Correlates of psychological distress amongst adult Inuit in Nunavik, northern Québec

Déterminants Facteurs de la détresse psychologique entre les Inuits adultes à Nunavik, Nord du Québec

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ABSTRACT/RÉSUMÉ

Objectives: Inuit in Nunavik (Northern Québec) have high rates of suicide among youth in recent years. Suicide may be a manifestation of other co-existing mental health problems. This study examined correlates of psychological distress to identify factors that may be targeted for preventive interventions. **Method:** Potential correlates of distress were identified through a literature review and secondary analysis of the 1992 Santé Québec Health Survey of Inuit, in which data was collected from 284 households in fourteen villages (N=584). Bivariate analysis was followed by multiple linear regression to identify independent contributors. **Results:** Correlates of psychological distress varied by age and gender strata and included sociodemographic characteristics, alcohol/solvent use, social support, significant life events, and country food consumption. **Conclusion:** In addition to well-established correlates of distress, there were some specific risk and protective factors which varied by age and gender. Further research is required to clarify causal pathways and identify feasible interventions.

Objectif: Il y a des taux de suicide élévés parmi les jeunes Inuits au Nunavik (Nord du Québec) dans les années récentes. Le suicide peut être une manifestation de plusieurs autres problèmes mentaux coexistants. Cette étude a examiné les corrélats de la détresse psychologique pour identifier les facteurs qui pourront être ciblés dans les interventions préventives. **Méthode:** Les corrélats potentiels de la détresse psychologique ont été identifié par une analyse secondaire du « Santé Québec Health Survey of Inuit » (1992), dans laquelle les données ont été rassemblés dans 284 maisons de quatorze villages (N=584). L'analyse bivariée a été suivie par une analyse de régression linéaire multiple pour identifier les facteurs contributifs. **Résultats:** Les corrélats de la détresse psychologique ont varié selon les strates d'âge et de sexe et ont inclu les caractéristiques sociodémographiques suivants : l'usage de l'alcool/solvant, le soutien social, les événements significatifs de la vie et la consommation de nourriture locale. **Conclusion:** De plus que les corrélats établis de la détresse, il y avait quelques facteurs spécifiques de risque et de protection qui ont varié selon l'âge et le sexe des participants. Plus de recherche est nécessaire pour clarifier les voies causales et pour identifier les interventions réalisables.

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1.0 INTRODUCTION

The present study examines the correlates of psychological distress among the Inuit of Nunavik, the northern region of Québec. The Inuit population across Canada has undergone rapid and profound changes in their way of life in the span of two generations with effects on their health and well-being. In particular, Inuit youth have suffered a very high rate of suicide and this has been attributed to the psychological impact of social changes (Kirmayer, Fletcher & Boothroyd, 1997).

One of the more profound changes in way of life that affected Inuit in Nunavik was the move from seasonal camps to villages during the 1950s and 60s (Vick-Westgate, 2002, p. 38). Depending on the season, camps varied from several close family members to a few extended families (D'Anglure, 1984, p.494), but the social organization changed since the villages consisted of families that previously had not lived together. By 1961, with the exception of one village of eighteen, populations ranged from 100-900, averaging 300 (excluding the smallest village) (Ornstein, 1973, vol.2, p. 197).

The movement to villages also affected individual and social values, particularly for those born and raised in the new settlements who received mandatory schooling. Schooling meant that children spent less time out on the land (Hodgins, 1997, p.45). Since Inuit traditionally taught their children by spending time out on the land (D'Anglure, 1984, p.492), the transfer of traditional skills was compromised, along with the values placed on these activities (Vick-Westgate, 2002, pp.41-42). Formal schooling also: 1) eroded social cohesion by its emphasis on individualism and competition; 2) diminished the role of parents in the socialization process since children spent more time with teachers; and 3) impacted on social integration across the generations since children

preferred to spend more time with same age peers than with their elders (Hodgins, 1997, pp.46, 54).

Although many other significant social changes occurred, e.g. the emergence of the co-operative movement in the 1950s and the signing of the James Bay and Northern Québec Agreement (JBNQA) in the mid-70s[1], by the late 1960s, there was evidence of increasing social problems, with alcohol use becoming widespread in some villages and drugs (primarily marijuana) increasingly available. Concurrently, use of these substances started to increase amongst youth (Hodgins, 1997, p.48).

The most dramatic indicator of a change in the mental health status of the population was an increase in suicides starting in 1980. Between 1980-84 there were eight, between 1985-1989 fourteen, and 38 between 1990-1994 (including two cluster suicides) and six probable cases between 1987-1995. As well, between 1987-1995, fourteen of the 49 suicides were by women, whereas all were previously by men. In addition, there was a cluster of four suicides in the last quarter of 1996 in one community. A majority of the suicides between 1980-1996 were amongst those aged 15-19 (Hodgins,

[1] The JBNQA was ratified on November 11, 1975 and was the first modern day treaty, where Inuit surrendered Aboriginal title to large tracts of land for hydroelectric development by the province of Québec, and in turn the province committed funds to develop new infrastructure such as airports, roads, schools, and new housing and agreed to the creation of regional government structures such as the Katavik Regional Government and the Katavik School Board that would allow for Inuit oversight of the administration of all public services – with ongoing funding to cover the costs of these structures by the province (75%) and the federal government (25%). As well, the villages became Québec municipalities (Vick-Westgate, 2002, pp. 71-73, 75, 77-81) Although the JBNQA was and continues to be a major development, particularly with respect to aspirations to self determination by the Inuit in Nunavik, it is beyond the scope of this study to examine its impact on psychological distress since unpacking its impact would require collection of primary data specific to the JBNQA, such as the influence of loss of some traditional territory and the impact of local and regional control over government services (including education) on the mental health and well-being of the Inuit in Nunavik and therefore a separate study would be required. As well, although this author initially attempted to conduct such an analysis using secondary data e.g. Statistics Canada censuses to examine changes in population and employment prior to the JBNQA (1971) and onward (1976, 1981, 1986, 1991), the exercise proved futile since the survey upon which this study is based upon is cross-sectional and therefore attributions of these changes upon the level of psychological distress became speculation. In addition, space limitations for this study did not permit for a detailed analysis of this secondary data.

1997, pp.220-223). Although in many cases the classification of suicides are fairly straightforward, because the primary methods are hanging and gunshot wounds (Ibid, p. 222), it is acknowledged that the coroner may be reluctant to classify certain cases as a death by suicide and therefore the rates of suicide may be underreported. But there are also high rates of non-intentional injury leading to death such that between 1980-1994 there were 108 deaths versus 65 deaths by suicide and these are also predominately among youth, suggesting that, even if a proportion of accidents were actually suicides, the age distribution would remain unchanged (Ibid, p. 237).

This increase in suicide indicates that certain individuals were suffering a great distress of distress and empirical studies have examined some of the factors associated with suicidal behaviours amongst Inuit in Nunavik (Kirmayer, Boothroyd & Hodgins, 1998; Kirmayer, Malus & Boothroyd, 1996; Malus, Kirmayer & Boothroyd, 1994). However, since little is known about the correlates associated with common forms of psychological distress in this population, this study will be exploratory in nature. The goals of this study are to identify psychosocial factors associated with distress amongst Inuit in Nunavik and to discuss the possible health policy implication of these findings.

1.1 Background

Nunavik is located north of the 55th parallel, and covers 560,000 km^2, roughly one-third of the province of Québec (Hodgins, 1997, p.19). In Inuktitut, Nunavik means "The Big Land" (Kativik School Board Adult Education Services, 1993, Part1). The region contains fourteen villages located on the eastern coast of Hudson Bay, the south shore of the Hudson Strait, and the southern coast of Ungava Bay. In 1912 the region was

called "Nouveau Québec", then legally "Northern Québec" pursuant to the ratification of the JBNQA in 1975 (Santé Québec, 1994, vol.1, p.3) and subsequently named "Nunavik" by the Avataq Cultural Institute in 1987 and officially recognized as such by the Québec government in 1988 (Vick-Westgate, 2002, p.21, Santé Québec, 1994, vol.1, p.3).

In order to contextualize the current determinants of distress in Nunavik, a brief history of Nunavik is required, with particular attention to the impact of European contact with the Inuit in the region up until the formation of permanent settlements.

1.2 A brief history of Nunavik[2]

Archeological evidence suggests that the ancestors of current day Inuit have lived in the region of Nunavik at least since 4,000 to 5,000 B.C. (D'Anglure, 1984, p.480; Kativik School Board Adult Education Services, 1993, Part1*)*. Traditionally, the Inuit traveled in small groups ranging from several close family members to a few extended families depending on the particular animal and plant resources available for survival, which varied with the season (D'Anglure, 1984, pp.487-492).

Although there were sporadic encounters with European explorers searching for the Northwest Passage to China as early as the late sixteenth century, this type of contact ceased after 1631 when the search shifted further north and west. From 1667 (when the Hudson's Bay Company was formed) up until 1750 there was some contact with British and French trading ships, but no effort was made by either group to settle in the region. In 1750 the Hudson's Bay Company set up a trading post on the southern edge of Nunavik but this proved unviable and closed down within six years. Over the next 150 years, there

[2] Since the oldest person in the sample was 83 years old at the time of the survey (1992) the following discussion will be mainly limited to after 1910.

was a slow wave of incursions by European settlers on the regions bordering Inuit lands, including the establishment of Hudson Bay Company trading posts and whaling stations. This affected the migratory patterns of the Inuit in the region, since they quickly adopted and became dependent on European technology to the point where some would travel great distances to trade for this technology (D'Anglure, 1984, pp. 499-501). Although the whaling industry collapsed in 1906, the Hudson Bay Company took over the vacuum left by whaling and by 1921 had established nine trading posts in Nunavik trading for arctic fox furs. The Inuit continued to subsist on trapping fox until the Depression (Ornstein, 1973, vol.2, pp.141-143, Jenness, 1964, p.74). Inuit families started to build shacks near the trading posts, creating informal villages, but most of the year was still spent in seasonal camps in small extended family groups (Hodgins, 1997, p.29). By 1941 nine of these informal villages existed (Ornstein, 1973, vol.2, p.196). By the late 1940s the drop in fur prices and declining caribou population led to the emergence of a tuberculosis epidemic. The federal government's response was to establish nursing stations at Kuujjuaq (formerly Fort Chimo) in 1946 and at Inukjuak (formerly Port Harrison) in 1947. As well, there were annual visits by a hospital ship and by the late 1950s, one in six children were evacuated to hospitals in the south. These children would usually remain there for several years and in many cases were unaccompanied by family members. By the early 1950s many of the villages became permanent settlements with nursing stations, and between 1957 and 1962 federal day schools were started in ten of the villages (Vick-Westgate, 2002, pp.28, 54).[3]

[3] Of the four villages remaining, Tasiujaq (formerly Leaf Bay) became a permanent settlement in the 1960s, while Aupaluk was a former hunting camp and was resettled in the late 1970s by Inuit from Kangirsuk. (Vick-Westgate, 2002, p.54) Akulivik (formerly Cape Smith) had been inhabited prior to 1952, but abandoned because of the HBC closing in 1952, meant that the remainder of those moved to

This history is important for understanding the change experiences of different age cohorts in the present study. Given that the survey was conducted in 1992, the vast majority of those aged 45 and over at that time (i.e., born before 1947) would have been exposed to the TB evacuations and born in the seasonal camps. Conversely, those aged 15-24 (born after 1968) would have been born and raised in the settlements with access to local health care and education. Those aged 25-44 (between 1948 and 1967) could be considered the "transitional generation," since some of the older individuals would have been born and initially raised in the seasonal camps, i.e. born before 1960, but also experienced the formation and development of theses villages. (D'Anglure, 1984)

2.0 LITERATURE REVIEW

2.1 Psychiatric disorders amongst Inuit in Canada and the United States[4]

One of the first population-based epidemiological studies conducted amongst an arctic population was in 1955-56 in a small Eskimo village in Alaska with an adult population of 146. Seventeen percent of the adult population (N=25) was surveyed using a systematic sampling method and the final sample consisted of 12 females and 13 males. The survey was conducted in an interview style, with interpreters when necessary, and

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Purvirnituq and only resettled this community after a period of over 20 years where it legally became a village in 1976. The last village Umiujaq only became a permanent settlement in the 1980s where some Inuit from the community of Kuujjuaraapik (formerly Great Whale River) moved (Vick-Westgate, 2002, p.28).

[4] This review excludes the so-called culture bound syndrome of "Pibloktoq" or "arctic hysteria" that was reported by various explorers, missionaries and anthropologists since a recent historical review indicates that this syndrome was both rare and very likely a consequence of stressful encounters between European explorers and Inuit (Dick, 1995). As well, Kirmayer and colleagues found no evidence of a pibloktoq-like syndrome in their ethnographic work on Inuit concepts of mental health and illness (Kirmayer, Fletcher, Corin & Boothroyd, 1995).

the instrument used was the same as the Sterling County study, the Health Opinion Survey (HOS). The authors, two anthropologists, used a classification scheme with a broad continuum ranging from relative wellness to relative illness. Only five individuals were classified as relatively ill, having psychoneurotic symptoms with only mild impairment in terms of functioning. The authors noted that the HOS is particularly sensitive to these types of symptoms (Murphy & Hughes, 1965).

The first epidemiologic study of psychiatric distress amongst Inuit in Canada was conducted in the eastern arctic in 1970 (Sampath, 1976). The village of "Oxford Bay" (a pseudonym) had a total population of 592, and over 93% of the adult population aged 15 and over was interviewed (N = 214, 117 females and 97 males). Although Sampath did not state when this village was initially established, he mentions that the government had experimented with different types of housing in the early 1950s but that it was not until 1966 that 25 homes were built and only September 1970 when the last camp was abandoned, making this village a permanent settlement. These developments are pertinent to understanding the results, which reflect the fact that this population was in the process of sedentarization (Sampath, 1976).

Regarding the interviews, the HOS, along with a mental status exam were conducted. Based upon the exam and using DSM-II criteria, 37.4% (80) were diagnosed with a mental disorder for an overall prevalence rate of 373/1000 and prevalence rates of 177/1000 for personality disorders, 116/1000 for neuroses, 46/1000 for affective disorder, and 28/1000 for schizophrenia. With respect to gender breakdown, twice as many males were diagnosed with a personality disorder, while three times as many females were diagnosed with a neurotic disorder. Although Sampath acknowledged that these

prevalence rates were quite high by southern standards, he did note some studies of Native Americans in the US with higher rates. As for the HOS, using an approach similar to Murphy and Hughes, he found that 38.5% of females and 32.3% of males reported moderate to severe symptoms and that with increased age females reported more severe symptoms while younger males reported more severe symptoms.

In his discussion section, Sampath noted that the move to a permanent settlement meant living in a geographically confined space, with formal organizational structures imposed by outsiders, and living with a large number of Inuit that had already formed their own sets of informal alliances. He argued that there was a differential impact of this change on both men and women and specifically for certain age groups. For men, moving to the settlement had a "castrating" effect, since men could no longer demonstrate their masculinity and they no longer held the same level of control over women that they had while living in the camps. Women had more opportunities for financial independence through employment, were exposed to a measure of equality between the sexes, and had access to more economically secure white male partners. The result of these changes was an increase in conflict between men and women, with women bearing more of the negative consequences of this conflict. With respect to age and gender differences, Sampath suggested that adolescence was more stressful for males perhaps because of issues surrounding identity, while for females the stresses did not start until they began dating men. He argued that older females felt the stresses of adjustment more than older males. He specifically mentioned menopausal women (aged 45-54) since he observed that many of the men in this age group were "acting out" against their wives by being promiscuous. He also noted that many women in this age group if not widowed were

either unhappy or living alone in one-room houses. Although Sampath's study utilized DSM-II criteria and non-standardized interviewing with unknown reliability, his observations provide insight into the potential impact of the move to permanent villages for some Inuit in terms of the psychiatric outcomes. It is likely that growing up in this new environment has had different effects for the young adults in this study.

Between the mid 1960s to the late 1990s, there were several other studies with Inuit samples but none of them were population-based epidemiologic studies. All of these were either chart reviews of patients in an urban setting in Alaska (Bloom, 1972; Aoun & Gregory, 1998) or studies of a clinical database of 581 psychiatric referrals in the Baffin Island region between 1986-1989 (Abbey, Hood, Young, & Malcolmson, 1991; Young, Hood, Abbey & Malcolmson, 1993; Abbey, Young, Hood & Malcolmson, 1993). Selzer (1980) reviewed issues related to acculturation and mental disorder amongst Inuit but drew mainly on articles about Native American and First Nations populations living on either reservations or reserves. Three articles focused specifically on the delivery of psychiatric services to Inuit in Baffin Island (e.g. Atcheson & Malcolmsom, 1976; Hood, Young, Abbey, & Malcolmson, 1991; Hood, Malcolmson, Young & Abbey, 1993) but did not discuss the prevalence of psychiatric disorders amongst Inuit.

Haggarty and colleagues (2000) conducted a population-based epidemiologic survey in a Canadian arctic community of 1100.[5] The study used an Inuktitut translation of the Hospital Anxiety and Depression Scale (HADS) and the CAGE questionnaire,[6] as well as structured clinical interviews with the SCID using DSM-III-R diagnostic criteria

[5] Although the authors did mention that the initial survey took place in the spring, they did not mention the year their data was collected, but since the original manuscript was received in May 1999, it was most likely in the late 1990s.

[6] The authors noted that among the reasons for selecting the HADS over the CES-D was that the HADS was easier to translate (Ibid, p. 358).

on a stratified subsample. The principal investigator, a clinical psychiatrist, trained three local community health workers to deliver the HADS and CAGE. A total of 26.2% of the total eligible population (14-85) participated for a total sample size of 163 (101 females and 52 males). The refusal rate was less than 10%. The average age was 32.9 years with a standard deviation of 15.6 years. A majority of the initial interviews were conducted in English (105 versus 58 in Inuktitut). The overall prevalence rates were 30.6% for lifetime alcohol abuse, 26.5% for depression (past week) and 19.0% for anxiety (past week). The breakdown by gender was, for females, 29.4% for depression, 21.4% for anxiety and 23.2% for lifetime alcohol abuse, whereas for males it was 21.8%, 15.1% and 42.3%, respectively. The statistically significant differences were for lifetime alcohol abuse for men and anxiety for those that chose to conduct the interview in English, while there no significant differences between men and women for depression or anxiety. Regarding age, younger respondents had higher HAD-A scores while older respondents had higher HAD-D scores. With respect to co-morbidity, about one-third (34.3%) of those with depression also suffered from anxiety and a similar proportion (35.7%) abused alcohol. There were higher levels of comorbidity with anxiety: fully 46.2% of participants with anxiety suffered from depression, and 42.3% abused alcohol. Among those abusing alcohol, 27.0% had depression and 29.7% had anxiety (Haggarty, Cernovsky, Kermeen & Merskey, 2000, p.360). Slightly over half were not diagnosed with any of the three disorders. Although differences in diagnostic criteria and methodology limit any clear comparison, the prevalence rates of psychiatric disorders overall appears higher than that reported by Sampath.

Although the prevalence of psychiatric disorders among Inuit in Nunavik is unknown, the limited number of population-based studies with an Inuit population suggest that psychiatric disorders do exist and may occur at a higher prevalence than that of the south. Although this study cannot ascertain cases of psychiatric disorder due to the lack of inclusion of diagnostic instruments in the original survey, it does provide an indication of distress that may be associated with such disorders.

2.2 Factors associated with psychological distress

This section reviews the empirical literature on psychosocial determinants of psychological distress relevant to the present study. Although a wide range of factors have been identified as associated with some form of psychological distress (such as anxiety and depression), the factors chosen for review are limited to those variables measured in the Santé Québec survey. Given that there are a very limited number of studies that include Inuit or other indigenous populations, much of the empirical literature will be from studies of the general population. Variables that have previously been associated with suicidal behaviours (primarily suicide attempts) amongst Inuit in Nunavik, will be more extensively covered, e.g. lifetime inhalant use and alcohol abuse.

2.2.1 Socio-demographic factors[7]

2.2.1.1 Age

[7] Although there is a great deal of empirical literature that shows that higher levels of income decrease one's level of distress, overall, this factor could not be examined since less than 50% of respondents answered the question on this variable (Santé Québec, 1994, vol.1, p.67). Consequently, an examination of the combined impact of income level and other socio-demographic factors such as gender, age, employment, education, and number of dependents, on level of distress could not be conducted and therefore there will only be limited discussion of this variable, as it relates to the other socio-demographic variables discussed in this subsection.

Studies in the general population often find a U-shaped relationship between distress and age, where distress is highest in young adulthood, declines with increasing age, reaching a low between the ages of 40 and 60, and then increases after age 60 (e.g. Schieman, Van Gundy & Taylor, 2001; Mirowsky & Ross, 2003; D'Arcy, 1982). This pattern probably is related to the characteristics of life stages. For example, young adults tend to face a larger number of significant life events for the first time such as, transition from student to employee, moving away from family to attend college or university, or having a child. As well, many young adults are single and when employed have less job stability and lower incomes given their relative inexperience and time in the work force. For those aged 40 to 60, distress levels tend to be lowest since they tend to have stable employment, are at the peek of their earning capacity, and are married. For those over 60, distress levels start to increase due to the debilitating effects of chronic illness, retirement leading to reduced income, and death of a partner/spouse with resultant loss of social support (Mirowsky & Ross, 2003).

Of note, in a secondary analysis of a data set with an indigenous population (a Cree sample from the James Bay region of Québec), Kirmayer and colleagues found an inverse linear relationship between age and current level of psychological distress (using the same psychological distress measure used in this study) and that this relationship was significant for the entire sample in their bivarate analysis and reduced model (Kirmayer, Boothroyd, Tanner, Adelson & Robinson, 2000).

Consistent with the pattern in the general population, it is expected that young Inuit adult will have higher levels of distress relative to older Inuit. However, since over one third of adult Inuit were between the ages of 15 to 24 (Santé Québec, 1994, vol.1, pp.43, 61)[9], this high proportion of young adults in Nunavik will likely influence the sample-wide observed effect on psychological distress of variables including marital status, since young adults tend to be single; level of education, since a large proportion are still in school; and significant life events, given the relative recentness of the event (e.g. death of a parent prior to age twelve, or experiencing sexual abuse as a teenager). In addition, there may be important birth cohort effects due to substantially different experiences of specific generations (e.g. exposure to prolonged hospitalization away from family for treatment of tuberculosis, or the growing up in different family and social environments due to the transition to from seasonal camps to settlement life).

2.2.1.2 Gender

The literature on the differences in levels of distress between men and women in the general population suggests that women tend to report higher levels of distress than men (e.g. Parker & Hadzi-Pavlovic, 2004; Thayer, Rossy, Ruiz-Padial & Johnsen 2003). Part of the reason for this is that, owing to gender roles in North America, women tend to be more expressive of emotions and therefore report symptoms of distress more readily

[9] Although Santé Québec does not provide the breakdown of the population by age groups in their breakdown by age and gender on Table 2.2 (page 43), they do provide total numbers of those in the three age groups of 15-24, 25-44, and 45 and over on Table 2.7 with respect to breakdown of marital status (page 61) where the total adult Inuit population was 3,956 with 1,405 in the 15-24 age group, which is where the percentage mentioned above was derived.

than men. Although expressiveness by women may account for up to 30% of the reported higher levels of distress, there are also factors specific to the role of women in society such as dual role strain, where women both work outside the home and maintain the home, including provision of child care (when present in the home), which contributes to higher levels of distress for women (Mirowsky & Ross, 2003). Of note, in the analysis of the Cree Health Survey, Kirmayer and colleagues found that female gender was associated with a higher level of distress (Kirmayer, et al., 2000).

2.2.1.3 Marital status

Marital status involves a number of discrete categories, including: married, single, separated or divorces, or widowed. Level of distress has been shown to differ across categories, and between males and females in the same category. In addition, the quality of the marital relationship has an impact on levels of distress.[10]

Regarding comparisons between categories, those who are legally married tend to have the lowest levels of distress, while those who are separated/divorced or widowed report the highest levels.[11] For example, the 1995 Aging, Status and Sense of Control (ASOC) survey conducted in the US showed that, after adjusting for age, those who are widowed and separated/divorced, have the highest levels of depression followed by those who are cohabitating, and those that have never been married; while those who are legally married have the lowest levels of depression. For those separated/divorced or widowed, the *loss* of a previous source of emotional support (particularly for men – see

[10] Since Santé Québec did not collect data on the quality of the spouse/partner relationship this area cannot be examined, but there is literature that suggests that being in a poor quality marriage is more distressing than being single (Gove, Hughes & Style, 1983).

[11] The only exception are those who become legally married as young adults where their levels of depression are much higher (Mirowsky & Ross, 2003).

below) and income (particularly for women – see below) are the two primary reasons for the high level of distress; while for those legally married, the converse holds. For those never married, the level of distress is somewhat higher than for those legally married because of the lack of emotional support and additional income that would be provided by a spouse. Since the level of distress for those in cohabitating (or common-law) relationships is similar to those who have never been married, it appears that although there may be emotional support and possibly additional income provided by the other partner, the lack of a legally binding relationship makes these types of relationships less stable contributing to higher distress, particularly for women (Mirowsky & Ross, 2003).

Regarding the differences between men and women in the same marital category, men who are legally married, cohabitating, or never married, tend to be less distressed than their female counterparts, while women who are widowed or separated/divorced tend to be less distressed than their male counterparts (Mirowsky & Ross, 2003).

Among those legally married, levels of depression are higher for women than men. The difference comes from a combination of husbands benefiting more from the emotional support of their wives, and wives experiencing distress from role strain since they tend to provide the bulk of the household duties and childcare (when children are present in the home). For those in common-law relationships, men still appear to benefit more from the emotional support of their partner, but not only is there role strain for women, there is instability particularly with respect to income since if the relationship ends there is less legal recourse for spousal and/or child support. For those separated/divorced or widowed, the difference is reversed, since the *loss* of emotional support tends to have a much greater negative impact on the mental health for men

(Mirowsky & Ross, 2003). Finally, for those who were never married, it is unclear why women have higher levels of depression, but it is most likely because women in general tend to report higher levels of depression.

Regarding the difference across categories being much greater for males and than females, the large difference is due to the emotional support that a man receives from his partner, which has a large positive effect on his mental health but this positive effect becomes very negative when the relationship ends either because of separation/divorce or death. For females the difference in levels of depression is much smaller between those who are legally married (where females experience the lowest levels of depression) and those either separated/divorced or widowed (the marital categories where females experience the highest levels of depression) (Mirowsky & Ross, 2003).

Of note, in their analysis of data from the Cree Health Survey, Kirmayer and colleagues found that being single (which included those never married, separated/divorced and widowed) was associated with a higher level of distress for the entire sample in their bivariate analysis and reduced model (Kirmayer, et al., 2000).

In Nunavik, nearly 40% declared themselves as having never been married. Of these, two-thirds were between the ages of 15-24. (Santé Québec, 1994, vol.1, p.61)[12] Although widowhood among young adults was fairly rare (less than 2% of those aged 15-24), a large proportion of those aged 45 and were widowed (20% compared to just over 5% for the rest of the total Québec population). A greater proportion of women aged 45 and over were widowed. Despite the high proportion of those aged 45 and over who were widowed, this translates into just over 5% of the total adult Inuit population being widowed. Although only 3% of those aged 45 and over were separated/divorced, it is

[12] In fact, 70% of those aged 15-24 declared themselves as having never been married. (ibid, p.61)

noteworthy that all of those in this age cohort were males (Santé Québec, 1994, vol.1, pp.61-62). This may have an impact on levels of distress for this age/gender cohort given the literature mentioned above.

Given the high proportion of young adults that have never been married, combined with the fairly small numbers of those who were separated/divorced and widowed, these three categories will be combined into the being single category and it is expected that being single will be associated with higher levels of distress.

2.2.1.4 Employment

Those that are employed have lower levels of distress than those not employed. The difference is primarily because of the income derived from work and associated self esteem. Although one may expect that work related stress would contribute to higher levels of distress, jobs that are highly stressful also tend to be higher paying and tend to have a great deal of responsibility that is intrinsically rewarding thereby bolstering self-esteem with resultant lower levels of distress (Mirowsky & Ross, 2003).

Of note, Kirmayer and colleagues found being unemployed was associated with a higher level of distress and that this relationship was significant for the entire sample, in their bivarate analysis (Kirmayer, et al., 2000).

According to Santé Québec, 37% of Inuit in Nunavik were employed full-time, an additional 13% part-time, 3% occasionally, 1% self-employed, and another 2% were receiving income through the Hunter Support Program, for a total of 55% of all Inuit being employed. There were differences both in terms of gender and age. Nearly two thirds of males versus slightly less than 50% of females were employed. In terms of age

groups, nearly 70% of those aged 25-44, were employed compared to 44% of those aged 15-24 and 52% of those aged 45 and over. (Santé Québec, 1994, vol.1, p.65)[13]

In addition to the gender and age differences, there were differences in the percentage of those employed depending on level of education, where over 70% of those who have completed secondary school or more were employed, compared to roughly 50% of those with less than secondary education completed, the only exception were those who had some elementary education but not completed, where 66% of those in this group were employed. (Santé Québec, 1994, vol.1, p.50)[14]

2.2.1.5 Level of education

Distress decreases with increasing levels of education, with the highest levels of distress for those with less than elementary education, while increasing educational level tends to increase levels of income leading to lower distress (Mirowsky & Ross, 2003).

Of note, in their analysis of data from the Cree Health Survey, Kirmayer and colleagues found that having more than elementary education was associated with a higher level of distress for the entire sample (in both their bivariate analysis and reduced model) and for females aged 45-64 (Kirmayer, et al., 2000).

As mentioned in a previous footnote, formal education is a relatively recent phenomenon in Nunavik and that 90% of those aged 45 and over had less than secondary education. For those aged 15-24, 78% had some secondary education but not completed

[13] Thirty percent of those aged 15-24 were students and hence not employed (Ibid, p.65).
[14] Formal education was a relatively recent phenomenon, such that of those aged 45 and over, 63% had no formal education, with an additional 25% that had some elementary education but not completed, and an additional 2% had only completed elementary education, and hence 90% of those aged 45 and over, had less than a secondary education. As well, 21% of those aged 25-44 had some elementary education but not completed (Santé Québec, 1994, vol.1, p.50). It appears that part of the reason for the higher percentage of those with only some elementary education being employed was a combination of those in aged 25-44 which had the highest percentage of those employed overall and the large proportion of those aged 45 and over with this level of education.

and an additional 13% had completed secondary education, for a combined total of just over 90% in these categories alone.[15] As for those aged 25-44 (the transitional generation), this cohort is in between the other two, since 43% had only completed elementary education or less, while 41% had some secondary education and the remaining 16% had completed secondary education (Santé Québec, 1994, vol.1, p.50).[16] Hence, it appears that older adults of this cohort had little or no formal schooling because of the limited or non-existence of formal schooling in the villages during their school age years, while the younger adults in this cohort were able to attend school.

Since a large proportion of those aged 15-24 were still in secondary school, combined with a large proportion of those aged 25-44 having had some secondary education but not completed, the most appropriate cut-off level of education will be more than elementary education and the expected result is that those who have more than elementary education should have lower levels of distress.

2.2.2 Alcohol abuse

A number of population-based surveys in the US have demonstrated that there is increased risk for those with depression to meet the criteria for alcohol abuse or

[15] According to Santé Québec 98% of those aged 6-16 were enrolled in school at the time of the survey and 30% of those aged 15-24 were students (Ibid, pp. 50, 65) Hence, of the 78% not having completed secondary school, most were still in school.

[16] There were no differences in the level of education between men and women aged 15-24, but men had higher levels of education in the 25-44 age group and of those aged 45 and over, there were no women that had completed a secondary program (Santé Québec, 1994, vol.1, pp.50-51).

[18] Citing the results of a school-based survey conducted in Nunavik in 1986, Hodgins notes that "solvent use typically began by about 12 or 13 (and peaked at 14-15); cannabis use began by 14 or 15 and alcohol use by age 16 or 17" (Hodgins, 1997, p.112). Although it is recognized that a school-based survey does not capture youth not in school, the onset of use (particularly solvents) is likely to be similar or even younger among those not in school, who are likely to be less supervised. Hence, given the relative young age of the Inuit population and the early onset use of substances, some of the literature to be presented in the following subsections will include results from studies with adolescent populations, particularly regarding solvent use.

dependence disorder (e.g. Drabble, Midanik & Trocki 2005; Crum, Brown, Liang & Eaton, 2001; Mirowsky & Ross, 2003)

Similar findings hold in Canada. For example, the Canadian National Population Health Survey (NPHS) conducted in 1994, using the CIDI-SF and several measures of alcohol consumption showed that those that reported any drinking in the past year had a greater risk for experiencing a major depressive episode in the past year relative to those that did not drink in the past year. The authors also found that those that had consumed five drinks or more on at least one occasion during the past year had a higher period prevalence for major depression compared to those that did not drink and those that consumed less than five drinks (Patten & Charney, 1998).

The consumption of five or more drinks on at least one occasion in the past year is particularly relevant for this study since according to Santé Québec, 60% of Inuit aged 15 and over were occasional or regular drinkers compared to 80% for the rest of Québec, but of those Inuit that did drink, over 60% drank an average of five or more drinks per occasion (Santé Québec, 1994, vol.1, pp.120, 123).

Although directionality cannot be determined in cross-sectional studies, Patten and Charney citing several studies using clinical samples where the percentage of those experiencing depression is lowered after a period of abstinence state that "[m]ost recent studies support a model of secondary or alcohol-induced depression among individuals with co-morbid depression and heavy alcohol consumption" (Patten & Charney, 1998, p.502). Hence, not only is there a high proportion of individuals with heavy alcohol consumption in Nunavik but this pattern may increase the likelihood of alcohol induced depression.

In addition, although the prevalence of depression is unknown in Nunavik and the distress measure cannot be used to ascertain cases of depression, in a randomly selected sample of households in an Inuit village of 1100 in the Canadian Arctic, using both the CAGE and the Hospital Anxiety and Depression Scale (HADS) translated into Inuktitut, Haggarty and colleagues found that over one quarter of the sample experienced depression in the past week and of these, over a third had also abused alcohol in their lifetime. As well, close to one fifth of the sample suffered from anxiety in the past week and of those, over 40% also had abused alcohol in their lifetime. Conversely, of the 30% that had abused alcohol in their lifetime, 30% suffered from anxiety and nearly 30% suffered from depression, in the past week, while just over half of the sample did not report either abuse of alcohol, depression, or anxiety (Haggarty, et al., 2000, p.360).

In their Cree sample, Kirmayer and colleagues found that those who had a drinking problem in the past year had a higher level of distress; this association was found for the entire sample and for females aged 15-24 and 25-44, and males aged 25-44 and (Kirmayer, et al., 2000).

Santé Québec reported that of those that drank alcohol in the past year, close to 30% of females and just over 20% of males aged 15-19 had met the CAGE criteria for a lifetime "at risk" drinking, while for those aged 20-24, the percentage increased to one third of males, with females having a slightly higher percentage than females aged 15-19. As well, the highest percentages of those that met the CAGE criteria for both males and females were found among those aged 20-24 and declined slightly for those 25-44, with a large decrease for those 45 and over (15% of males and 13% of females) (Santé Québec, 1994, vol.1, p.124). Therefore, it is expected that higher levels of distress will be found

among those that drank five or more drinks on at least one occasion in the past year or those that met the CAGE criteria for lifetime alcohol abuse problem.

2.2.3 Substance use[18]

Since Santé Québec did not ask respondents about the frequency of consumption of substances, substance abusers could not be identified for analysis purposes. As well, they only asked about whether the respondent had used the substance either in her/his lifetime and/or sometime during the 12 months preceding the survey (classified as current user). Since the numbers of those that were current users of solvents, or cocaine or crack, were insufficient to conduct analyses, data on lifetime use of these substances in Nunavik will only be presented. Therefore, much of the literature to be cited will focus on lifetime use of the particular substance.

2.2.3.1 Solvent use

By the late 1960s, solvent use was starting to increase among younger adolescents in the US (e.g. Johnson, Donnelly, Scheble, Wine & Weitman, 1971). This trend also started to manifest itself in at least one reservation in New Mexico where Kauffman found that 62% of those aged 6-12 had sniffed gasoline at least once in their lifetime - 75% of boys and 50% of girls and of those that sniffed (42 out of 72) only three usually sniffed alone. As well, despite the fact that 87% of all of the children answered yes to the question "Can gasoline sniffing hurt you?" it appears that peer pressure outweighed the knowledge of such harm. Contrary to previous findings, Kauffman did not find any significant differences between those who sniffed gasoline and those who did not, in

terms risk factors such as coming from a broken home or parental alcoholism, or in terms of behaviours that would be considered deviant. He therefore suggests that gasoline sniffing may have become normalized to the point that the other characteristics of the user did not differ from the nonuser (Kauffman, 1973).

Regarding Canadian statistics, a review in 1986 located three studies; all were school-based and the estimates for the previous year use of solvents ranged from a low of 3.3% in Prince Edward Island to a high of 6.2% in Vancouver, while in Toronto the estimates were 3.2% and 4.1% for glue and other solvents, respectively (Smart, 1986). Although the estimated percentages in Canada appear to be low, solvent use was much higher for remote reserves. For example, in an isolated reserve located in northwestern Ontario with a total population of 997, over the period 1977-1981, roughly 10% of the population were brought to the nursing station for suspected gasoline sniffing either because police or parents caught them sniffing gasoline or because they exhibited bizarre behaviour and were disoriented. Although there were no significant gender differences, twelve out of the 105 cases (11.4%) were seen four or more times and of those, 66% were males. They noted that females tended to be "social sniffers" and less likely to be at risk for chronic abuse. The other findings of note were that 77% of all cases were between the ages of 5-15 (25.9% of the total in this age group), with an additional 19% between the ages of 16-19 (19.1% of the total in this age group). The authors argue that isolation plays a role in the widespread use of gasoline, not only terms of lack of availability of other drugs, but also because of the lack of a recreational centre or other activities for children (Remington & Hoffman, 1984).[19]

[19] Regrettably, although the authors in their discussion section referenced the results of the study by Kauffman where he found no difference in terms of a higher proportion of users coming from broken

In his 1994 review of abuse of inhalants Dinwiddie states:

> "...while some degree of inhalant use on a lifetime basis is very common, most who use inhalants do so only a few times, then rapidly abandon the practice. Inhalant use may follow an "epidemic" pattern, with outbreaks occurring among schoolmates; incidence appears to peak in early to mid-adolescence..." (Dinwiddie, 1994, p.931).

Although Dinwiddie was referring to mainstream populations, the two examples with indigenous populations mentioned above appear to follow a similar type of "epidemic" or cluster pattern, albeit not necessarily classmates since the others one would sniff gasoline with could be siblings and/or cousins. Whether the majority of users did so only a few times cannot be determined, but it appears that in the northwestern Ontario example 11.4% of the cases may have been chronic users since they were seen four or more times.

Despite the statement made by Dinwiddie above regarding some degree of lifetime use of inhalants being very common, only four studies were located that examined the association between lifetime use of inhalants and distress and of these, two had an indigenous sample.

In a seven-year prospective study of 224 urban American Indian youth starting in grades 5 and 6, the authors examined a number of different variables (including conduct disorder, alcohol dependence, and depression) and found at year five, alcohol dependence and lifetime conduct disorders were more prevalent among lifetime inhalant users, and at year seven lifetime inhalant users were more sensation-seeking, had lower perceived self worth and had more extensive networks of deviant peers.[20] But, in none of the years was

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and/or alcoholic homes or having more deviant behaviours (thus inferring that these findings were similar to what they found), they did not report any results to support this.

[20] Peer deviance was measured by a six-item scale, in which students were asked "how many of your close friends... used marijuana, alcohol, smoked cigarettes, were suspended from school, had trouble in school, or had antisocial behaviour, within the past year." The response categories were none (0), some (1), or all (2) for each activity.

prevalence of depression higher amongst lifetime inhalant users (Howard, Walker, Walker, Cottler & Compton, 1999).

In their analysis of the Cree Health Survey, Kirmayer and colleagues (2000) found that there was a significant association between lifetime use of solvents and a higher level of distress for the entire sample in their bivariate analysis, but not in their reduced model. Regarding solvent use in Nunavik, 19% of all adult Inuit had used solvents in their lifetime, including 23% of males and 13% of females. The rates of use among those aged 15-19, 20-24, and 25-44 were fairly similar, 22%, 24%, and 21%, respectively, while only 7% of those 45 and over had used solvents in their lifetime. Lifetime solvent use was significantly associated with suicide attempts amongst Inuit youth in the Nunavik region (Kirmayer, et al, 1998) and in a separate study of Inuit youth in a village in Nunavik (Malus, et al., 1994).

2.2.3.2 Cocaine or crack use

Several studies have examined the relationship between cocaine abuse and distress, primarily depression. For example, in a prospective study of adolescents into young adulthood found that heavy cocaine use (cocaine abuse) was a precursor to depression rather than frequent low intensity cocaine use (Castro, Newcomb & Bentler, 1988). A study of 463 Alaska Native patients from three alcohol residential treatment centers found that men were more likely to have a lifetime diagnosis of marijuana dependence and ASPD while women were more likely to have a lifetime diagnoses of cocaine dependence and major depression (Parks, Hesselbrock, Hesselbrock & Segal, 2001).

In Nunavik, only 10% of all adult Inuit had used either cocaine or crack during their lifetime – 14% men and 6% of women. Those aged 20-24 had the highest percentage at 17%, followed by those aged 25-44 at 10%, those aged 15-24 at 8%, with only 5% for those aged 45 and over. Although lifetime cocaine or crack use was fairly low relative to solvents and marijuana (see below), given that over 20% of males aged 20-24 used cocaine or crack it is expected that levels of distress would be higher for this group.

Kirmayer and colleagues' analysis of the Cree Health Survey found that lifetime use of cocaine was associated with a higher level of distress in their bivariate analysis for the entire sample (Kirmayer, et al., 2000). In addition, since lifetime use of cocaine or crack has been shown to be associated with a previous suicide attempt at the bivariate level amongst Inuit youth in Nunavik (Kirmayer, et al., 1998), it will be useful to examine the relationship of this variable in terms of its association with distress.

2.2.3.3 Marijuana use

Studies with adolescent populations have shown higher rates of depression amongst marijuana abusers (e.g. Diamond, Panichelli-Mindel, Shera, Dennis, Tims & Ungemack, 2006). Some studies that suggest that cannabis (or marijuana) abuse causes depression via motivational syndrome (e.g. Raphael, Wooding, Stevens & Connor, 2005; Bovasso, 2001), while others suggest depression causes one to abuse cannabis to alleviate symptoms (i.e. the self-medicating hypothesis) (e.g. Musty & Kaback, 1995; Kupfer, Detre, Koral & Fajans, 1973).

In Nunavik, 56% of the adult Inuit population used marijuana in their lifetime - 66% of males versus 45% of females. The highest percentage was among those aged 20-24 (72%), and slightly lower for those aged 25-44 (68%) and just over half of those aged 15-19 (51%), while those aged 45 and over had the lowest percentage (22%). Among males, 86% of those aged 20-24, 79% of those aged 25-44, 56% of those aged 15-19, and 35% of those aged 45 and over. Among females, 61% of those aged 20-24, 57% of those aged 25-44, 46% of those aged 15-19, and 9% of those aged 45 and over (Santé Québec, 1994, vol.1, p.129).

In their analysis of data from the Cree Health Survey, Kirmayer and colleagues found that lifetime use of cannabis was associated with a higher level of distress for the entire sample (in both their bivariate analysis and reduced model) and females aged 25-44 (Kirmayer, et al., 2000). In addition, since lifetime use of cannabis has been shown to be associated with a previous suicide attempt at the bivariate level amongst Inuit youth in Nunavik (Kirmayer, et al., 1998), it will be useful to examine this variable.

2.2.4 Social support

The empirical literature has consistently shown that social support has positive effects on mental and physical health (Coventry, Gillespie, Heath & Martin, 2004). Two types of social support variables have been studied: structural and functional. *Structural* social support variables include the size and composition of the person's social network, (i.e. types of relationships within a network), network density (i.e. number of links among members, or extent that members know each other), frequency of interaction, and social

integration (i.e. the breadth and extent of social ties). In contrast, *functional* social support include variables pertaining to the nature or quality of the social interaction and can be classified into three types: (a) emotional support (or esteem support) which provides assistance that promotes feelings of being valued and loved; (b) appraisal support (or informational support) which provides advice, feedback or information on a specific problem; and (c) instrumental support, which is the most concrete form since it provides tangible assistance. Within functional support, there is also a distinction between perceived support (or expected support), which pertains to the quality of support that one expects to receive in time of need versus received support, which has to do with obtaining actual support efforts (Limpitlaw, 1998).

2.2.4.1 Fewer than five close friends

The Santé Québec survey asked "How many people are you close to, we mean friends or family you could talk to if you needed help or had a problem?" The answer was a fill-in and had space for a double-digit number. (Santé Québec, 1994, vol.1. Appendix 4) Given that the question asked for a specific number, it appears that Santé Québec was ascertaining structural support in the form of network size. But the question also appears to be asking about functional support in general and given the percentage distribution of the responses, the interpretation of the type of functional support appears to differ between males and females. For example, there were large differences in: (a) the average number of close friends between males and females (7 versus 4); (b) the percentage of those with 5 or more close friends – 53% of males versus 30% of females; and (c) the percentage of males aged 25-44 that had five or more friends 67% versus 32%

of females in this age group. (Santé Québec, 1994, vol.1. pp.239-240) Hence, it appears that males interpreted the question as either appraisal or instrumental support, or both, while females interpreted the question primarily as emotional support and possibly appraisal support.[21]

In their analysis of the Santé Québec Cree survey, Kirmayer and colleagues found that having fewer than five close friends was associated with a higher level of distress in their bivariate analysis and reduced model for the entire sample and in the reduced models for both males and females aged 15-24 (Kirmayer, et al., 2000). Therefore, it is expected that those who have 0-4 close friends will have higher levels of distress, particularly females.

2.2.4.2 Religiosity

A recent meta-analysis examined the results of 147 studies (N=98 975) on the relationship between religiosity and distress showed a small but significant relationship between higher levels of religiosity and lower number of depressive symptoms. (Smith, McCullough & Poll, 2003). However, this study also found that negative religious coping (e.g. using religious activities to avoid difficulties) and extrinsic religious orientation (e.g. blaming God for one's situation) were both associated with higher levels of depressive symptoms. Other reviews are more equivocal. For example, Maselko and Kubzansky state "While the overall associations are positive, numerous studies found no association between religiosity and mental health, or have found that religiousness is associated with worse mental health" (Maselko & Kubzansky, 2006, p. 2849). In another study,

[21] Since Santé Québec chose to draw the distinction between those that had few friends (0-4) and those that had several friends (5 or more), this same cut-off was used as one of the three social support variables used in this study.

religiosity that is either unexamined or imposed was found to be detrimental to mental health (Pargarment, 2002). Hence, although religiosity in general appears to be associated with lower distress, there are various dimensions that are either negatively associated or have no association at all.

Studies that examined the frequency of church attendance have shown an association with lower levels of distress, in particular among large population-based studies of the elderly, (e.g. Braam, et al., 2004; Braam, et al., 2001). At least one study of adolescents found that higher frequency of church attendance was associated with lower BDI scores (Wright, Frost & Wisecarver, 1993). In terms of gender differences, results are variable. In one large-scale prospective study conducted over a 20-year period in the Netherlands, church attendance was more protective for women against experiencing depressive symptoms (Meertens, Scheepers & Tax, 2003). In another other study using data from the 1998 General Social Survey in the US, found that weekly public religious activity was beneficial to wellbeing in terms of lower levels of distress, but the association was stronger for men. This study also found that when public and private religious activities, and spiritual experiences were considered simultaneously, spiritual experiences and public religious activity each independently contributed to the mental health of women, while only public religious activity consistently contributed to the mental health of men (Maselko & Kubzansky, 2006).

Regular church attendance was shown to be protective of lifetime suicide attempts amongst Inuit youth in Nunavik (Kirmayer, et al., 1998) and protective in terms of lifetime suicide ideation and lifetime suicide attempts amongst youth in an Inuit village in

Nunavik (Malus, et al., 1994). Consequently, it is expected that a higher frequency of church attendance will be associated with a lower level of distress.

2.2.4.3 Relationship to the community

Having a very good relationship with the community could be interpreted as a high level of social integration (a form of structural social support) or as having high instrumental social support (a form of functional social support) in the case of males and emotional support in the case of females. Kirmayer and colleagues found that having a very good relationship with the community was associated with a lower level of distress for the entire Cree sample (in both their bivariate analysis and reduced model) and for males aged 15-24, 25-44, and 45-64, and females 45-64 (Kirmayer, et al., 2000). In Nunavik, Santé Québec did not report results of their question on relationship with the community, but it is expected that those who have a very good relationship with the community will have a lower level of distress.

2.2.5 Significant life events in the past year and in lifetime

According to Mirowsky and Ross research on significant life events on has shifted over the years. In the late 1960s and early 1970s researchers thought that 'change' itself influenced distress and thus positive and negative events were included in research, e.g. getting married or death of a spouse. But after a decade of mounting contradictory evidence, it became apparent that undesirable events were much more distressing. These undesirable events could also be characterized as status loss and mark the transition to a

social position that is associated with a higher level of distress such as unemployment or loss of income leading to living below the poverty line, marital breakdown leading to increased role strain for women still responsible for care of the children. Undesirable events that are beyond one's control are more distressing than event that the person has some measure of responsibility for since the former type of events increase feelings of helplessness and powerlessness. But context can modify the impact of events, for example, when one's role prior to the event was already stressful, such as a marriage characterized by a lack of respect prior to the death of a spouse, or an undesirable job or work environment prior to loss of work. The outcome of the event then may be less distressing than would otherwise be the case. Finally, Mirowsky and Ross argue against simply summing events to create a single index since this ignores the distinctive relationships between specific events and types of distress. For example, job loss may create self-doubt and worry, while divorce may generate anger and loneliness, and hence each event would have a differential impact on distress (Mirowsky & Ross, 2003).

2.2.5.1 Significant life events in the past year

Among the seven significant life events in the past year that the Santé Québec survey asked about, one pertained to death of a spouse and another to death of a loved one, both of which this author suspects would have a differential impact on distress as opposed to loss of employment. Following Mirowsky and Ross, therefore this study will examine these life events separately in one model, but will also employ an index in another model, since the latter approach is the standard behavioural scientific approach.

In an analysis of the Santé Québec Cree survey, the number of significant life events in the past year was associated with a higher level of distress for the entire sample (Kirmayer, et al., 2000). In addition, in a study of attempted suicide among Inuit youth in Nunavik, an index based on the same seven life events was correlated with a previous suicide attempt, especially for males (Kirmayer, et al., 1998). Therefore it is expected that one or more of these significant life events experienced during the past year will be associated with a high level of distress.

2.2.5.2 Lifetime significant events

One of the significant life events included in this study was being a victim of sexual abuse during one's lifetime. There are numerous studies that show that sexual abuse is associated with higher levels of distress (e.g. including one study of Inuit youth in Nunavik, where the authors found that females that had experienced sexual abuse at least once in their lifetime were more likely to have made a suicide attempt) (Kirmayer, et al., 1998). Hence, it is hypothesized that having experienced sexual abuse during one's lifetime will be associated with a higher level of distress in this sample.

Death of a parent prior to age twelve also is expected to be associated with distress since this event signifies loss of a significant caregiver, while death of a *close* relative prior to age twelve is also expected to be associated with a higher level of distress since the individual was most likely a source of social support. In fact, from the Cree Health Survey, death of a close relative under age twelve was associated with a higher level of distress (Kirmayer, et al., 2000).

2.2.6 Lifetime history of a psychiatric problem or chronic medical illness

Although Santé Québec did not report the percentage distribution of either of those that had experienced a psychiatric problem or chronic medical illness, Kirmayer and colleagues found that chronic illness in one's lifetime was associated with a higher level of distress in their at bivariate analysis for the entire sample, but did not find a significant association for those who had a psychiatric problem in their lifetime (Kirmayer, et al., 2000).

2.2.7 Other potential stressors

2.2.7.1 Overcrowding – people per home (PPH)

Inuit communities face a severe housing shortage; at the time of the survey the average people per home (dwelling) was five (twice that of the rest of Québec) and nearly 40% of homes had six or more people living in them (Santé Québec, 1994, vol.1, p.53) With the exception of prison populations and psychiatric patients, there was only one study located that specifically examined overcrowding in terms of the number of people per home and level of current psychological distress. Although Kirmayer and colleagues included this variable in their bivariate analyses, they did not find it to be statistically significant (Kirmayer, et al., 2000). Hence, although there is limited literature to suggest that overcrowding will contribute to higher levels of distress, from a public policy perspective it would be very helpful to know if the number of people in the home is associated with a higher level of distress.

2.2.7.2 Number of sexual partners in the past year

Most studies that examine the relationship between number of sexual partners and distress are in relation to those infected with HIV/AIDS, with a majority being samples of gay men and only a few with heterosexual men and still fewer with heterosexual women. A school-based survey conducted in Finland in 1999 and 2000 of grade eight and nine students (11 793 girls and 10 443 boys, mean age 15.5 years) found a significant association between the number of sexual partners and higher levels of depression on the BDI for both males and females (Kosunen, Kaltiala-Heino, Rimpelä & Laippala, 2003). Another study of young heterosexual men found an association between the number of sexual partners in the past year (and one night stands) and the proportion of depressed young men. They speculate that one possible reason for this finding is that these men are seeking out a number of sexual partners as part of a mood-regulating pattern (Bancroft, Janssen, Carnes, Goodrich, Strong & Long, 2004).

The Santé Québec survey defined sexual behaviour at risk is considered having two or more partners in the previous twelve months. In the Nunavik survey, 22% of men and 17% of women had such behaviour; 46% of these individuals also met the CAGE criteria for problem drinking and 58% have used marijuana in the past year (Santé Québec, 1994, vol.1, p.192).

2.2.8 Frequency of consumption of country foods

Inuit concepts of self and personhood make a link between diet and wellbeing. The person's physical and psychological state is understood to be strongly affected by their diet, with regular consumption of 'country food' contributing to health and

wellbeing. Although there is no empirical literature that specifically examines the relationship between frequency of consumption of country foods and level of distress, research conducted by an anthropologist who interviewed Inuit elders in the village of Clyde in Baffin Island in 1985 and 1992 found that seal meat and more specifically seal blood were regularly consumed to prevent depression and when someone experienced depressive symptoms the normally prescribed treatment was seal meat (Borré, 1991, 1994). Given this indigenous view, the present study examined the relationship of psychological distress to the frequency of consumption of each of the five foods assessed in the survey as well as to an overall an index of the consumption of traditional foods.

As seen in Table 1 there is substantial variation by age in the consumption of specific foods. Thus, it is important to control for age in exploring the links between diet and depression.

Table 1. Percentage distribution of adult Inuit aged 15 and over that consumed country food at least once a month - by Age group

Type of food	15-24	25-44	45+	Total
Seal meat	59.0	60.2	75.7*	63.1
Seal fat	44.9*	63.8	72.6	58.7
Whale meat	37.0	37.2	31.3	35.8
Whale blubber	26.8*	48.4	49.2	40.6
Whale skin	63.5	64.7	59.0	63.0

(Source: Santé Québec, vol.1, p. 157, Table 5.2)
* Significant effect of age

3.0 OBJECTIVES AND HYPOTHESES

Although the high rates of suicide amongst Inuit in Nunavik indicate that some individuals have suffered high levels of psychological distress, little is known about more common forms of distress in this population, Hence, this study aimed to explore potential

determinants of psychological distress in this population. The main objectives of this study were: (1) to identify psychosocial correlates associated with common forms of psychological distress; and (2) to discuss the possible health policy implications of these findings.

Three sets of hypotheses were tested.

(1) Despite the lack of empirical literature on correlates of psychological distress amongst Inuit in Nunavik, it is hypothesized that variables found to be associated with distress in the general population will also be predictive of distress among Inuit, including: socio-demographic variables such as age and gender, alcohol and substance use, and stressful or traumatic life events (both lifetime and past twelve months) such as sexual abuse in one's lifetime, death of someone close in the past twelve months.

(2) There will be certain variables that are particularly salient given the local environment, (e.g. crowding due to the lack of housing in Nunavik) or given the cultural importance attached to it, (diet, e.g. the frequency of consumption of seal meat).

(3) There will be cohort effects due to the historical of impact of events such as the TB evacuations in the 1950s, changes due to movement from seasonal camps to permanent settlements, and the introduction of formal education in the permanent settlements, and that some of these events will specifically impact those born and initially raised in the seasonal camps, i.e. the transitional generation. Thus, the determinants of distress will be different for specific age and gender strata.

4.0 METHOD

4.1 Sample

This study is based on data collected during the autumn of 1992 as part of the Santé Québec Inuit Health Survey. An editorial committee composed of representatives of the Inuit, Santé Québec, health and social services planners in Nunavik, and the Québec Ministry of Health and Social Services collaborated on the revision of instruments, which were based on those used in the 1987 general population health survey. The questionnaires were translated and pre-tested in an Inuit community with ten households consisting of 30 Inuit and subsequently revised for face validity. Respondents had the option to choose to answer questions in Inuktitut, or English or both. Among the objectives of the survey, data was collected to provide a picture of the health and social conditions of Inuit in Nunavik. The estimated total Inuit population was 7,078 in 1,567 private households.

The details of the survey methods are described elsewhere (Santé Quebec, 1994, vol.1). Briefly, the original sample size was set at 400 households, stratified by village. Given the relatively small populations within the villages a decision was made that no two adjacent homes within a village were to be surveyed, and sampling used "quasi-proportional" representation within each village (Ibid, p.24). Of the 400 homes approached 284 (71.0%) households participated (for a final sample of 584 individuals). In order to ensure confidentiality, community names and locations were removed from the dataset. Permission to conduct analysis of the data was obtained from Nunavik Regional Health and Social Services Board (see Appendix 1)

4.2 Measures

The data were drawn from three questionnaires: (1) the Household Questionnaire where a primary respondent (aged 18 and over) was identified to provide information on

the entire household on topics such as disabilities and chronic health problems; (2) an Individual Questionnaire (completed by those aged 15 and over) which covered topics such as socio-economic characteristics and lifestyle habits; and (3) a Confidential Questionnaire (for those aged 15 and over) which included topics such as psychological distress, alcohol and drug use, and suicidal behaviours. The first two questionnaires were administered in face-to-face interviews with either an Inuit interviewer or interpreter. Given the sensitive nature of the questions in the third questionaire, it was self-administered to ensure confidentiality with the added intention that this would increase the response rate (Santé Québec, 1994, vol. 1, pp. 20-21).

4.2.1 Psychological distress measure – the dependent variable

The survey included a fourteen-item psychological distress index originally based on the Ilfeld Psychiatric Symptom Index and subsequently adapted by Santé Québec in 1987 to become the Psychological Distress Index Santé Québec Survey (PDISQS) (Ilfeld, 1976; Boyer, Préville, Légaré & Valois, 1993). The internal consistency of this measure has been shown to be fairly good (Cronbach's alpha = 0.91) in at least one study using the 1998 Québec Health and Social Survey with a sample size of 10 387 (Marchand, Demers, Durand & Simard, 2003), which is comparable to the value found for this study (Cronbach's alpha = .88).

Table 2 lists the symptoms of distress experienced during the previous week.[22] Although the original questions had four response categories (Never, Once in a while,

[22] The only modification to the original index was the wording change of one item from "how often have you felt lonely?" to "how often have you felt like being alone?" Although this wording change suggests social withdrawal or irritability rather than distress or sadness (Kirmayer, Boothroyd, Tanner, Adelson & Robinson, 2000), the measure had a high internal consistency (see analysis section below).

Fairly often, Very often), the translation into Inuktitut did not permit a clear distinction between Fairly often and Very often and therefore each item was coded as 0 = Never, 1 = Once in a while, and 2 = Often. (Santé Québec, 1994, vol.2, p.122) To standardize the scoring, the sum of the items was divided by 28 (the maximum possible score, i.e. answering "Often" to all items) and then multiplied by 100. Only those who answered all 14 items were included in this analysis, which reduced the sample size by 11% from 584 to 520.[23]

Table 2. Items on the Psychological Distress Measure

How often in the past week did you...

- Feel hopeless about the future?
- Have your mind go blank?
- Feel down or blue?
- Feel tense or under pressure?
- Lose your temper?
- Feel bored or have little interest in things
- Feel fearful or afraid?
- Have trouble remembering things?
- Cry easily or feel like crying?
- Feel nervous or shaky inside?
- Feel critical of others?
- Feel easily annoyed or irritated?
- Get angry over things that are not too important?
- Feel like being alone?

4.2.2 Socio-demographic variables

Age was coded as a continuous variable, ranging from 15-83. Marital status was coded dichotomously with being single (never married, separated or divorced) = 0 and married (or cohabiting) = 1. Gender was coded as males =0, females=1. Employment was

[23] Of the 64 respondents with at least one item out of the 14 items missing, weighting the index for those that answered at least 50% of the items, would only add an additional 28 observations, since 20 respondents did not answer any of the 14 items and the other 16 answered five items or less.

coded dichotomously as those employed =1, which included those working full/part-time or occasionally, and self-employed, while those not employed (=0) included those collecting unemployment insurance or welfare, students, homemakers, retired, and those who declared 'doing nothing' or 'looking for a job'. Education was coded dichotomously as those with more than elementary education (=1).

4.2.3 Alcohol abuse and substance use variables

Of the two sets of questions used to determine alcohol abuse, the first comes from the CAGE, a short screening tool that has been used in a wide variety of cultures and populations, such as in Poland (Cherpitel, Ye, Moskalewicz and Swiatkiewicz, 2005), France (Malet, Schwan, Boussiron, Aublet-Cuvelier & Llorca, 2005), a comparison between the US and Germany (Bloomfield, Greenfield, Kraus & Augustin, 2002), at least two Native American samples (Leonardson, et al., 2005; Saremi, et al., 2001), and an Inuit community in the Canadian arctic (Haggarty, et al., 2000). The CAGE has only four questions (each letter stands for a key word or phrase): feeling like one should *cut* down on one's drinking, feeling *annoyed* by people criticizing one's drinking, felt *guilty* about one's drinking, and having an *eye* opener in the morning (Ewing, 1984).[24]

The alcohol abuse variable was coded dichotomously as those with a drinking problem in the past year and those without a drinking problem in the past year.[25] A respondent was classified with a drinking problem if she/he met two specific criteria:

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[24] It should be noted that since the survey did not administer any other 'gold standard' diagnostic tools such as the CIDI to diagnose alcohol abuse or dependence, the sensitivity, specificity and positive predictive value of the CAGE questionnaire could not be determined (e.g. Dervaux, Bayle, Laqueille, Bourdel, Leborgne, Olie & Krebs, 2006).

[25] As noted by Santé Québec partial non-response was greater amongst Inuit males than females, while the rate of total non-response was highest amongst young adults (Santé Québec, 1994, vol.1, p.119). A total of

(1) answered 'yes' to two of the four CAGE questions: (i) "Have you ever felt you should cut down on your drinking?"; (ii) "Have people annoyed you by criticizing your drinking?"[26]; (iii) "Have you ever felt bad or guilty about your drinking?" and (iv) "Have you ever had a drink first thing in the morning to calm your nerves or get rid of a hangover?"[27] These questions are used to identify those at risk for alcohol dependence (Ewing, 1984).

(2) she/he reported one of a list of nine problems related to alcohol abuse, such as tension or disagreement with family or friends because of drinking, or accidentally injuring oneself or another while drinking.

There are at least three reasons why both criteria were used instead of reliance on the CAGE only.

First, in a large population-based survey conducted in 1992 in Québec with a sample size of 23 564 assessing the criterion validity of the CAGE with two indicators of heavy drinking that covered the frequency of consumption, e.g. "How many times in the past 12 months have you had five or more drinks on one occasion?" and the volume of consumption, e.g. "How many drinks do you generally take in a week?" and using guidelines put forward by the Canadian Royal College of Physicians and Surgeons' for hazardous consumption levels, the authors found that the CAGE was unable to discriminate between heavy and non-heavy drinkers. As well, using a set of seven

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111 respondents had missing data for either one or both sets of questions, with 44.1% in the 15-25 age group. As for gender breakdown, a slightly higher percentage of males than females (53.2% vs. 46.8%) had missing data.

[26] This question was worded somewhat differently in the confidential survey and read "Have you ever been criticized by people around you because of your drinking?" Santé Québec did not report why the wording was changed but perhaps it was a translation issue with the word 'annoyed'.

[27] This question was asked for the timeframe of the past twelve months with the four response categories being 'Almost everyday', 'Very often' 'Rarely' and 'Never'. Adjustments were made in this analysis to code all those that have experienced this problem, even if declared 'Rarely' since in a dichotomous format the answer would have been 'yes' given the format of the other three questions.

questions pertaining to problems associated with alcohol use in the past year, e.g. problems at work or at school, in order to assess the prevalence of those with at least one drinking problem, 62% of males and 86% of females that met the CAGE criteria did not report a drinking problem. The authors conclude that the CAGE alone should not be used in a population-based survey as a screening tool for heavy drinking or to estimate the prevalence of drinking problems in the population (Bisson, Nadeau & Demers, 1999).

Second, in the original province-wide population-based health survey conducted in 1987, Santé Québec included the CAGE and questions on problems associated with alcohol use in the past year in order to classify those with alcohol dependency as defined by the Index of Alcohol Dependency (IAD) from the DSM-III-R (Santé Québec, 1994, vol.1, pp. 111, 119) and since both sets of questions were included in the 1992 health survey of the Inuit in Nunavik, the author felt that the analysis should include data from both sets of questions. But, rather than use the IAD, where Santé Québec states "Individuals having replied in the affirmative to *a* CAGE question and having experienced one problem linked to the consumption of alcohol in the past twelve months have been classified using the IAD" (Ibid, p.119, emphasis added), this author it was felt that since the CAGE cutoff for ascertaining drinkers at risk is answering in the affirmative at least two of the four questions (Ewing, 1984), that individuals had to meet both the CAGE criteria and having answered in the affirmative for at least one out of the nine questions on problems associated with alcohol use.

Third, in the work done by Kirmayer and colleagues on the correlates of psychological distress amongst the James Bay Cree, they defined those who had a

drinking problem in the past year using the same criteria as this study (Kirmayer, et al., 2000).

Concerning substance use, respondents were asked if in their lifetime they had 'ever' got high by sniffing glue, gasoline or other solvents, or used cocaine or crack, or used marijuana or hashish. Use of each of the three substances was coded dichotomously 'ever'(1) versus 'never' (0).

4.2.4 Social support variables

Three questions assessed social support:

(1) Respondents were asked "How many people are you close to, we mean friends or family you could talk to if you needed help or had a problem?" Although the answer was left open for respondents to fill-in with a specific number, as mentioned above since Santé Québec has determined that the most meaningful cut-off was between 0-4 and 5 and more, this variable was coded dichotomously as having fewer than five friends.

(2) Respondents were asked "In the past twelve months, other than special occasions such as weddings, funerals, or baptisms, how often did you attend church (or religious) services?" Respondents were provided with six options, 'at least once a week', 'at least once a month', a few times a year', 'at least once a year', less than once a year', and 'never'. This question was reverse coded as an index of church attendance with values ranging from '0' for "never" to '5' for "at least once a week".

(3) Respondents were asked to characterize their relationship with the community, as 'very satisfactory', 'somewhat satisfactory', 'somewhat unsatisfactory', and 'very unsatisfactory'. As in the case of previous research conducted by Kirmayer and

colleagues, only those characterizing their relationship with the community as being 'very satisfactory' were considered as having a good relationship with their community (Kirmayer, et al., 2000).

4.2.5 Significant life events in the past year and in lifetime

The seven life events in the past year were scored dichotomously (0=absent or 1=present) and summed to create an index with values ranging from 0-7 to measure cumulative effects; separate analyses examined the impact of each event separately.

There were two questions regarding lifetime history of sexual abuse; however, the question concerning the timeframe when the abuse(s) occurred such as, during childhood, as a teenager, or adult, yielded insufficient numbers to analyze. The single question used was: "[Have you] Ever been forced into any kind of sexual activity (kissing, fondling, touching, intercourse)?" with response categories of 'never', 'once', 'a few times' and 'often'. Responses were coded as an index of frequency of sexual abuse, with values ranging between '0' for 'never' and '3' for 'often'.

Three questions asked respondents about significant losses prior to age twelve: (i) "Did your natural or adopted mother die?" (ii) "Did your natural or adoptive father die?" and (iii) "Did another close member of your natural or adoptive family die?" Three approaches were taken: (1) to examine the effect of at least one death - coded dichotomously; (2) to examine the compounded effect of experiencing more than one death - coded as an index ranging from 0-3; (3) separately examine the deaths of a mother, father, or other close family member - each event coded dichotomously.

4.2.6 Experience psychiatric problem or chronic medical illness during one's lifetime[28,29]

Having experienced a psychiatric problem or chronic illness during one's lifetime were both coded dichotomously 'ever' versus 'never'.

4.2.7 Other potential stressors

Household respondents were asked about the number of total people living in the home; which may indicate crowding. Answers were treated as a continuous variable and ranged from 1-11.

With regard to sexual behaviour, respondents were asked: "How many partners did you have in the past 12 months?" with the answers being "none", "one", two to five", and "six or more". The responses were coded as an index, ranging from 0-3. The use of a linear index reflects the fact that the number of partners one has had during the past year increases the likelihood of acquiring a sexually transmitted disease, In fact, Santé Québec citing a 1993 registry stated that "in 1992, the rate of Chlamydia was 23 times greater and that of gonorrhoea 60 times greater than levels recorded in southern Québec" (Santé Québec, 1994, vol.1, p.193). Although testing for STDs was not conducted for the 1992 health survey, one would expect that one's level of distress would be higher the more partners one has had in the past year. As well, although the relationship between number of sexual partners and distress may be non-linear, the cut-off for what constitutes the

[28] Medical and psychiatric history was assessed by questions included in the Household Survey (for which an adult aged 18 or over was the primary respondent and answered for each of those within the household).
[29] Santé Québec defined psychiatric problems as including: (1) periods of confusion or frequent memory loss; (2) periods of excessive nervousness or irritability; (3) depression; (4) periods of six months or more when he(she) has visions, hears voices, or is afraid without reason; and (5) the belief that his/her mind is affected by a curse (possessed). The household respondent answered for each person in the household.

extreme end of risky sexual behaviour is unknown, e.g. whether the cut-off should be two to five or six or more, combined with the exploratory nature of this research, the use of a linear index may provide some initial insights that can guide further research.

4.2.8 Frequency of consumption of country foods

The questions were all worded the same for each of the five types of country food asked about and began with the phrase "During the last month, how often do you eat?", with the same response categories, which were "everyday", "2 to 3 times a week", "once a week", "2-3 times a month", "once a month", "less than once a month", and "never". Responses were reverse coded and an index was formed with values from 0-6, where 0 = 'never' and 6 = 'everyday'. Two approaches were taken with this data. The first was the creation of an index to examine the compound effect of the frequency of consumption of more than one food, while the other examined each type of food separately.

4.3 Data analysis

One of the primary objectives of this study was the identification of psychosocial correlates associated with common forms of psychological distress. Since many variables were included, data analysis involve methods to identify most statistically significant correlates of distress, both at the level of the entire sample and for each of the six age/gender groups. To achieve this goal, data analysis used the following five steps :

(1) Basic diagnostic assessments on the dataset and variables were conducted, including internal consistency (Cronbach's alpha) and external validation of the distress measure, analysis of collinearity, and identification and treatment of outliers.

(2) Characteristics of the entire sample were examined and subsequent identification of statistically significant gender differences using Chi-square analysis.

(3) Statistically significant variables correlated with level of distress at the level of entire sample were identified using bivariate analysis; a Bonferroni correction was used to correct for the possibility of capturing false-positives through application of multiple tests.

(4) The most statistically significant variables at the level of the entire sample were identified using backwards linear regression. In order to determine whether specific events or the compound impact of events was more closely associated with current levels of distress, two models were examined. Model 1 included indices such as number of significant life events in the past year, while Model 2 included each of the separate components of the indices used in Model 1 such as serious illness of oneself in the past year.

(5) In order to examine possible cohort effects, the sample was stratified into six age/gender groups with the initial identification of statistically significant variables associated with distress using bivariate analysis and subsequent identification of the most statistically significant variables using backwards linear regression as described in steps 3 and 4 above.

All statistical analyses were conducted using SPSS version 15.0.

5.0 RESULTS

5.1 Internal consistency and external validation of the distress measure

The measure of psychological distress had a high internal consistency (Cronbach's alpha = .88) and was externally validated by its significant positive association with lifetime suicide ideation, with a Pearson's correlation coefficient (r) =.36, ($p<.0001$).

5.2 Analysis of collinearity

A correlation matrix was examined to test for collinearity. Of those variables suspected of having a high degree of collinearity (such as number of significant life events and any of the seven events), none had a Variance Inflation Factor above 1.4 and therefore no correction for collinearity was required (Frees, 1996, pp.273-274).[32]

5.3 Treatment of outliers

There was one individual who had a distress score of 96.43 (meaning this person answered 'often' to thirteen out of the fourteen questions and 'sometimes' to the other question) and was therefore excluded.[33]

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[32] Frees notes that is the VIF is above ten then there is significant collinearity that needs to be addressed (Ibid,p. 274).

[33] Three respondents scored in the mid to low 80s range, but since they had scores of 10 points (or more) lower than the respondent with highest score, only this respondent was considered to be an outlier. In addition, since these three appear to cluster around the mid to lower 80s, they appear more as the upper bound of scores rather than outliers.

5.4 Socio-demographic and other characteristics of the sample

Table 3 shows the socio-demographic characteristics of the sample, with unadjusted frequencies for the 584 respondents. Of note, a much lower percentage of women than men were employed full-time (25.9 versus 44.8), while more than twice the percentage of women were employed part-time (16.7 versus 8.1) along with substantial proportion who declared their occupation as homemaker (19.0 versus 2.0). Average age was 33.7 years (± 14.9), people per household ranged from 1 to 11, with the average 5.7 (± 2.3), and for those that had children the number of children still living at home ranged from 1 to 9 children (± 1.6).

Table 3. Socio-demographic characteristics of the sample by gender and total sample (N=584)

	% Male (unadjusted)	% Female (unadjusted)	% Total (unadjusted)
Gender (% female)	N/A	N/A	57.5
Single	38.3	43.2	40.1
More than elementary education	63.3	54.5	58.4
Occupational status			
Student	12.1	8.6	10.1
Working full-time	44.8	25.9	33.9
Working part-time	8.1	16.7	13.0
Homemaker	2.0	19.0	11.8
Retired	2.8	1.8	2.2
Unemployed/welfare	10.9	14.9	15.9

The frequency of psychiatric problems/symptoms, are listed in Table 4.

Table 4. Percentage of those having experienced a psychiatric symptom (N=572)

Psychiatric problem/symptom	N[a]	%
Periods of confusion or frequent memory loss	76	13.3
Periods of excessive nervousness or irritability	29	5.1
Depression	21	3.6
Periods of six months or more when he(she) has visions, hears voices, or is afraid without reason	9	1.6
The belief that his/her mind is affected by a curse (possessed)	2	0.3
At least one psychiatric symptom	78	13.4

[a] Data was missing for twelve respondents.

Table 5 shows other characteristics and gender differences using chi-square analysis.

Table 5. Percentage of males and females and total sample with characteristics of interest

	% Males (unadjusted)	% Females (unadjusted)	Chi-square (p-value)[a]	% Total (unadjusted)
Alcohol and substance use				
Drinking problem in the past year	15.7	15.5	NS	15.6
Used solvents in lifetime	21.4	12.2	8.22 (.004)	16.1
Used cocaine in lifetime	12.5	7.3	8.65 (.003)	8.4
Used marijuana in lifetime	59.7	41.4	18.41 (.0001)	49.1
Social Support				
Very good relationship with the community	41.5	34.2	NS	37.3
Less than five close friends	32.3	55.4	29.77 (.0001)	45.5
Significant life events in the past year				
Separation from one's family	12.5	17.6	NS	15.4
Loss of employment	14.5	14.3	NS	14.4
Experience rejection or disapproval from community	10.9	6.5	NS	8.4
Serious illness	18.1	21.1	NS	19.9
Someone else in household had serious illness	12.9	7.7	NS	9.9
Spouse/partner die	1.2	1.8	NS	1.5
Someone close (other than partner) die	24.6	25.0	NS	24.8
Significant life events prior to age 12				
Death of a natural or adoptive mother	13.7	17.0	NS	15.6
Death of a natural or adoptive father	23.4	19.3	NS	21.1
Death of a close natural or adoptive relative	50.4	49.1	NS	49.7
Death of at least one close person	60.5	61.0	NS	60.8
Psychiatric problem or chronic illness				
Chronic medical illness lifetime *	44.0	59.8	13.80 (.0002)	53.1
Psychiatric problem/symptom lifetime *	4.0	20.5	31.00 (.0001)	13.4

[a] Chi-square statistic and p-value noted only if significant (p-value < .05).
NS – not significant; * According to household respondent

5.5 Bivariate analyses

Table 6 shows the results of simple bivariate regressions for the 36 variables.

Table 6 - Correlates of psychological distress, bivariate analyses

Factor	Simple Regression (N=469)[a, b]		
	B	*95% C.I.*	*p-value*
Socio-demographic characteristics			
Age	-.34¶	-.44, -.24	.001
Single	6.83¶	3.66, 10.01	.001
Female Gender	6.51†	3.38, 9.64	.005
Employed	NS		
More than elementary education	8.70¶	5.49, 11.91	.001
Alcohol abuse and substance use			
Drinking problem in the past year	9.90¶	5.70, 14.10	.001
Used solvents in lifetime	8.89¶	4.88, 12.89	.001
Used cocaine in lifetime	NS		
Used marijuana in lifetime	4.67†	1.44, 7.91	.005
Social support			
Has fewer than five friends	NS		
Frequency of church attendance past month	-1.31*	-2.40, -.22	.02
Very good relationship with the community	-8.72¶	-11.89, -5.55	.001
Significant life event in the past year and lifetime			
Separation from one's family – past yr	7.88¶	3.75, 12.00	.001
Loss of employment – past yr	8.10¶	3.76, 12.45	.001
Experience rejection/disapproval from community – past yr	13.34¶	7.66, 19.02	.001
Serious illness – past yr	3.97*	.01, 7.93	.049
Someone else in household had serious illness – past yr	9.05¶	3.90, 14.19	.001
Spouse/partner die – past yr	NS		
Someone close (other than partner) die – past yr	NS		
Number of life events - past yr [c]	3.66¶	2.20, 5.11	.001
Frequency of sexual abuse in one's lifetime	6.75¶	4.70, 8.81	.001
Death of a natural or adoptive mother before age 12	NS		
Death of a natural or adoptive father before age 12	NS		
Death of a close natural or adoptive family member before age 12	NS		
Number of deaths before age 12	NS		
Death of at least one family member before age 12	NS		
Psychiatric problem/symptom or chronic illness lifetime			
Chronic medical illness lifetime [d]	NS		
Psychiatric problem/symptom lifetime [d]	7.06†	2.35, 11.78	.003
Other potential stressors			
Number of people in household	NS		
Number of sexual partners past year	4.80¶	2.64, 6.96	.001
Frequency of consumption of traditional foods in the past month			
Seal meat	NS		
Seat fat (including misirak made out of seal)	-.72*	-1.44, -.006	.048
Beluga meat	1.23†	.34, 2.11	.007
Beluga blubber (including misirak made out of beluga)	-.70*	-1.47, -.07	.03
Beluga skin	NS		
Traditional food index	NS		
Constant	NA		

NA, not applicable, NS, not significant; * $p < .05$; † $p < .01$; ¶ $p < .0014$ (Bonferroni correction).

[a] Given the preponderance of missing values for various variables this number is the average of the 36 simple linear regressions conducted, the actual sample size ranged from a low of 430 for the variable alcohol problem in the past year fewer to a maximum of 519 for age and gender, which had no missing values.

[b] β, CI, (confidence interval) and p-value noted only if significant (p-value < .05).

[c] For each additional life event.

[d] According to the household respondent.

Although 21 out of 36 were significant, the number of tests increases the likelihood of false-positives and therefore a Bonferroni correction was applied with a

corrected p-value = .0014 (05/36) retaining thirteen variables: (1) age; (2) being single; (3) more than elementary education, (4) having drinking problem past year; (5) used solvents in lifetime; (6) having a good relationship with the community; (7) separation from one's family past year; (8) job loss past year; (9) experience rejection from the community past year; (10) someone else in household had serious illness past year; (11) number of significant life events past year; (12) frequency of sexual abuse during one's lifetime; and (13) number of sexual partners past year. Only increased age, and having a good relationship with the community were associated with lower levels of distress.

5.6 Multivariate Models 1 and 2

For the 233 respondents with complete data, backward stepwise linear regression was used to remove all nonsignificant independent variables ($p > .05$). The next tables show the variables retained from the backward regression for Models 1 and 2 respectively. Table 7 shows the results of reduced Model 1 using 20 variables, while Table 8 shows the results of the reduced Model 2 using 32 variables.

The reduced Model 1 contained five independent variables and explained 20% of the variance (adjusted R^2 =.205) in level of distress. The regression equation for Model 1 is: Distress Score = 15.41 + 7.76 More than elementary education + 6.38 Drinking problem in the past year – 7.55 Very good relationship with the community + 3.68 Frequency of sexual abuse in one's lifetime + 2.64 Number of significant life events in the past year.

Since the estimated B values presented in the tables above are the unstandarized coefficients and therefore not directly comparable, in order to make comparisons standardization of the B coefficient is required. According to Newton and Rudestam:

> "standardization allows us to compare variables with a mean zero and a standard deviation of one. Thus the interpretation of beta weights is in terms of the expected change in the dependent variable, expressed in standard scores, associated with a change of one standard deviation in an independent variable, while holding the remaining independent variables constant" (Newton & Rudestam, 1999, p.268)

To allow such a comparison, the standardized Beta coefficients will be presented as well.

Table 7. Factors associated with psychological distress, multivariate model 1[1, 2]

Factor	*Multivariate Regression reduced model (N=233)*		
	B	*C.I.*	*P-value*
Socio-demographic characteristics			
More than elementary education	7.76‡	3.63, 11.89	.001
Alcohol and substance use			
Drinking problem in the past year	6.34*	1.47, 11.28	.011
Social support			
Very good relationship with the community	-7.55‡	-11.52, -3.58	.001
Significant life event in the past year and lifetime			
Number of life events past year [a]	2.64*	.70, 4.57	.008
Frequency of sexual abuse in one's lifetime	3.68*	.77, 6.59	.013
Constant	15.41‡	11.33, 19.48	.001
Total explained variance			R^2 adjusted = .205

[1] Variables not retained in the model: age, female gender, single, employed, used cannabis in the past year, used cocaine in lifetime, used solvents in lifetime, chronic medical illness lifetime, psychiatric problem/symptom lifetime, has fewer than five close friends, frequency of church attendance in the past month, number of deaths prior to age 12, number of people in household, and traditional food index.

[2] It should be noted that the since the initial sample size was 519, the rule of thumb criteria of a sample size of ten for each independent variable was met and, rather than arbitrarily exclude variables, it was decided to include all 20 variables with the intention that the stepwise backwards linear regression would retain only the most significant variables. The result shows that only five variables were retained, thereby meeting this rule of thumb criteria, despite the significant decrease in sample size for the reduced model, which was primarily a result of a large number of missing value for the self-reported Confidential Survey.

NA, not applicable, NS, not significant; * $p < .05$; † $p < .01$; ‡ $p < .001$.

[a] For each additional life event.

Table 8. Factors associated with psychological distress, multivariate model 2[1,2]

Factor	*Multivariate Regression reduced model (N=233)*		
	B	*C.I.*	*P-value*
Socio-demographic characteristics			
Single	5.72*	1.24, 9.30	.011
More than elementary education	7.98‡	3.82, 12.13	.001
Alcohol and substance use			
Drinking problem past year	5.92*	1.10, 10.74	.016
Social support			
Very good relationship with the community	-6.81†	-10.72, -2.90	.001
Significant life event in the past year and lifetime			
Other close family member die (before age 12)	4.3*	.37, 8.28	.032
Someone else in household had serious illness (past yr)	9.61*	2.76, 16.46	.006
Other potential stressors			
Number of sexual partners past year	3.18*	.31, 6.05	.030
Frequency of consumption of beluga meat past month	1.31*	.17, 2.45	.025
Constant	8.8‡	3.53, 14.09	.001
Total explained variance			R^2 adjusted = .241

[1] Variables not retained in the model: female gender, employed, used cannabis in the past year, used cocaine in lifetime, used solvents in lifetime, chronic medical illness lifetime, psychiatric problem/symptom lifetime, has fewer than five close friends, frequency of church attendance in the past month, someone close (other than partner) die in the past year, moved away from family in the past year, serious physical or mental illness in the past year, job loss in the past year, experience rejection/disapproval from community in the past year, spouse/partner die in the past year, death of a natural or adoptive mother prior to age 12, death of a natural or adoptive father prior to age 12, at least one death of a close family member prior to age 12, number of people in household, frequency of consumption of seal meat in the past month, frequency of consumption of seal fat (including misirak made out of seal) in the past month, frequency of beluga fat (including misirak made out of beluga) in the past month, and frequency of beluga skin in the past month.

[2] See footnote #2 in Table 7 above.

NA, not applicable, NS, not significant; * $p < .05$; † $p < .01$; ‡ $p < .001$.

[a] According to the household respondent.

For Model 1: + .220 More than elementary education + .154 Drinking problem in the past year – .220 Very good relationship with the community + .156 Frequency of sexual abuse in one's lifetime + .163 Number of significant life events in the past year

In terms of magnitude, both having more than elementary education and having a very good relationship with the community have the largest magnitude but contribute to distress in different directions, where having a very good relationship to the community lowers distress, while the former increases distress. The number of significant life events

in the past year is the next highest in terms of magnitude and distress is increased for each additional event experienced. The last two variables are fairly similar and not much lower in terms of magnitude. Both were associated with a higher level of distress.

The reduced Model 2 retained eight variables and explained nearly 25% of the variance (adjusted R^2 =.241). Three of the variables were the same as in Model 1, three were different from Model 1 but were included separately whereas in Model 1 they were included in the three indices, with only the one index being retained in Model 1. The other two variables are different from what was retained in Model 1 (where frequency of sexual abuse was retained), but now number of sexual partners in the past year and being single were retained in model 2.

The regression equation for Model 2 is: Distress Score = 8.81 + 5.27 Being single + 7.98 More than elementary education + 5.92 Drinking problem in the past year – 6.81 Very good relationship with the community + 4.32 Other close member died prior to age 12 + 9.61 Experience serious illness of another in household during the past year + 3.18 Number of sexual partners in the past year + 1.31 Frequency of consumption of beluga meat in the past month.

The standardized Beta coefficients were as follows: + .151 Being single + .227 More than elementary education + .143 Drinking problem in the past year -.198 Very good relationship with the community + .125 Other close member died prior to age 12 + .161 Experience serious illness of another in household during the past year + .132 Number of sexual partners in the past year + .131 Frequency of consumption of beluga meat in the past month.

In this case, having more than elementary education had the largest impact on distress and was associated with increasing distress. The variable with the second largest value was having a very good relationship with the community and was the only variable associated with lowering distress. The variable with the third largest impact was having someone else seriously ill in the household, followed by being single and then number of sexual partners in the past year and frequency of consumption of beluga meat in the past month. The variable with the lowest impact was experiencing the death of a close family member prior to age twelve.

5.7 Age/gender analyses

Tables 9 and 10 show the results of bivariate analyses conducted with all 36 variables (excluding age and gender) in each of the groups. Table 9 presents the percentage of those respondents with the attribute for the dichotomous variables and Table 10 shows the Pearson correlation coefficient for continuous variables and indices. Significant variables (with $p \leq .05$) were included in the stepwise backward selection, which was set at the p-value of .05 to remove nonsignificant variables.

The inclusion of independent variables was based on the initial sample size for the given gender/age group (shown as Initial N=). Although, in all but one case, the reduced sample size was sufficient to meet the rule-of-thumb criterion of one independent variable per a sample size of 10, in the case of females aged 15-24, the inclusion of 11 independent variables only approximated this rule of thumb. The stepwise backwards linear regression included only the most significant variables, with the end result showing only four variables thereby meeting the rule of thumb criteria, despite the significant

decrease in sample size for the reduced model, which was primarily a result of a large number of missing value for the self-reported Confidential survey.

Table 9. Bivariate analysis in each gender/age grouping of association between the given psychosocial or socio-demographic factors and psychological distress

Factor	*Percentage of the respondents with factor*					
	15-24 years old		**25-44 years old**		**45 yrs and over**	
	Males (n=86)	Females (n=117)	Males (n=112)	Females (n=143)	Males (n=50)	Females (n=75)
Socio-demographic						
Single	58	64	28	28	26†	39
Employed	42	37†	71	64	56	32
More than elementary education	83	87	67	56	22	3
Alcohol abuse and substance use						
Drinking problem in the past year	14¶	17¶	20	16	10	8
Used solvents in lifetime	23	18†	24†	13†	12	3
Used cocaine in lifetime	17	5	10	8	10	1
Used marijuana in lifetime	63	49	68	52	36	9
Social Support						
Has fewer than five friends	34	53	27	54	42	61
Good relationship with the community	24	23	48‡	35†	56	49
Significant life events past year and lifetime						
Separation from one's family past yr	16	22	12	16	6	12
Loss of employment past yr	20	19†	14	12	6	12†
Experienced rejection from community past yr	20	12†	7	4	4	1
Serious illness past yr	16	21	12	13	30	35
Someone else in home had serious illness past yr	17	9¶	9‡	5	14†	9
Spouse partner/die past yr	1	1	2	1	0	4†
Someone close (other than spouse) die	27	25	22	22	24	31
Death of natural or adoptive mother before age 12	7	7	15	16	22	35
Death of natural or adoptive father before age 12	14	14	25	19	36	28
Death of a close natural or adoptive family member before age 12	42	49	50	44	62	59
At least one close relative died before age 12	49	55	63	58	74	76
Psychiatric problem or chronic illness						
Chronic medical illness lifetime [a]	37	49	43	54†	58	88
Psychiatric symptoms/problems lifetime [a]	1	9	6	21‡	4	35‡

† $p \leq .05$; ‡ $p \leq .01$; ¶ $p \leq .001$

[a] According to the household respondent.

Table 10. Bivariate analysis by gender/age cohort of association between continuous variables, indices, and level of psychological distress

Factor	*Pearson correlation coefficient*					
	15-24 years old		**25-44 years old**		**45 yrs and over**	
	Males (n=86)	Females (n=117)	Males (n=112)	Females (n=143)	Males (n=50)	Females (n=75)
Continuous variables and indices						
Frequency of church attendance	-.01	-.18	-.14	-.15	-39†	.19
Number of significant life events past year	.32†	.42¶	.14	.08	-.21	-.09
Frequency of sexual abuse lifetime	.01	.43¶	-.06	.24‡	.28	.13
Number of deaths prior to age 12	-.03	.24†	.15	.002	-.15	.01
Number of people in household	.28†	-.004	-.18	-.17†	-.5	-.04
Number of sexual partners past year	.22	.36¶	.07	-.05	-.14	-.17
Frequency of consuming seal meat past month	.16	-.001	.05	-.19†	-.11	.06
Frequency of consuming seal fat past month	.14	-.01	-.05	-.12	.03	.04
Frequency of consuming beluga meat past month	.25†	.28‡	.03	.08	-.28	-.01
Frequency of consuming beluga blubber past month	-.07	.06	-.05	-.08	-.07	.04
Frequency of consuming beluga skin past month	-.01	.02	-.11	-.05	-.08	.05
Traditional food index	.15	.10	-.05	-.12	-.16	.05

† $p \leq .05$; ‡ $p \leq .01$; ¶ $p \leq .001$

Table 11. Results of multivariate regression analyses in gender/age cohorts

Significant factors in the reduced model	Beta coefficient (C.I.)	Significance level
Males 15-24 years	Initial N=86 Reduced N = 39	Adj. R^2 = .171
Number of significant life events in the past year	5.45 (1.19, 9.71)	.014
People per household	2.77 (.33, 5.21)	.027
Other factors in the full model: drinking problem in the past year and frequency of consumption of beluga meat		
Females 15-24 years	Initial N=117 Reduced N = 49	Adj. R^2 = .535
Drinking problem in the past year	11.28 (.41, 22.17)	.042
Serious illness of someone else in the household in the past yr	19.18 (6.68, 31.67)	.003
Frequency of sexual abuse in one's lifetime	8.72 (3.08, 14.35)	.003
Number of sexual partners in the past year	6.50 (.14, 12.87)	.045
Other factors in the full model: work, use of solvents in lifetime, experience job loss in the past year, experience of rejection by community in the past year, number of significant life events in the past year, number of deaths experienced prior to age 12, and frequency of consumption of beluga meat in the past month		
Males 25-44 years	Initial N=112 Reduced N = 90	Adj. R^2 = .177
Used solvents in lifetime	6.52 (.10, 12.94)	.047
Good relationship with the community	-7.03 (-12.76, -1.30)	.017
Serious illness of someone else in the household in the past yr	15.14 (5.07, 25.22)	.004
No other factors included in the full model		
Females 25-44 years	Initial N=143 Reduced N= 108	Adj. R^2 = .162
Good relationship with the community	-6.50 (-12.76, -.24)	.042
Frequency of sexual abuse in one's lifetime	4.64 (1.00, 8.27)	.013
Frequency of consumption of seal meat in the past month	-2.37 (-4.12, -.62)	.008
Other factors in the full model: use of solvents in one's lifetime, experience chronic illness lifetime, experience psychiatric problem/symptom in lifetime, and people per household		
Males 45 and over	Initial N=50 Reduced N = 37	Adj. R^2 = .216
Being single	10.59 (1.25, 19.93)	.027
Frequency of church attendance	-3.02 (-5.73, -.32)	.030
Other factors in the full model: illness of someone else in the household in the past year		
Females 45 and over	Initial N=75 N = 59	Adj. R^2 =.143
Psychiatric illness in lifetime [a]	10.32 (4.04, 16.60)	.002
Other factors in the full model: loss of job in the past year, and spouse/partner die in the past year		

[a] According to the household respondent.

The regression equation for the reduced model for males aged 15-24 is: Distress Score = - 0.006 +5.45 Number of significant life events in the past year + 2.77 Number of people in the household.

The standardized Beta coefficients are as follows: .385 Number of significant life events in the past year + .342 Number of people in the household.

In this case, the number of significant life events had the greatest magnitude pf the two, but both were associated with an increase in distress by each additional event experienced or by additional person in the home.

The regression equation for the reduced model for females 15-24 : Distress score = + 12.22 + 11.29 Having a drinking problem in the past year + 19.18 Serious illness of another in the household + 8.72 Frequency of sexual abuse in one's lifetime + 6.50 Number of sexual partners in the past year.

In this case, the standardized Beta coefficients are: .236 Having a drinking problem in the past year + .317 Serious illness of another in the household + .355 Frequency of sexual abuse in one's lifetime + .211 Number of sexual partners in the past year.

Frequency of sexual abuse experienced in one's lifetime had the largest magnitude, followed by having someone else seriously ill in the home and then having a drinking problem in the past year, with number of sexual partners in the past year having the lowest magnitude. All four variables were associated with a higher level of distress.

The regression equation for the reduced model for males aged 25-44 is: Distress Score = +20.76 – 7.03 Having a very good relationship with the community + 6.52 Use of solvents in one's lifetime + 15.14 Serious of another in the household

In this case, the standardized Beta coefficients are: -.235 Having a very good relationship with the community + .195 Use of solvents in one's lifetime + .287 Serious illness of another in the household.

Serious illness of another had the largest magnitude and was associated with a higher level of distress, followed by having a very good relationship with the community which was associated with a lower level of distress, with use of solvents in one's lifetime having the lowest magnitude and associated with a higher level of distress.

The regression equation for the reduced model for females aged 25-44 is*:* Distress Score = + 26.68 + 4.64 Frequency of sexual abuse in one's lifetime – 6.50 Very good relationship with the community - 2.37 Frequency of consumption of seal meat during the past month.

In this case the standardized Beta coefficients are as follows: .231 Frequency of sexual abuse in one's lifetime – .190 Very good relationship with the community - .249 Frequency of consumption of seal meat during the past month. [34]

Frequency of seal meat had the largest magnitude and was associated with a lower level of distress, followed by frequency of sexual abuse, which was associated with a high level of distress. Having a very good relationship with the community had the lowest magnitude but was associated with lowering the level of distress.

The regression equation for the reduced model for males aged 45 and over is: Distress score = + 22.90 + 10.59 Being single – 3.20 Frequency of church attendance. [35]

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[34] As mentioned in the Measures section, the frequency of consumption of the five foods during the past month was coded such that those who declared consuming a particular food 'never' were coded with a value of '0' and those claiming to consume the food 'everyday' with a value of '6' and hence the negative Beta value implies that the more one consumed a particular food the lower the level of current distress.

[35] As mentioned in the Measures section the frequency of church attendance was coded such that those who 'never' attended church in the past year were coded with a value of '0' and those claiming to attend "at least

In this case the standardized Beta coefficients are: .338 Being single —.333 Frequency of church attendance.

Being single had the largest magnitude and was associated with a higher level of distress, while frequency of church attendance was only slightly lower in terms of magnitude but associated with a lower level of distress.

The regression equation for the reduced model for females aged 45 and over is: Distress score = +11.67 + 10.32 Having experienced a psychiatric problem/symptom.

In this case, the standardized coefficient for having experienced a psychiatric problem/symptom (as reported by the household respondent) was .40 and was associated with a higher level of distress.

6.0 DISCUSSION

6.1 Internal consistency and external validation of the distress measure

The internal consistency of the distress measure (Cronbach's alpha = .88) was comparable to that of another study from a mainstream Québec sample (N=10 387) (Cronbach's alpha = 0.91) and a sample of the James Bay Cree (N= 1 136) (Cronbach's alpha = .94) (Marchand, et al., 2003; Kirmayer, et el. 2000).

In terms of external validation of the index, the significant association with lifetime suicide ideation is consistent with the findings of Kirmayer and colleagues, amongst a sample of James Bay Cree, where they found a significant positive association with previous suicidal ideation (Kirmayer, et al., 2000).

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once a week" were coded with a value of '5' and hence the negative Beta value implies that the more frequently one attends church the lower the level of current psychological distress.

6.2 Socio-demographic variables

At the bivariate level, lower age and female gender were associated with a higher level of distress at the level of the entire sample. In other studies, the relationship for age has been U-shaped, with distress highest for the young and old; in the present study, the small number of those aged 65 and over in the sample is likely why the relationship between distress and age was linear instead. The findings are consistent with other work in North America in that young adults reported the highest levels of distress (e.g. Mirowsky & Ross, 2003). Female gender, was associated with a higher level of distress, which is consistent with the mainstream literature (e.g. Parker & Hadzi-Pavlovic, 2004; Thayer, et al.,2003) and with the findings of Kirmayer and colleagues for the James Bay Cree (Kirmayer, et al., 2000). Although significant at the bivariate level, female gender was not retained in the multivariate regression models perhaps because its influence was accounted for by some of the other variables such as having a drinking problem in the past year, frequency of sexual abuse, and experiencing the serious illness of another in the home.

At the level of the entire sample (at the bivariate level and in multivariate Models 1 and 2), having more than an elementary education was associated with a higher level of distress. Although this finding is not consistent with the mainstream literature (e.g. Mirowsky & Ross, 2003), a similar finding was reported by Kirmayer and colleagues in the Cree population (Kirmayer, et al., 2000). One possible reason for this result is that there may be a cohort effect since the introduction of formal education is a relatively recent phenomenon in Nunavik such that only 10% of those aged 45 and over had more than elementary education compared to 90% of those aged 15-24. As well, it may be that

higher levels of education may lead to increased expectations for employment and higher levels of income, but since there are limited employment opportunities in Nunavik may be distressing. In addition, 30% of those aged 15-24 were still students and therefore not financially benefiting from their higher levels of education, and therefore the correlation between having more than elementary education and distress is understandable.

Being single was associated with a higher level of distress for the entire sample (at the bivariate level and in multivariate Model 2), and for males 45 and over. These results are consistent with the literature.

Although males 45 and over would contribute to results for the entire sample, the higher level of distress for this age group most likely came from those who were separated/divorced (recall that all of those separated/divorced in this age group were males), combined with those that were widowed, and since both marital categories have the highest levels of distress of all marital categories this result is therefore consistent with the mainstream literature (e.g. Mirowsky & Ross, 2003). In addition, there may be a cohort effect since some of those aged 45 and over would have experienced separation from other family members for several years due to the TB evacuations in the 1950s and therefore may be more acutely sensitive to divorce or other forms of family separation such as death of a spouse/partner.

6.3 Alcohol abuse and substance use

Having a drinking problem in the past year was associated with a higher level of distress for the entire sample (at the bivariate level and in multivariate Models 1 and 2), and for females aged 15-24 and is consistent with the Canadian literature (e.g. Patten &

Charney, 1998) and amongst the one study conducted in an Inuit community in the Canadian arctic (Haggarty, et al., 2000). Given that only five variables were retained in the multivariate Model 1 and eight in the multivariate Model 2, having a drinking problem during the past year was fairly significant in terms of impact on current levels of distress amongst adult Inuit in Nunavik. In addition, this variable was only one of three variables retained in the multivariate model for females aged 15-24 suggesting that females may have faced distressing consequences of drinking such as an unwanted pregnancy or sexual abuse.

Use of solvents in one's lifetime was associated with a higher level of distress for the entire sample and for males 25-44 and is consistent with the one study conducted with a Cree sample (Kirmayer, et al., 2000). Although lifetime use of solvents was not clearly associated with current levels of distress in some studies either because of heavy use of other substances (Howard, et al., 1999), this result is consistent with two previous studies that found that a history of solvent use was associated with a previous suicide attempt amongst Inuit youth in Nunavik (Kirmayer, et al., 1998; Malus, et al., 1994).

6.4 Social support

Having a very good relationship with the community was associated with a lower level of distress for the entire sample (at the bivariate level and in multivariate Models 1 and 2) and for both males and females aged 25-44. These findings are consistent with those of Kirmayer and colleagues among the Cree. As for why this variable was significant for those aged 25-44, there may be a cohort effect where some of those in this age cohort were born and initially raised in the camps, i.e. the transitional generation and

may have been able to maintain a very good relationship to community perhaps by providing country foods in the case of males specifically or some valued volunteer work such as in the local church, while others may have experienced conflict within the community or were unable to fulfill community expectations of their respective gender roles.

Frequency of church attendance was associated with a lower level of distress for males aged 45 and over. This result is consistent with the literature on the positive benefits of frequency of church attendance on large population-based studies of the elderly (e.g. Braam, et al., 2004; Braam, et al. , 2001).

6.5 Significant life events in the past year and in lifetime

Several forms of loss or rejection were associated with higher levels of distress. Separation from one's family in the past year was associated with a higher level of distress for the entire sample. This result suggests that there may have been some loss of social support from family members, which contributed to higher levels of distress. Loss of employment in the past year also was associated with a higher level of distress for the entire sample. Experiencing rejection from the community in the past year was associated with a higher level of distress for the entire sample.

Having someone else in the household with a serious illness in the past year was associated with a higher level of distress for the entire sample; it remained significant for females aged 15-24, males aged 25-44 and in the reduced Model 2. The impact that this event had on females aged 15-24 may be a result of experiencing the illness of one's child since according to Santé Québec slightly over half of females aged 15-24 had given

birth to at least one child (Santé Québec, 1994, vol.1, p.189). As for males aged 25-44, the person may have been either be a partner or spouse and/or one of their children.

Number of significant life events was associated with a higher level of distress for the entire sample (including Model 1) and for males aged 15-24. The former finding is to be expected given that four out of the seven events were associated with higher levels of current distress for the entire sample in their respective bivariate analyses. As for males aged 15-24, it is unclear why this variable was retained in their reduced model. But this variable was one of the two strongest correlates of a previous lifetime suicide attempt among male Inuit youth in Nunavik (Kirmayer, et al., 1998).

Experiencing the death of a close family member prior to age twelve was retained in the multivariate Model 2 and was associated with a higher level of distress and is consistent with the finding by Kirmayer and colleagues amongst the James Bay Cree (Kirmayer, et al., 1998). As well, this result appears to have been masked in index of the number of deaths experienced prior to age twelve used in the Multivariate Model 1.

Frequency of sexual abuse during one's lifetime was associated with a higher level of distress for the entire sample (including Model 1), and for females aged 15-24 and 25-44. These results are consistent with the literature in terms of the long term impact of sexual abuse amongst women as shown in a meta-analysis of 36 studies on the long-term sequelae of childhood sexual abuse which demonstrated a range of negative outcomes including depression, anxiety, substance abuse, and suicidality (Neumann, Houskamp, Pollock & Briere, 1996) and at least one meta-analysis of studies containing male samples that showed a range of outcomes as well (Quinones-Munoz, 2001). As well as amongst an Aboriginal population (Kirmayer, et al., 1998).

A history of having experienced a psychiatric problem/symptom in one's lifetime was associated with a higher level of distress for females aged 45 and over. It is unclear why this result occurred specifically for this group, but it should be noted that this was the only variable to be retained.

6.6 Other stressors

The number of sexual partners in the past year was associated with a higher level of distress for the entire sample (including Model 2). One possible reason may be that since over 45% of those that had two or more partners in the past year also met the CAGE criteria and nearly 60% had used marijuana in the past twelve months (Santé Québec, 1994, vol.1, p.192), both of which could increase promiscuity resulting in remorse, regret and distress from these behaviours.

Number of people in the home was associated with a higher level of distress for males aged 15-24. It is unclear why overcrowding was an issue for this group only but perhaps they may want to have their own relationships and/or form families and so lack of space would be a major stressor. As well, it may that since lack of housing is so prevalent in Nunavik that much of the remainder of the population groups has adjusted to their living conditions to the extent that the impact of overcrowding cannot be determined as an independent contributor to distress. In other words, the hypothesized risk factor becomes "normalized" as in the example of gas sniffing in one New Mexico reservation (Kauffman, 1973).

6.7 Frequency of consumption of country food

Frequency of consumption of seal meat was found to be associated with lower levels of distress for females aged 25-44. As mentioned previously, since this age group could be considered the transitional generation, there may be a cohort effect since a certain proportion may been able to maintain integration into a social network that not only provides seal meat but also provides a source of additional social support. There may be a biological rationale for Inuit beliefs about seal meat being protective of depression since according to the Dr. Grace Egland, Director of the Centre for Indigenous Nutrition and Education (C.I.N.E.) at McGill seal meat is rich in iron and iron deficiency can lead to feelings of lethargy and low mood.[36]

Frequency of beluga meat was significant at the bivariate level for the entire sample and in the multivariate Model 2 and was associated with a higher level of distress. Although it is not exactly clear as to why a higher frequency of consumption of this particular type of country food is associated with a higher level of distress, but it could be that this particular food serves as a comfort food, i.e. a food consumed in greater quantities when one is feeling distressed. As well, although not retained in either of the reduced models for males and females aged 15-24, frequency of consumption of beluga meat was included in their respective full multivariate models. It also appears that the traditional food index used in Model 1 masked the impact of this relationship and that of seal meat on levels of distress since seal meat was only significant for females aged 15-24 in their bivariate analysis but not for the entire sample at the bivariate level and therefore would not cancel out the impact that higher levels of consumption of beluga meat would pose.

[36] (According to email correspondence from Dr. Grace Egland October 11, 2005).

7.0 LIMITATIONS

There are a number of limitations to this study that warrant discussion. Most of these limitations stem from the original design of the study conducted by Santé Québec. As this study involved secondary analysis, nothing could be done to remedy these, but this section presents brief suggestions for future studies that could address specific limitations.

First, this is a cross-sectional survey and therefore the results can only look at the association between variables and not be viewed in terms of causation. The most direct way to address this limitation would be to conduct a longitudinal survey.

Second, since only between 20-25% of the total variance in levels of psychological distress was explained in the two reduced models there must be other factors that were not measured that contribute to distress such as parental and other family member drinking patterns, spousal abuse (Kirmayer, et al, 2000), level of self esteem, as well as potential protective factors including time spent out on the land, and traditional Inuit spiritual practices. One possible way to address this limitation would be to first conduct qualitative ethnographic research to identify valid indicators of psychological distress and well-being in this population and then to collect data on these indicators in a large public health survey for quantitative analysis.

Third, the large number of missing values that primarily came from the self-reported Confidential questionnaire, which included many of the variables relevant to personal mental health and wellbeing, significantly reduced the sample size for many of the analyses and therefore limited the power to detect other possible meaningful

associations. One approach to address this limitation would be to use an interviewer such as a local health clinic nurse or physician to deliver the confidential survey.

Fourth, the psychological distress measure itself only provides an indirect measure of psychiatric disorder within the population (Santé Québec, 1994, vol.2, p.133). One possible approach to address this limitation would be to use more specific measures such as the Composite International Diagnostic Interview or Beck Depression Inventory. As well, there is a need for more qualitative ethnographic and quantitative research to identify valid indicators of psychological distress and well-being in this population.

Fifth, questions with respect to having experienced one of the five psychiatric problems or symptoms in one's lifetime were reported by the household respondent and therefore should be interpreted with caution, in particular for females aged 45 and over. One possible approach to address this limitation would be to include these questions in future individual or confidential surveys.

Sixth, although there is very limited empirical research on the correlates of psychological distress amongst adult Inuit in Nunavik, thereby justifying the exploratory use of backwards stepwise linear regression to identify significant correlates, the use of this type of regression should be theory driven since this statistical approach can lead to what is commonly termed "a fishing expedition". Therefore the results should be viewed with caution. To address this issue, further research is required to examine various theories of distress that may be applicable to adult Inuit in Nunavik.

Finally, the large number of variables included in the multivariate models has the potential to result in spurious findings or results that are specific to this sample, and

therefore some results require further research to determine whether there is a true association with current levels of psychological distress amongst adult Inuit in Nunavik.

Despite these limitations, this was the only available data set with which to examine correlates of psychological distress in this population and as such, the only way to identify issues for future research.

8.0 CONCLUSIONS

Of the three sets of hypotheses put forward, a majority of the variables were associated with distress in the same direction as that of mainstream samples and therefore support the transcultural applicability of these variables in this sample. Although these results appear obvious, given the limited empirical literature on correlates of common forms of psychological distress amongst adult Inuit in Nunavik, inclusion of these variables was necessary to determine their relevance for this particular sample. The only variable that did not have the expected direction of association was having more than elementary education. But this finding, along with others that will be discussed below demonstrates that cohort effects can impact the expected the direction of the association between a particular variable and current levels of distress and therefore knowledge of local and regional history of the Aboriginal population under study is important.

Regarding the second set of hypotheses concerning culture or context-specific determinants of distress, it appears the local environment was salient in at least two ways for specific age and gender groups. Crowding or lack of housing was a correlate of distress for males aged 15-24. The widespread prevalence of overcrowding in Nunavik means that it has impact on most people and may make it difficult to identify its

independent influence. This finding suggests that if the prevalence of a given risk or protective factor is so common that its impact may become normalized and therefore it may not be possible to determine the independent contribution of the variable unless further research is conducted on other characteristics of the variable under study.

The frequency of consumption of foods made from seal meat or fat was associated with lower levels of distress for females aged 25-44 but not for the other age/gender groups. This suggests a possible cohort effect, since this age group was considered the transitional generation and may reflect a lack of social integration by some of the females in this cohort. Another possible explanation is that there may be a physiological effect due to the high iron content of seal meat. This association fits with the Inuit belief that when one is depressed seal (seal blood specifically) may be a remedy (Borré, 1994, 1991) and suggests additional biomedical research. The latter suggestion also applies to the finding that greater frequency of consumption of beluga meat was associated with higher levels of distress possibly acting as a form of comfort food and when combined with the previous result suggests that further research is required on the role of consumption of country foods has on Inuit mental health in particular and possibly for other Aboriginal populations living within their respective traditional territories.

With respect to cohort effects, two other additional findings that merit attention are the positive impact of having a very good relationship with the community and the negative effect of being single for males aged 45 and over. These two findings, combined with many of the findings discussed in this section support the hypotheses that historical events such as the TB evacuations in the 1950s, changes due to movement from seasonal camps to permanent settlements from the late 1940s to 1960s, and the introduction of

formal education in the permanent settlements had an influence on the relationship between certain variables and current levels of psychological distress and therefore further research on Inuit mental health should include an examination of significant historical events and their potential impact on various age cohort groups and possibly for other Aboriginal populations living in their respective traditional territories.

8.1 Public health policy implications

Despite the fact that the directionality of the association between a given variable and current levels of psychological distress cannot be determined, and that causality remains uncertain, these results have potential public health policy implications. In particular, while the differences in determinants of psychological distress across age and gender groups may reflect the variability of a small sample, it suggests that preventive policies should be targeted to specific age/gender groups rather than at the population-wide level not only to save costs, but also to meet specific needs of certain segments of the adult Inuit population in Nunavik. For example, it would be difficult to deny the need for counseling for those that have been sexually abused, specifically females aged 15-24 and 25-44, counseling for males aged 25-44 that have used solvents in their lifetime, or the need to bolster forms of social support for males aged 45 and over in general, and specifically those that are divorced. Other results suggest that some policies would better serve the adult Inuit population in Nunavik if targeted at the population-wide level such as counseling for those with a drinking problem, a public awareness campaign about the risks associated with contracting a sexually transmitted disease, home care support for

those that have someone seriously ill in the household, or counseling for those that have been rejected by the community or experienced job loss in the past year.

8.2 Need for Future Research

Given the methodological limitations noted above, these results require further research to confirm and clarify. Initially, qualitative work is needed to better understand why overcrowding is an issue for young males, why serious illness of another in the household is an issue for both young females and males aged 25-44 (possibly through the study of family dynamics surrounding the care of those seriously ill), what is it about the frequency of consumption of seal meat that is protective of distress, and what is it about number of sexual partners in the past year that makes this behaviour associated with distress for the entire adult population. All of this would help generate questions to be asked in future heath surveys in Nunavik. In the medium to long term, since collection of population-based epidemiological data is so infrequent, future health surveys should collect data on frequency of use of substances to ascertain substance abusers, parental and other family member (i.e. siblings) history of alcohol and substance abuse, time spent on the land, self-esteem, and quality of married and cohabitating relationships.

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APPENDIX 1