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Hindawi Publishing Corporation
Journal of Anthropology
Volume 2013, Article ID 185048, 11 pages
http://dx.doi.org/10.1155/2013/185048

Research Article

Out on the Land: Income, Subsistence Activities, and Food Sharing Networks in Nain, Labrador

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Received 13 December 2012; Accepted 17 January 2013

Academic Editor: Santos Alonso

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In recent Inuit ethnography, a major concern has been how and to what extent contemporary Inuit participate in and depend on subsistence activities, particularly in the context of increasing wage employment and growing participation in the cash economy. This paper provides an analysis of these activities in the predominately Inuit community of Nain, Labrador. Using social network data and demographic information collected between January and June 2010, we examine the interconnections between subsistence activities—obtaining "country food" through activities such as hunting, fishing, and collecting—with access to the means of obtaining subsistence resources (such as snow mobiles, cabins, and boats), employment status, and income. Our data indicate that individuals with higher employment status and income tend to be more central to the network of subsistence food sharing, but not because they have greater access to hunting tools or equipment (they do not). We conclude that those individuals who play the most central role in the network are those who are financially able to do so, regardless of access to hunting tools/means.

1. Introduction

Throughout the history of Inuit ethnography, a major concern has been how and to what extent contemporary Inuit participate in and depend on subsistence activities, particularly in the context of increasing wage employment and growing participation in the cash economy [1–4]. Based on a social network research study of the predominantly Inuit community of Nain, Labrador, carried out between January and June 2010, it is clear that locally obtained resources continue to be a central aspect of Inuit household livelihoods. This is true despite the fact that a majority of adult residents in the community (54%) are employed and virtually all resource use in and around Nain involves modern equipment (boats, skidoos, guns, and modern fishing equipment) which must be purchased in the cash economy. While such results agree with data obtained in many Inuit communities and present important testimony about the ongoing importance of hunted and collected foods in the lives of today's residents, it remains unclear how and to what extent participation in the wider economy has altered the actual circulation of what are referred to locally as "country foods." This paper employs social network analysis to answer questions about whether the *circulation* of country foods in Nain is influenced by participation in the cash economy and the ability to possess or access the major means necessary for hunting, fishing, or what is described as "being out on the land."

Subsistence hunting, fishing, and collecting vary widely in Nain and throughout Labrador. Most people fish for char and rock cod within the community at times when they are available. Similarly, many people hunt for ptarmigan (locally referred to as "partridge") under similar circumstances. These, however, are less important in terms of total amount collected than either seal or caribou (see Figure 1). The latter

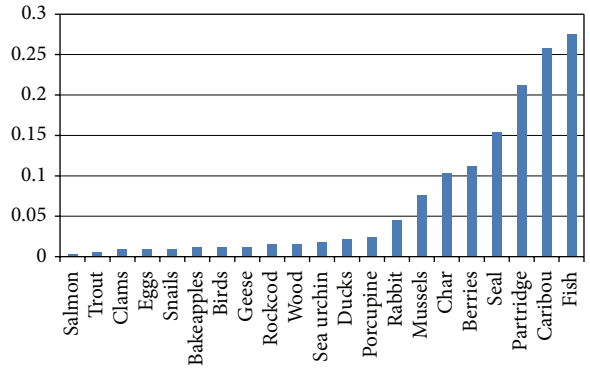


Figure 1: Percentage of respondents reporting the hunting/fishing/collecting of each resource in the previous 12 months.

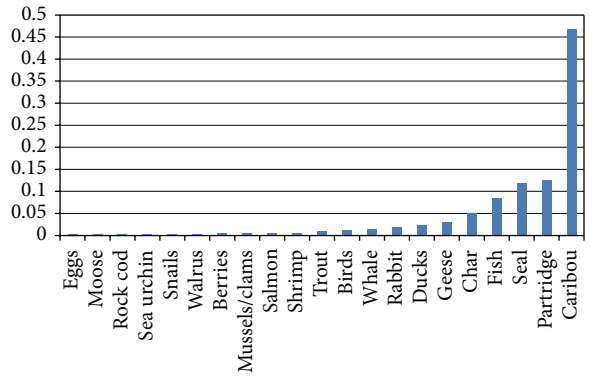


Figure 2: Percentage of reports of sharing of each resource in the previous 12 months.

are hunted primarily in the winter and early spring, normally quite far from the community. Inuit hunters may travel as far as 100 kilometers in groups of 2–5 on these hunting excursions. Such trips are time consuming and susceptible to interruption from weather and heavily dependent on modern hunting materials (such as skidoos, guns, and oftentimes cabins maintained outside of the community for use on extended hunting trips). During the summer, some households or even groups of related households will travel by boat to "camps" in the islands north of Nain, again usually at a significant distance (more than 50 kilometers) where they will spend several weeks gillnetting char. Some of this is sold commercially to the local fish cooperative, but much makes its way into the various freezers, either their own or other households. This is especially true in recent years where commercial fish processing in Nain and elsewhere in Labrador has been significantly limited. Figure 1 presents the percentage of respondents reporting hunting/gathering each resource in the previous 12 months.

Sharing of these resources is widespread. As will be seen below, we document 538 concrete exchanges of significant amounts of country food among 430 people in the community across 218 households. These included many of the above named resources as well as small amounts of others (including shellfish, berries, and other kinds of fish). Figure 2 shows the percentage of reports that included the sharing each resource in the previous 12 months. Labrador Inuit attitudes toward subsistence resources have received considerable attention from researchers in recent years, often in the context of health [5], or toward an understanding of climate change [6]. For a more general account see [7, 8]. The most comprehensive historical account can be found in the works collected by Brice-Bennett in anticipation of the Labrador Inuit Land Claims [9].

When considering the influence of employment on access to locally obtained resources, jobs can be alternately seen helpful or harmful. Where cash is seen as needed to obtain the tools for hunting, having a job could be seen as necessary for obtaining those tools (such as a boat, gun, or snowmobile). Where having a job is seen to restrict the ability to hunt when animals are near, when the weather permits, or when a hunting partner is ready to go, having a job may hinder participation in subsistence activities [10]. Either way is clear that the impact of jobs, state transfer payments, and the general immersion of community residents in a cash economy on subsistence hunting and exchange is likely to be significant, even if, as Stern has pointed out, its specific repercussions depend on a range of both local and external, state-level factors [11]. As numerous Northern researchers have pointed out, for many individuals and households in Inuit communities, access to country foods means having social contacts who both have the ability to supply needed resources *and* are willing to do so. As such, where obtaining those resources depends on participation in the cash economy, the positive/negative impacts of employment can potentially be felt beyond the households of hunters themselves.

2. Prior Research

Across the Arctic and Subarctic, food sharing networks among the Inuit have been a long-standing interest for ethnographers. Early on Damas [12] connected the organization of food sharing networks with kin relationships, describing variations in the impact of kin relations on the structures of food sharing from eastern to western Arctic areas. He suggests that "taken together these various systems of meat sharing constituted an overlapping and interlocking network of distribution which provided insurance against the vagaries of the hunt and served to compensate for the differential skills of the hunters" [12, Page 227]. Similarly and continuing into the present, Wenzel [13] has confirmed that sharing remains an important strategy of distribution that attempts to support as many members of the community as possible, and that kinship is the primary organizer of sharing networks. Collings et al. [14] extend this conclusion and situate sharing within the mid-Twentieth Century history of the North, writing that, because of relocation to sedentary communities throughout 1960s, "[m]ore than ever before. . .food sharing is likely to involve close relatives." Further, they note that "in a growing, permanent community individuals simply have more siblings and close collateral relatives available to them than was the case in their grandparents' time" [14, Page 311]. At the same time, kinship remains flexible if necessary, allowing food sharing networks to retain a powerful fluidity.

Nuttall [15] describes the shifting and even "chosen" nature of kinship relations, all of which are equally real as biologically based kinship. These relationships are often actualized in subsistence activities and sharing: "[k]inship does not determine the relationships of those involved in commodity production, although kin relationships are expressed and reconstituted, or even brought into being, through hunting, fishing, and sharing" [15, Page 51]. Similarly, Bodenhorn [16] confirms the ways that sharing contributes to ideas of kin (which, for her subjects, are not necessarily based on biology but still contribute to a broader structure of equality and balance) but also notes the importance of participation in the cash economy as an important factor in determining local sharing dynamics. Like Stern, she points to the fact that participation in other economic realms and incorporation into novel bureaucratic forms of governance (whose ideologies differ significantly from past notions of community organization) has repercussions for exchanges that may have nothing to do with cash or family values. She writes:

> *a general ideology of egalitarianism is expressed in a number of ways, among them "we're all related" and "we share with everybody". This exists alongside a system of hierarchical relations that fosters asymmetrical accumulation and allots differential status to individuals. Clearly everything is not shared with everybody and not everything is shared equally" [16, Page 45].*

Our main concern here, like that of Bodenhorn, is to move beyond kinship to a view of how other relationships come to be embedded in subsistence sharing practices, reshaping them in the process. For an analysis of the role of kinship in various network domains from the same research see [17].

Supporting this view, Wenzel et al. [18] conclude that new and imported resources, like technology, enter communities in unbalanced ways which threaten existing social structures. The problem, they point out, is not scarcity of money or machines/tools, but the unequal ways that these resources—which are now necessary to sustain subsistence activities—are distributed. Usually "just a few members of the community generally obtain these kinds of resources" [18, Page 2], potentially making others more reliant on their generosity to participate in subsistence or even obtain subsistence foods.

One result of these changes is that contemporary ethnographers have increasingly characterized Inuit societies across the Arctic as "mixed subsistence-based economies" [19, Page 185] (also [20]) that incorporate both subsistence activities and an engagement in a cash economy to procure nonlocal foods as well as tools necessary to access to subsistence resources. Duhaime, Chabot, and Gaudreault contend that "[t]oday, the Inuit are part of a pluralistic society, where traditional way of life and traditional values can no longer explain all practices. Access to markets, the development of wage earning, and an increase in monetary income have all helped to produce greater diversity in food consumption behaviours" [21, Pages 94-5]. Usher et al. note the historical presumption common throughout the 1950s–1970s that Inuit would move away from a migratory lifestyle to sites of wage labor and, in so doing, would emigrate from a traditional economy to a capitalist one: this "new economy would thus be the key route to modernization and acculturation" [19, Page 176]. Yet, as they point out, for many communities the mixed subsistence-based economies represent a significant departure from this trend, with widespread evidence that Northern communities do not necessarily see these forms of livelihood as alternatives, but rather practice a mixing of the two, with resources and values from each "realm" moving in both directions, creating a distinct economic mode (though see [10]).

Chief among those advocating this position is Steven Langdon. Among the Yup'ik in Alaska, Langdon reports that Yup'ik were able to adapt their subsistence activities to capitalist development with minimal economic stratification or deterioration of the traditional way of life. In Langdon's view, the cash economy had little to no impact on the Alaska Yup'ik because "[s]ubsistence is deeply embedded in what it means to be Yup'ik" [20, Page 283]. In viewing the effect of growing participation in the cash economy, he notes that "[t]he expenditures (of cash) appear to be consonant with the essentially egalitarian orientation of forager culture" [20, Page 285]. Low population density and little desire for land and resources kept subsistence practices at the forefront of the Yup'ik economy despite the influx of cash jobs and commoditized exchange, although he expressed concern that the impact of women leaving the community, formal schooling, the deterioration of diet, and increased television consumption would have a deteriorating effect on the "internal coherence" of the Yup'ik "cultural system" [20, Page 289].

Others holding this view emphasize that country food sharing remains integral to the confirmation of Inuit self-identity, even when the economics of hunting change. Advocates of this position would include Duhaime et al., who argue that "the general perceptions are that the [real] Inuit eat mainly, if not only, country foods" [21, Page 92]. Expanding on this, Searles claims that food is one of the main avenues through which Inuit define themselves and their Inuit identity in relation or contrast to the increasing number of white residents [*Qallunaat*] in Nunavut. Inuit foods "are said to be effective in keeping the body warm, making the body strong, keeping the body fit, and even making the body healthy—all qualities that Inuit value" [22, Page 64] (and more recently [23]). Accordingly, Searles argues that sharing country foods among Inuit solidifies the distinction between Inuit and white settlers. He notes that "increased access to *Qallunaat* food has actually increased local awareness of the social and cultural divide separating Inuit and *Qallunaat* ways of preparing and eating meals" [22, Page 73].

In contrast, others have emphasized the role of economic stratification within Inuit communities, rather than symbolic factors, as critical to changes in the place of country foods in local social spheres. In these cases, changes are most often related not simply to the acquisition of tools and the cash to get them, but to the increasing economic disparity caused by differential participation in the cash side of the economy as a whole. Nuttall, when examining the government of Greenland's encouragement of the practice of sale of hunted resources, notes the unanticipated impact on ideologies of

traditional exchange: "Royal Greenland has failed to recognise the essence of sharing as a fundamental part of the hunting culture, as well as understanding the immediate gains for a hunter who sells meat privately rather than to the Royal Greenland processing plant" [15, Page 57]. The result has been, at times, a reorientation to cash exchanges and a growing division between successful hunters and those gradually priced out of ability to remain on the land. At other times, or for other hunters, it has resulted in an emphasis on community relations over participation in the larger economy (even when there is an economic incentive for the latter), driving the most active hunters away from economic coparticipation. Kishigami finds similar forms of differentiation in an analysis of the Nunavik government's intervention into hunting and subsistence via a "hunter support program." Here, in an attempt to encourage hunting, fishing, and trapping as part of the Inuit way of life [24, Page 180], government buying of hunted resources (which are then recirculated within the community) has shown significant benefit to widows, elders, full-time workers, and hunters in need for support; yet the program has proven detrimental to young Inuit, he points out, who only get meat from the program without contributing to hunting or fishing. Kishigami notes that "through the program, Inuit have begun to receive meat and fish from unspecified individuals, thus weakening reciprocal obligations or responsibilities to food givers" [24, Page 187], which distances Inuit youth from traditions of reciprocity and sharing.

More directly, Wenzel [13] suggests that jobs and income have stratified the Clyde River Inuit into "haves" who are expected to share with the "have-nots." According to traditional values, those who do not share are considered ungenerous, yet the result of placing these values within a new set of relations of production has not necessarily resulted in a continuation of past patterns of exchange, such as was discussed by Langdon. Rather, according to Wenzel a "considerable undercurrent of conflict has emerged between those who work and have equipment but no time and those who are unemployed and have time but lack fuel or gear" [13, Page 54]. As Kishigami points out, "cash, which is used to purchase gasoline, ammunition, rifles, nets, snowmobiles, and boats with outboard engines," has become a necessity for those who intend to carry out subsistence activities [24, Page 175]. Wenzel characterizes money as "both the most important resource required by Clyde Inuit for the conduct of ecological activities and even more problematic than equipment in terms of incorporation within ningiqtuq [food sharing] relations" [2, Page 71]. Similarly, Stern sees the influx of government housing and other bureaucratic initiatives as directly influencing both the values and the structure of exchanges in both the cash and subsistence economy, even beyond the issue of access to hunting and fishing. For her, subsidized housing has joined income as one of the two main institutions threatening Inuit social relations, especially sharing networks. She concludes that "[t]he transition to a cash-based wage labor and state welfare economy has complicated sharing and placed the cultural values for sharing in tension with modernist desires for individual accumulation and self-determination" [11, Page 70]. Further exacerbating these problems is lack of employment opportunities available in many northern communities. As Stern puts it, a lack of jobs has become "a source of personal and community distress [that] produces social cleavages, giving rise to a situation where many stop looking for paid employment" [11, Page 74]. The result is a situation of haves and have-nots similar to that described by Wenzel, with similar sorts of tensions and resentments. This is a drastic shift from Langdon's perspective.

3. Research Questions

In what follows, this paper seeks to answer the following questions.

(1) Is there a significant statistical relationship between a person's role (hub? marginal?) in the country food sharing network and his/her employment status/income of the current residents of Nain, Labrador?

(2) Is there a significant statistical relationship between a person's role in the country food network and his/her possession of the means necessary to go hunting/fishing (measured here as "subsistence factor") in Nain?

(3) Is there a significant statistical relationship between a person's employment status or income level and his/her ownership of the tools necessary for hunting/fishing (subsistence factor) in Nain?

Nain is a predominantly Inuit community (92% aboriginal) and the capital of the newly formed indigenous autonomous area of Nunatsiavut, Labrador, Canada. The community was formed by Moravian missionaries in the late 18th century and is currently composed of approximately 1200 people, roughly 60% of whom are of age 18 or over. Nain and the surrounding communities have been embedded in the global economy since the early 1900s, retreating only in the mid-1990s with the collapse of Labrador's commercial fishing economy. Yet, as suggested by Langdon and others, this long term-participation in the cash economy did not result in a full collapse of the subsistence economy. The seasonal nature of the fishery encouraged many families to couple wage/cash employment with traditional subsistence activities such as seal hunting, caribou hunting, fishing, and the gathering of other available resources, in a pattern that lasted until the collapse of the commercial fishery only 20 years ago.

Residential concentration caused by the relocation of many communities of Inuit throughout Labrador over the last century (into the current five) [9, 25] has caused strain on local hunting resources, however, requiring greater travel and the investment in more costly hunting means to accomplish subsistence goals. As the population of Nain grew in the second half of the 20th century, people had to travel further and for longer periods of time to obtain resources that in the past may have been more locally accessible. This process is greatly facilitated by the use of snow machines, boats, and cabins built in remote areas that support subsistence activities

in the surrounding region. There a family may spend anywhere from 2 days to 2 months, obtaining seasonally available resources which they store for later use or sharing. In all of these cases, subsistence equipment has become a near fundamental necessity for obtaining "country foods." Yet it remains an open question to what extent access to these things is required for participation in the network of country food exchanges. This situation is further complicated by important recent changes in the political economy of the region, most notably the revival of the local economy that accompanied the 2006 Labrador Inuit Land Settlement Agreement. Under this settlement, Labrador Inuit were granted partial control and quasigovernmental autonomy over the land and resources of an area roughly the size of Belgium.

The creation of the indigenous semiautonomous region of Nunatsiavut in 2006 represented the intersection of three distinct trends: (1) the advocacy of Labrador Inuit for several decades, particularly under the aegis of the Labrador Inuit Association [9], (2) a general trend of recognizing indigenous land rights in northern Canada that resulted, most noticeably, in the creation of Nunatsiavut's northern neighbor, Nunavut [26], and (3) the increasing use of land claims to facilitate the industrial development of the North. In this case, the first step in that development was the opening of the Voisey's Bay Nickel Mine, located approximately 30 km south of Nain [27] (on the intersection of these processes, see [28]), which began mining operations shortly after the Land Settlement was officially adopted by both sides.

The Settlement and subsequent mining development brought an influx of wage employment, mainly in government employment for Nunatsiavut, but also directly at the Voisey's Bay mine and related mine services industry. As such, this paper seeks to understand how these two factors—an increase in wage-related employment (and following Wenzel and others, the resulting differentiation of household incomes) and an increased importance of modern tools for hunting and fishing in the region as a whole—influence the place of individuals in the network of country food exchanges that characterizes the subsistence economy within Nain.

The results described here are based on data obtained from 330 interviews with adult residents of Nain obtained over 6 months of fieldwork in the community in 2010. Interview participants provided demographic information, such as age, gender, and ethnic identity, as well as employment status, income, and reports of their access to subsistence resources such as cabins, snowmobiles (known locally by the brand name "skidoos"), and boats. In the network portion of the interview, the residents were asked to name those individuals in the community from whom they regularly received help (or to whom they would turn if they found themselves in need for help) in eight network domains: Country Food, Store-Bought Food, Traditional Knowledge, Domestic Violence and Household Wellness, Alcohol Co-Use, Youth Support, Housing, and Jobs. The responses from these interviews allowed for the creation of full-scale sociograms of each network, which were then subject to formal analysis aimed at determining network roles, resource flows, and relative network position for all participants. Social network analysis is now a burgeoning field of relational sociology, whose historic and current use is too complex to address here. For an introduction to the methods and strategies of the field see [29]; for history of SNA see [30].

In the remainder of this paper, we are particularly concerned with the interplay between the network of Country Food exchanges and employment status/income on the one hand, and access to the means necessary to obtain country foods on the other. Of particular concern here are network measures involving "centrality" (measures of how important an individual or household may be in the overall exchange system). In the analysis that follows, a number of centrality measures are contrasted with individual data about employment status and access to hunting/fishing tools via statistical means, and the results are presented in table form. We note that the 330 interviews included approximately half of the adult individuals in the community between 18 and 60 years old, and the distribution of our sample matched census data percentages across the vast majority of categories (see [31]).

4. Study Variables

4.1. Employment. While the overall employment situation in Nain is probably better than in other Labrador communities, there remain high numbers of people who are unemployed or underemployed. The Torngat Fish Producers Cooperative, which was a major local employer during the years of the commercial fishery, still provides seasonal work to a moderate number of people in Nain and supports seasonal work for others such as fishermen who sell to the co-op. In recent years, however, the months of operation of the plant and the amount of fish purchased have dropped dramatically—operating in for 4–6 weeks in some years. As a result, and helped along by the transition to self-government, the major source of full-time work in Nain is now the Nunatsiavut Government's employment of administrative personnel. Beyond this, a limited number of full-time jobs are available in local grocery stores or via the school, and for a number of small service operations associated with industrial mining development nearby. Because so much local employment is seasonal, many people depend on Employment Insurance (EI) for income in months they cannot work.

In order to gain a better picture of the current employment situation in Nain, we asked interview participants to estimate their weekly income (individual and household) and current employment status. The latter responses were categorized as unemployed (0), occasional (1), seasonal (2), part time (3), or full time (4). According to this scale, mean employment status for our participants was 1.73, indicating that the majority of those in Nain were employed part time, seasonally, or not at all. Women were slightly more likely to have secure employment than men: the mean employment status of women was 1.88, while the mean for men was 1.58. The average individual's weekly income after taxes and other state deductions was $227, while the average household income was $486 per week. Likely reflecting differences in employment status, the mean weekly income among men was $179, and women's mean weekly income was $272, or almost $100/week more than men's.

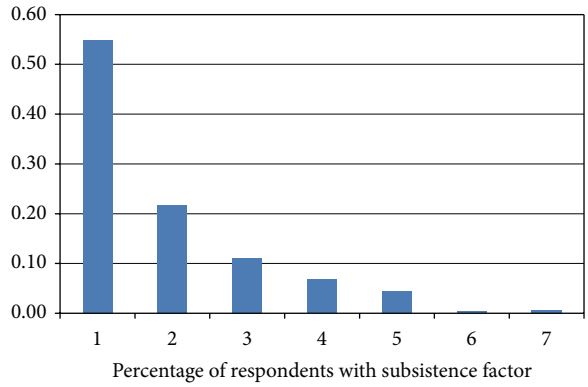


Figure 3: Respondent access to hunting cabins, boats, snowmobiles, cumulative according to the scale: none (0), occasional via family/friend (1), ownership (2). Thus, for example, an individual who owns (2) a snowmobile, has access to a cabin (1) owned by a relative, but no boat (0) would have a total Subsistence Factor of 2 + 1 + 0 = 3.

4.2. Subsistence Factor. As above, subsistence resources in and around Nain are more easily and frequently obtained when one has access to the technological means of hunting, fishing, and gathering. The three main means for obtaining subsistence resources are cabins, skidoos, and boats. For each of these, individuals were asked to describe their current access, which was then grouped into one of three categories: (0) no access at all; (1) occasional access via family member/close friend; (2) ownership. Access across all three categories was amalgamated into a single factor, which we refer to as a person's "subsistence factor." An individual's subsistence factor was defined as the sum of his/her respective access to all three means, resulting in a range of scores from 0 (no access to any of the 3 major means) to 6 (ownership of at least 1 cabin, skidoo, *and* boat). The distribution of subsistence factor scores is shown below.

As can be seen in Figure 3, ownership of all three means of access is rare. In fact, a score of 0 or 1 is applied to more than two-thirds of all individual subsistence factors, indicating that, at best, the vast majority of adults living in Nain have only occasional access to only one of the three most important means to obtain country food away from the community. We note that the subsistence factor was consciously composed to register the sharing of hunting equipment, not just its ownership. In this way we sought to give credence to ideas about Inuit sharing of equipment within and between households [2, 11]. As such, this analysis attempts to incorporate sharing of both the products of hunting and fishing as well as the ability to get "out on the land" and perform those tasks for one's self/household.

4.3. Network Measures. To obtain a list of recent country food exchanges, interview participants were asked about their recent exchanges of hunted and collected foods. Connections were derived from answers to the questions: "if you did not have any country food (wild meats like caribou or other things like fish, birds, or berries), who would you go to? When was the last time you received any country food from this person? How many times in the last year have you received country food from this person?" 330 interviews document 538 exchanges of food sufficient for at least 1 meal in the previous 12 months among 430 people. For purposes of analysis here, only those ties based on actual sharing events of substantial food (1 meal for one person) in the last 12 months were used to construct the network. Hypothetical ties that had not been acted on were not included. In Figure 4, node size is drawn proportional to the number of incoming connections. In all of the networks, the tie strength data was collected in the form of (1) inverse of months from most recent sharing event and (2) the number of sharing events in the last 12 months. Answers that revealed concrete exchanges in the last year resulted in creation of exchange "dyads," links between two people across which locally obtained foods travelled (often more than once, and at times in both directions). Individual dyads were amalgamated into a single, weighted network that included connections among 430 adults living in 218 distinct households. This network is shown in Figure 4.

From Figure 4, one can see that some individuals play a large role in the network, with many people dependent on them as sources of wild means and fish. The majority of those in the network, however, had very few partners, indicating significant disproportion in network roles. Overall, the network as a whole is well connected, meaning that almost no one is isolated and removed entirely from ties that move country food through the network.

By rendering the network as a graph in this way, this data becomes amenable to formal analysis. Because network analysis is still relatively rare in ethnographic social sciences, a brief explanation of the network measures was used in this analysis follows. In each case, the values for the measures are obtained by a combination of considerations involving degree (the number of connections for a given node—in this case, the number of other people/households who indicated in an interview that they had obtained country food from the individual/household depicted) and path (the number of connections that exist between a given node and some other, such that dyad neighbors have a path length of 1, neighbors' neighbors a length of 2, and so on). Given this, the following measures are employed in the analysis below.

Input degree is simply a count of the number of incoming connections for each respective individual in the network. Input degrees in the country food network range from 0 to 27, with more than half of the individuals in the network having no incoming connections from others to whom they served as a source of country food (though they did have outgoing connections, that is, links to those individuals/households they named as their own country food sources). Input degree can be seen as a measure of an individual's raw importance in the network. Individuals with high input degree are often referred to in network terms as "hubs" [32, 33].

Input domain is the total number of people who could potentially receive food from an individual via resharing by others in the given structure. This is discovered by examining all individuals in the network and distinguishing those who can connect to a given node via a path of outgoing

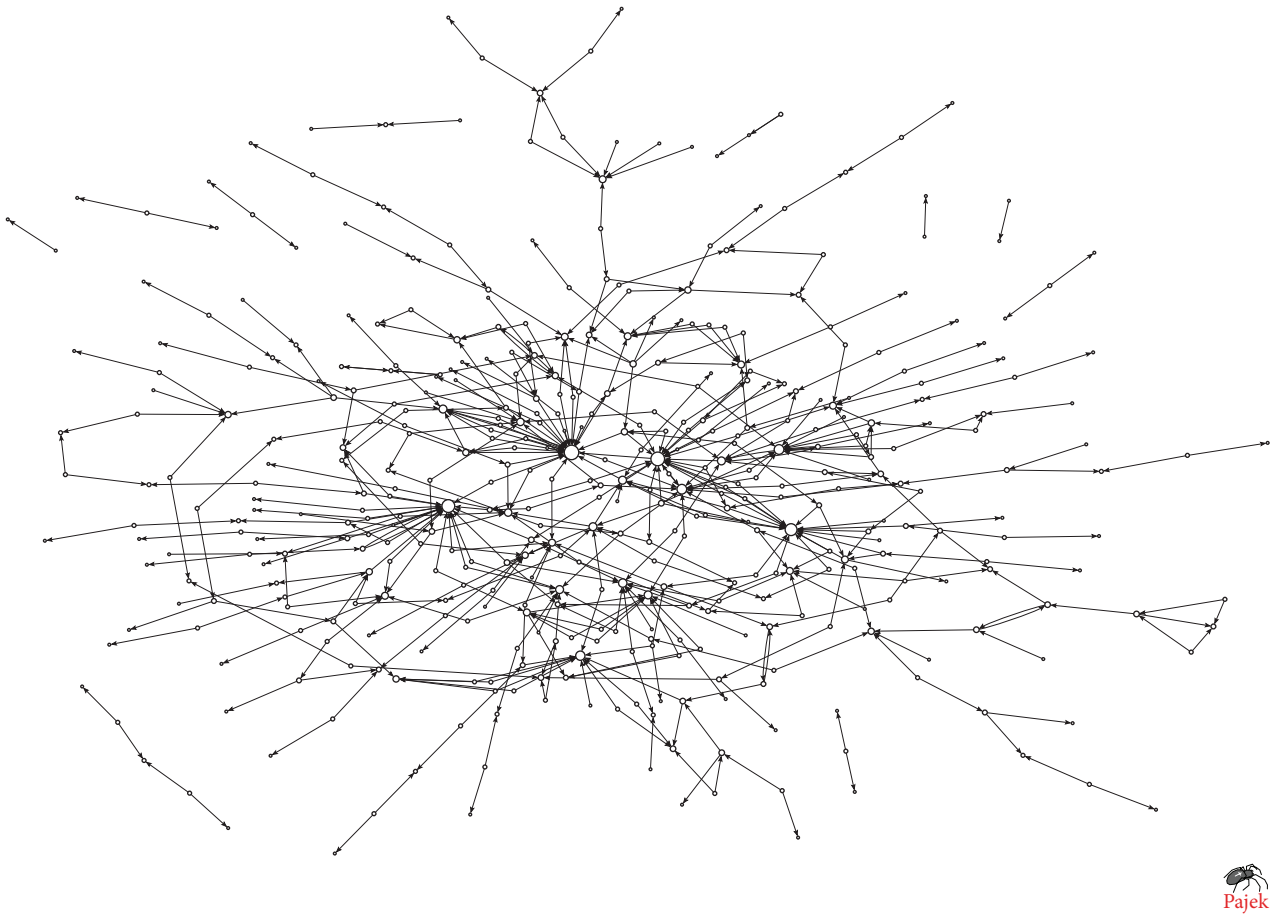


Figure 4: Country food sharing. Node size indicates number of sharing events.

connections. For example, if A looks to B as a source of food and B looks to C as a source of food, then both A and B lie within C's input domain. Input domain is an indicator of an individual's potential total influence within the network [34].

Input closeness centrality is a network measure which indicates the inverse geodesic distance of each network member to all others in the network (normalized by the highest value). This is calculated by finding the shortest path between a node and all other nodes. In general, closeness centrality indicates a general sense of how central one is to a network as a whole rather than just to the subgroup of one's nearest neighbors or domain [33, 35, 36].

Betweenness centrality finds the shortest paths between all pairs of nodes in the network and then calculates the proportion which passes through a given network node. In general, betweenness centrality indicates how likely one is to be part of a series of resource exchanges, and thus how central one is to the connectivity of others. In such cases, an individual who has only a few exchange partners, but who connects sections of the network that would otherwise be separate from one another, will show up as an important person in the network even though her/his actual input degree is low and his/her closeness centrality may still be small [37, 38].

With these measures in mind, our analysis focused on answering the three research questions introduced above.

5. Analysis

5.1. Question 1 (Is There a Relationship between Network Position and Income/Employment?) To answer Question 1, we tested for correlations between income (individual and household) and each of the 4 network measures described above: input degree, input domain, closeness centrality, and betweenness centrality. Positive correlation between income and network position would indicate that higher income was related to network importance as described above.

5.1.1. Individual Income. We found a modest but positive (and statistically significant) relationship between individual income and input degree ($r = 0.205$), size of input domain ($r = 0.203$), and input closeness centrality ($r = 0.205$) in the Country Food Network. In determining relationship, we used Pearson's Correlation Coefficient (r) for continuous variables (i.e., income and network statistics) and Spearman's Rank Correlation Coefficient (ρ) for ranked categorical variables (employment status and subsistence factor), see [39] for discussion. Only highly significant results ($P < 0.05$) are reported here. Such results show that the higher the one's personal income, the more likely one is to be a source of country food for others, and thus the more likely one is to perform a central role in the distribution of country foods and wild resources. These and the following results are shown in Table 1.

Table 1

	Input degree	Size of input domain	Input closeness centrality
Individual income	$r = 0.205$	$r = 0.203$	$r = 0.205$
	$P < 0.001$	$P < 0.001$	$P < 0.001$
Household income	$r = 0.112$	$r = 0.104$	$r = 0.107$
	$P < 0.05$	$P < 0.05$	$P < 0.05$
Employment status	$\rho = 0.209$	$\rho = 0.209$	$\rho = 0.207$
	$P < 0.001$	$P < 0.001$	$P < 0.001$
Subsistence factor	$\rho = -0.239$	$\rho = -0.237$	$\rho = -0.236$
	$P < 0.001$	$P < 0.001$	$P < 0.001$

5.1.2. Household Income. We also found a weaker but still positive association between household income and input degree ($r = 0.112$), input domain size ($r = 0.104$), and input closeness centrality ($r = 0.107$) in the Country Food network. We note here, however, that the association is roughly half the value of the same measure when concerned with individual income, meaning that household income is a less reliable indicator of the likelihood of one being a central network member in the Country Food Network than is individual income.

The same analysis was repeated to test for a correlation between network position (as reflected in the network measures used in this paper) and employment status.

5.1.3. Employment Status. Here again we found a positive association between employment level and input degree ($\rho = 0.209$), input domain size ($\rho = 0.209$), and input closeness centrality ($\rho = 0.207$). As above, these figures show a moderate but highly significant relationship between these two variables across a range of measures. This would indicate that more central members of the network are more likely to be employed than those on the network margins. The lack of a relationship of either variable with betweenness centrality would indicate that there is no significant relationship between employment/income and having a position as a broker or bottleneck within the network.

Taken together, these results provide an answer to Question 1: we can confirm that centrality in the country food network, indicating a person who is seen by others as a source of country food (both directly and indirectly), is positively related to both employment and income. Interestingly, we note that the least important predictor here was household income, which seems to indicate that it is the employment status of the individual (and likewise individual income) that is driving his/her network importance, rather than his/her status as a member of household where others provide significant income.

5.2. Question 2 (Is There a Relationship between Network Position and Access to Means Necessary for Hunting?) As above, to answer Question 2 we performed a similar analysis testing network position for correlation with the subsistence factor (used to indicate readiness of access to the main means necessary to pursue wild resources). A positive correlation here would indicate that the more access one has to the tools necessary to pursue subsistence resources (as an individual or through occasional access via a friend or family member), the more important one is to the circulation of country foods within the community.

5.2.1. Subsistence Factor. The correlation between an individual's centrality in the Country Food Network and her/his subsistence factor was modest but significant. Input degree ($\rho = -0.239$), input closeness centrality ($\rho = -0.237$), betweenness centrality ($\rho = -0.175$), and input domain size ($\rho = -0.236$) all showed a relationship between network position and access to subsistence tools. However, the association was uniformly *negative*, meaning that the more important one was to the distribution of country food, the *less likely* one was to have access to a cabin, skidoo, or boat.

These results were, initially, somewhat puzzling and seemed to run counter to ethnographic reports from other communities discussed above. However, the implication of these results is that, rather than the central members of the Country Food Network being composed of hunters, it appears instead that many of the central members of the sharing network are those who circulate (or more likely recirculate) food to others. This point is particularly interesting given the findings for Question 1, as it seems to indicate that these same recirculators tend to be individuals who are generally more likely to be employed than unemployed and to have greater individual income than their peers.

These results point to our final question, though perhaps in a new light. Given that network centrality was negatively associated with access to the tools necessary to pursue subsistence resources but positively associated with income and employment, we must then consider the relationship between income/employment and whether or not an individual has access to the tools necessary to obtain subsistence foods.

5.3. Question 3 (Is There a Relationship between Income/Employment and Access to Means Necessary for Hunting?) In a statistical analysis of these data, we *did not* find a relationship between subsistence factor and employment status or between subsistence factor and individual income. However, we did find a weak relationship between subsistence factor and *household* income ($\rho_{\text{household}} = 0.134$, $P < 0.05$), though the effect size here is smaller than that noted above for individual income/employment and network role. As such, the answer to the question of whether or not there is a connection between subsistence factor and working status or income is mostly no: access to the means necessary to obtain subsistence resources was not predictable from one's individual job status or individual income, though it did tend to conform (to a lesser degree) to being in a household where other members were employed and provided income. Together with the answers to Questions 1 and 2, we can conclude that those with higher income thus appear to be more central to the country food network, but not because they use that income to gain greater access to subsistence resources.

6. Discussion

To summarize the above results and relate them back to the questions that motivated this analysis, the effect of participating in cash economy (including wage labor and cash employment) on the circulation of country food in Nain indicates a complex relationship that in general goes beyond the conventional descriptions of a "mixed economy." Firstly, employment status seems a particularly poor predictor of individual access to the means necessary to go hunting, fishing, gathering, or wooding. This is not to say that everyone has access far from it. As shown with the distribution of subsistence factors, very few people have ownership or regular access to the tools necessary to go out on the land and pursue country food. The point here is that whether or not a person has access to the means necessary for hunting and fishing seems to have no systematic relationship with his/her employment status. The same is true for individual income. We found no significant relationship between individual income and access to subsistence tools (as defined in the subsistence factor, at least). Those with greater income in Nain, it appears, do not use that income to gain disproportionate access to the means for hunting, fishing, and "being on the land" in general.

While this conclusion does not contradict Wenzel's [2] recognition of the necessity of access to money to obtain tools for subsistence (income may be necessary but not sufficient, and other kinds of access besides direct ownership or even regular access via kin/friends may take place), it does challenge his [13] and others' [40] suggestion that it is mainly through the ability to access food on the land that employment and income are stratifying Inuit society. The lack of access to the means necessary to obtain subsistence foods does not seem to influence one's role in the food sharing network (though obviously it would still limit one's ability to hunt for food directly). Yet it remains strikingly true that employment status and individual income did affect ones place in the network. Those with more income and more steady employment status were more likely to be central to the network across a number of measures and thus to be frequent sharers of food with others.

A second mechanism for achieving a central network role advanced in the literature is that such a role is gained by the pooling of resources within or between closely related households, such that frequent hunters count on the support of income generating others who may also serve as important distributors (see [11]). The data above show that it is only partly true: one is more likely to have access to hunting and fishing equipment and the means to obtain wild foods if one lives in a household with a higher income than if one lives in a household with a lower one, but that this does not translate directly into a more central role in the network of resource sharing. While important, the effect size of household income is generally half that of individual income and employment status, which are themselves unrelated to access to subsistence equipment. These results thus support Stern's [11] findings that intrahousehold sharing represents an accommodation to the imposed bureaucratic forms (which may themselves be underwritten by a particular ideological view of the role of indigenous households in a modern economy, see Lea [41, 42]), but this accommodation does not appear to translate into broad community-wide sharing in a way that elevates the importance of the pooling household. Arguing against the latter is the fact that individuals who are simply sharing the wild catch of someone in his/her own household (while continuing to work in the cash economy and support the hunting access of others) would still be likely to have better access to a skidoo, cabin, or boat (i.e., subsistence factor) by virtue of the fact that intra-household/intrafamily sharing is included in the construction of the variable used to measure access. If an individual lives in a house with someone who has ownership or reliable access, they will have a subsistence factor higher than one who does not, and this would be captured in the correlation statistic.

The latter does not appear to be the case (if it were true, the correlation between access and network position should hold for the sharer as well where instead it turns out to be negative). Indeed, important sharers showed a systematic *inverse* correlation, meaning that they were more likely to be further removed from those with access than those at the margins of the sharing network.

In contrast to the collective pooling of resources explanation, then, a more direct and simple interpretation of these data may be that those individuals with jobs and income are more likely to be named as sources of country food by others simply because they can afford to share, while others more dependent on hunting and fishing for direct consumption may not be in a position to share, despite greater access to the means necessary to pursue their own subsistence. That is, those with more steady employment and greater individual income are in a financial position to share country food, regardless of how it is obtained and regardless of the presence or absence of the ability to go and get more. Those who depend more directly on country foods for direct consumption may be more likely to possess the means to obtain those foods, but in less of a position to share what they get. Added to this, we must note that those at the margins of the network (who are, according to the above findings, more likely to be without income and steady employment) are thus likely to be more dependent on whatever food they obtain from others for simple household reproduction and thus not in a position to reshare these resources. These individuals and households would not appear as central members of the network even if they have access to hunted and collected resources and do obtain them. Taken together, and foregoing various cultural and social-transition explanations, the pattern of food sharing in Nain may simply reflect the fact that only a limited number of people (those with jobs and income) can afford to be food sources for others, regardless of whether those foods are "traditional" or not, and regardless of access to obtaining those resources directly.

Such a view would ask us to rethink those interpretations that see country food sharing as integral to the confirmation of Inuit self-identity. Were this to be the case, our findings indicate that a traditional identity—and the ability to differentiate oneself ethnically and ideologically from non-Inuit—may ironically be dependent on one's employment in the wage economy and related income status. While

seemingly counterintuitive at one level, such results are actually widespread in the North [10, 43, 44]. More so, recalling Stern's observation that sharing remains an important means through which values are transmitted, it would then be the case that those with higher income and more consistent employment thus possess the ability to enhance or withhold the ability of other households to participate in identity construction as well.

The latter comments find some support in Nain, where many individuals on the economic margins commented on the way that recent changes in the local economy had redefined the way that "being Inuit" was understood and lived (see [31], and also [45] for historical context). Unable to get out on the land, people felt that Inuit culture was "gettin' gone"—despite the fact that country food exchanges and access to tokens of identity were common. As seen in Figures 1 and 2, considerable amounts of traditional foods continue to circulate and be consumed in Nain. Yet the perception was that this was not sufficient to sustain individual identity. The results magnify existing forms of social differentiation found in Nain that have been complicated by recent political events. As this aspect is discussed in detail by the authors elsewhere [17], we note here the changes that have followed the Labrador Inuit Land Settlement of 2006, and the opening of the Voisey's Bay Nickel Mine has significantly redefined identity dynamics in Nain and throughout Labrador. The patterns of dependency shown here likely exaggerate those trends. While anthropologists have been open to the idea that local identity is being reformed in the context of economic incorporation into the global economy (the vast majority of which are driven by a complex combination of historic claims and larger government interest in promoting industrial resource development [28]), few have considered the ways that these processes result in the production and reproduction of "tradition" becoming increasingly located in fewer and fewer hands.

Applying social network methodology has allowed for a consideration of how resources, including the social resources intrinsic to cultural reproduction, are distributed in a community. In applying this approach, we attempt to go beyond the homogenizing tendencies of aggregate statistics and sometimes the myopic view of conventional ethnography where too often a small number of cultural exemplars are allowed to stand for the community as a whole. Arctic communities are complex organizations and as such require greater attention to internal social topologies than conventional approaches have allowed. Future work will address the nature of the other social networks in the community that were the focus of our research (including those concerning household wellness, store-bought foods, housing, job access, and the circulation of traditional knowledge), and importantly, the influence of both structure and position in one network as it affects actor roles in the others.

Acknowledgments

This project was supported by a grant from the US National Science Foundation, Office of Polar Programs, Division of Arctic Social Sciences, GR ARC 0908155, with the approval of the Nunatsiavut Research Committee. All of the material contained here was obtained with the informed consent of all participants. The analysis of the data and all conclusions and recommendations are the responsibility of the Principal Investigator/Lead Author and do not represent the opinions of either the US National Science Foundation, The Nunatsiavut Government, the Nunatsiavut Research Committee, or City University of New York. K. Dombrowski remains solely responsible for the full content of this work. Special thanks go to Fran Williams, Jane Dicker, Toby Pijogge, and Eva Lampe in Nain. Supporting modeling work was performed at the Social Network Research Group labs at John Jay College, http://snrg-nyc.org/.

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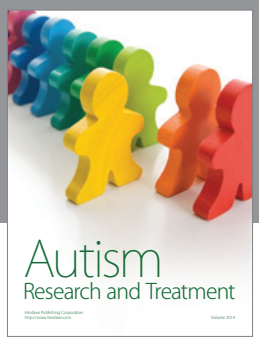
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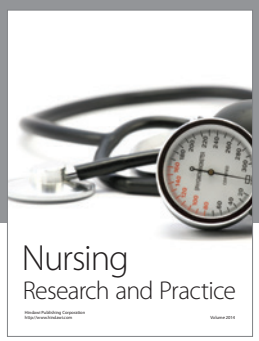
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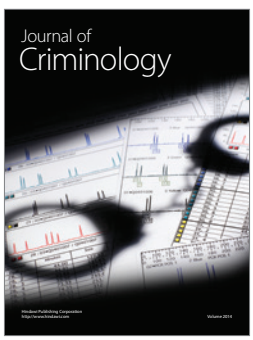


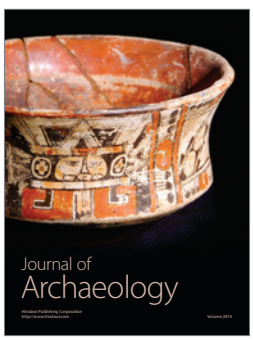




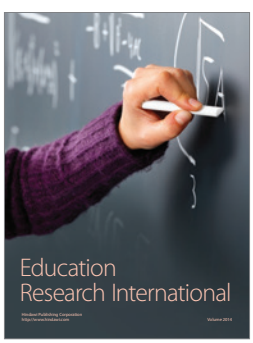


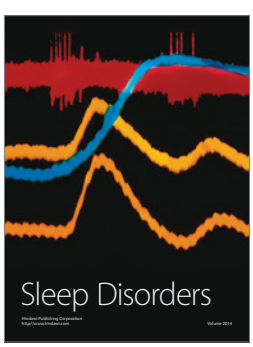


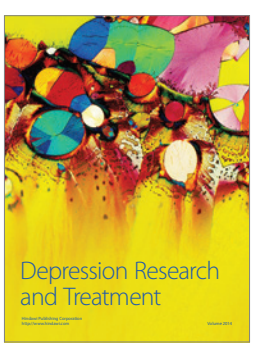


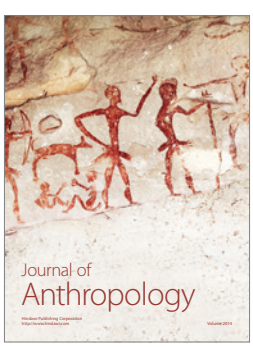


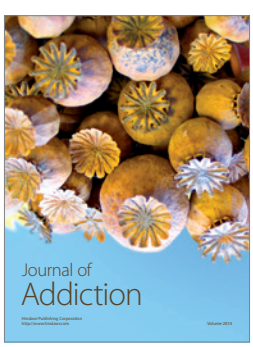


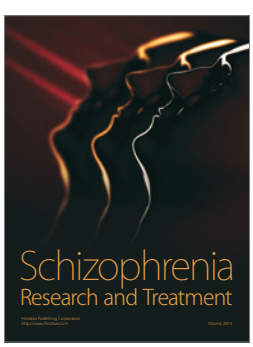




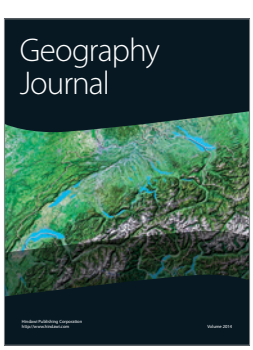






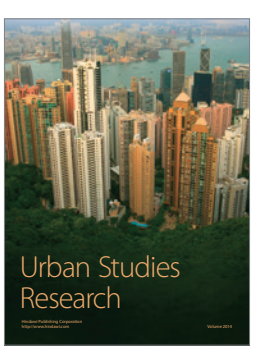












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