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Using network expectations to identify multiple exchange systems: A case study from Postclassic Sauce and its hinterland in Veracruz, Mexico



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ABSTRACT

Exchanges of material objects often play a pivotal role in the trajectories of political, social, and economic development for ancient societies, but the study can be challenging because of the complexity of exchange. Multiple forms of exchange co-exist in ancient societies including market exchange and social exchange such as gift-giving. A further complicating factor is that different exchange systems such as redistribution and central place market exchange can result in the same regional spatial patterning of artifacts. Recent innovations in identifying exchange systems use network expectations for spatial, contextual, and distributional information to help distinguish between social exchanges such as gift-giving versus market exchange using household inventories. I introduce a Monte Carlo computer simulation to evaluate network expectations for alternative exchange mechanisms, using a case study of decorated ceramics from 65 residential inventories from the center of Sauce and its hinterland during the Middle Postclassic period (1200–1350 A.D.) in southcentral Veracruz, Mexico. Using these new tools, I identify the coexistence of several exchange systems operating simultaneously. The methods developed here demonstrate the potential of using network expectations to refine existing methods to identify different exchange systems that can be applied to other complex ancient economies.

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Introduction

Exchanges of material objects are only a fraction of the complex social and political exchanges in human societies, but these artifacts can provide important insights into exchange and its role in the trajectories of political, social, and economic development for ancient societies (Homans, 1958; Mauss, 1990; Oka and Kusimba, 2008; Renfrew, 1975: 4). Using archaeologically durable materials, such as ceramics, archaeologists can analyze exchange systems, but the study has always been challenging. Part of the difficulty lies in the complexity of exchange. The exchange circuits for material objects are shaped by a mix of social, political, and commercial factors, and this combination is often difficult to disentangle (Granovetter, 2005: 87; Smith, 2004: 77). A further complicating factor is that different exchange systems such as redistribution and central place market exchange can result in the same regional spatial patterning of artifacts (Renfrew, 1977: 88). This exchange mixture can be simplified into categories based on tendencies, (e.g. market exchange, redistribution, etc.) that use abstract distinctions of much fuzziest realities to define exchange systems for analytical purposes. Recent advances in identifying exchange systems archaeologically have used distributional concepts and related

methodological tools to grapple with exchange complexity and equifinality (Garraty, 2009; Garraty and Stark, 2010; Hirth, 1998; Ossa, 2011; Stark and Garraty, 2010). These new tools are important because of the role they play in understanding economic development across different ancient complex societies. I demonstrate new methodological tools I have developed based on these recent conceptual advances to identify the coexistence of several exchange systems within the Postclassic Mesoamerican town of Sauce and its hinterland in Veracruz, Mexico.

Concepts for understanding exchange systems

As a preface to this new method and its application, I outline a set of related concepts and terms that I use to put network expectations into practice, including market, market exchange, market-place, redistribution, and social exchange. My usage of the term network does not refer to the networking strategies of elites described by Blanton et al. (1996) for Mesoamerican political development. Instead, the term network refers to any group of consumers, producers, or middlemen that participate in the exchange of an item. The group exchanging the item, however they are defined by status, kinship, or region, constitute the network. Here, exchange through networks is defined as the exchange of items among groups of people, regardless of whether their spatial locations are known. The end result of repeated exchanges through

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distinct networks of consumers and producers will produce spatial, contextual, and distributional evidence that can be used in turn to infer the exchange that produced them. My primary focus is on developing methods to distinguish different networks in exchange because, as I will demonstrate, network based expectations can be used to differentiate exchange systems with greater precision than other techniques can alone.

Exchange systems produce spatial, distributional, and contextual data that provide different kinds of information about exchange. For many years, spatial information was the primary data that archaeologists relied on for exchange analyses (Adams, 1975). One particularly useful tool for archaeologists is spatial fall-off patterning, which refers to the pattern of the decrease of product frequencies away from a source that reflects the increasing costs associated with distance. The spatial fall-off of product frequencies can identify how centers and settlements articulate with the economy, but there are complications to using these data to interpret the circulation mechanism in operation. The problem is that spatial fall-off patterns can appear the same for redistributive systems and central place market exchange (Renfrew, 1977: 88). Additionally, greater concentrations of product frequencies do not always point to a central place, but also can be the results of preferential access by elites, or specialized activities, further complicating efforts to identify exchange mechanisms through spatial distance decay alone (Renfrew, 1977: 85–86). Recent advances in evaluating exchange archaeologically use the end consumption point, that is, residential inventories, to infer exchange mechanisms (Hirth, 1998; Smith, 1999, 2004). The premise of Hirth's (1998: 455) distributional approach is that markets generally provide products restricted in access by cost alone. Social exchange, such as elite gift-giving or kin exchange produce flows of products that are restricted by the status, kinship, and political affiliations of residential groups. Generally, market exchange will produce more open access while social exchange will involve more restricted access. Therefore, different exchange systems will produce different quantitative distributional patterns of artifact amounts among residential groups. Items circulating via market exchange will produce a different mathematical distribution than those circulating via social exchange based on the defining characteristics of how items are exchanged within them.

There are differences between market exchanges in which monetary exchange is deployed rather than barter, in which formal media of exchange are not generally expected. However, standardized media are not required for market exchanges to occur. In Feinman and Garraty's (2010: 171) view, market exchanges can occur without formal media of exchange at least initially, and if the scale of market exchanges increases, the need for shared agreements on price and value could encourage the development of formal media which may include currencies. Smith's (2004: 79–80) degree of commercialization provides a useful conceptual continuum with which to consider media exchange differences; for example, institutions such as money might be expected in the more commercialized setting compared to barter. The degree of commercialization for nascent market exchange in developing economies can give important insights into political and social aspects of exchange. However, the topic is well beyond the scope of this paper. Here I am concerned with a specific method and its potential for identifying both market and other kinds of co-existing exchanges and do not discuss the degree of commercialization present in Sauce; the results of that analysis are presented elsewhere (Ossa, 2011).

By market exchange, I refer to the process or institution of market exchange rather than a specific place where markets occur, such as a marketplace. I define market exchange as a set of economic transactions where products are exchanged by barter or for media of exchange and in which considerations of supply and demand are prominent (Pryor, 1977; Smith, 1976, 2004: 78–80).

A marketplace is the physical location where market exchanges are facilitated or perhaps regulated; a marketplace is a formal setting, such as the ones described for the Postclassic period capitals of Tenochtitlan and Texcoco (Hirth, 1998: 454–458). In contrast, social exchanges of products occur via social and/or political connections. Although market exchanges have multiple complex political and social aspects as exemplified by the markets used strategically by the Aztec political elite (Blanton, 1996; Garraty, 2006), I define social exchange as a form of exchange in which the social and/or political connection is *exclusively* required for the exchange to take place. High ranking groups have special privileges, obligations, and prestige concerns that often involve the exchange and administration of goods (Davenport, 1986; Helms, 1993; Schneider, 1991). Elite exchanges, including gift-giving, preciousness acquisition, and redistribution, have long figured in anthropological interpretations, and I consider them to be sub-categories of social exchange. Social exchange also could involve the restriction of specific goods to particular social groups, such as with sumptuary laws. Redistribution also fits under the term social exchange. Redistribution is the controlled distribution of items via the political elite, typically along socially significant networks. For my study, redistribution is a special case of social exchange in which everyone may have some quantity of a redistributed item, but its distribution in much higher amounts is attached to socially significant networks (such as residences with higher socioeconomic status or social connections) (after Stark and Garraty, 2010). In the case of the Sauce polity, if redistribution were a significant mechanism of exchange, as opposed to gift-giving or one-time client-patron largess, we might expect most households to have access to a redistributed item, but the control and administration of its distribution would result in political or social elites having higher quantities (after Stark and Garraty, 2010: 44). Each of these exchange systems produces distinguishable signatures that should be identifiable when comparing the mathematical distributions of items among a sample of households from a region or site.

The ability to identify multiple kinds of exchange is important because comparative research on ancient complex societies has demonstrated convincingly that different types of exchange systems coexisted and played complementary roles in the economic and social development of polities and regions (Sherratt, 2004: 98–100). Among these exchange systems, the archaeological study of market systems has been neglected until fairly recently (Feinman and Garraty, 2010; Garraty, 2010). Market exchange as a vital part of exchange systems was often ignored by anthropologists in favor of approaches that appeared to emphasize more social aspects of exchanges (Oka and Kusimba, 2008: 354; Schneider, 1991). More recently, anthropologists have recognized that market systems are part of the social processes affecting development and integration within ancient states, as opposed to being the result of these processes (after Minc, 2006: 82–83; Smith, 2004). Identifying and studying the development of market exchange, and particularly more commercialized market exchange (after Smith, 2004) within communities of different sizes and complexities is important for understanding regional cycles of economic development.

In this article, I begin with a brief overview of more recent ideas and approaches to identifying exchange archaeologically based largely on Hirth's *distributional model* (1998), and describe a new conceptual application. Next, I introduce a case study using two methods for evaluating the mathematical distributions of individual pottery types including a visual distributional analysis using statistical graphing methods and a Monte Carlo network simulation. The results of these two methods are summarized and compared for the chosen pottery types. Finally, I consider the broader implications and potential applications of being able to identify

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