), especially social information as it allows both the perpetuation of the mobile group, and the construction and reproduction of bonds with other mobile units (Whallon, 2006, 2011; Hamilton et al., 2007; Funk, 2011; Ichikawa et al., 2011; Hill, 2011). Acquisition and control of social information is so relevant that information mobility has been identified as a specific type of movement deployed by these groups in order to secure their reproduction (Whallon, 2006).

Material culture is central in the information flows and in the construction of networks, making it possible to storage and to circulate information (Wobst, 1977; Gamble, 1982; Braun and Plog, 1982; Whallon, 2006, 2011). Visual attributes of objects have been the explored the most to understand and characterize social networks of hunter-gatherer groups, analyzing them from their distribution and circulation within wide regions. In this context, it has been observed how through the production and use of different objects, different social networks have been created and maintained. For example, Whallon (2006, 2011), has suggested that the exchange and circulation of objects within a short distance are usually associated to utilitarian objects, whereas in larger distance contacts are reinforced by symbolic items, possibly due to their higher social significance. Also regarding the circulation of objects, Gamble (1982) has suggested that in spaces where social networks are open, and social alliances operate over extensive areas with shared territories, visual information systems should be homogeneous because they function as a resource that promotes intergroup cohesion on a broad scale. In contrast, in regions with closed social networks and rigid territorial dynamics, the visual information should reflect the presence of different groups, each with its own system. The difference in the constitution of networks through the particular elements of material culture used and produced is related to the multi-level character of these networks, which can cover from gender groups to family units (Hamilton et al., 2007; Whallon, 2011; Lovis and Donahue, 2011).

Although the above shows how information flow and the constitution of networks occur at different scales (Braun and Plog, 1982; Hamilton et al., 2007; Fitzhugh et al., 2011; Ichikawa et al., 2011; Whallon, 2011), visual/symbolic elements seem to work as resources for the construction of affiliations in a wider spatial, intergroup scale, related to their symbolic nature and their association to ritual dynamics linked to social tradition (Gamble, 1982; Whallon, 2011; Zvelebil, 2011).

Following this idea, we consider rock art as related to the flow of information and to the construction of networks in a wide spatial scale, related to territory and space. In fact, as different scholars have acknowledged (Tilley, 1994; Bradley, 1997; Nash, 2000; Chippindale and Nash, 2004), the immobility of rock art deeply anchors its flows of information, audiences, and its very nature, to the landscape in which human groups lived their lives. Through its distribution and presence, landscapes are semanticized and made part of the human action (Tilley, 1994; Bradley, 1997). Thanks to this, its scale of action and connectivity surpasses the limits of the mobile family unit, favouring the articulation of a series of other units dispersed in, and occupying a particular landscape.

This idea is supported by the work of different scholars, who have used spatial and visual variability of rock art as an indicator to evaluate the flow of visual information, the nature of social networks, and the territorial dynamics of hunter-gatherer groups (e.g. Mc Donald and Veth, 2011; Veth et al., 2011; Scheinsohn, 2011; Gallardo et al., 2012; Bernardini, 2005; Quinlan and Woody, 2003). These studies have mainly relied upon Gamble's proposals (1982, see also Scheinsohn, 2011), suggesting a large-scale model for homogeneity in rock art associated with extensive and open macroregional networks of interaction, and a smaller-scale model for spatial heterogeneity in rock art that is associated with territorial circumscription and closed networks. In most of these approaches environmental elements have been highlighted in the configuration of the networks (David and Cole, 1990; Mc Donald and Veth, 2006, 2011, 2012, 2013; Scheinsohn, 2011), although some researchers have questioned the necessary relation established between environmental characteristics, rock art and the nature of social networks (David and Cole, 1990; Smith, 1992). Methodologically, these works have been focused on the discussion of the networks based on the formal variability of the representations, but without integrating it into a wider argument associated to the multi-level character of these networks. In contrast, our approach involves multiple levels of analysis based on the basic propositions by Wobst (1977), Gamble (1982) and Whallon (2011), who affirm that, above and beyond formal differences in visual information systems, it is the rules guiding the codification of key information that are most relevant for differentiating such systems, and therefore for evaluating whether or not the record is homogeneous or heterogeneous at the regional level. These systems, including rock art, follow a set of basic rules to codify information that is then decoded by individuals who know the rules (Wobst, 1977; Gamble, 1982; Whallon, 2011). We believe that these should be expressed through: (i) the use of a finite set of minimal units; (ii) some rules for combining these minimal units to produce the repertoire of motifs; and (iii) some compositional principles that relate the motifs on the panels to one another, expressed as combinations of specific motifs or symmetrical patterns (Sauvet, 1988; Groupe U, 1993; Troncoso, 2005; Basile and Ratto, 2011). This last aspect refers to more structural aspects that define those visual information systems (Wobst, 1977; Washburn, 1999; Nash and Children, 2008; González, 2011). Also; given that the space is a key variable in creating these kinds of visual information systems, the frequency with which rock art is distributed within the space is an indicator of the intensity with which these visual information systems were deployed in the landscape, which in turn should be related to the need for and importance of deploying these communication networks in the region.

Using these different analytical variables enable a discussion on the constitution of the networks and their multi-level character within the landscape occupied by the Late Holocene hunter-gatherers in Central-north Chile.