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Influence Structures in a Tongan Village: 'Every Villager is not the Same!'

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Introduction

“*Tatau, tatau pé, katoa tatau* (the same, just the same, all the same).” This is what most Tongan villagers rushed to say when asked if any person within the village groups they had just mentioned was *mahu'inga taha* ‘most important.’ And, when asked if any of the groups they had identified within the village was more important than the others, they produced very similar statements.

Such forceful insistence on equality among villagers seems incongruous in the context of a monarchial political system, the Kingdom of Tonga, the only surviving Polynesian monarchy. At the head of this highly stratified society is King George Tupou V, heir of a dynasty that goes back at least a millennium. The Kingdom has been a constitutional monarchy since its Constitution, granted in 1875 by King George Tupou I, sanctioned the format of the present political system (Latukeyu, 1974) and, today, the monarchial rule extends to villages via a village ceremonial leader linked to the king or through a hereditary link to the king or one of the constitutional nobles.

A recently born democratic movement, however, is shaking the roots of this system (Hoponoa, 1992; James, 1994; Lawson, 1996). The political debate has reached its highest points in the last few years, and, though concentrated in the capital town of Nuku'alofa, its reverberations can be heard throughout the country's 150 islands and most remote villages.

A small scale, modern economic activity, based on markets rather than personal exchange, is developing alongside the traditional subsistence farming and craft production. Could these features of modernization, democracy and market economies, be simultaneously generating the verbal descriptions of the stratification system in this village and its influence structure? The results of interviews about democracy and monarchy conducted on a small representative sample of 18 adults in the village showed that, in fact and in spite of the high profile of the political discussion generated by the new democratic movement, the majority of villagers feel a sense of congruency between their current status and their cultural and historical milieu based upon monarchial rule (see also James, 1994, 2002, 2003; Lawson, 1996).

Could it be that within the Tongan monarchic socio-cultural environment, equality and inequality coexist in some realistic and functional manner? Could it be that at the level of such a small village, stratification so strongly implemented in the social fabric of the overall Tongan milieu is not cognitively present? How can we reconcile the lack of a perceived local stratification with the overt positive feelings toward a monarchy and its aristocracy?

In order to answer these questions, we conducted an investigation of the quality and type of social networks in the village. This investigation revealed a more nuanced local influence structure and showed that the descriptive statements used by villagers, ‘we are all the same’, similar to descriptions of stratification systems by members of other Polynesian cultures such as Samoan and Tahitian (Duranti, 1994, Levy, 1973; Morton, 1996; Ochs, 1988; Schweizer, Klemm, and Schweizer, 1993), do not adequately represent the empirical nature of the local influence structure. In this village, we have a traditional, kin-based and monarchial social structure along with an emerging democratic impulse emphasizing equality. A cash economy with a degree of occupational differentiation is developing structures that contain mechanisms capable of increasing stratification along new dimensions. Thus, along side the communal sharing and equality matching relations, this small society appears to have multiple forms of relations among members that could be the basis for the differentiation of influence: authority-ranking and market pricing (Fiske, 1991).

This article addresses how the villagers' various types of resources and social positions relate to the derived positions villagers occupy in the informal influence network. *Thus, our work is an examination of the extent to which an informal influence structure exists in this communal village*, particularly, the variable degree of centrality (measured as derived network statistics for degree balance, out-closeness, betweenness, and constraint) of each villager in the influence network *and an examination of the factors that might account for the degree of centrality each villager possesses*. Thus we model the influence generating mechanisms at work as part of the village social structure. We first describe the ethnography of a Tongan village and formulate working hypotheses about forms and types of influence-based networks that might exist. We then describe the methodology used to measure sociometric influence and outline the analysis employed. Our first set of results is descriptive, portraying the major features of the influence network over voting. The next set of results test the degree of equality (symmetry and balance) or ranking found in the voting influence network. We next detail how various individual and social resources (both traditional and those related to education, wealth, and occupation) correlate with derived measures of sociometric influence, our centrality measures. In closing, we speculate on how the nature of the stratification detected in the village may correlate with cognitive representations found in other Tongan cultural domains.

The Social Structure of a Tongan Village

The village chosen was well known to one of us, Bennardo, who has conducted extensive fieldwork there over the last 15 years. The village is small, even in Tongan terms, with only 172 residents, comprising 95 adults (i.e., 18 years and up). This small number made possible complete social network surveys of the adult population. The village lacks a resident noble. The village is located in the northern Tongan archipelago of Vava'u on a governmental estate. Land in the Kingdom of Tonga belongs either to the King personally, to any of the thirty-three constitutional nobles, to any of six (out of many existing ones) 'talking chief or ceremonial attendant of a chief/noble/king,' or to the Government. Villages are located on these estates and, depending on the owner of the estate, villagers have differential access to subsistence plots.

In all four types of ownership, by the age of sixteen any male is entitled to a 100 hundred year lease for a plot of 8.25 farm acres and to a town plot of 0.4 acres. The plots are inherited through the male line. In the absence of male heirs, it can be inherited by a woman, but only for the duration of her life and as long as she does not marry (James, 1995). While access to land is uniform among males, the acreage owned is highly skewed, so ownership may play a role in determining the influence structure. Villagers obtain their land by inheritance or by applying for a plot allocation with the current Minister of Land. Once obtained, villagers act as owners of the land as long as they pay a symbolic sum of 80 cents¹ a year to the owner of the estate, i.e., the Government.²

While the village lacks a residing noble, the residing chief is directly descended from a well established line of chiefs. One of his ancestors sat in the council of chiefs that approved the first set of Tongan laws (the Vava'u Code) in 1839, over three decades before the 1875 Constitution. However, the residing chief cannot claim full inheritance to nobility because one individual in

¹ A Tongan *pa'anga* is worth around 50% of an American dollar.

² When the owner is a noble or the King, the due sum is set in a different way and typically along traditional lines that may include yearly (and sometimes more often) donation of food, dried kava roots, animals (e.g., pig), mats, and barkcloth.

his line of descent was conceived out of wedlock. In addition to the chief, a *mātāpule* or ‘talking chief’ is also in residence, but this status is not often recognized and very few people even mention his existing title. Much more visible is the local Wesleyan minister.³ Ministers, however, are rotated every four years, and, while they may appear very prominent during their appointment, neither they nor their role has become part of the long lasting social fabric of the village.⁴

Another prominent figure is the *'ofisa kolo* ‘town officer’ who is elected every three years. The town officer is described in this way by Tupouniua (1977):

“He oversees compliance with government regulations, is consulted by government departments, and reports regularly to the district officer (*'ofisa fa kavahe fopua*) on the general state of the village. He has authority to call on every household in the village to contribute for an important event such as the marriage or death of a royal person. His support is canvassed by prospective candidates during elections for Parliament and is the link between Hoi [a Tongan village] and the police in the preservation of law and order.” (1977:20)

Thus, the formal social structure suggests three formal positions with some formally recognized authority: a chief with quasi-noble links, the *mātāpule* ‘a talking chief’, and an elected town officer.

Other occupational roles may account for variable degrees of sociometric influence as well. In a village whose main income comes from subsistence, it is crucial to point out the presence of wage laborers earning cash and to note that the cash economy has become more significant in the last few decades. We classified villagers into 6 occupational categories:

- ‘subsistence workers and homemakers’ (58);
- ‘public employees’ (2): the town officer and a police officer;
- ‘professionals’ (11): 3 high school teachers (commute daily to Neiafu, the main town on the island), 3 nurses (commute daily to Neiafu), an elementary school teacher, a school principal, 2 bank employees, and a retired minister;
- ‘wage workers’ (13): 2 shop assistants (commute daily to Neiafu), 2 furniture factory workers (in the capital town of Nuku’alofa); 1 security guard (commutes daily to Neiafu), 1 taxi driver (commutes daily to Neiafu), 1 at a car dealer (commutes daily to Neiafu); 1 as a cleaner at the market (commutes daily to Neiafu); 1 at the telephone office (commutes daily to Mangia, a very close neighboring village); 1 at the Ha’apai airport (in the Ha’apai archipelago, the middle archipelago of the three making up the Kingdom), 1 at a gas station (commutes daily to Neiafu), 1 food distributor for *falekoloa* ‘small grocery shop’ throughout the island of Vava’u⁵, 1 unspecified;
- ‘entrepreneur-shop owners’ (4): 2 grocery store co-owners; a food stand owner at the market in Neiafu, mechanic (commutes daily to Neiafu);
- ‘not working’ (5).

The development of cash commodity markets introduces the possibility of additional resources that affect the structure of social influence in the village. *We hypothesize that the distribution of symbolic skills, such as expanded vocabulary, accounting and computational techniques, associated with market-based jobs and income will correlate with the distribution of influence.*

³ There are also some individuals of Mormon faith in the village. However, they do not have a residing minister, probably because their number is very limited.

⁴ The ‘presence’ of the Wesleyan Church and its influence on Tongan culture in the last 150 years is undeniable. However, the frequent rotation of ministers in any village makes their social influence not central. Nonetheless, the status of the ‘office’ of minister is of cultural relevance.

⁵ This information is updated to July 2005.

Kinship ties are of paramount importance to the life of a Tongan village. The two major kin groups are *famili* ('family' or household) and *kāinga* ('extended family'). A *famili* consists of a married couple and their children living in the same house and usually includes male and/or female collaterals and affinals. The *'ulumotu'a* ('head of the family') presides over this group. A *kāinga* consists of relatives living in different households in the same village or in several villages. They are related by bilateral relationships of consanguinity in a cognatic system. One, specific *'ulumotu'a* from among those related families serves as the 'head of *kāinga*' and presides over entire *kāinga* besides his own family. *Thus, we hypothesize that a person's kāinga is a factor in organizing the social networks of influence in the village* to the extent that the differing *kāingas* vary in cultural status or access to resources. The head of each *kāinga* also, hypothetically, possess a traditional kinship-basis of authority. Thus, Tongan social structure contains a priori 'authority ranking' relations available for social influence (Fisk, 1991). Below, we will present a measure of status-authority, the out-degree, for each villager, based upon their position in the *kāinga* structure.

Two prominent parameters in establishing hierarchy in all societies are gender and age. In Tongan culture, a female is always considered higher in rank than a male sibling even though inheritance of land and titles goes through the male line and primogeniture usually is enforced (Gifford, 1929; Gailey, 1987). Because of traditional brother-sister avoidance, from around the age of ten, boys sleep in a separate house. Though avoidance is less strictly enforced now, it still affects daily life. Brothers and sisters do not discuss sex nor share certain activities, such as watching videos. Gender, and age via the deference shown to elders, should, therefore, be additional characteristics that determine the structure of social influence.

Four further groups are recognized in the village: *to'u tupu* 'unmarried individuals,' *kau matu'a* 'male elders,' *fine matu'a* 'female elders,' and the *lalanga* 'weaving' group. The first one is usually composed of young individuals, but it may contain members of any age if they never married. Interestingly, the elders' groups are explicitly labeled as male or female, reflecting the gender divide already highlighted. The weaving group is composed only of women of various ages with different individual skills, even though typically a minimum level of competency is expected.

Hypotheses about Forms and Types of Social Influence Networks

In formulating hypotheses about the types and composition of the village social networks to be expected, we rely on Bennardo's ethnographic knowledge of the social structure of the village illustrated in the previous section; his extensive familiarity with the population of the village, established from living in the village for almost two years over a period of more than ten years; and his familiarity with other domains of Tongan knowledge such as space, kinship, and exchanges (Bennardo, 1996, 1999, 2000a, 2000b, 2002; Bennardo and Read, 2005, 2007).

Given the very close knit social life characterizing a Tongan small village, we can expect social influence networks to reflect communal sharing and equality matching relationships (Fiske, 1991). These general forms of relational structure are defined in the context of influence structures by the presence of mutual influence, or the absence of influence. But we also recognize that hierarchical structures, authority ranking, are common to nearly all societies as well (Chase, 1980; Fiske, 1991), even when individual differences in relevant resources and personal qualities are minimal (Gould, 2002; Webster & Hysom, 1998). Informal authority relations are likely to exist in this village, in combination with other forms, such as communal

sharing, which may predominate superficially. We focused our research question on the mobilization of influence. Clearly, influence structures are worth investigating and comparing in their own right; the nature and quality of our daily lives is dependent upon our positions in influence networks. Beyond description, it is important to understand the “influence generating mechanisms’ in a social group; by what explanatory or causal mechanisms are the various forms of influence distributed?

As one considers a constitutional monarchy with a closed set of noble hereditary titles and, with a single villager representing the monarch, one is led to anticipate radial, asymmetric social networks, perhaps a star graph, in the extreme case (Wasserman and Faust, 1994:171). We think the measure of centrality in the influence structure is most consistent with the cognitive and cultural models discussed in Bennardo’s related work, models that demonstrate the property of ‘radiality.’ Therefore, *we hypothesize that individual influence networks in this village will have appreciable variation in the degree of centrality realized by its members, and that the level of centrality derived for each villager will be correlated, or embedded, within other radial social and cultural systems.* To test this, we will derive 4 measures of centrality. If the graphs exhibit low and uniform measures of centrality for all members, this would undermine our hypothesis and support the villagers’ claims as reported in the first line of this work, ‘we are all the same’.

We also know that status characteristics are universally created in small groups, and that these status characteristics can translate into differential social influence (Webster and Hysom, 1998). When new tasks or new skills are introduced into a group, we can expect that individual characteristics will be attributed to correlate with the performance of those tasks. Thus new characteristics, such as those based in a cash economy, can translate into social influence, defined as the ability of one villager to influence the thinking or actions of another villager.

The distribution of centrality of individual villagers, derived from the influence network, is the focus of our inquiry. Studying influence centrality articulates with Bennardo’s research on other Tongan knowledge domains, including spatial relationships. When expressing spatial relationships linguistically, Tongans prevalently use the relative frame of reference (front-back and left-right axes centered on the speaker) in small-scale space (small objects very close to the speaker), but prefer the absolute frame of reference (fixed points of reference in the field of the speaker, e.g., east, west, north, south) to refer to large-scale space (any size objects at some distance from the speaker) (Bennardo, 2000b). Tongan speakers are one of only three documented cases in the world⁶ who use the translation subtype of the relative frame of reference (an object positioned beyond a tree that is in front of the speaker is considered “in front of” the tree) in both types of space.

When representing spatial relationships in small-scale space in long-term memory, Tongans prefer the absolute frame of reference. The specific subtype of the absolute frame of reference that they use Bennardo (1996, 2004) called “radial.” A fixed point of reference in the field of the speaker is selected and objects are represented as from or toward that point. This preference for radiality does not exclude other forms of representations for spatial relationships.⁷

Bennardo’s (2001) research also suggests that radiality (with the specific meaning already indicated above) exists in the organization of three other Tongan knowledge domains including navigation, religion, and kinship (see also Bennardo and Read, 2005, 2007). Finding authority-

⁶ The other two are the Hausa in Africa (Hill, 1982) and the Marquesans (Cablitz, 2006).

⁷ What Bennardo is calling radiality (choosing a point in one’s field and describing movement toward/away from it) is present in any culture. Tongans, however, seem to prefer it over other forms of spatial representations.

ranking influence networks, i.e., networks with a high degree of variation in the network centrality of villagers, particularly with few villagers having high levels of centrality, set the stage for a subsequent inquiry on whether centrally situated villagers in the influence structure also figure predominantly as referential points, i.e., the nodes in a radial configuration, in other cognitive representations of village life and structure. In this paper, however, we limit our investigation to describing and explaining the level of influence centrality.

A few individuals seem a priori to be well positioned to occupy central positions in the village's influence network. First and foremost, we hypothesize the various *ulumotu'a* 'head' of any *kāinga* 'extended family' present in the village to be some of those individuals with a high degree of centrality. Thus, we hypothesize that influence will be correlated with a villager's status position in the *kāinga* structure. *Second, we expect the chief, ceremonial leader, and town officer to possess a higher level of centrality.* Elected individuals by definition are able to attract the favorable attention of a good number of villagers towards their person, thus, they may play central influential roles in the life of the village. *Third, community elders are well positioned to occupy central roles in the village.* We are not focusing on the minister resident in the village because their timely limited appointment (4 years) does not allow ministers to become an integral and lasting part of the social fabric of the village. Since power between genders is perceived overall as balanced by Tongans, although unevenly distributed in different contexts (e.g., rank and heredity), it is not expected to have an effect on the virtual positions of centrality. Kinship ties have traditionally played a relevant role in Tongan social life (Gifford, 1929; Latukefu, 1974; Helu, 1999). Kinship is expected to play an influential role in distributing the level of centrality across the influence network. The *kāingas* may bequeath varying amounts of influence themselves, apart from the influence of the *kāinga* heads.

Finally, changes in the economic practices of Tongan villages have occurred in the past few decades (Gailey, 1987; Tupouniua, 1977; van der Grijp, 1993, 2004), including the formation of large communities overseas (Small, 1997; Evans, 2001; Morton, 2003). Onto a village life based fundamentally on subsistence have been introduced principles of a cash economy, i.e., local wage jobs and economic activities like running small shops, and especially revenues from transnational relatives. These changes have had an impact on the villagers' social life, in sum creating additional sources of human capital (education, occupational skills, cognitive skills) that potentially can be transformed into social capital/influence (Burt, 2000; Coleman, 1990). Then, it is possible that variation in the resources derived from the market economy will correspond to variations in the centrality of influence. We focus on influence structures in this paper because network-based influence is a clear form of ranking relations and a form of social capital. The distribution of influence offers a clear test of the collective perception of these villagers that 'we are all the same.'

In the West, it is more natural to think of influence as an asymmetric relationship since economic and political power are unevenly distributed. And yet, in these more modern, highly differentiated societies, there are multiple sources of human, social, and cultural capital that can be converted to social influence. There is also great freedom of association, the ability to form multiple networks, based on different relational contents. Influence can be mutual. Even in highly differentiated societies, relations of equality matching or communal sharing can create networks whose members are mutually influential (Fiske, 1991). Thus, the degree of symmetry/asymmetry found in the influence networks we are studying will reveal something about the relative extent of basic forms of social organization, equality or ranking, operating in

this village.

The ability to influence others, and the resources that accrue to one when those relations are activated, are a form of social capital (Coleman, 1990: Ch. 12; Burt, 2000). Since we are measuring influence relations, we obtained direct measures of this manifestation of network-based social capital. Our research on the influence network of these villagers is thus intended to make a contribution to further understanding of how different forms of social capital, here influence, are generated. Influence may come from a variety of structural characteristics, being in dense, redundant relations, or offering a connection to distant parts of the network as captured in Burt's idea of the "broker" (Burt, 2000).

Our inquiry examines the structural measures of influence centrality of these villagers. We examine the 'influence generating characteristics' at work here. We analyze the sociometric relations of influence directly, deriving a set of centrality scores. We then test hypotheses about the sources, or correlates, of each villager's influence centrality: traditional authority roles, kinship positions, and characteristics derived from the cash economy.

To summarize, we hypothesize that measures of network-based influence, will be unevenly distributed in the population of the village, thus, creating a *de facto* stratification that villagers themselves might willingly or unwillingly disregard when presenting the image of their village to an outsider (see opening paragraph in Introduction). We also hypothesize that *kāinga* membership and one's position within a *kāinga* will play a fundamental role in generating social capital leading to uneven distribution of influence. Finally, we hypothesize that newly introduced market-based jobs will also play a role in determining the distribution of influence and thus contribute to the *de facto* stratification of the village's influence structure.

Methodology: Questionnaires, Administration, and Types of Analyses

Social networks data typically consist of information collected by means of questionnaires (for an example see Burkett, 1998), interviews (for an example see Wellman and Wortley, 1990), and/or structured observations (for an example see Bernard, Killworth, and Sailer, 1980, 1982; Freeman and Romney, 1987) about people's perceived and actual frequency of interactions with members of their real or imagined community along an almost countless number of qualitative dimensions, such as social support, friendship, sexual encounters, citations, as well as power and influence. The analyses of social network data (e.g. estimating cliques or clusters, centrality, and density measures to determine influence structures) portrays the structure of a group derived from the collected individual representations of each villager's social relations. (McCarty, 2002).

In our inquiry, we used all three data collection strategies indicated above: two questionnaires, interviews, and what we have termed indirect observations (repeated interviews with villagers about people with whom they interacted during the day previous to the interview measuring the length of and reason for the interaction). In this article, we discuss only the results of the network questionnaire about influence, using two different influence questions.

Influence is only one aspect of social structure, albeit an important component of how one fits into a group. The varying structures of influence within a group have been hypothesized to correlate with a group's adaptability, acceptance of innovations, and mode of decision-making. One long term research interest of the first author of this paper is whether the influence structure of villages has any bearing on the broader political-cultural debate regarding Tongan transition from a monarchy to a democracy.

We asked all available adult villagers about people they could influence and about people

that could influence them. In total, there were four questions about three different scenarios. The scenarios we devised were about a real situation (see question 1a) and also imagined ones (see questions 1b, 2a and 2b). The two imagined scenarios were very ecologically motivated and we arrived at their composition after a lengthy selection process in cooperation with several villagers (not current residents). The four questions posed were as follows:

Questionnaire about Social Networks: Influence (SNP)

To influence and being influenced

4 QUESTIONS to all villagers (95)

- 1a) I have donated \$1,000 to spend for the village.⁸ If you propose to buy oil for the water pump:
Who could you persuade to vote for/support you?
SHOW LIST + OTHER
- 1b) The town officer assigned you to prepare two *pola* 'food tray' for the next King visit. You said yes at first, but now realize that you cannot afford to prepare two, but only one.
Who do you think you can persuade to support your change?
SHOW LIST + OTHER
- 2a) You are having a dispute with a kin member about a border of a lot (or about some crop use, or about the assignment of *fahu* for a funeral).
Who can come in and make you change your mind/convince/persuade you to compromise?
SHOW LIST + OTHER
- 2b) You are having a dispute with a non-kin member about a border of a lot (or about some crop use, or about the assignment of *fahu* for a funeral).
Who can come in and make you change your mind/convince/persuade you to compromise?
SHOW LIST + OTHER

In this paper, we analyze only the first two questions, SNP1a and SNP1b, foregoing the possible complications introduced by the focus on dispute resolution among kin and non-kin in the second set of questions. It is worth discussing in greater depth the nature of the influence measured by the SNP1a and SNP1b questions.

Question SNP1a: *I have donated \$1,000 to spend for the village. If you propose to buy oil for the water pump, who could you persuade to vote for/support you?*

This question appears to rely on mostly resources employed in persuasion, social and intellectual capital needed to influence a vote or opinion. Those villagers with more respected opinions, more leadership experience, or more education might have more of these resources. Of course, political negotiation comes into play as well, and to the extent that the village has modernized its political structure to accommodate the "horse-trading" stage common to forms of "negotiated democracy," those with more political resources who are able to reciprocate favorable to a future request may have more influence.

Question SNP1b: *The town officer assigned you to prepare two *pola* 'food tray' for the next King visit. You said yes at first, but now realize that you cannot afford to prepare two, but only one. Who do you think you can persuade to support your change?*

This question taps a need to influence someone able to ultimately persuade the town officer. It may connote that the respondent looks to someone with some influence over the formal administration of the village. The question may be contaminated if the villager interprets the question as finding someone to provide material resources in case the two *polas* remain required, but as posed, it seems to reflect influence over the formal decision making authority of town officials.

The questionnaire was translated in Tongan and administered to the whole adult population

⁸ The village is kept anonymous.

of the village, that is, 95 individuals. After each question, the list of the 95 villagers was read to the interviewees in order to help them remember the current adults in the village. The list ends with 'other' to allow interviewees to add any individual not listed. Villagers could mention as many villagers as were on the list; there was no constraint placed on the out-degree of the questions. There is no way to know the extent of an upward bias in the number of mentions from those trying to inflate their own importance. But neither is there any theoretical or empirical level of mentions that can be justified as a cutoff point, which introduces a different form of bias, truncation. Below, we will see that while the average out-degree on questions SNP1a and SNP1b are high, just over 40, the variation in mentions is also high, just over 30. We therefore analyzed the complete network including all mentions.

The questionnaire was administered with the help of five local assistants whom Bennardo personally trained by administering the questionnaire to them in an exemplary fashion. Each evening they reported back to Bennardo about their daily activities and any problems they encountered. Thus corrective actions were taken in some cases, such as a second administration of the questionnaire. Six people in the list were not residing in the village during the administration of the questionnaires and three individuals not on the list had taken up residence. We eliminated from the data absent villagers as well as new residents.

The data were organized into sociometric form. A wide range of procedures were used to uncover the structure of the influence network. All of the graphs of the entire network produced using a variety of methods revealed a dense cluster of points at the center and a slightly less dense peripheral ring.

Results: Influence Measures

We begin our discussion of the influence structure by describing the network structure of influence among villagers. After discussing descriptively some of the network properties extracted in this preliminary investigation, we examine *kāinga* structure and then test the hypothesis regarding the extent of mutuality and balance vs. ranking and hierarchy in the influence network. The bulk of the analysis tests hypotheses regarding the influence generating mechanisms at work in the village.

Influence seems on the face an asymmetric relation. But we know that influence can be mutual as well, and that influence implies dependence and possible future reciprocation. Coalitions may form among villagers who are mutually influential. These coalitions may then have more asymmetric power over other, smaller, or less resource laden individuals or coalitions.

An influence relation is only one of several that are common to social structure; and this authority-based relation has to exist among other, contradictory relations equally important to the functioning of the group. See for example, Fiske, 1991, who lists communal sharing, authority ranking, equality matching, and market pricing as major relational dimensions. Thus, even while studying what seemingly should reveal asymmetry in relations, who can influence whom, equality may be present. This is, in fact, what the villagers perceive to be the case. When asked directly, they will often say that everything is decided mutually. The questions administered in the field to capture the influence structure were designed to uncover more objectively the form of the influence structure.

In this paper, we present the extensive analysis of the first two questions measuring influence. We will refer to influence from the first question SNP1a as 'voting' influence and from the second question, SNP1b, involving the *polas* as 'administrative' influence. Note in the

second case, the question involves mobilizing contacts better able to alter the official decisions.

Figure 1 represents the voting influence (SNP1a) relations among all village members. We obtain a preliminary view of the relatively dense, and mutual level of influence among villagers. We observe an inner core of very dense and mutual influence relations among a large set of villagers. A few villagers who exert little influence over other villagers are found on the periphery. Subsequent analyses present more detailed descriptions and analysis of role positions, with an initial focus on *kāinga* membership. A triad census analysis in a later section will further quantify the extent of mutual v. asymmetric influence.

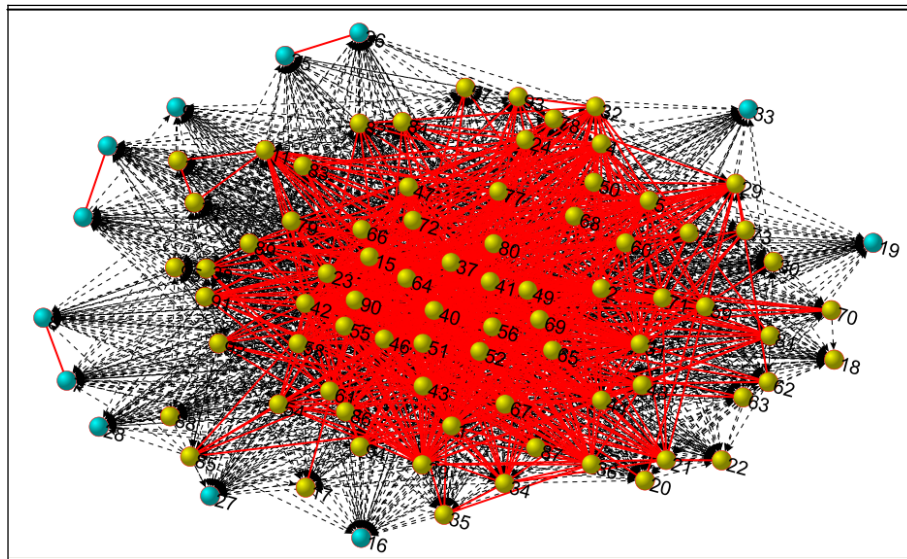


Figure 1: Observed Influence Network SNP1a

(Note: Thicker red lines indicate mutual influence; thinner dotted lines asymmetrical influence; 77 strongly connected nodes, outward influence to 12 peripheral nodes.)

***Kāinga* Structure**

We first define and describe the theoretical structure of a *kāinga*: it consists of relatives living in different households in the same village or in several villages. They are related by bilateral relationships of consanguinity in a cognatic system. A specific *'ulumotu'a* (head of the *kāinga*) presides over this group besides his own family. Historically, “It also had a ‘quasi-metaphorical’ (Bott, 1982:57) usage, in which it referred to the groups and individuals subordinated to a localized chief; that is, they would be referred to as his *kāinga*.” (Evans, 2001:37). Though its meaning changed in recent times by losing this “metaphorical” usage, a *kāinga* still represents a fundamental social unit in the local organization of Tongan social fabric.

Knowledge of *kāinga* composition and boundaries is essential in determining possible marriages (exogamy). This rule, however, was in the past and it is nowadays dealt with lightheartedly by Tongans. Typically, a wife belongs to her husband’s *kāinga*, but if the husband lives matrilocally (in wife’s village), then he is considered part of the wife’s *kāinga*. As importantly, *kāinga* knowledge is necessary to determine land inheritance, funeral proceedings, and the assignment of respect in special ceremonial events as well as in daily life.

Bennardo created a theoretical sociomatrix capturing the authority relations implied by the practical kinship status-ranking in the village. The matrix portrayed below in Figure 1 is based on the theoretical structure of day-to-day kinship authority relations. While the purely theoretical and formal kinship structure identifies 22 distinct branches of *kāinga* structure, the relations graphed are collapsed to show 9 distinct subgraphs in Figure 2 capturing the relation: villager I has kinship rank-authority over villager J.

- H1: H1 represents the largest *kāinga* in the village. The village officer, (Villager 64) is a member of this *kāinga*.
- L: This subgraph labeled L consists of 3 branches and has encapsulated members from 2 other *kāingas*. The village chief (89), easily visible due to his centrality, and his wife (90) are in this *kāinga*.
- H2: The members of this subgraph are not from the village under analysis. They are the wife of a minister who decided to continue her residence after his husband passed away and two of her children (adults).
- F1: The eldest member of this group, a female, is a widow related to L. Her daughters are married and live matrilocally. So, all 3 women, in spite of belonging to their husbands' *kāingas*, for all practical purposes are considered part of L.
- F2, M: F2 is the group that hosted Bennardo during his fieldwork. M members are considered members of the F2 *kāinga* because their elder member was adopted into the F2 *kāinga*. F2 is also related to other *kāingas* via female members. These relationships are not immediately acknowledged by the members of the other *kāingas*. Many members of this group migrated to the capital town or abroad (e.g., New Zealand).
- T: The subgraph labeled T is a small network whose 'ulumotu'a (66) is the current holder of the title of *mātāpule* in the village; a rank below village chief but one with several privileges and ceremonial duties especially during noble or royal visits to the island.
- A: The few members of this *kāinga* belong to an original founding group of the village. However, most members have migrated abroad, especially the US.
- V: The previous town officer (29) belongs to this group. While separate from F1, strong ties exists between them.
- S1: Another *kāinga* descending from an original founding group. A police officer and a nurse are members of this group.

The two *kāingas* designated as A and S1 have ancestral status linked to the founding groups of the village. No other *kāingas* have any exceptional status ranking in terms of ancestral status. *Kāinga* T and L have weak connections to Royalty, but they both originated from the major town on the island (Neiafu) and not locally. Our analysis in the last section of this paper that explains the distribution of influence centrality in the village will examine whether the two *kāingas* with some slight advantage in ancestral status occupy influential roles.

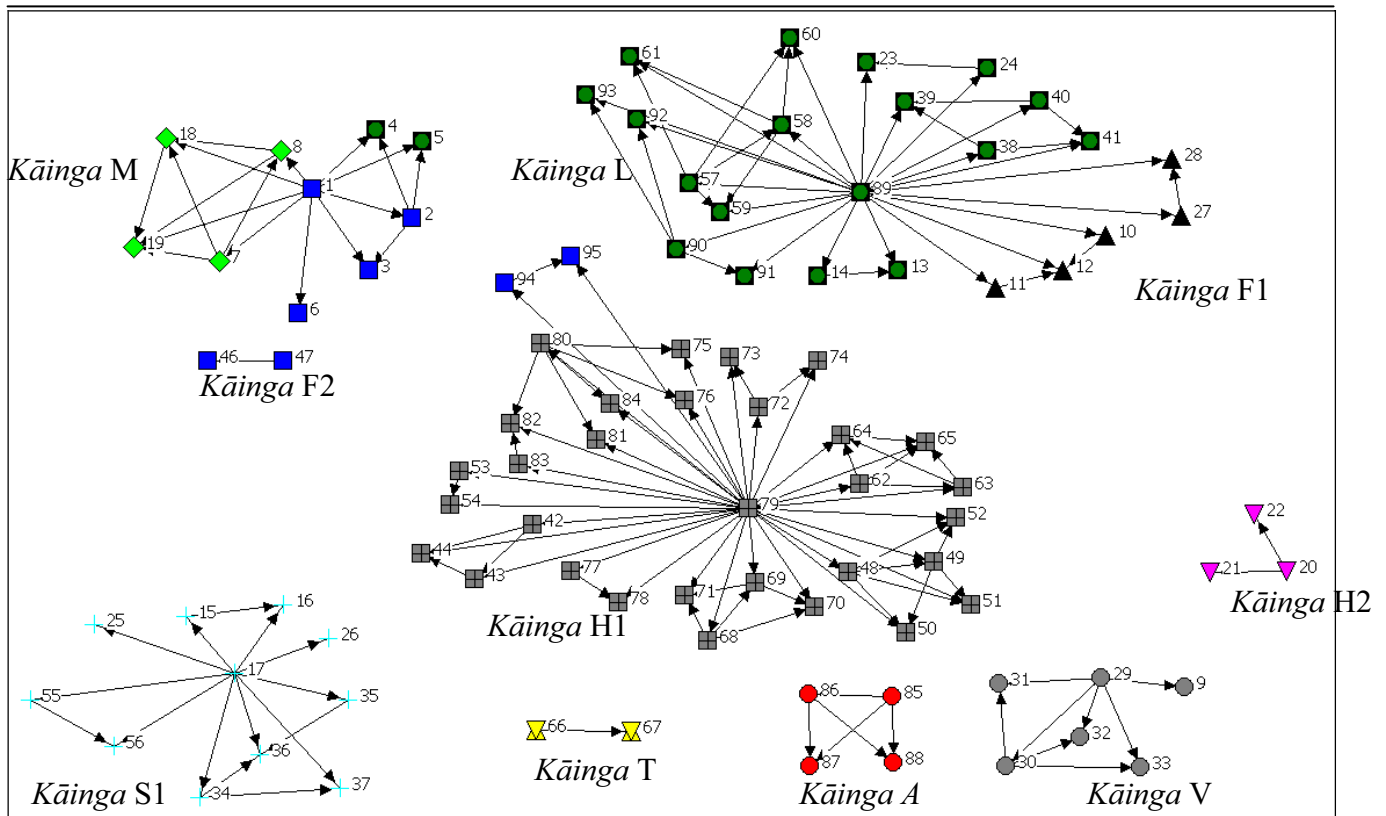


Figure 2: Theoretical *Kāinga* Structure
 (Note: Villagers 7,8,18,19 are members of the M *kāinga*)
 linked to F2 via villager 1. F1 is embedded in L via villager 89
 (Chief). Villager 45 was dropped (sole member of S2).

This theoretical sociomatrix of *kāinga* authority-rank relations was analyzed and a centrality measure was generated that summarizes the overall authority-rank of each villager that is grounded in the *kāinga* structure: the out-degree (see Figure 2). Using this kinship authority out-degree, we later estimate what portion of the overall influence a villager has is derived from his or her position in the *kāinga*-based authority-rank structure, as well as whether membership in the *kāinga* itself, or its size conveys influence. We will also compare a portion of this theoretical structure to one of the influence networks we measured.

Comparison of Theoretical and Empirical *Kāinga* Authority

We hypothesize that *kāinga*-based authority positions and *kāinga* membership have something to do with individual level influence. We will test this influence statistically in a subsequent section. Here we simply display the difference between the theoretical authority structure of the largest *kāinga*, H1, and the influence network measured by SNP1a, Voting Influence.

We can see from the subgraphs in Figure 3a and 3b that the measured extent of villagers' influence exceeds that established by kinship authority ranking. While the theoretical model ascribes zero symmetry (mutual authority), the actual extent of mutual influence (symmetry) within this *kāinga* reveals that, on average, the proportion of relations for the villagers that are

symmetric is .69. Clearly, kinship authority alone will not account for the structure of Voting Influence.

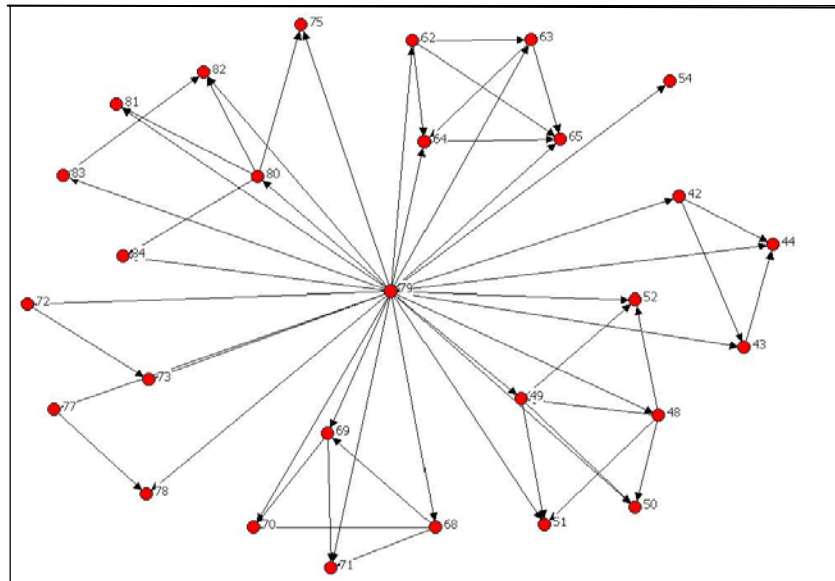


Figure 3a: Theoretical Authority Network within H1 Kāinga

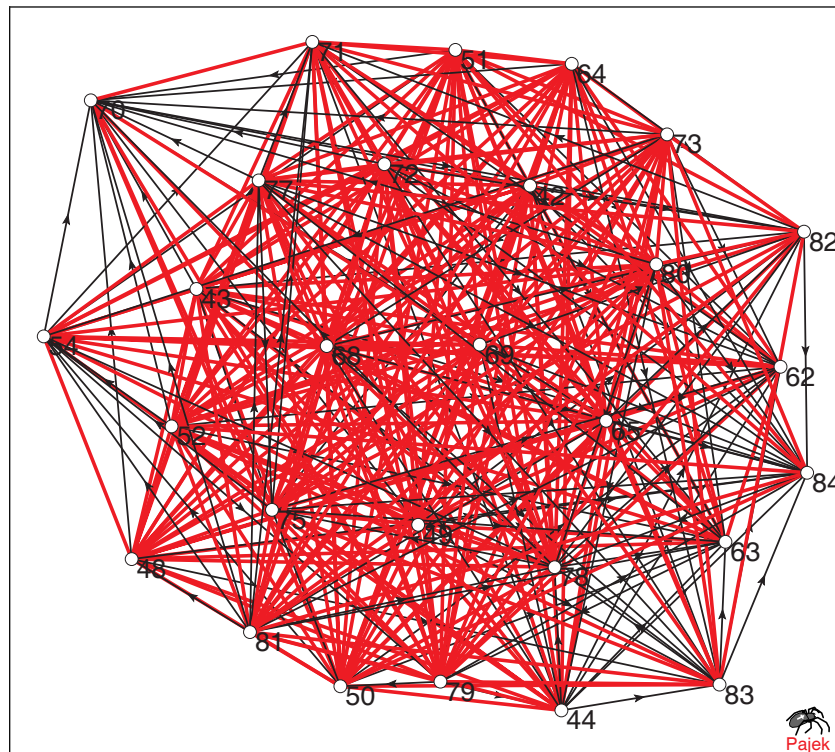


Figure 3b: Observed Influence Network SNP1a within H1 Kāinga
(Note: Thick red lines indicate mutual influence,
thin black lines with arrows for asymmetrical influence.)

Network Density, Transitivity, and Symmetry of Village Influence

We next discuss the basic network measures of density, transitivity, and symmetry. The density measure tells us what percentage of the potential influence relations were activated by the question. Symmetry will tell us the proportion of influence relations that were reciprocated, thus a measure of mutual influence. And the transitivity measure reveals the extent to which groups of three villagers have at least one set of closed influence relations, such that if villager A influences villager B, and villager B influences villager C, it is also the case that villager A influences villager C. Transitivity indicates the extent to which intermediaries are not important and can be thought of as a more developed hierarchical structure consisting of at least 3 ranks.

The results in Table 1 indicate that the influence network is fairly dense for both relations but slightly more dense for the voting relation (SNP1a, 55%) than the administrative influence relation (SNP1b, 48%). Roughly half of all the potential influence relations available were mentioned. A substantial portion of these are symmetrical, although not a majority. Given the high density, it is perhaps not surprising that most influence relations are transitively closed, over 70%.

Table 1: Density, Symmetry, and Transitivity of Influence Network (Percentages)

Relation	Density	Symmetry	Transitivity
SNP1a – Voting Influence	55	41	79
SNP1b – Administrative Influence	48	37	73

SNP1a: I have donated \$1,000 to spend for the village. If you propose to buy oil for the water pump, who could you persuade to vote for/support you?

SNP1b: The town officer assigned you to prepare two polas for the next King visit. You said yes at first, but now realize that you cannot afford to prepare two, but only one. Who do you think you can persuade to support your change?

The Test of Balance or Rank: A Triadic Census of Voting Influence

We are interested in the extent to which influence relations in this village are equal (“We are all the same”), implying mutuality of influence, either null or symmetric influence, versus ranked, implying ranked clusters and the presence of some asymmetric relations. A test of this descriptive question involves the triadic census of the network, first developed to test balance theory (Holland and Leinhardt, 1975, 1979). One enumerates the frequency with which each of the isomorphic types of triads appears in a network. The (M-A-N) notation describing the type of triad refers to the type of relation among 3 nodes. The first index (M) refers to the number of mutual (reciprocated) dyads in the triad; the second index (A) refers to the number of asymmetric dyads in the triad; and the third index (N) refers to the number of absent, null, dyads in the triad. The basic (M,A,N) designation needs to be augmented in some cases with letters distinguishing different forms for the same (M,A,N) frequencies: U for a directed path up, D for a directed path down, C for a cyclical relation, and T for a transitive relation. For any sampled triad, there are only 16 possible (M,A,N) configurations. The 16 types of triads can be arranged in a hierarchical table that increases the different types of relations permitted beyond the simplest, balanced digraph. The number of actually occurring directed paths of influence (arcs) is compared to the expected number, conditioned on the total number of arcs in the network. Thus, a comparison of the presence of different types of triads that are present compared to the number of this type that are expected randomly can be made (de Nooy, Mrvar, and Batagelj, 2005:205-212; Holland and Leinhardt, 1975, 1979; Wasserman & Faust, 1994, Ch. 14: pp. 556-602). The least restrictive type of triad can be used to characterize the network; it includes all the

types of triads implied by the more restrictive models above it in the triadic census table. The triadic census of the SNP1a network is presented in Table 2.

If equality matching dominates, then reciprocal relations with no ranking clusters should characterize the patterns in the influence network; we should see an over-representation of two major triad types: Balance and Clusterability. Balance refers in the context of this influence network to two structures: complete mutual influence (3,0,0), and a sole-mutual influence relation between two members and the mutual absence of influence involving the third member (1,0,2). The complete mutual triad has been called a “Simmelian triad” to reflect that the reciprocal dyads are embedded in a fully mutual triad and to distinguish it theoretically from other forms reflecting Heiderian balance (e.g. those that are transitive without mutuality) (Krackhardt and Handcock, 2007). The (1,0,2) balance form is more Heiderian in that a triad with a sole-reciprocal relation (mutual influence) also contains balanced relations with the third member: namely the absence of any influence. Clusterability refers to the presence of more than two clusters where balance occurs within the clusters and the absence of influence characterizes members from different clusters.

In fact, the voting influence network (SNP1a) shows balanced and clusterable triads. We find more balanced triads of the form (3,0,0), Simmel’s complete triadic mutual influence, than expected by chance, surprising in an influence network in general, but consistent with the shared observation among these villagers that “We are all the same”. This implies that there is a high statistical rate of triadic mutual influence among these Tongan villagers exceeding that expected randomly. The higher than expected level of Clusterability indicates that separate clusters exist, more than 2, in which mutual influence occurs within clusters, and no influence relations occur between members in different clusters. We saw above that mutual influence is prevalent within the H1 *kāinga*; and we will see below that influence relations exist between members in different *kāingas*.

If ranking occurs within the influence structure, then ranked, transitive, and hierarchical structures will appear more frequently than expected on the basis of the dyadic frequency distribution. Hierarchical triadic structures imply a more complicated form of ranking, cyclic relations imply an asymmetric influence structure, but one in which the influence comes back around, nullifying a rank order distinction among the 3 members.

Mutually influential and null triads alone cannot account for the overall pattern in the Voting Influence network; there is evidence that two particular types of triads involving asymmetric relations are overrepresented: (021D) and (120U), implying the presence of differently ranked individuals. Let’s consider these two types since they seem to account for the asymmetric influence structure.



The triad type (021D) is clearly of a radial form, a simple star graph; thus we find, as one would expect in influence networks, a level of radiality above random expectations. Subgraph type (120U) has two transitive paths, also typical of influence structures with ranks. However the mutual arc between B and C along with the transitivity involving A indicate 2 inconsistent

transitive rankings ($C > B > A$, $B > C > A$) rather than 1 ranking with 3 ranks. This graph reflects balance in the Heiderian sense of transitive closure (Krackhardt and Handcock, 2007).

Given these results, we can see that the influence network does include a much larger number of complete mutual influence triads than is expected by chance. Since we specifically asked about influence relations, given Western standards of ranking relations in influence, we could have expected less balance than one would expect by chance, not more. The influence structure of this Tongan village also has more ranked relations than expected by chance. The overall structure displayed in the voting influence network is that of a ranked network: at least 3 ranked clusters where dyadic relations across clusters are asymmetric; dyadic influence relations within clusters occur within complete mutual triads; and villagers from different clusters at the same rank have no influence relation.

Table 2: Triadic Census of SNP1a, Full Village Network (n=89)

Type	# of Triads (n_i)	Expected n_i (e_i)	$(n_i - e_i) / e_i$	Model
3 - 102	2748	4216.44	-0.35	Balance
16 - 300	11221	3158.44	2.55	Balance
1 - 003	4548	937.56	3.85	Clusterability
4 - 021D	14911	4216.44	2.54	Ranked
5 - 021U	1517	4216.44	-0.64	Ranked
9 - 030T	8873	10324.95	-0.14	Ranked
12 - 120D	1868	6320.77	-0.70	Ranked
13 - 120U	20130	6320.77	2.18	Ranked
2 - 012	9840	6887.54	0.43	Transitivity
14 - 120C	3130	12641.54	-0.75	Hierarchical
15 - 210	14373	15477.90	-0.07	Hierarchical
6 - 021C	2951	8432.88	-0.65	Forbidden
7 - 111D	1106	10324.95	-0.89	Forbidden
8 - 111U	13845	10324.95	0.34	Forbidden
10 - 030C	224	3441.65	-0.93	Forbidden
11 - 201	2279	6320.77	-0.64	Forbidden

The analysis of the administrative influence question, SNP1b, produced consistent results (not shown): triadic structures of complete triadic mutuality (balance), clusterability, and the same 2 ranked triad forms. The triadic census of the networks generated by questions SNP2a and SNP2b, Dispute Settlement, were somewhat different (results not shown): mutuality and the two previously identified ranked triadic structures were reproduced; Clusterability was not. In both of these networks, the hierarchical structure (210) was found, i.e., 2 mutual relations and 1 asymmetric relation. The network structure related to dispute settlement appears to be a more complicated form than voting or administrative influence.

Thus, a succinct answer to our first research question emerges: mutuality and ranking both are present in influence relations. These Tongan villagers are not quite 'the same' when it comes to influence but they have a great deal of complete triadic (Simmelian) mutuality.

Structural Equivalence in the Voting Influence Network (SNP1a)

We begin the search for a simplified structure of influence by shrinking the network according to *kāinga* membership. In this shrunk graph, the nodes become *kāingas*, and the arcs represent the number of influence relations directed from each *kāinga* to the others. We can see from Figure 4 that the influence structure between *kāingas* is much denser than a model restricting influence only to kinship status rank within *kāingas* implies.

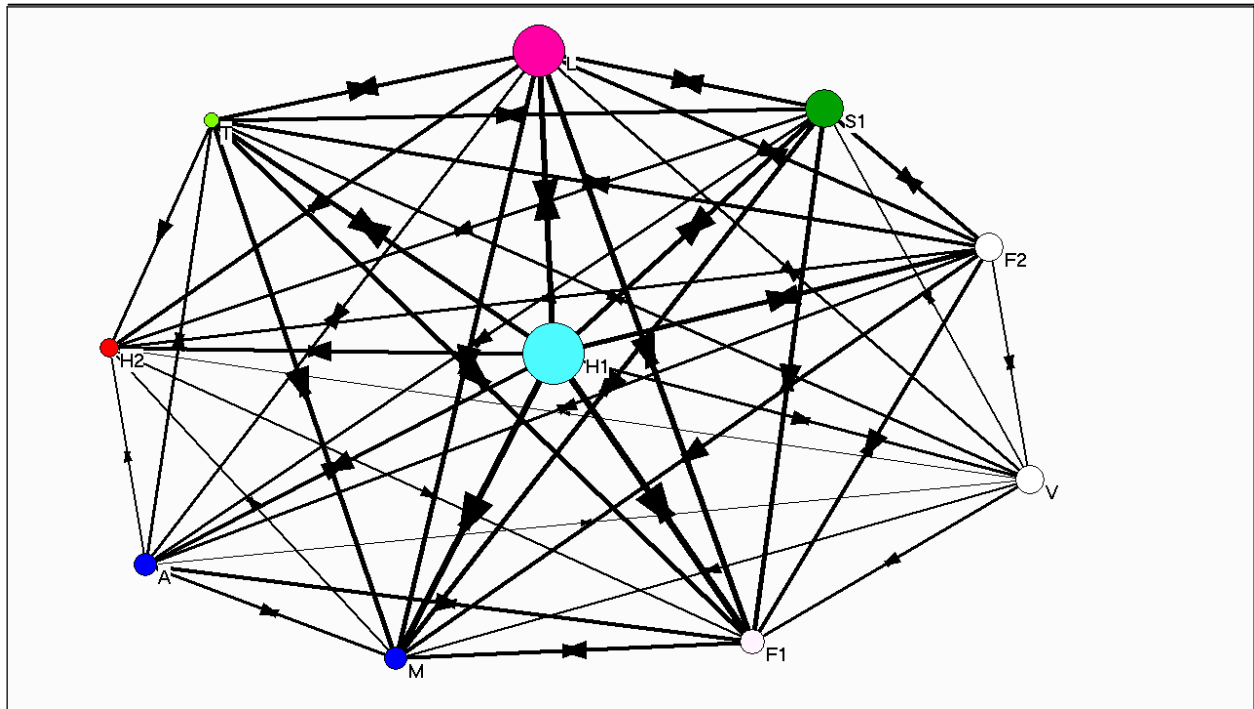


Figure 4: Influence Network (SNP1a) among *Kāinga*.
(Note: Node size proportional to *kāinga* size and lines proportional to number of relations.)

Networks can be simplified by finding structurally equivalent roles, defined by isomorphic positions within the network. An initial unrestricted blockmodel analysis revealed that 8 blocks provided the most reasonable reconstruction (lowest error rate of 1,177) among all 89 villagers of the structural equivalence in the Voting Influence network. Inspection of these 8 showed them to be very close to *kāinga* memberships. To directly test for the power of *kāinga* structure to generate structurally equivalent roles, we conducted a second blockmodel analysis setting the starting partition to *kāinga* memberships and permuting membership in the 10 blocks to give a best-fit solution. This does not give as good a solution (final error rate = 1,267) as the unconstrained blockmodel, but the crosstabulation in Table 3A shows that *kāinga* membership does correlate with structurally equivalent roles. Even though expected cell frequencies are frequently small, the overall Cramer chi-square statistic (Cramer's $V = .55$) shows a moderate degree of association between the 10 structurally equivalent blocks and *kāinga* membership, and

thus significant but not determinative patterning for structurally equivalent role relationships in Voting Influence among villagers. We can see from Table 3A that members of the H2 (Block 10), the T (Block 8), and M (Block 6) *kāingas* occupy structurally equivalent roles completely isomorphic with their *kāinga*_membership. Blocks 8 & 10 are predicted by the image matrix to be complete, i.e., full mutual influence between villagers within the block, but Block 6 is predicted to be null. The largest *kāinga*, H1, with 28 members is distributed across 6 structurally equivalent blocks. Eight of the 10 blocks have image matrices predicting complete (mutual) influence relations among members of the block.

Table 3A: Cross-classification of *Kāingas* with Structurally Equivalent 10-Block Blockmodel for SNP1a

<i>Kāinga</i>	Blocks											Total Members
	Label	1	2	3	4	5	6	7	8	9	10	
1	L1	9	3	3	1	0	2	1	0	1	0	20
2	F1	0	3	0	0	0	2	0	0	0	0	5
3	F2	0	1	3	0	0	0	1	1	0	0	6
4	H1	0	3	0	13	1	3	3	5	0	0	28
5	A	0	1	0	0	3	0	0	0	0	0	4
6	M	0	0	0	0	0	4	0	0	0	0	4
7	S1	1	2	0	2	0	3	1	1	0	1	11
8	T	0	0	0	0	0	0	0	2	0	0	2
9	V	0	2	0	0	0	2	1	0	1	0	6
10	H2	0	0	0	0	0	0	0	0	0	3	3
Total		10	15	6	16	4	16	7	9	2	4	89

Table 3B: Cross-classification of *Kāingas* with Additional Structural Equivalence Blockmodels for SNP1a

<i>Kāinga</i>	<i>Ten-block 8-block 6-block and 2-block blockmodels</i>											Total Members
	10 Blocks	1	3	4	7	9	5	2	6	8	10	
	8 Blocks	1	2	3	4	5	6	7	8	8	8	
	6 Blocks	1	2	3	4	5	6	6	6	6	6	
	2 Blocks	1	1	1	1	1	2	2	2	2	2	
1	L1	9	3	1	1	1	0	3	2	0	0	20
4	H1	0	0	13	3	0	1	3	3	5	0	28
7	S1	1	0	2	1	0	0	2	3	1	1	11
3	F2	0	3	0	1	0	0	1	0	1	0	6
9	V	0	0	0	1	1	0	2	2	0	0	6
5	A	0	0	0	0	0	3	1	0	0	0	4
2	F1	0	0	0	0	0	0	3	2	0	0	5
6	M	0	0	0	0	0	0	0	4*	0	0	4
8	T	0	0	0	0	0	0	0	0	2**	0	2
10	H2	0	0	0	0	0	0	0	0	0	3**	3
Total		10	6	16	7	2	4	15	16	9	4	89
Approximate	<i>Kāinga</i> Alignments	~L1	~F2 ~L1	~H1	~H1 ~S	~V ~L1	~A	~F1 ~H1 ~L1	~M ~H1 ~S	~H1 ~T	~H2	

Key: * No influence within this *kāinga*, ** All influences within these *kāingas*.
(Note: the authors acknowledge the assistance of Doug White in preparing Table 3B.)

A more expanded and more clearly interpretable view of the 8- and 10-block blockmodels is shown in Table 3B, noting that blocks 6-8-10 in the latter tend to collapse into a single block in the former, with members of the H2 (Block 10), the T (Block 8), and M (Block 6) *kāingas* in

structurally equivalent roles completely isomorphic with their kāinga membership. Blocks 8 and 10, however, are predicted by the image matrix to be complete, i.e. full mutual influence between villagers within the block, but Block 6 is predicted to be null. Tables 3A and 3B are not the image graphs, but the numbers of overlaps between kāinga memberships and members in blockmodel-equivalent sets. The image graphs and other blockmodels will be studied in a separate paper.

The 8-block designations are renumbered sequentially. Rows and columns in this Table are reordered to show the core-periphery structure in the overlaps kāingas and influence blocks. The larger *kāingas* form the core that tend to overlap (by inclusion) into the smaller blocks associated with *kāinga* in the periphery. When blocks are further collapsed (to six), the smaller peripheral blocks also show a pattern of internally isomorphic influence (all or none) within their *kāinga*. The core-periphery overlap structure is most evident in a 2-block contrast between the core and periphery where the lower left quadrant contains no overlap, the upper right quadrant shows the overlaps of core *kāinga* on two or more of the smaller *kāinga*-blocks. The deviation from random placement of overlap relations has a 2-tail p-value = 0.000005 using the Fisher exact test. The core-periphery structure of Table 3B is suggestive with what we see in Figure 1, recalling that the large core *kāinga* have many Simmelian triads as shown by the triads test.

In the next section, we turn to the last major research question addressed: how are the villagers' individual levels of influence generated? We ask in the tradition of structural analysis: what are the influence generating mechanisms at work in this village? We analyze four dimensions of each villager's network centrality in the Voting and Administrative influence networks.

Network Centrality of Villager's Influence

We use the following direct measures of influence network centrality: the out-degree of the villager's network, the villager's degree balance defined as the out-degree minus the in-degree, out-closeness, betweenness, and network constraint. Each of these centrality measures taps a different dimension of the centrality concept, and each dimension needs to be analyzed.

The interpretation of out-degree is straightforward, it represents the number of villagers each villager mentioned as someone they would be able to influence directly. Hence, this is considered a measure of local centrality of influence, or direct, proximate influence a villager has in a network. Degree balance gives the 'net' influence of each villager; the balance of villagers over which the villager has some influence over against the number who can influence him or her.

Out-closeness is derived from the sum of the length of all arcs leaving a villager; it takes into account the ability of a villager to extend influence throughout the network and measures how close or proximate that extended sphere of influence is (Borgatti, Everett, and Freeman, 2002; Wasserman and Faust, 1994:183-118). A higher number indicates that more villagers can be influenced in fewer steps. This is a centrality measure of the extent of influence across the entire network, through intermediary links as well as direct links.

Betweenness is a measure of the network's dependence on the ability of a villager to link other villagers in the network (Wasserman & Faust, 1994:188-192). Betweenness measures of centrality thus describe the degree to which the network is characterized by how much the connections between villagers are dependent upon a link to third party. This can be thought of as a form of intermediary influence, a structural position that might indicate brokerage or

gatekeeping.

Constraint is a measure of the ‘redundancy’ in the network, a measure of how interconnected one’s alters are with one another. It is a measure of social capital proposed by Burt (1992, 2000) designed to exploit the different network sources of social capital: that source due to closed, reinforcing networks (high levels of constraint), versus a bridging resource due to the ability to span the network’s structural holes (low level of constraint). A structural hole is a gap in a network that reduces the overall connectivity (Burt, 1992). These gaps, once filled, become influential actors in the network. In entrepreneurial, modern organizational networks, Burt found that brokerage forms of social network are more related to efficiency and performance than closed, constrained networks.

In Table 4, we report the aggregate results of these measures across the entire network. We note that Out-degree and Out-closeness influence measures are slightly smaller for administrative influence (SNP1b) compared to those for voting influence (SNP1a). Without specifying a context—a competitor appealing for a vote—compliance with this request may be fairly cost free on its face. Question SNP1b connotes a possible cost to the villager influenced, however, the time and effort needed to influence the town officials assigning the *polas*. It is reasonable to hypothesize that the ability to influence other villagers would be less in a possible public effort to influence village officials than to cast a vote. The results indicate a smaller influence network in this question, but not by much.

Table 4: Descriptive Statistics for Influence Relations – Reported Ability to Influence

Relation	Mean	Stan. Dev.	25 th Quantile	Median	75 th Quantile
1. SNP1a (Voting)					
Out-degree (Local)	48.4	32.1	24	59	77
Out-closeness (Global)	66.2	30.8	57.9	75.2	88.9
Betweenness (normed)	.395	.410	.095	.366	.530
Constraint	.072	.086	.053	.060	.073
2. SNP1b (Administrative)					
Out-degree (Local)	42.6	30.0	7	47	63
Out-closeness (Global)	64.7	25.0	51.5	68.2	77.9
Betweenness (normed)	.615	.746	.132	.474	.821
Constraint	.072	.020	.059	.066	.086
SNP1a (Voting) Degree Balance	0	31.0	-29	8	25
SNP1b (Administrative) Degree Balance	0	29.0	-26	3	24

Note: Local Influence is measured as the Out-degree, Global Influence as the Out-closeness.

The betweenness influence centrality measures are different for the two influence networks: the average betweenness score for the Administrative Influence network (.615) is greater than that for the Voting Influence network (.395). This indicates to us that the mobilization of Administrative Influence is more dependent on being able to bridge subnetworks, or less connected portions of the network. This makes intuitive sense, because the ultimate target in the Administrative Influence network can be the official responsible for the decision. Thus, it becomes more important to access parts of the network able to reach this official. Villagers apparently took this subtle distinction into account when reflecting on their responses.

The measure of constraint, or dependency upon overlapping networks, does not have much

variation across the villagers. These are fairly dense, closed networks, and the measures for each villager reflect that. In this context, network constraint appears to be the least informative centrality measure.

The imbalance between out-degree and in-degree is a simple measure of the degree of asymmetric influence a villager has in a network, and is the measure we will use in later sections. Computing the difference between out-degree and in-degree gives a measure for each villager; the mean of this value for the entire village is zero by definition. The descriptive statistics for the degree balance used as a measure of direct asymmetric influence are summarized in the bottom two rows of Table 4.

Table 5: Correlations of Influence Measures

	Degbal SNP1a	OutDeg SNP1a	OutCls SNP1a	Betwn SNP1a	Cnstrnt SNP1a	Degbal SNP1b	OutDeg SNP1b	OutCls SNP1b	Betwn SNP1b	Cnstrnt SNP1b	<i>kāinga</i> Outdeg
Voting Influence:											
Degree balance SNP1a	1.00										
Out-degree SNP1a	.99	1.00									
Out-closeness SNP1a	.92	.93	1.00								
Betweenness SNP1a	.53	.56	.55	1.00							
Constraint SNP1a	-.91	-.94	-.86	-.57	1.00						
Administrative Influence:											
Degree balance SNP1b	-.27	-.31	-.25	-.17	.26	1.00					
Out-degree SNP1b	-.26	-.29	-.24	-.13	.24	.98	1.00				
Out-closeness SNP1b	.66	.68	.68	.37	-.64	-.22	-.23	1.00			
Betweenness SNP1b	.27	.28	.27	.68	-.32	-.04	-.02	.39	1.00		
Constraint SNP1b	-.59	-.62	-.60	-.40	.65	.29	.30	-.84	-.41	1.00	
<i>kāinga</i> OutDeg	.06	.09	.11	.04	-.07	-.16	-.17	-.01	.07	-.07	1.00

The median degree imbalance for SNP1a is 8, for SNP1b, 3, indicating that there is less asymmetry for the SNP1b relation involving influencing official decisions than there is for the relation involving votes. There is substantial variation in the measure, a quarter of the villagers have more than 24 villagers they influence over and above those who can influence them. These villagers we term “Asymmetric Influencers” to denote their exceptional imbalance in influence relations.

Table 5 gives the negative correlation between the two out-degree measures of influence over votes and administrative decisions as -.29. The negative correlation is generated by two subsets of villagers who have very low levels of out-degree on one relation and average or substantial out-degree on the other. This and the other low to moderate correlations between SNP1a and SNP1b centrality measures indicate that the questions eliciting different influence relations (voting v. administrative influence) elicited different networks. Apparently the political (voting) context and administrative decision-making influence context (*polas* change) tap different mediums of exchange and generated different status positions. The degree of direct influence is conditional on the type of influence needed: voting or administrative.

The correlations between *kāinga* status authority measured as the out-degree derived from the theoretical *kāinga* status authority network and the influence centrality measures indicates that the theoretically derived status position correlates very little with the actual observed influence centrality measures across either type of influence relation.

Table 6: List of Asymmetric Influencers

RS_Code_no	Degbal_snp1a	RS_Code_no	Degbal_snp1b
46	45	<u>67</u>	52
<u>90</u>	44	<u>77</u>	51
56	39	<u>47</u>	45
41	38	93	45
42	38	48	44
37	37	95	43
40	37	24	42
<u>58</u>	37	32	41
23	36	<u>90</u>	40
51	36	83	40
55	36	44	40
64	36	50	34
<u>80</u>	36	11	33
15	35	63	33
69	35	9	33
72	35	34	32
49	34	70	30
<u>77</u>	34	<u>58</u>	29
<u>47</u>	33	<u>80</u>	28
43	32	33	27
52	32	35	26
65	30	8	25
66	25	88	24
<u>67</u>	25	92	22
86	24	94	22
87	24	49	21

In Table 6, we identify the top quarter of asymmetric influencers in the village, those who have a preponderance of out-degree compared to in-degree nominations on both relations. We note also that higher levels of degree balance are characteristic of the central nodes in more radial structures, or star graphs. The villagers' identification codes underlined and highlighted in bold print occur in both relations. These six villagers are the most asymmetric influential in the village. They occupy positions where they are able to influence many more villagers than are able to influence them.

Description of the Asymmetric Influentials: Radiality Hypothesis

Based upon the imbalance between in-degree and out-degree, these six villagers (47, 58, 67, 77, 80, 90), should be “referential nodes” in the cognitive imagery of villagers. They should be distinguished by their radiality in the cognitive descriptions of the important villagers, yet in our unstructured ethnographic interview, no villagers were identified as exceptionally influential.

This group consists of one male (47) and five females (58, 67, 77, 80, 90). Three women (67, 80, 90) are wives of three *‘ulumotu’*a (head of *kāinga* ‘extended family’), one woman (58) is married into a prominent member of the *kāinga* of the local chief, and one woman (77) is the

eldest female (still living in the village) in her *kāinga*. The only man (47) is married to a member of the oldest *kāinga* in the village, he resides matrilocally—thus, typically considered a member of his wife’s *kāinga* and not his own—and is a major figure in the minority Mormon group. The majority of villagers belong to the local Wesleyan Church.

The identities of these potential “referential nodes,” while not activated in our open-ended questioning, reflect characteristics in synchrony with a number of cultural parameters contributing to the construction of village social structure. In fact, since female siblings are always considered superior to male siblings, notwithstanding age differences (see above “The Social Structure of a Tongan Village”), it is salient that five of the most asymmetric influentials are female. Similarly, while no *‘ulumotu’*a appears in this group, three of the women are wives of *‘ulumotu’*a. Thus it is likely that their asymmetric influence is the result of both their status as wives of *‘ulumotu’*a in addition to their gender.

A similar hypothesis can be examined by looking at the 13 villagers that share the highest measures of “out-closeness” for the two relations: 15, 37, 41, 42, 49, 52, 55, 56, 58, 64, 65, 69, 72. Table 7 identifies the villagers with the highest ranking on out-closeness, a measure of global influence for the two relations.

Table 7: List of Villagers with Highest Global Influence Measures (Out-closeness)

RS_Code_no	Out-closeness_snp1a	RS_Code_no	Out-closeness_snp1b
23	100.000	<u>37</u>	100.000
<u>37</u>	100.000	<u>41</u>	100.000
40	100.000	<u>42</u>	100.000
<u>41</u>	100.000	<u>49</u>	100.000
<u>42</u>	100.000	<u>52</u>	100.000
46	100.000	<u>55</u>	100.000
<u>49</u>	100.000	<u>56</u>	100.000
51	100.000	<u>64</u>	100.000
<u>52</u>	100.000	18	100.000
<u>55</u>	100.000	19	100.000
<u>56</u>	100.000	<u>69</u>	97.778
<u>64</u>	100.000	<u>58</u>	95.652
<u>69</u>	100.000	<u>65</u>	95.652
90	100.000	<u>72</u>	94.624
80	98.876	66	91.667
<u>58</u>	97.778	67	88.000
<u>15</u>	96.703	77	84.615
<u>65</u>	96.703	61	83.019
<u>72</u>	95.652	<u>15</u>	81.481
43	93.617	60	79.279

Of these thirteen, 6 are female (49, 56, 58, 65, 69) and 7 are male (15, 37, 41, 42, 52, 55, 64, 72), so gender appears to play no role in this measure of influence. These individuals belong to only 4 of the 14 *kāinga* present in the village: 15 and 37 to *kāinga* S1, 41 and 58 to *kāinga* L, 55 and 56 to *kāinga* M, 42, 49, 52, 64, 65, 69, and 72 to *kāinga* H. However, 56 is a female who belongs to *kāinga* S1 and since her husband resides matrilocally, they are both considered as belonging to *kāinga* S1. So, individuals from only three of the 14 *kāinga* appear to have the

highest global influence. Noticeably, the *kāinga* of the local chief does not appear in this group, contrary to the hypothesis that traditional hierarchy is an important influence generating mechanism.

The town officer (64) appears in the list as expected. Interestingly, two couples (55, 56, and 64, 65) also appear in the list. It seems like their individual capacity of influencing others is enhanced by the corresponding capacity of their spouses. This is more so in the case of the town officer (64) and his wife (65). And in the case of 55 and 56, they both have job that bring cash income, including the wife's nursing job in the local hospital (in the main town). Two other individuals are linked by a mother-daughter relationship (49 and 52). The mother is a prominent weaver in the village weaving group (all female) and the daughter is a wage laborer in the local town. Finally, female 58 appears as both asymmetrically influential and "globally influential." She is married to a prominent villager (second in line to be '*ulumotu*'a) of the *kāinga* of the local chief. This factor and her gender must be contributing to her centrality.

Influence-Centrality Generating Mechanisms

We now turn to a more statistical investigation of the various mechanisms hypothesized to generate variance in centrality, the structure-based form of influence and status in social networks. This approach is based in a well-established research tradition to model the mechanisms involved in generating positions in networks, such as 'social influence' (e.g., Laumann and Pappi, 1976) or social and conceptual structures (e.g., Cappell and Guterbock, 1992). In practically all societies, control of valued resources, whether material or symbolic, differentiates members' network characteristics. Affiliation with kinship groups that have been afforded traditional status, as well as age and gender need to be considered as well. Modern society generates influence positions in networks based on market characteristics, e.g. occupation and income.

For each influence measure, several villager characteristics were used to predict the individual villager's influence balance. Age and gender were examined, as well as the *kāinga* to which the villager belonged, the *kāinga*'s size, and the villager's extent of *kāinga*-based status-authority (*kāinga*-based out-degree derived from the theoretical *kāinga* status-authority relations network). Because *kāinga* and *kāinga* size were linearly dependent, we estimated two separate models to learn if any effect of *kāinga* was more due to its size or its type. We also created three separate incidence variables to indicate the villagers who were the chief, the ceremonial leader, and the village officer to assess the influence of traditional status characteristics.

Material and cultural resources were measured by examining the following characteristics: income, owning an automobile, occupation, and control over land. The distributions of these resources were highly skewed. For example, only 10 villagers owned a plot of land, and only 2 owned two plots. The vast majority of villagers (67 of 88) worked as subsistence farmers or performed homework, 10 of 88 were classified as holding jobs that required some educational training; 4 of 88 were entrepreneurs operating small shops; and 2 of 88 were public employees. Sixty-eight percent (65 of 95) of the villagers reported no earned income; a single villager reported \$600, the highest of any villager. Only 17 of 95 villagers owned a car, with one villager owning 2.

To examine the mechanisms that may be generating a villager's network position in terms of influence and centrality measures, 8 separate analyses were conducted. The four network derived measures of influence for each of the two influence questions (voting and administrative) were analyzed: Degree balance—the balance between the out-degree and in-degree (a measure of

direct asymmetric influence); the out-closeness measure (a measure of the global influence of a villager, the extensiveness of their influence); the normed betweenness measure (a measure of the intermediary or embedded influence a villager has); and the constraint measure (a measure of the network-based influence due to closure/redundancy or bridging capacity in the villager’s network).

Regression analysis was used to model the variation in each of the 8 network-based measures. Various models were specified, checking for stability and spurious effects. We followed a general strategy in estimating the models: we began with a model containing only the effects of *kāinga* (type, size, *kāinga* out-degree), the leadership variables (chief, ceremonial leader, and village officer), age, and gender. These variables capture the traditional, status-based resources of villagers. Then we trimmed the model to retain only significant effects, if any, and introduced the material and cultural resource variables. As several models were specified in the analysis of each dependent measure of the centrality of influence, we report only the final results.

Results: Explaining the Degree of Asymmetric Voting Influence (SNP1a degree balance)

The only factor able to account for any substantial and statistically significant variation in asymmetric Voting Influence was *kāinga* membership. While the effect of *kāinga* size showed that for every one additional villager in a *kāinga*, the villager gained voting influence over 1.20 villagers, estimating vote-influence based on the *kāinga* itself explained far more variance (40%) than *kāinga* size alone (17%). According to this analysis, the two members of the T *kāinga* have the greatest asymmetric voting influence (See Table 8, mean +25). They are followed in the degree of Voting Influence balance by the 6 members of the F2 *kāinga*, and then the larger H1 *kāinga*. Members of neither of the *kāingas* (A, S1) with ancestral status—descent from founding groups—possess exceptional influence.

Perhaps even more noteworthy, the analysis highlights that village leadership, *kāinga*-based status-authority, nor sex, nor age translate into vote-influence.

Table 8: Mean Vote Influence Balance SNP1a (Out-degree – In-degree) by *Kāinga*

<i>kāinga</i>	Size	Mean O-I Degree	Std. Dev.
T	2	+25.00	0.00
F2	6	+17.00	20.70
H1	28	+14.75	20.38
A	4	+6.75	20.02
L	20	+5.50	28.99
S1	11	-5.27	37.88
V	6	-27.50	28.32
F1	5	-35.40	18.64
H2	3	-41.00	13.07
M	4	-44.75	2.50

While ownership of land, cars, and occupation explained no substantial variation, income does explain a portion of the variance in vote influence balance when *kāinga* is controlled for; the more income the more the asymmetric voting influence of the villager, controlling for *kāinga*. *Kāinga* membership continues to be the most important explanation of vote influence even when income is included in the same model, but adding income increases the explained variance in vote-influence to 47%.

Results: Explaining Degree of Global Voting Influence (SNP1a closeness)

A second indicator of influence focuses on a global measure of influence, across the entire network, out-closeness. The higher the out-closeness score, the more villagers that can be influenced in fewer links or steps. Again, *kāinga* is the most important factor in explaining variation across villagers in their global voting influence (explaining 40% of the variance in the closeness measure. (See Table 9.) Again, the actual *kāinga* of which one is a member is more important the *kāinga* size (size treated as a linear effect only explains 17% of the variance). Income again becomes significant when *kāinga* is controlled for and raises the explained variation to 46%; no other villager characteristic can account for further variation in global Voting Influence.

We also note that neither village leadership positions, nor *kāinga* status-authority, nor membership in the two *kāingas* with highest ancestral status (A, S1), nor sex nor age translate into vote-influence centrality as measured by closeness.

Table 9: Mean Vote Influence SNP1a (Out-closeness – global influence) by *Kāinga*

<i>kāinga</i>	Size	Mean Out-closeness	Std. Dev.
T	2	89.34	0.64
H1	27	82.41	14.67
F2	6	81.34	13.13
L	20	71.57	28.17
A	4	70.04	11.05
S1	11	57.91	41.19
H2	3	48.80	10.84
V	6	43.41	34.75
F1	5	29.69	27.85
M	4	10.29	18.31

Results: Explaining Degree of Intermediary Voting Influence (Betweenness SNP1a)

Betweenness is the third measure of centrality used to characterize the relative voting influence of villagers (see Table 10). Betweenness measures the relative position in the network of a villager to link villagers across the network. In this analysis, *kāinga* membership as well as *kāinga* size and the level *kāinga*-based status-authority had no effect on betweenness. Neither did any of the tradition-based resources: traditional and ceremonial titles, age nor gender.

The betweenness-based Voting Influence, the ability to bridge, or link, portions of the village network as an intermediary, is influenced by nearly all of the resource variables: owning land, access to a car, and income. Occupation has a borderline effect, significant at the .11 level, and it appears that only the category of public servant matters (but note, the village official indicator alone was not significant). Curiously, owning a car has a negative effect, inconsistent with the resource hypothesis and the positive effects observed for all the other resource variables. Thus, the betweenness measure of voting influence is generated by the villager's income and land ownership, resources based in part in the more modern market economy in the village rather than kinship or traditional structure. These market-based resources, including occupation, explain 28% of the variation in betweenness.

The effect of occupation shows that the highest betweenness influence is generated by being a public official (primarily the police officer, since the effect for village officer was nil). Wage workers and those with more professional type jobs occupied the second tier of influence based upon their intermediary influence. This type of influence seems based upon official powers and the transactional powers that come with having occupational skills apart from the subsistence

farming and weaving economy, and apart from kinship relations.

Table 10: Mean Vote Bridging Influence SNP1a (Normed Betweenness) by Occupation

Occupation	Size	Mean Betweenness	Normed	Std. Dev.
Public Employee	2	1.26		1.02
Wage Worker	13	.61		.34
Professional	10	.43		.42
Entrepreneur	4	.36		.30
Subsistence/Home Work	.54	.34		.38
No Work	5	.14		.16

Results: Explaining Degree of Constraint Voting Influence (Constraint SNP1a)

The degree of Voting Influence as measured by Burt's constraint index varied by *kāinga*. (see Table 11). This measure reflects differing network based forms of influence: high levels reflect an influence measure based in closed, redundant network links; low measures are taken to indicate influence based in broker links—the ability to bridge holes in the influence network. We note first that *kāinga* size was significant at the .07 level. We can see from the results in Table 11 that in general the smaller *kāingas* seem to have more closed forms of networked influence, but this generalization has a couple of notable exceptions. There are 2 *kāingas* that seem to have highest levels of broker-based influence: T (.052), and F2 (.054). H1 (.057) is the largest *kāinga*. Most of the significance of *kāinga* is due to the very poor bridging capacity of members of the M *kāinga*. *Kāinga* membership explains 29% of the variance in constraint-based Voting Influence. The two *kāingas* with ancestral status do not have exceptionally high or low levels of constraint centrality.

Kāinga T contains the villager with the title of *mātāpule* ‘ceremonial leader’, but the effect for the ceremonial leader was insignificant. While this *kāinga* is not very large at the moment due to movement of many of its members either south to the capital town or abroad (e.g., New Zealand), it still represents the *kāinga* of the major legitimate aristocratic title in the village. *Kāingas* F2 and H1 differ in number of members, (H1 being the most numerous *kāinga* in the village at the moment). Both F2 and H1 are very influential groups because F1 is related to many other *kāingas* in the village even if only through female members. Thus claims of membership are caused by several instances of matrilocality (husband residing in wife's village). Nonetheless, bonds are strong and they come to be used when influence is exercised as Table 11 clearly indicates.

Neither the occupation of the villager nor any of the resources located in the more market economy (income, land ownership) exerted an effect on the level of constraint (bridging) type Voting Influence independent of *kāinga*. Given the earlier result showing that market-based resources did affect betweenness measures of Voting Influence centrality, we expected a corresponding effect on the constraint measure. Apparently market-based resources do not explain variation in constraint-based (bridging) Voting Influence as they do for betweenness (intermediary) Voting Influence. One can note that betweenness and constraint measure different network properties of villagers ($r = -.19$, refer to Table 5); and now we note that the two network properties are produced by different influence generating mechanisms.

Table 11: Mean Voting Influence Centrality (SNP1a Constraint) by *Kāinga* and Occupation

<i>kāinga</i>	Size	Mean Constraint	Std. Dev.
T	2	.052	.002
H1	27	.057	.008
A	4	.067	.012
F2	6	.054	.004
L1	20	.061	.118
S1	11	.072	.022
V	6	.070	.119
M	4	.280	.387
H2	3	.075	.004
F1	5	.079	.009

Results: Explaining Degree of Asymmetric Administrative Influence (SNP1b degree balance)

The second domain of influence asked about the ability to influence another villager to support a change to an administrative decision regarding sponsoring a *pola*. In the analysis of degree balance, *kāinga* did not explain a significant portion of variance in Administrative Influence; *kāinga* size was significant at the .13 level, but in a negative direction. The effects of being the ceremonial leader, chief, or village officer were insignificant. The ownership of a car was the only characteristic that attained statistical significance at the .05 level, and its effect was negative. This effect held up even when the other characteristics, such as income and occupation, as well as the status authority measures, were included in the model, but together, only explained 8% of the variation in degree balance. Since this effect over a material resource does not extend to other such resources, such as income or ownership of land, it is difficult to interpret why access to a car would explain a significant portion of the degree balance in mobilizing support for changing an administrative decision, especially in a negative direction, indicating that those without a car possessed more direct influence. We speculate that car ownership is spurious due to some unmeasured villager characteristics.

Results: Explaining Degree of Global Administrative Influence (SNP1b Out-closeness)

The analysis of out-closeness as a measure of the global Administrative Influence revealed the same pattern found in Voting Influence: namely the *kāinga* is the characteristic of villagers with the greatest explanatory power (see Table 12). It is likely that this effect is due to *kāinga* size, as that effect is even more significant. Notably, other measures of traditional authority, including the *kāinga* –based status authority of a villager or membership in an ancestral *kāinga*, were not significant. Income has a positive effect and again adds a statistically significant (at the .005 level) amount of explanation of the variance in Administrative Influence once *kāinga* is controlled for. Together, *kāinga* and income account for 51% of the variance in out-closeness. No other resources contribute to the global influence over mobilizing others to support a change in an administrative decision.

Table 12: Mean Global Administrative Influence (SNP1b Out-closeness) by *Kāinga*

<i>kāinga</i>	Size	Mean Out-closeness	Std. Dev.
T	2	89.83	2.59
H1	28	75.50	15.68
A	4	69.73	6.23
F2	6	66.43	15.50
L1	20	65.51	17.94
S1	11	62.30	32.07
V	6	56.53	13.29
M	4	50.57	57.08
H2	3	33.87	30.53
F1	5	28.85	26.84

Results: Explaining Degree of Intermediary Administrative Influence (Betweenness SNP1b)

For Administrative Influence, we find a model that is very consistent with that found for Voting Influence, one that emphasizes more market-based resources. Neither *kāinga* membership, nor size, nor degree of individual kinship status-authority have an effect. However, female villagers have a higher level of betweenness (intermediary) influence than males (p-value .05).

Table 13: Mean Bridging Administrative Influence (SNP1b Normed Betweenness) by Occupation

Occupation	Size	Mean Normed Betweenness	Std. Dev.
Public Employee	2	1.43	.24
Professional	10	.85	.93
Wage Worker	13	.83	.50
Entrepreneur	4	.43	.35
Subsistence/Home Work	54	.54	.80
No Work	5	.34	.34

Two resources related to the market economy matter slightly: ownership of land (p-value of .02) and a car (p-value of .12, and again, an unexplainable negative effect for car ownership). When occupation is included in the model, even though it is only significant overall at the .16 level, the variable makes the effects of land and car ownership more pronounced, and the effects of occupation reinforce the market-based resource explanation for betweenness influence (see Table 13). With respect to occupation, the major contrasts that are statistically significant contrast those with no work or subsistence/housework with the 2 public employees, professionals, and wage earners (but not the village officer, since that effect was not significant).. It is interesting that income alone, or in combination with these other market-based resources was not helpful in explaining betweenness influence over administrative decisions. Gender, land-ownership, car ownership, and occupation together explain 20% of the variation in betweenness.

Results: Explaining Degree of Constraint Influence (Constraint SNP1b)

The measure of Administrative Influence (Table 14) that focuses on the type of network-based influence—closed or bridged—parallels the findings for Voting Influence (Table 11). Both *kāinga* and *kāinga* size predict the extent of bridging influence; *kāinga* size appears the more robust mechanism. None of the other status-based authority resources had an effect. Only one *kāinga* stands out, T (.053), because of its significantly lower level of closure-based influence, indicating a higher level of bridging influence. As the *kāinga* size increases, the level of closure

increases, indicating that the smaller *kāingas* have a better structural position to span structural holes in the influence network.

Table 14: Mean Constraint Administrative Influence (SNP1b Constraint) by *Kāinga* and Occupation

<i>kāinga</i>	Size	Mean Constraint	Std. Dev.
T	2	.053	.001
H1	28	.064	.013
A	4	.065	.007
F2	6	.070	.019
L1	20	.070	.016
S1	11	.088	.037
V	6	.077	.014
M	4	.076	.030
H2	3	.079	.011
F1	5	.090	.013
Occupation			
Public Employee	2	.052	.004
Wage Worker	13	.062	.012
Professional	10	.067	.018
Entrepreneur	4	.065	.020
Subsistence/Home Work	54	.075	.019
No Work	5	.089	.040

Occupation plays a similar role in structuring Administrative Influence as it did in structuring Voting Influence: the public employees, wage earners, and entrepreneurs have greater social influence in their bridging roles than those who do not work at all or work in subsistence/home crafts, these later occupations characterized by more closed, redundant networks. The finding for occupation is not entirely robust; the effects could as easily be captured by income. As a villager's income increases, so does the extent of their bridging capacity. Conversely, as incomes decline, influence networks become more closed and redundant. *Kāinga* size and income explain 14% of the variability in constraint; whereas *kāinga* size and occupation explain 18%.

Discussion and Summary

We first summarize the major effects found to generate some aspect of the villager's network derived level of influence and centrality in Table 15. The most consistent attributes that have independent effects are *kāinga* membership, occupation, and income. These results indicate that resources based in both traditional village life as well as the overlaying market economy operate side-by-side to generate influence centrality.

Table 15: Summary of Significant Factors Generating Influence Centrality

Measured Network Characteristic	Generating Mechanisms
1. Influence another Villager's Vote (SNP1a)	
Balance of Degree in Direct Influence	<i>kāinga</i>
Out-closeness – Extent of Global Influence	<i>kāinga</i> and income (+)
Betweenness – Extent of Bridging Centrality	Income, Occupation (public employees, wage earners, and professional) land ownership (+), car ownership (-)
Network Constraint – Form of Influence: closed or brokered	<i>kāinga</i> , possibly via <i>kāinga</i> size.
2. Mobilize Support to Change Admin, Decision (SNP1b)	
Balance of Degree in Direct Influence	Car ownership (-)
Out-closeness – Extent of Global Influence	<i>kāinga</i> , likely via <i>kāinga</i> size, and income (+)
Betweenness – Extent of Bridging Centrality	Gender (females +), Occupation (public employees, wage earners, and professionals +), land ownership (+), car ownership (-)
Network Constraint – Form of Influence: closed or brokered	<i>kāinga</i> , via <i>kāinga</i> size, Occupation (no work - closure based influence, wage & public - broker-based) and income (+ brokerage)

Which *kāingas* are better at generating more direct influence and centrality for its members? The results designate members of the H1 and T *kāingas* as the most influential. Status based on membership in the founding *kāingas* (A, S1) does not translate into occupying central positions in the village influence network. What aspects of these two *kāingas* best account for this influence generating capacity? *Kāinga* size is important, but not consistently so. Somewhat surprisingly, the extent of a villagers' *kāinga*-based status-authority is not a factor, nor are occupying the roles of chief, ceremonial leader, or village officer. The actual *kāinga* to which a villager belongs appears to convey more influence than the individually derived status-authority within the *kāinga*. In fact, the individual *kāinga*-based authority ranking failed to explain any variation in any influence measure. We think the following historical and contextual attributes are also sources that generate these more influential network positions.

Regarding *kāinga* H1, the number of its members should already provide an explanation. It is the largest *kāinga* in number of membership in the village. As such, its members typically could stick together in any conceivable matter that would jeopardize their interests, thus, forming a coalition able to 'influence' others as well. Regarding *kāinga* T, while it is the smallest, as we noted earlier its 'ulumotu'a is the current holder of the title of *mātāpule* in the village. Yet, the ceremonial leader himself seems not to possess any exceptional influence, rather his wife does. This 'ulumotu'a is well known for his house building skills and is often called upon for those services. Just few months before the interviews, a typhoon hit the village destroying some houses and damaging many others (especially the roof). Consequently, one might expect his individual influence centrality to be high, since his services had been in high demand, yet the analysis shows that not he, but his *kāinga* had structural influence.

We also note that *kāinga* membership is more pronounced in affecting the level of direct influence advantages. Thus, the cultural or ecological status of the *kāinga* helps its members to influence other villagers. This does not seem to be simply an effect of size, since the two largest *kāingas*, the H1 and L, are not both consistently more influential.

Income affects one's advantage in mobilizing votes across the global network more directly. Should this effect be interpreted as a surrogate effect for individual status, or as a directly

interpreted effect as the ability to pay, or exchange cash, for a vote? When it comes to the more subtle measures of centrality, the bridging or linking capacity of villagers in the network, we see that more symbolic and culturally-based resources and income matter more than *kāinga*. Namely, occupying official positions (apparently the police officer, but not chief or ceremonial leader) generates a position that can bridge parts of the network. Working for wages may be measuring a capacity to cross boundaries, bringing one into contact with villagers from different locations in the village network in a market context not available to subsistence farmers and houseworkers. The possession of the cognitive and cultural skills and resources of professional workers seems to have importance only in this bridging capacity as well, not in direct asymmetric influence.

These findings seem to indicate the presence and development of a modern, market-based set of resources that can generate different types of influence and a corresponding decline of the tradition based authority: occupying the role of chief, ceremonial leader, and possessing a high degree of *kāinga*-based status-authority. Tonga, even while a small and relatively isolated locale, appears to be in a transitional state from a traditional based system of village influence of perceived uniformity of influence based on shared subsistence farming and *kāinga* membership to one that is also responsive to market success via income and occupation.

The relatively high level of symmetry in the influence structures, 20 symmetric subnetworks were identified in another analysis we conducted, shows that there is some empirical confirmation for the attribution that ‘we are all the same.’ All villagers participate in a subgraph where the members are mutually influential, providing some confirmation for equality-matching relations, even in the influence context. But a significant amount of ranked relations also occur. Influence networks change with the type of influence elicited by our questions: Voting Influence or Administrative Influence. It is likely that with other substantively contextualized questions, additional network structures would appear showing some variability in the influence centrality of villagers from that obtained with the two measures employed here.

The influence structure of the village shows a more nuanced pattern than either the complete egalitarian model of *gemeinschaft* (Equality Matching/Communal Sharing) or the traditional nobility model (Authority Ranking) posited. The influence structures mobilized appear to be sophisticated, functional, conditional, and generated by different human and social resources.

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