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Country food sharing networks, household structure, and implications for understanding food insecurity in Arctic Canada

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ABSTRACT

We examine the cultural context of food insecurity among Inuit in Ulukhaktok, Northwest Territories, Canada. An analysis of the social network of country food exchanges among 122 households in the settlement reveals that a household's betweenness centrality—a measure of brokerage—in the country food network is predicted by the age of the household. The households of married couples were better positioned within the sharing network than were the households of single females or single males. Households with an active hunter or elder were also better positioned in the network. The households of single men and women appear to experience limited access to country food, a considerable problem given the increasing number of single-adult households over time. We conclude that the differences between how single women and single men experience constrained access to country foods may partially account for previous findings that single women in arctic settlements appear to be at particular risk for food insecurity.

KEYWORDS

Food security; food sharing; industrial foods; Inuit; traditional foods

Introduction

For many Canadian Inuit, country foods—foods acquired by hunting, fishing, trapping, or collecting—remain central to their diets despite decades of social, economic, and political changes. These changes have steadily challenged the viability of the mixed subsistence-market economies that characterize Inuit settlements. Research on Inuit subsistence and foodways has documented that country food confers important health benefits and satisfies cultural needs. Inclusion of country food in the diet is associated with both better health and reduced food insecurity (Beaumier and Ford 2010; Egeland et al. 2011; Wein, Freeman, and Makus 1996) and is an important component of healing practice and well-being (Borre 1991, 1994). Culturally, country food exchange and consumption reinforces Inuit identity (Condon,

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Collings, and Wenzel 1995; Freeman 1988; Searles 2002), strengthens community social bonds (Chabot 2003; Collings, Wenzel, and Condon 1998; Natcher 2009), and links people with their environment and the other-than-human beings that inhabit it (Fienup-Riordan 1999; Laugrand and Van Oosten 2014; Stairs and Wenzel 1992).

Despite the continued importance of country food to Inuit, a consensus has emerged that rapid social change, changing economic conditions, and climate change have all contributed to reduced country food consumption and increasing periods of food insecurity. The current understanding is that arctic settlements are moderately to severely food insecure (Chan et al. 2006; Ford and Beaumier 2011; Huet, Rosol, and Egeland 2012), with women in female-headed households more likely to report food insecurity (Duhaime, Chabot, and Gaudreault 2002; Lambden, Receveur, and Kuhnlein 2007; Lambden et al. 2006). The 2007–08 Inuit Health Survey (IHS) for the Inuvialuit Settlement Region (Egeland 2010), for example, reports that food insecurity affects an estimated 46% of households, with 13% of these households being severely food insecure. Members of these households reported disrupted eating patterns, limiting consumption, or skipping meals. An additional 33% of households were moderately food insecure, consuming reduced quality, limited variety, or less desirable foods.

While food insecurity is well documented and detailed, the role of cultural practices in driving or mitigating food insecurity is not fully understood (see Harder and Wenzel 2012). For example, in the IHS report discussed above, country food sharing networks were reported to be “strong” in the Inuvialuit Settlement Region (ISR). Sharing networks are critical in communities where the number of productive and active hunters is limited (see Wolfe 1987), but it is unclear how sharing networks articulate with food insecurity or health. What does it mean for a community to have a strong sharing network? Despite strong networks, why are nearly half of households moderately or severely food insecure?

In this article, we examine country food sharing networks in Ulukhaktok, an Inuit settlement in the ISR. Our examination explores potential vulnerabilities in food access, one of the pillars of food security (FAO, IFAD, and WFP 2013). We argue that the more-restricted sharing networks of households of single adults is a problem tied to broader changes in the settlement that have occurred over several decades. These changes include changing marriage patterns, changes to public housing policy, and economic change (such as increased reliance on wage employment). The following section provides a brief background on subsistence, Inuit foodways, and food insecurity research in the Canadian Arctic, including a discussion of food and subsistence in Ulukhaktok. We then turn to country food sharing networks in Ulukhaktok. We examine three things: (1) the extent to which households can activate networks to acquire culturally valued, nutritionally superior

food; (2) how structural and network constraints potentially limit access to country food; and (3) the implications of restricted country food access for understanding food insecurity in the Arctic.

Food research in the Canadian Arctic

Research on food systems in the North American Arctic has a lengthy history. A comprehensive discussion of this literature is beyond the scope of this article, so we limit our treatment to the Canadian Arctic. In Canada, an interest in Inuit subsistence and foodways dates from the times of the earliest explorers and has been a major focus of anthropological research during the contact-traditional and early settlement periods (see Balikci 1964; Damas 1969; Usher 1976). An interest in subsistence as both an economic and social form has continued to the present, with work targeting the importance of subsistence to identity and culture (Condon, Collings, and Wenzel 1995; Searles 2002; Stairs and Wenzel 1992), the persistence of country food sharing practices in contemporary settlements (Collings, Wenzel, and Condon 1998; Dombrowski et al. 2013a, 2013b), and the challenges posed by rapid climate change (Berkes and Jolly 2001; Pearce et al. 2008, 2010; Wenzel 2009).

Work specifically addressing food consumption in the Arctic initially investigated the relationship between health and rapid change. Early work (Mann et al. 1962; Mayhall 1976; Schaefer et al. 1980) observed that the introduction of and reliance on imported foods was correlated with significant declines in health. Later work by Kuhnlein and others (Kuhnlein and Soueida 1992; Kuhnlein, Soueida, and Receveur 1996; Moffat 1995) compiled the nutritional profiles of commonly consumed country foods, documenting their nutritional superiority over imported, “industrial” foods (following Duhaime, Chabot, and Gaudreault 2002). A related body of research documents the potential for exposure to environmental toxins and contaminants through eating country food, but most research has argued that the benefits of country food outweigh these concerns (see Kuhnlein 1995; Kuhnlein and Chan 2000; Kuhnlein, Receveur, and Chan 1999; O’Neil, Elias, and Yassi 1997).

Despite the recognized superiority of country foods, the increasing significance of industrial foods in the diets of northern residents is well known (see Kuhnlein and Receveur 1996). The imported foods available in arctic settlements tend to be highly processed, calorically dense, and nutrient poor. Consumption of these foods is associated with adverse health outcomes, among them rising rates of obesity and diabetes (Egeland et al. 2011; Huet, Rosol, and Egeland 2012; Wesche and Chan 2010).

Precisely *why* industrial foods are increasingly attractive to Inuit despite the known benefits of country food consumption remains an open question.

There appear to be multiple possibilities, among them (1) increasing costs of mechanized foraging, (2) dependence on wage labor that limits hunting time, (3) declines in hunting skills and knowledge, (4) acculturative forces that amplify the desirability of industrial foods, and (5) the basic human desire for salt, sugar, and fat, which are happily married in a stick of beef jerky, a potato chip, or a can of soda. Whatever the reasons, the high cost of industrial foods, coupled with a decline in country food consumption, has generated significant concerns about Inuit health and food insecurity. Duhaime, Chabot, and Gaudreault (2002), for example, demonstrate that 55% of household income is spent on food and food production, a significant economic burden for Inuit who already face markedly higher costs in other sectors of the economy. Lambden et al. (2006) likewise cite economic forces as highly influential in limiting access to both country and industrial foods.

We focus here on access to country foods. Food security is most frequently defined as “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and *food preferences* for an active and healthy life” (FAO 2009, p. 8, emphasis ours). In settlements such as Ulukhaktok, it has been apparent for quite some time that Inuit prefer country foods to industrial foods. Furthermore, industrial food, though an important component of the local diet, lacks cultural salience. Ulukhaktomiuq, in our experience, cannot (or do not) accurately recall industrial food consumption, and industrial foods are not shared in a manner that resonates with cultural patterns of exchange.

Food consumption in Ulukhaktok, Northwest territories

The Hamlet of Ulukhaktok is a coastal Inuit settlement of approximately 450 people (over 98% Inuit) on Victoria Island, in the Northwest Territories of Canada. Ulukhaktok was originally settled in the late 1930s, when the Hudson's Bay Company and the Roman Catholic Mission consolidated their operations and relocated to the present site (see Condon 1994). The majority of Inuit remained on the land, however, pursuing a traditional subsistence round and traveling to Ulukhaktok only to trade. It was not until the late 1950s and 1960s that Inuit settled permanently at Ulukhaktok, lured by the presence of government-sponsored public housing, increased investment in social services, and the availability of wage labor. Many families continued to spend significant time on the land in the pursuit of subsistence activities, and it was only after the European Economic Community (EEC) ban on sealskin imports in 1983 that full-time hunting declined precipitously. For the past twenty years, the norm has been for Inuit to forage within 50 miles of the settlement—trips that can be completed within a day. Only a few activities, such as summer

caribou hunting, require longer journeys. Despite this shift in subsistence strategy, Ulukhaktomiat remain comparatively active hunters, with outsiders frequently commenting on the land-oriented focus of residents relative to other settlements.

Prior work on food and subsistence (Collings, Wenzel, and Condon 1998; Condon, Collings, and Wenzel 1995) and observation suggest that for many adults, roughly 50% of the meat Inuit consume is hunted food. The amount of country food in the diet, however, may be somewhat higher if the snacking that invariably occurs between meals is factored into total consumption (Ovaskainen et al. 2006). Dry meat (*mipku*) and fish (*piffi*), for example, are nearly ubiquitous. Informal food preference surveys and observations of Inuit eating patterns suggest that ducks and char (which are stored in freezers and available year round) and caribou meat (which has been increasingly difficult to obtain) are by far the favored meats.

It is important to note here that the *availability* of food, especially country food, was not a particularly pressing issue in Ulukhaktok in 2009 or during earlier research visits. While some species' availability is highly seasonal, country food of one kind or another is widely available, evident by drying fish hanging from racks, the remains of freshly butchered animals outside in the snow, or the number of hunters leaving or returning from hunting trips. The *utilization* of country food does not appear to be a pressing issue, either. Inuit in Ulukhaktok and elsewhere consume nearly all parts of an animal, including organs, blood, marrow, and rumen contents. It is, however, apparent that not all Inuit have equal access to these foods, and some country foods are more accessible than others. Eider ducks and arctic char, for example, can be seasonally taken by most men and women because of their proximity to the settlement, but other country foods, particularly larger game such as caribou and muskoxen, require greater investments in time, equipment, and skill. If a household lacks an active hunter, access to larger game depends upon connections to households with a hunter who catches these foods. On the ground, a household's access is evident by observing the remains of previous meals on the counter or hearing a public declaration such as "gee, I'm really hungry for caribou." The individual may then ask if anyone present has caribou, though it is more common to hear someone, if they have caribou, to offer to share.

Despite the value and importance of country foods, it is clear that younger Inuit, as a group, eat less country food than do their parents or grandparents. Younger people also tend to be pickier about what they eat. Caribou roast, boiled duck, and baked char are highly valued, but fish heads, seal intestines, caribou head, and polar bear feet are less attractive than Pizza Pockets or Hungry Man dinners. Younger Inuit also consume large quantities of prepared meat snacks (beef jerky and associated products), which are some of

the most popular items purchased at the stores. Sweetened drinks, especially soda and Kool-Aid, are consumed with equal vigor.

Nearly all meals include industrial food. In 2009, there were three stores from which Inuit purchased imported food: the Holman Eskimo Co-op, the Northern Store, and a “Snack Shack” run and managed by an Inuk who opened the store in the evenings after the other two closed. The Snack Shack exclusively sold what Inuit call “junk”—candy, pop, chips, and beef jerky. The Co-op and the Northern are general stores that offer groceries, hardware, and household goods. Their food sections are akin to southern convenience stores, selling a limited variety of canned foods, dry goods, and ready-to-eat meals. Fresh produce, dairy products, and frozen meats are flown in regularly, but these are extraordinarily expensive. Huet, Rosol, and Egeland (2012) note that prices in settlements like Ulukhaktok tend to be twice as expensive, or more, compared to southern markets. Furthermore, the quality of these items tends to be inferior, often arriving nearing their expiration dates and sometimes spoiled.

Eating routines somewhat resemble southern eating schedules. Lunchtime is between noon and one p.m. Dinner follows the end of the workday, when the Hamlet offices and stores close for the evening. Generally, at least one meal of the day is an extended family affair, with adults congregating at their parents’ house to eat, a practice referred to as *nirriyaktuqtuq*, or “eating together.” Preferences vary by family and season. In one such pattern, the noon meal might consist of leftovers from the previous evening, supplemented by industrial food and mipku, piffi, or *quaq* (frozen raw meat or fish). The dinner meal might then consist of freshly boiled or roasted meat, supplemented by industrial food. Other families may do the reverse. In either case, these affairs are casual. People arrive and leave as schedules and preferences dictate, late arrivals choosing to eat after everyone else is done, or sometimes not at all.

Nevertheless, eating habits are variable, and they remain distinctively Inuit. Many younger adults keep very little food in their own house beyond essentials like coffee, tea, and breakfast items. They simply visit their parents or in-laws when they are hungry. For those without regular employment, the variable photoperiod encourages some to become backward—sleeping all day and remaining awake all night—and miss meals. In addition, there remains a strong sense that one should eat when hungry rather than submit to the tyranny of scheduled mealtimes. It is common to visit with Inuit in the late evening, for example, and for the host to declare that it is time to eat. Out comes a piece of cardboard, which functions as a very large paper plate for the piffi, *quaq*, or mipku. People sit down, often camp style, on the floor, to help themselves.

Research methods

Social network analysis and country food

We employ social network analysis to document the nature of household connections as they relate to country food exchange. As we stated earlier, we are interested in the ability of households to draw on others when they desire or require particular foods. We are also interested in how these sharing patterns help our understanding of food insecurity.

Social network analysis is both a method and an approach that incorporates anthropologists' and sociologists' long-standing interests in social structure (see Scott 2000, 7–16; Wasserman and Faust 1994, 9–13). The aim of a network analysis is to uncover the complexities of social systems emerging from the relationships and interactions among social actors. Understanding how individuals are connected is a useful lens through which social scientists can explore and comprehend human behavior. Mapping those connections is a means to examine social structures to better focus on individuals and their connections to others. In visual terms, individuals (or nodes) are connected by ties created by family, friendship, employment, physical proximity, or, in the case examined here, food sharing. Network approaches begin by eliciting social structure and working toward individual behavior, rather than inferring structure from individual behavior (Wellman and Berkowitz 1988).

There are numerous ways one could establish the structure and composition of networks in Ulukhaktok, including tracking the exchange of material goods and foods, such as money and industrial food, or by noting participation in community events, such as attendance at meetings, sewing clubs, or church services. Country food exchanges, however, are unique because they mark culturally meaningful interactions. Food exchanges are economically important because of the nutritional value of the items exchanged, but they also carry political and economic meaning. Individuals who give are held in higher esteem than those who only receive.

Not all material exchanges offer such a clear view of social structure in Ulukhaktok. Money is clearly important for Inuit, but they are unwilling to report large gifts of money to others and often do not track smaller exchanges (see Collings 2009). Industrial food does change hands, but these exchanges are typically limited to either large, settlement-wide functions at the community hall or the customary snacks of bannock, cookies, and other tidbits consumed during social visits. For our informants, food given or received of any kind at large community gatherings was not considered sharing, and Inuit did not consider eating at these functions equivalent to sharing a meal. At large gatherings, people invariably arrive and sit with their own nuclear families, often clustered around their own parents or adult siblings' families. Snacks offered during social visits simply do not register as important and are neither remembered nor reported on survey forms.

Data collection and analysis

Data for this article were collected in early 2009 during two community-wide surveys conducted by Pearce and two research assistants, Elsie Ovilok and Wilma Memogana. Study protocols were approved by Institutional Review Boards at the University of Florida and the University of Guelph. The research was licensed by the Aurora Research Institute (#14440 R), which oversees research in the Northwest Territories. Verbal consent was obtained from each respondent. Each household was visited twice, once in February and once in April. Heads of household were asked to name the households they had given country food to and received country food from during the previous week.

Of the available households in the settlement, all of the permanent residents—122 households—were interviewed during the survey period. The interview was part of a larger community-wide survey investigating traditional knowledge transmission and subsistence involvement. The questions were embedded in this larger survey and took approximately 10 minutes to answer. “In the past week, did you give country food to another household? Who did you give food to? What did you give them? In the past week, did you receive country food from another household? Who did you receive food from? What did they give you?” Nonnative schoolteachers, Royal Canadian Mounted Police (RCMP) officers, nurses, and store managers were excluded from the study. Members of these households are temporary residents (typically staying two years or less) and, in the cases of nurses and teachers, leave the settlement for lengthy periods. Teachers, for example, leave for the summer months. None of the Inuit included in the study named these households as recipients of food gifts. Inuit are unclear on the regulations, but many believe that it is unlawful to give country food to nonnatives and are less likely to report food exchanges with these households.¹

We chose measures of access that have to do with centrality—the position of an actor (in this case, a household) within the whole network. In coding the data, we opted for inclusion rather than exclusion. That is, if Household A declared that food was given to Household B, but B did not name A, we coded for a link between the two households. We used UCInet and Netdraw (Borgatti, Everett, and Freeman 2002) to assist with data analysis.

We consider *betweenness* centrality in this analysis. Rather than simply count the number of exchange partners a household has—called degree centrality—betweenness operates through notions of brokerage and social capital (see Gould and Fernandez 1989). In a network, a household’s

¹Current law (2014–15) in the Northwest Territories is that hunters may give gifts of meat to friends and family. The hunter must provide a signed note with the hunter’s name, hunting license number, the date of the gift, the species, and the weight of the gift. To our knowledge, Ulukhaktomiuut have never observed this law, nor has it ever been enforced.

betweenness is equal to the shortest path from all nodes to all other nodes that pass through that household. Households with high betweenness are those more frequently along the shortest paths between two other households. By virtue of being in position between many different households, those with high betweenness centrality are better able to act as mediators of exchange (for more detailed definitions, see Wasserman and Faust 1994, 188–90; Scott 2000, 86–87). As an example, an individual with high betweenness might not have immediate access to country food from a direct connection, but he or she can activate those direct connections to procure food from a secondary source. Secondary exchange is significant in Ulukhaktok, as country food frequently flows from the original hunter to other households through indirect paths. A hunter may give food to an elderly parent, who then distributes some of that food to others directly connected to the elder's household. Conversely, a household with low betweenness lies on fewer (or no) paths between other households and has a limited ability to influence other households. Betweenness is therefore a measure of social power and influence, in this case influence in access to country food. Ulukhaktok households with high betweenness, or access and influence, should be less vulnerable to fluctuations in the availability of country food. Conversely, we expect households on the margins to be more vulnerable.

Results

Table 1 displays the household types and economic strategies of the 122 households surveyed in the settlement. “Single female” and “Single male” households are those in which the head of the household does not have a spouse residing in the home. “Married” includes couples married in church or civil ceremonies but also includes those referred to as being “shacked up” or having a “common-law” partner. Most commonly, Ulukhaktomiat consider a relationship a marriage when a couple cohabits and the union produces a child. Three households were coresident siblings. One household consisted of two brothers, a second was a brother-sister pair, and a third household was a woman living with her two brothers.

For employment categories, we coded a household as being “Full-time” if one adult in the household held a full-time (in Ulukhaktok, 35 hours per

Table 1. Household types and employment, Ulukhaktok 2009.

Household type	Employment category				
	Full-time	Underemployed	Hunter	Elder	Totals
Single female	7	23	0	7	37
Single male	2	17	0	3	22
Married	26	17	10	7	60
Coresident siblings	1	2	0	0	3
Totals	37	59	10	20	122

week) job in the settlement. “Hunters” are households in which the man identified hunting as his primary occupation. Hunting entails making a living through a combination of subsistence hunting, trapping, guiding sports hunters, arts and craft sales, and some seasonal wage labor. With one exception, wives in hunting households held either a part-time or full-time job. “Elder” households are those in which the household head was over age 60 (when Inuit qualify for an old-age pension), did not hold a job, and acknowledged having retired from hunting. “Underemployed” includes multiple employment statuses, none of which independently provide a living wage. Part-time work in Ulukhaktok is less than 20 hours per week, but other households depended upon seasonal or casual labor when it was available. Many of the households in this category depended upon social assistance to meet their needs.

Figures 1 and 2 display the country food network in Ulukhaktok. The figures are identical save for two household attributes we emphasize here. In Figure 1, nodes are sized by the age of the head of household. In Figure 2, nodes are sized by betweenness centrality.

The figures display some important features of social structure. Figure 1 shows that, with the exception of four elderly-female-headed households, single-female households appear to be marginal within this network. Of the thirty nonelderly-single-female households, ten shared with only a single

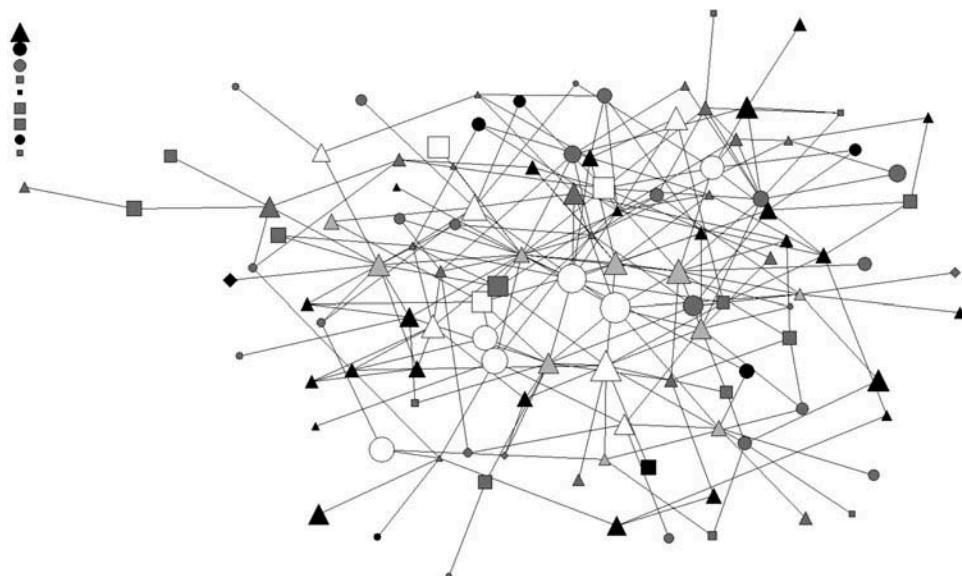


Figure 1. Ulukhaktok country food sharing network and employment categories, 2009.

Note. Nodes are sized by age of household head: Larger nodes represent older heads of household. Circle: single-female household; square: single-male household; triangle: married household; diamond: sibling-set household; black: full-time employed; dark grey: underemployed; light grey: hunter; white: retired elder.

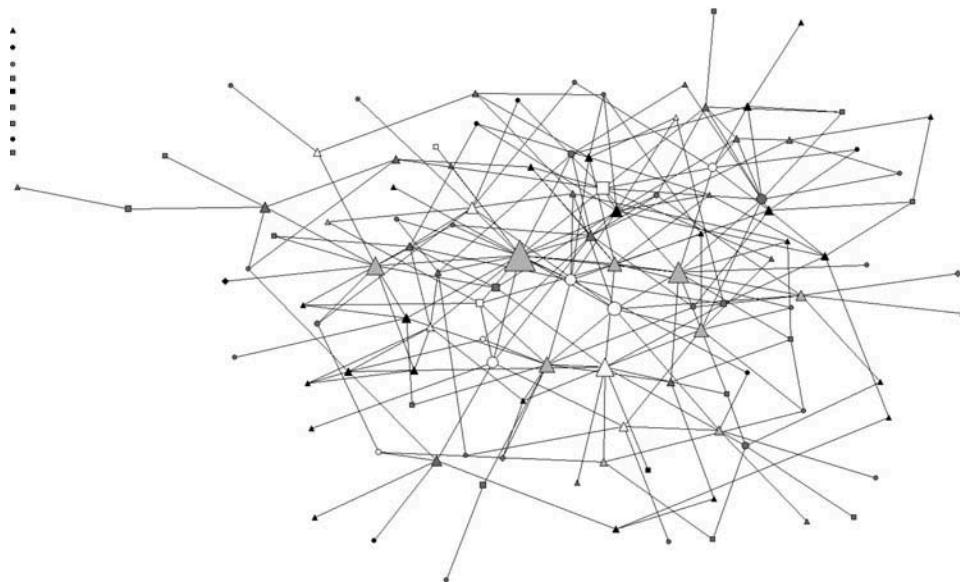


Figure 2. Ulukhaktok country food sharing network and employment categories, 2009.

Note. Nodes are sized by betweenness scores: Larger nodes represent higher betweenness. Circle: single-female household; square: single-male household; triangle: married household; diamond: sibling-set household; black: full-time employed; dark grey: underemployed; light grey: hunter; white: retired elder.

household, and three other households neither gave nor received any country food. In summary, 39% of these households had extremely limited options for accessing country food. In each of these cases, the single exchange partner was the household of the woman's parents.

Most women in single-female households have children of their own, but their sons are too young to hunt, with the oldest of these being in their late teens. Elderly women may find their situation improved by the fact that their own children are grown and capable of providing country food for their aging mothers. An additional advantage for elderly women is a strong ethic of sharing with elders. This ethic is reinforced by kinship terminology that expands the category of grandfather and grandmother to include all individuals in the same generation as one's grandparents (Damas 1975).

Figure 2 highlights the betweenness centrality of households. Five households, in particular, stand out as important brokers of country food exchange. Of these households, one was retired from hunting (the hunter was in his mid-eighties). Another hunter was in his late seventies at the time and was nearly retired; he declared his involvement in hunting primarily as "the driver" for his teenage grandson. The youngest of this group had just turned 60 years and is noteworthy for being an outlier both because of his hunting production and because of his generosity. Despite their ages, these four hunting households were among the most productive hunters in the

Table 2. Associations between demographic and structural variables and betweenness scores.

	N	Mean betweenness score	Standard deviation	df	Significance
Marital status					
Married	64	2.65	3.97	120	<i>p</i> < .05
Single	58	0.88	1.72		
Household head					
Female	35	1.13	2.00	120	.079
Male	87	2.08	3.57		
Single-headed households					
Single female	32	0.96	1.89	56	.691
Single male	26	0.78	1.51		
Employment					
Full-time	35	0.77	1.23	3	<i>p</i> < .05
Underemployed	62	0.86	1.26		
Hunter	10	8.23	6.54		
Elder	15	3.91	3.22		

settlement. In the case of the retired hunter, his household remained the nexus of social relations for his very large family.

These two features of the networks, age and betweenness centrality, are important features of food sharing in Ulukhaktok. The age of the head of household predicted betweenness scores ($p < .001$, adjusted $r^2 = 0.320$, $df = 121$). Differences in betweenness also appear by employment category ($p < .05$), with hunter and elder households having higher mean betweenness scores than either full-time employed or underemployed households. Likewise, mean betweenness scores in the households of married couples are significantly higher ($p < .05$) than those of either single-female or single-male households. Single-female households, however, do not appear to be any different in terms of brokerage than do the households of single men, as displayed in Table 2.

Discussion: social structure, country food networks, and vulnerability

We noted earlier that the general consensus of food insecurity studies in the Arctic is that female-headed households seem to be particularly vulnerable to food insecurity. We cannot directly assess the food insecurity of households in Ulukhaktok—we do not have the data to do so—but our data suggest some important features of social structure that have implications for access to country food.

The finding that married households have, as a group, better access to country foods is not surprising, given that married households, especially younger households, have access to two sets of relatives, both of the husband and of the wife. Traditional Inuit conceptions of gender and social structure emphasize the complementarity of men and women. The division of labor between men and women is one form of this complementarity, but

Table 3. Changes in household structure, 1992–2009.

Household type	Years		
	1992	1997	2009
Married	70	74	60
Single female	14	23	37
Single male	9	17	22
Coresident siblings	8	4	3
Totals	101	118	122

attachment to a member of the opposite sex is important for both social and personal balance (Burch 1975; Guemple 1995; Jenness 1922).

The finding that nearly half of the households in the settlement now consist of single adults is noteworthy. This is not to say that marriage is a necessity: Inuit social organization has always been very flexible. Within living memory there are cases of both polygyny and polyandry in Ulukhaktok, and not all men and women during the contract-traditional period were married. However, the recent past suggests a significant change in settlement social structure. **Table 3** shows the household composition of Ulukhaktok at three points in time: 1992 (Collings's first field season), 1997 (Collings's dissertation fieldwork), and 2009. Over a 17-year period, there has been an increase in both single-female and single-male households and a subsequent a decline in married couples. In 1992, 69% of households were married couples, whereas in 2009, only 50% of households were married couples.

The change in household structure may be driven partly by housing policy. During the 1990s, the settlement expanded dramatically as the Northwest Territories Housing Corporation encouraged Inuit to acquire their own, privately owned units (see Collings 2005). Although single women with children always had priority for public housing, the relative surplus of housing created by this building boom allowed for both unmarried men and women to acquire their own units. That single men could acquire their own unit—and only two of the single men in the 2009 sample were custodial parents—speaks to the abundance of housing stock in Ulukhaktok.

Another influence on changing social structure may have more to do with the position of men and women within the economy. As noted in **Table 1**, employment strategy varies by household type, with married households far more likely to have full-time employment than single-female or single-male households. On one level this makes sense—with two adults in the household, there is a greater likelihood that at least one adult can secure a job. However, not all jobs are equal. In our experience in Ulukhaktok, men are far more likely to face bottlenecks in the wage-labor market than are women. Full-time, male-appropriate jobs typically appear in the maintenance and construction sectors, many of which require training and licensing beyond a high school-level education. For some of these jobs, such as positions in

public housing maintenance, training is a lengthy time commitment requiring multiple absences from Ulukhaktok. Men who secure these positions tend to keep them, making it difficult for younger men to gain a foothold in the wage-labor economy. Women, by contrast, tend to work in administrative capacities in the Hamlet government and the Community Corporation, jobs with fewer training and licensing requirements. Consequently, there appear to be far fewer gender-appropriate jobs for men than for women, which may partly account for why fewer single men have full-time employment.

Younger men also face significant obstacles to participating in the subsistence economy. Pursuing a livelihood incorporating full-time hunting is fraught with difficulty. Mechanized foraging from the settlement requires a significant cash outlay for equipment and supplies, which is beyond the means of many younger men. Making a living as a hunter likewise requires a suite of skills and knowledge that take both time and experience to develop and master (Pearce et al. 2011) and network strategies for balancing dynamic environmental and economic conditions (Collings 2011). Men who can neither find employment nor develop as productive hunters consequently have little to offer prospective partners.

Conclusions

Previous research in the Canadian Arctic has documented widespread food insecurity among Inuit. Our purpose here is to examine one of the pillars of food security—access. Our data suggest that single-female households in arctic settlements might be food insecure because of limited access to country foods. This investigation also reveals the existence of numerous single-male households, which also appear to have limited access to country foods. These male households also appear, as a group, to be even more economically marginal than female-headed households.

Together, these raise questions about why female-headed households might differentially register as being food insecure. Duhaime, Chabot, and Gaudreault (2002), one of the few works with a specific focus on the cultural context of food insecurity, argue that female-headed households were likely food insecure because of the lack of a male in the household as a hunter and provider. In Ulukhaktok—in a different part of the Arctic with a different history and social organization—we find a similar pattern. Having a hunter in the household is an important predictor of access to country foods. However, we also find that the lack of a partner has implications for exchange patterns. The households of single men and women lack access to an absent partner's kin, another venue to acquire country food. For female household heads, the problem is more acute because of the presence of children in the household. Having a male in the household does not mean

he actually hunts, and our experience is that single adult males in Ulukhaktok are not hunting much if at all in any case. Given their high rates of unemployment and underemployment, they appear to have little to offer to a household's economy.

Consequently, we suggest that the problem of food insecurity is one deeply embedded within social structural and economic trends within the settlement. We suspect that women may forgo cohabiting with men because of negative trade-offs—women appear to be better able to secure stable employment, and a man who does not hunt or work is a burden on the household. Household stability, however, comes at a cost in the form of reduced access to country food, perhaps the most important marker of identity and adherence to Inuit cultural values. Measures of food insecurity in Ulukhaktok are not necessarily about nutritional deprivation but rather cultural deprivation. To paraphrase a single young woman posting on Facebook, I don't really expect much money from him [the father of her children, who no longer lives in Ulukhaktok] when it comes to supporting his kids, but I sure wish he would send us some caribou. Caribou is like gold around here. Although the households of single men and women may experience similar levels of access to country food, the implications of that access, and the experience of food insecurity, may differ significantly in these two types of households.

It is important to note that the features of social structure and economy that underlie network access to country food in Ulukhaktok may not apply in other settlements. Ulukhaktok is noteworthy for relatively abundant housing availability—a situation that certainly does not exist in other regions of the Canadian Arctic, where housing conditions are both substandard and overcrowded (Lauster and Tester 2010). In addition, kinship and social structure vary across the Canadian Arctic (Damas 1975). Given such constraints, households in different settlements might report equal levels of food insecurity that are driven by entirely different factors.

Given the highly seasonal and dynamic nature of arctic environments, we expect that food access and availability vary by season. We collected this data during a time of year when hunting productivity is low. Asking the same questions in September, following expedition hunts for caribou, households would likely record greater access to country food than was the case in February. Another temporal issue is the pernicious nature of climate change. We noted earlier that country food availability did not appear to be a concern in 2009, but our experience is that the situation has since changed drastically. Sea ice conditions in recent years have had dramatic effects on the availability of local wildlife. As one example, persistent open water and early ice dispersal have restricted the availability of eider ducks and other waterfowl, as hunters depend on the ice as a platform for hunting. An earlier and longer open-water period has likewise encouraged an increase in beluga whales in local waters. Beluga is an increasingly important food source in Ulukhaktok, but

the cost is reduced availability of arctic char and eider ducks, which have altered their migration pattern and timing. Other conditions have resulted in a limited availability of caribou such that a local entrepreneur has begun importing and selling reindeer meat—and is facing difficulties in meeting the demand.

Despite these study limitations, the results point to some important questions: *Why* do the numbers of female-headed households appear to be increasing? What processes underlie going without a male? What are the consequences of these decisions for both women's *and* men's health? What are the implications of growing up in a female-headed household for young men—can they acquire the skills to become productive hunters? Finally, given the advanced age of the current country food providers in the settlement, how will access to country food change when these hunters retire?

As previous research has outlined, food research reveals as much or more about culture, stress, and anxiety as it does about nutritional inadequacy. Our findings suggest that the experience of food insecurity in Ulukhaktok may reflect anxiety over rapidly shifting livelihood strategies, household demographics, and gender relations. In addition, these rapid shifts in economy, demography, and gender relations are both recursive and synergistic. We have limited our investigation of access to country food through the medium of social networks, but access to country food depends upon availability of both the animals and the hunters to catch them. Future work in Ulukhaktok and elsewhere in the Arctic must attend to these important cultural and contextual factors if we are to better understand food insecurity and what it means for residents of arctic communities.

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References

- Balikci, A. 1964. *Development of basic socioeconomic units in two Eskimo communities*. Ottawa, Canada: National Museum of Canada Bulletin 202.
- Beaumier, M. C., and J. D. Ford. 2010. Food insecurity among Inuit women exacerbated by socioeconomic stresses and climate change. *Canadian Journal of Public Health* 101 (3):196–201.
- Berkes, F., and D. Jolly. 2001. Adapting to climate change: Social-ecological resilience in a Canadian Western Arctic economy. *Conservation Ecology* 5:18.
- Borgatti, S. P., M. G. Everett, and L. C. Freeman. 2002. *Ucinet for windows: Software for social network analysis*. Harvard, MA: Analytic Technologies.
- Borre, K. 1991. Seal blood, Inuit blood, and diet: A biocultural model of physiology and cultural identity. *Medical Anthropology Quarterly* 5:48–62. doi:[10.1525/maq.1991.5.issue-1](https://doi.org/10.1525/maq.1991.5.issue-1).
- Borre, K. 1994. The healing power of the seal: The meaning of Inuit health practice and belief. *Arctic Anthropology* 31:1–15.
- Burch, E. S. 1975. *Eskimo Kinsmen: Changing family relationships in Northwest Alaska*. St. Paul, MN: West Publishing.
- Chabot, M. 2003. Economic changes, household strategies, and social relations of contemporary Nunavik Inuit. *Polar Record* 39:19–34. doi:[10.1017/S0032247402002711](https://doi.org/10.1017/S0032247402002711).
- Chan, H. M., K. Fediuk, S. Hamilton, L. Rostas, A. Caughey, H. V. Kuhnlein, G. M. Egeland, and E. Loring. 2006. Food security in Nunavut, Canada: Barriers and recommendations. *International Journal of Circumpolar Health* 65:416–31. doi:[10.3402/ijch.v65i5.18132](https://doi.org/10.3402/ijch.v65i5.18132).
- Collings, P. 2005. Housing policy, aging, and life course construction in a Canadian Inuit community. *Arctic Anthropology* 42:50–65. doi:[10.1353/arc.2011.0037](https://doi.org/10.1353/arc.2011.0037).
- Collings, P. 2009. Birth order, age, and hunting success in the Canadian Arctic. *Human Nature* 20:354–74. doi:[10.1007/s12110-009-9071-7](https://doi.org/10.1007/s12110-009-9071-7).
- Collings, P. 2011. Economic strategies, community, and food networks in Ulukhaktok, Northwest Territories, Canada. *Arctic* 64:207–19. doi:[10.14430/arctic4100](https://doi.org/10.14430/arctic4100).
- Collings, P., G. Wenzel, and R. G. Condon. 1998. Modern food sharing networks and community integration in the Central Canadian Arctic. *Arctic* 51:301–14. doi:[10.14430/arctic1073](https://doi.org/10.14430/arctic1073).
- Condon, R. G. 1994. East meets West: Fort Collinson, the fur trade, and the economic acculturation of the Northern Copper Inuit, 1928–1939. *Etudes/Inuit/Studies* 18:109–35.
- Condon, R. G., P. Collings, and G. Wenzel. 1995. The best part of life: Subsistence hunting, ethnicity, and economic adaptation among young adult Inuit males. *Arctic* 48:31–46. doi:[10.14430/arctic1222](https://doi.org/10.14430/arctic1222).
- Damas, D. 1995. Environment, history, and Central Eskimo society. *Bulletin of the National Museum of Canada, Contributions to Anthropology* 230:40–64.
- Damas, D. 1975. Three kinship systems from the Central Arctic. *Arctic Anthropology* 12 (1):10–30.
- Dombrowski, K., E. Channell, B. Khan, J. Moses, and E. Misshula. 2013a. Out on the land: Income, subsistence activities and food sharing networks in Nain, Labrador. *The Journal of Anthropology* 2013:1–11.
- Dombrowski, K., B. Khan, E. Channell, J. Moses, K. McLean, and E. Misshula. 2013b. Kinship, family, and exchange in a Labrador Inuit community. *Arctic Anthropology* 50 (1):89–104. doi:[10.3368/aa.50.1.89](https://doi.org/10.3368/aa.50.1.89).
- Duhame, G., M. Chabot, and M. Gaudreault. 2002. Food consumption patterns and socio-economic factors among the Inuit of Nunavik. *Ecology of Food and Nutrition* 41:91–118. doi:[10.1080/03670240214491](https://doi.org/10.1080/03670240214491).

- Egeland, G. M. 2010. 2007–2008 Inuit Health Survey: Inuvialuit Settlement Region. <http://www irc.inuvialuit.com/publications/pdf/ihss-report-final.pdf>
- Egeland, G. M., L. Johnson-Down, Z. R. Cao, N. Sheikh, and H. Weiler. 2011. Food insecurity and nutrition transition combine to affect nutrient intakes in Canadian Arctic communities. *The Journal of Nutrition* 141:1746–53. doi:[10.3945/jn.111.139006](https://doi.org/10.3945/jn.111.139006).
- FAO. 2009. *The state of food insecurity in the world 2009. Economic crises – impacts and lessons learned*. Rome, Italy: FAO.
- FAO, IFAD, and WFP. 2013. *The state of food insecurity in the world 2013. The multiple dimensions of food security*. Rome, Italy: FAO.
- Fienup-Riordan, A. 1999. *Yaqlut Qaillun Pilartat* (What the birds do): Yup'ik Eskimo understanding of geese and those who study them. *Arctic* 52:1–22. doi:[10.14430/arctic905](https://doi.org/10.14430/arctic905).
- Ford, J. D., and M. Beaumier. 2011. Feeding the family during times of stress: Experience and determinants of food insecurity in an Inuit community. *The Geographical Journal* 177:44–61. doi:[10.1111/geoj.2011.177.issue-1](https://doi.org/10.1111/geoj.2011.177.issue-1).
- Freeman, M. M. R. 1988. Tradition and change: Problems and persistence in the Inuit diet. In *Coping with uncertainty in food supply*, ed. I. De Garine, and G. A. Harrison, 150–69. Oxford, UK: Clarendon Press.
- Gould, R. V., and R. M. Fernandez. 1989. Structures of mediation: A formal approach to brokerage in transaction networks. *Sociological Methodology* 19:89–126. doi:[10.2307/270949](https://doi.org/10.2307/270949).
- Guemple, L. 1995. Gender in Inuit society. In *Women and power in native North America*, ed. L. Klein, and L. Ackerman, 17–27. Norman, OK: University of Oklahoma Press.
- Harder, M., and G. Wenzel. 2012. Inuit subsistence, social economy and food security in Clyde River, Nunavut. *Arctic* 65 (3):305–18. doi:[10.14430/arctic4218](https://doi.org/10.14430/arctic4218).
- Huet, C., R. Rosol, and G. M. Egeland. 2012. The prevalence of food insecurity is high and the diet quality poor in Inuit Communities. *Journal of Nutrition* 142:541–47. doi:[10.3945/jn.111.149278](https://doi.org/10.3945/jn.111.149278).
- Jenness, D. 1922. The life of the Copper Eskimo. Report of the Canadian Arctic Expedition, Vol. 12, F.A. Acland, Ottawa, Canada.
- Kuhnlein, H. V. 1995. Benefits and risks of traditional food for indigenous peoples: Focus on dietary intakes of arctic men. *Canadian Journal of Physiology and Pharmacology* 73:765–71. doi:[10.1139/y95-102](https://doi.org/10.1139/y95-102).
- Kuhnlein, H. V., and H. M. Chan. 2000. Environment and contaminants in traditional food systems of northern indigenous peoples. *Annual Review of Nutrition* 20:595–626. doi:[10.1146/annurev.nutr.20.1.595](https://doi.org/10.1146/annurev.nutr.20.1.595).
- Kuhnlein, H. V., and O. Receveur. 1996. Dietary change and traditional food systems of indigenous peoples. *Annual Review of Nutrition* 16:417–42. doi:[10.1146/annurev.nu.16.070196.002221](https://doi.org/10.1146/annurev.nu.16.070196.002221).
- Kuhnlein, H. V., O. Receveur, and H. M. Chan. 1999. Inuit diet benefits and risks: A Canadian Arctic Project in progress. *Nutritional Anthropology* 22:17–19. doi:[10.1525/nua.1999.22.2.17](https://doi.org/10.1525/nua.1999.22.2.17).
- Kuhnlein, H. V., and R. Soueida. 1992. Use and nutrient composition of traditional Baffin Inuit foods. *Journal of Food Composition and Analysis* 5:112–26. doi:[10.1016/0889-1575\(92\)90026-G](https://doi.org/10.1016/0889-1575(92)90026-G).
- Kuhnlein, H. V., R. Soueida, and O. Receveur. 1996. Dietary nutrient profiles of Canadian Baffin Island Inuit differ by food source, season, and age. *Journal of the American Dietetic Association* 96:155–62. doi:[10.1016/S0002-8223\(96\)00045-4](https://doi.org/10.1016/S0002-8223(96)00045-4).
- Lambden, J., O. Receveur, and H. V. Kuhnlein. 2007. Traditional food attributes must be included in studies of food security in the Canadian Arctic. *International Journal of Circumpolar Health* 66:308–19. doi:[10.3402/ijch.v66i4.18272](https://doi.org/10.3402/ijch.v66i4.18272).

- Lambden, J., O. Receveur, J. Marshall, and H. V. Kuhnlein. 2006. Traditional and market food access in Arctic Canada is affected by economic factors. *International Journal of Circumpolar Health* 65:331–40. doi:[10.3402/ijch.v65i4.18117](https://doi.org/10.3402/ijch.v65i4.18117).
- Laugrand, F., and J. Van Oosten. 2014. *Hunters, predators, and prey: Inuit perceptions of animals*. New York, NY: Berghahn.
- Lauster, N., and F. Tester. 2010. Culture as a problem in linking material inequality to health: On residential crowding in the Arctic. *Health & Place* 16:523–30. doi:[10.1016/j.healthplace.2009.12.010](https://doi.org/10.1016/j.healthplace.2009.12.010).
- Mann, G. V., E. M. Scott, L. M. Hursh, C. A. Heller, J. B. Youmans, F. Consolazio, A. A. Russell, and M. Milverman. 1962. The health and nutritional status of Alaskan Eskimos. *American Journal of Clinical Nutrition* 11:31–76.
- Mayhall, J. T. 1976. Inuit culture change and oral health: A four-year study. In *Circumpolar health (74): Proceedings of the 3rd international symposium, Yellowknife, NWT*, ed. R. J. Shepard, 414–20. Ontario, Canada: University of Toronto Press.
- Moffat, M. E. K. 1995. Current status of nutritional deficiencies in Canadian aboriginal people. *Canadian Journal of Physiology and Pharmacology* 73:754–58. doi:[10.1139/y95-100](https://doi.org/10.1139/y95-100).
- Natcher, D. 2009. Subsistence and the social economy of Canada's Aboriginal North. *The Northern Review* 30:83–98.
- O'Neil, J. D., B. Elias, and A. Yassi. 1997. Poisoned food: Cultural resistance to the contaminants discourse in Nunavik. *Arctic Anthropology* 34:29–40.
- Ovaskainen, M.-L., H. Reinivuo, H. Tapanainen, M.-L. Hannila, T. Korhonen, and H. Pakkala. 2006. Snacks as an element of energy intake and food consumption. *European Journal of Clinical Nutrition* 60:494–501. doi:[10.1038/sj.ejcn.1602343](https://doi.org/10.1038/sj.ejcn.1602343).
- Pearce, T., B. Smit, F. Duerden, J. Ford, A. Goose, and F. Kataoyak. 2010. Inuit vulnerability and adaptive capacity to climate change in Ulukhaktok, Northwest Territories, Canada. *Polar Record* 46:157–77. doi:[10.1017/S0032247409008602](https://doi.org/10.1017/S0032247409008602).
- Pearce, T., B. Smit, F. Duerden, F. Kataoyak, A. Goose, R. Inuktalik, J. Ford, and J. Wandel. 2008. Travel routes, harvesting, and climate change in Ulukhaktok, Canada. In *Proceedings of the 4th Northern Research Forum* eds. L. Heininen and K. Laine, 148–56. Oulu, Finland: Northern Research Forum.
- Pearce, T., H. Wright, R. Notaina, A. Kudlak, B. Smit, J. Ford, and C. Furgal. 2011. Transmission of environmental knowledge and land skills among Inuit men in Ulukhaktok, Northwest Territories, Canada. *Human Ecology* 39 (3):271–88. doi:[10.1007/s10745-011-9403-1](https://doi.org/10.1007/s10745-011-9403-1).
- Schaefer, O., J. F. W. Timmermans, R. D. P. Eaton, and A. R. Matthews. 1980. General and nutritional health in two Eskimo populations at different stages of acculturation. *Canadian Journal of Public Health* 71:397–405.
- Scott, J. 2000. *Social network analysis: A handbook*. 2nd ed. Los Angeles, CA: Sage Publications.
- Searles, E. 2002. Food and the making of modern Inuit identities. *Food and Foodways* 10:55–78. doi:[10.1080/07409710212485](https://doi.org/10.1080/07409710212485).
- Stairs, A., and G. Wenzel. 1992. "I am I and the Environment": Inuit hunting, community, and identity. *Journal of Indigenous Studies* 3 (1):2–12.
- Usher, P. J. 1976. Evaluating country food in the northern native economy. *Arctic* 29:105–20. doi:[10.14430/arctic2795](https://doi.org/10.14430/arctic2795).
- Wasserman, S., and K. Faust. 1994. *Social network analysis: Methods and applications*. Cambridge, UK: Cambridge University Press.
- Wein, E. E., M. M. R. Freeman, and J. Makus. 1996. Use of and preference for traditional foods among the Belcher Island Inuit. *Arctic* 49:256–64. doi:[10.14430/arctic1201](https://doi.org/10.14430/arctic1201).

- Wellman, B., and S. D. Berkowitz. 1988. Thinking structurally. In *Social structures: A network approach*, ed. B. Wellman, and S. D. Berkowitz, 15–18. Cambridge, UK: Cambridge University Press.
- Wenzel, G. 2009. Canadian Inuit subsistence and ecological instability: If the climate changes, must the Inuit? *Polar Research* 28:89–99.
- Wesche, S., and H. M. Chan. 2010. Adapting to the impacts of climate change on food security among Inuit in the Western Canadian Arctic. *EcoHealth* 7 (3):361–73. doi:10.1007/s10393-010-0344-8.
- Wolfe, R. J. 1987. The super-household: Specialization in subsistence economies. Paper presented at the 14th annual meeting of the Alaska Anthropological Association, March 12–13, Anchorage, AK, USA.