

Body Image Concepts Differ by Age and Sex in an Ojibway-Cree Community in Canada^{1,2}

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ABSTRACT Community-based studies of body image concepts can be useful for developing health interventions to prevent obesity-related diseases such as diabetes and cardiovascular disease in specific populations. First Nations peoples, in particular, face increased obesity-related health problems as a result of acculturative changes in diet and activity. This study examined body shape perception in an Ojibway-Cree community in Northern Ontario, Canada. A set of figure outline drawings ranging from very thin to very obese were used to examine perceived body shape, body shape satisfaction and ideals of healthiness across sex and age groups. Overall, only 16% of the population were satisfied with their current body shape. People with a higher body mass index (BMI) were less satisfied with their bodies and thought they were less healthy than people with a lower BMI. While females had a significantly greater BMI than males, males and females did not differ significantly in perception of current body shape. On the other hand, females desired relatively smaller body shapes than males ($P < 0.05$). Older people chose significantly larger healthy body shapes than did younger people ($P < 0.05$). Differences between our results and those reported for Anglo populations indicate that while both groups prefer body shapes smaller than those they have currently, the Ojibway-Cree tend to prefer relatively larger body shapes. Knowledge of age and sex-related patterns of body image concepts in communities can assist in the design of obesity-reducing interventions targeting specific groups. *J. Nutr.* 126: 2990-3000, 1996.

INDEXING KEY WORDS:

- *body image* • *Native Canadians* • *obesity*
- *community-based study* • *humans*

The majority of studies on body shape perception are found in the psychological literature (Berscheid et

al. 1973, Fallon and Rozin 1985, Gray 1977). It is important to recognize at the outset that much of the literature on body image focuses on the pathological implications of "body image disturbance," such as eating disorders (Cash and Brown 1987). Recent theories propose that body image and its related disturbances are strongly influenced by sociocultural factors, most notably through images perpetuated in Western society through the mass media and through social interactions (Heinberg 1996). Fallon (1990) and Heinberg (1996) give excellent reviews of historical trends in body shape ideals in Western society, leading up to the modern ideal of thinness, particularly in females. While thin body forms are idealized, obese forms are often associated with negative characteristics and face discrimination (Rand and Kuldau 1990, Rodin et al. 1985). Middle to upper socioeconomic class Caucasian subjects have traditionally been the focus of such studies, because of the belief that weight concerns and dieting were confined to that population (Story et al. 1995).

In recent years, there has been a call for further exploration of body image concepts in minority populations and non-white cultures (Fallon and Rozin 1985, Furnham and Baguma 1994, Hallinan 1988, Kumanyika 1993, Rittenbaugh 1982). Here the focus is on both pathology and a description of cultural norms and variation within subcultural groups. In addition, body image studies in non-Western cultures may provide information useful for developing interventions for obesity-

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related health problems, particularly when combined with an exploration of food consumption behavior, physical activity patterns, and related cultural beliefs.

The literature examining body image and related concepts of beauty in non-white populations is limited. Furnham and Alibhai (1983) used figure outline drawings to examine perceptions of female body shapes between Western (British), non-Western (Kenyan Asian), and acculturated (Kenyan British) subjects. They found that all three groups had similar ideas of what the most attractive figures were, but differed in their perception of the extremely obese and extremely thin. British and Kenyan-British showed more positive reactions to the extremely thin shapes whereas Kenyan-Asians perceived extremely obese shapes more positively than the British subjects. Interestingly, Kenyan-British had the most positive perception of the thin figures; a phenomenon which the authors attribute to a reaction against traditional Kenyan cultural values.

Other evidence supports the conclusion that intercultural differences exist in body image norms. Hallinan (1988) found that Judaic-Christians desired a thinner female image than Muslims at an American university. Furnham and Baguma (1994) found that British students rated the thin figures more attractive than did Ugandan students, and that the Ugandans rated the more obese shapes as more attractive.

Researchers have suggested several theories to explain why some cultures idealize relatively larger body shapes. Fallon (1990) suggests that from a functional perspective, heavier female body forms might be considered attractive in many cultures because they are associated with better birth outcomes. Heavier body forms may also be considered attractive or healthy in cultures which experience periods of famine or drought because fat is linked to survival. Rudolfsky (1972) suggests that obesity is a secondary sexual characteristic in some cultures. Socioeconomic status may be an additional factor affecting body image in traditional cultures (Altabe 1996), in which greater wealth means improved diet.

Acculturative effects on body image perception remain largely unexplored in the literature. Pate et al. (1992) suggest that greater rates of body dissatisfaction and eating disorders will be observed as different ethnic groups internalize Western ideals of thinness. However, studies of the actual process through which changes in body ideals and body image standards occur are lacking.

This paper presents an examination of body shape perception and its health implications in an Ojibway-Cree community in Northern Ontario. We explore whether there is a single "ideal" body shape in the community, analogous to the Western ideal, or whether different ideals exist within the community. Perceptions of current body shape, desired future body shape and healthy body shape are examined by sex and across age groups. Body shape satisfaction in the com-

TABLE 1

Age and sex distribution of the study population: members over 10 y in the Ojibway-Cree community of Sandy Lake, Ontario¹

Age, y	Male		Female		Overall	
	%	(n)	%	(n)	%	(n)
10-19	30.7	(93)	35.4	(151)	33.5	(244)
20-29	27.3	(83)	24.9	(106)	25.9	(189)
30-39	18.8	(57)	19.2	(82)	19.1	(139)
40-49	8.3	(25)	8.2	(35)	8.2	(60)
50-59	8.3	(25)	5.9	(25)	6.9	(50)
60+	6.6	(20)	6.3	(27)	6.4	(47)
Total	100	(303)	100	(426)	100	(729)

¹ The table shows the relative size of each age/sex group in the sampled population.

munity is also assessed, i.e., how people perceive their current body shape relative to what they would like their bodies to look like.

SUBJECTS AND METHODS

Study setting. Sandy Lake, Ontario, is a First Nations reservation located about 2000 km northwest of Toronto. The population, composed of about 1600 Ojibway-Cree, is isolated and stable, with relatively little immigration or emigration.

The Sandy Lake Health and Diabetes Project was initiated in January 1992 to assess diabetes status in the population, obtain information on risk factors such as obesity, and to develop a community-based intervention strategy to prevent diabetes. Our goal in recruiting participants into the assessment was to enroll all eligible members of the Sandy Lake community age 10 y and older. We received an excellent response and were able to collect data from 72% (729/1016) of the eligible population. Survey data were collected between July 1993 and March 1995. The age and sex structure of the population is shown in Table 1. Sandy Lake has a relatively young population; 30.7% of the study population is 10-19 y old, compared with 16% of the Canadian population; and just over 6% of the Sandy Lake population is above 60 y, compared with 18.5% of the Canadian population (Statistics Canada 1992). Population growth is four times the Canadian national average (Zinman 1992).

Levels of education vary greatly by age in the population. Overall, 64.3% of males and 57.5% of females above the age of 15 y have completed elementary school. Only 29.6% of males and 21.7% of females above the age of 21 y have completed secondary school. It is important to note that older respondents reported markedly lower levels of education, with 50-59 year-olds having a 25% elementary school completion rate, and

10% secondary school completion. None of the population over 60 reported elementary school completion.

The traditional language spoken in Sandy Lake is Oji-Cree, a member of the Algonkian language family. Roughly 90% of the Sandy Lake population reported being able to speak Oji-Cree, although proficiency was directly related to age. Members of the community under 50 y of age showed slightly lower levels of proficiency in Oji-Cree than older persons, all of whom reported being able to speak the language. Similarly, a majority of the population over the age of 50 y was able to read syllabics (the written form of Oji-Cree), whereas only about one fifth of the population under the age of 50 y could read the language.

Virtually all of the participants under age 50 y reported being able to speak and read English. While all of the males in the 50- to 59-y-old age group could speak English and 88% could read English, only about 58% of the females in this age group could speak English and only 4% could read the language. Approximately one third of the total population over the age of 60 y was able to speak English, with males again showing higher levels of fluency than females.

Historically, social organization among Native Canadians in Northern Ontario consisted of close-knit extended family groups. The traditional lifestyle was very active, with subsistence based on hunting and seasonal gathering of wild rice and berries. The traditional diet was high in protein, moderate in fat, low in carbohydrate, and low in dietary fiber (Berkes and Farkas 1978). With the enforced settling of First Nations peoples on reserves, diets and activity levels began to change, particularly in the past 20–30 y. Today, the Sandy Lake population relies primarily on foods purchased at the local store, frequently high in fat and carbohydrates. Less than 5% of total energy consumed by Sandy Lake residents comes from bush foods (Wolfe et al., unpublished data).

These dramatic changes in diet and activity have led to an increase in obesity and obesity-related illness on the reserve. **Table 2** presents the distribution of obesity in the population as measured by body mass index (BMI), calculated as weight/height² (kg/m²). By their thirties, over half of the population of Sandy Lake is either obese or markedly obese, based on Canadian National Standards (Department of National Health and Welfare 1988). In general, women tend to be more obese than men, in terms of both moderate and marked obesity. The high rates of obesity in Sandy Lake have important health implications; fully one third of adults above the age of 30 y have diabetes⁴ (Harris et al. 1996).

Measurements. Hanley et al. (1995) describe the community and data collection techniques used in the study in detail. A multicomponent questionnaire was

developed by the project team adapted from published sources and customized for the Ojibway-Cree population. The development phase made extensive use of ethnographic fieldwork conducted to evaluate applicability of various components of the questionnaires (Gittelsohn et al. 1996). Drafts of the questionnaires were translated into Oji-Cree and field tested by surveyors in the population. Surveyors were all local Ojibway-Cree women, in their 40s and 50s, fluent in the local language. Surveyors administered the questionnaires in English or Oji-Cree depending on the preference of the subjects. The questionnaire included demographic questions, a three-month qualitative food frequency, and a health beliefs and knowledge section in which subjects were asked to agree or disagree with a series of statements regarding food, health, obesity and the causes of diabetes. Education was determined by reported level of schooling completed (e.g., elementary, secondary).

There have been a number of instruments used to assess aspects of body image related to physical appearance. Thompson (1996) groups these instruments into the following two major categories: perceptual measures, which focus on size perception accuracy, and subjective indices, which measure attitudes, emotions and cognitive aspects of body image. Procedures for body size estimation, which include whole image adjustment measures, are used to explore the perceptual component of physical appearance, i.e., the differences between objective physical measures of body shape and subjective perceptions of body shape. The second major category exclusively assesses the subjective components of physical appearance. Methods include questionnaire measures and figure rating scales.

Figure/silhouette ratings are the most widely used method of determining an overall rating of size/weight satisfaction (Thompson et al. 1990). We felt that the use of this instrument would enable the exploration of subjective perceptions of body shape in the community, body shape ideals in the population, and concepts of healthy body shape, as well as allowing an estimation of dissatisfaction with current body shape in the community. In addition, the use of figure rating scales is relatively easy and permits comparison with studies done in other populations.

Subjects were presented with a scale consisting of nine figures of each sex (**Fig. 1**). These figures, adapted from Stunkard et al. (1980), range from very thin to very obese and are numbered incrementally from 1 to 9 in this order. Subjects were asked to identify the body shape (using the sex-appropriate set of figures): *a*) most resembling their current body shape, *b*) resembling the shape they would like to be in the future (ideal), *c*) corresponding to the most healthy First Nations man, and *d*) to the most healthy First Nations woman. Subjects were specifically asked to select the figure most like them (*a*), most like the shape they desired to be (*b*), and those they thought were healthy (*c*) or (*d*).

⁴ Diabetes status was assessed using a standard 75-g oral glucose tolerance test (OGTT) (Glucodex, Rougier, Chambly, QC, Canada).

TABLE 2

Distribution of obesity in the study population: the Ojibway-Cree community of Sandy Lake, Ontario^{1,2}

Age group, y	Males			Females		
	Normal (BMI < 27 kg/m ²)	Obese (BMI 27-30 kg/m ²)	Markedly obese (BMI > 30 kg/m ²)	Normal (BMI < 27 kg/m ²)	Obese (BMI 27-30 kg/m ²)	Markedly obese (BMI > 30 kg/m ²)
	%					
10-19 ^c	83.9	6.5	9.7	70.7	10.0	19.3
20-29 ^b	56.6	15.7	27.7	46.7	24.8	28.6
30-39 ^b	43.9	33.3	22.8	29.6	22.2	48.2
40-49 ^a	32.0	24.0	44.0	32.4	17.7	50.0
50-59 ^a	41.7	16.7	41.7	20.0	32.0	48.0
60+ ^a	47.4	21.1	31.6	22.2	29.6	48.2

¹ Standards for obesity based on Department of National Health and Welfare (1988). BMI, body mass index.

² Age groups not sharing a superscript differ significantly ($P < 0.05$) in obesity prevalence.

We recognize the limitations of using identifiably Anglo figures in a non-Anglo population. However, doing so allows comparison of our results with previous studies using these figures. In addition, these figures were extensively pretested in the population prior to implementing the survey. None of the participants in the pretest felt that the drawings were inappropriate, though some commented on how skinny white people could get. We also recognize the problems inherent in showing adult figures to persons aged 10-19 (who are still growing), and have interpreted our findings relative to this age group with caution.

Heights and weights were measured using a physician's stadiometer and standing scale, respectively. Body mass index was then calculated.

Data analysis. Several indices were created from these data:

1) Satisfaction with current body shape was derived by comparing perceived current body shape (question a) with desired future body shape (question b). When

the body sizes selected were the same, the individual was scored as "satisfied" with his/her current body shape. If the images selected did not agree, the individual was scored as unsatisfied, and the direction of desired body size (heavier or thinner) was recorded. Similar methods for the calculation of body satisfaction are outlined in Thompson et al. (1990).

2) Perceived healthiness of current body shape was calculated in a similar fashion as satisfaction, except perceived current body shape was compared with the body shape most appropriate for a healthy First Nations man (question c) or woman (question d), depending on the sex of the subject.

3) Language was used as a proxy for acculturation. Phinney (1990) describes two models that have been used to conceptualize acculturation. The linear model conceptualizes ethnic identity along a continuum, ranging from strong ethnic ties at one end to strong mainstream ties at the other. In doing so, this model assumes that acculturation is necessarily tied to a weakening of ethnic identity. In contrast, the two-dimensional model views the relationship with the traditional culture as independent from the relationship with the dominant culture. Our linguistic acculturation scale was based on the former model. This scale was operationalized by looking at reported speaking, reading and writing ability in English and Oji-Cree. Points were added to the scale if the respondent indicated that they could speak, read or write English; each positive response received one point. Points were subtracted from the scale if the respondent reported being able to speak, read or write Oji-Cree; each positive response resulted in the subtraction of one point. Individual acculturation scores ranged from -3 to +3, with a mean of +1.23 (SD = 1.44). Persons who were able to communicate only in Oji-Cree received a negative score, indicating less linguistic acculturation. Those who were able to communicate only in English received a positive score, representing greater linguistic

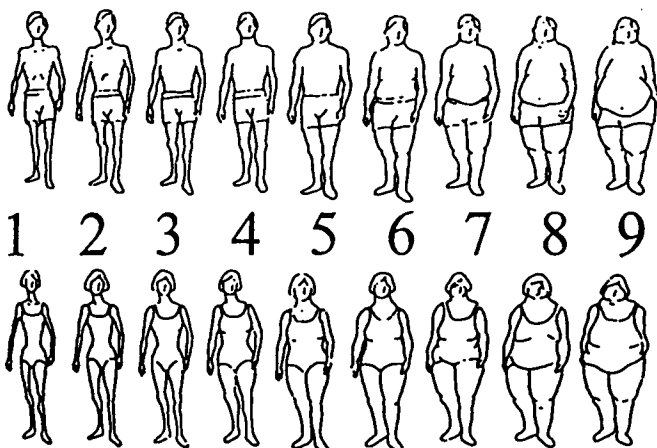


FIGURE 1 Nine-figure outline scale used to evaluate body shape perceptions in this study. (Source: Stunkard et al. 1980), reprinted with permission.

TABLE 3
Body shape ratings for perceived current body shape and desired future body shape within the Ojibway-Cree community of Sandy Lake, Ontario

Age group, y	Perceived current body shape			Desired future body shape		
	Male figure rating ¹	Female figure rating ¹	Combined figure rating ^{1,2}	Male figure rating ¹	Female figure rating ¹	Combined figure rating ^{1,2}
10-19	4.25 ± 1.13	4.23 ± 1.26	4.24 ± 1.21 ^d	4.21 ± 1.03	3.67 ± 0.89	3.88 ± 0.98 ^b
20-29	4.87 ± 1.33	4.50 ± 1.37	4.66 ± 1.36 ^{bcd}	4.10 ± 0.70	3.46 ± 0.85	3.74 ± 0.84 ^b
30-39	4.66 ± 1.34	5.04 ± 1.27	4.89 ± 1.31 ^{abc}	3.93 ± 0.91	3.46 ± 0.86	3.65 ± 0.91 ^b
40-49	5.00 ± 1.35	5.33 ± 1.40	5.18 ± 1.38 ^a	3.88 ± 0.97	3.80 ± 0.81	3.84 ± 0.88 ^b
50-59	5.40 ± 1.50	4.70 ± 1.82	5.06 ± 1.68 ^{ab}	4.32 ± 1.11	3.57 ± 1.12	3.96 ± 1.17 ^{ab}
60+	4.57 ± 1.43	4.37 ± 1.69	4.46 ± 1.57 ^{cd}	4.24 ± 1.14	4.15 ± 0.72	4.19 ± 0.92 ^a
All	4.67 ± 1.33 ³	4.56 ± 1.41 ³	4.61 ± 1.37	4.11 ± 0.94 ⁴	3.61 ± 0.88 ⁴	3.82 ± 0.94

¹ These values correspond to mean body shape ratings gathered using the figure rating scale in Figure 1 ± SD.

² Within the combined columns, values not sharing a superscript differ significantly ($P < 0.05$).

³ Mean perceived current male and female body shape ratings differed significantly ($P < 0.05$).

⁴ Mean desired future male and female body shape ratings did not differ significantly ($P > 0.05$).

acculturation. Persons who communicated in both languages received a medium score indicating partial acculturation.

Statistical analysis was performed using the SAS statistical package (SAS/STAT Version 6, SAS Institute, Cary, NC). Means for each of the body shape ratings were calculated for age and sex subgroups and are shown in Tables 3 and 4. Chi-square tests were used to compare the body shape satisfaction variable by sex and age group. Multiple regression analysis was used to examine age, sex, education, and the linguistic acculturation variable, as determinants of current, future, and healthy body shapes. The relative weights of each of the independent variables are reported as standardized beta coefficients. The model for future body shape (b) was tested with and without perceived current body shape (a) as a predictor. Similarly, the model for healthy male and female body shapes was tested with and without perceived current body shape (a) and future body shape (b) as independent variables.

Multiple regression analyses were also used to examine the determinants of satisfaction with and perceived healthiness of current body shape. New variables representing satisfaction (SATIS2) and perceived healthiness (HEALTHY2) of current body shape were created for the regression analysis using the following formulas:

$$\text{SATIS2} = |(\text{current figure} - \text{future figure})| \cdot (-1)$$

$$\text{HEALTHY2} = |(\text{current figure} - \text{healthy figure})| \cdot (-1)$$

Thus, satisfaction with current body shape (SATIS2) in the regression analysis was estimated by taking the absolute value of the difference between the desired future body shape and that corresponding to current perceived body shape and multiplying that value by negative one. This led to satisfaction values ranging from 0 to -7. The resulting number was an indication of the relative magnitude of satisfaction; more negative satisfaction scores represent less satisfaction with current body shape. Thus, those individuals who desired

TABLE 4
Body shape ratings representing a healthy First Nations male or female as selected by community members in Sandy Lake, Ontario¹

Age group, y	Healthy male body shape			Healthy female body shape		
	Male figure rating ¹	Female figure rating ¹	Combined figure rating ^{1,2}	Male figure rating ¹	Female figure rating ¹	Combined figure rating ^{1,2}
10-19	4.40 ± 1.19	4.05 ± 0.99	4.19 ± 1.08 ^b	3.87 ± 0.81	3.81 ± 0.95	3.83 ± 0.90 ^{bc}
20-29	4.07 ± 0.83	3.88 ± 0.92	3.97 ± 0.88 ^b	3.74 ± 0.62	3.74 ± 0.86	3.74 ± 0.76 ^c
30-39	3.88 ± 0.97	3.83 ± 0.88	3.85 ± 0.92 ^b	3.66 ± 0.83	3.56 ± 0.84	3.60 ± 0.84 ^c
40-49	3.72 ± 1.24	4.07 ± 0.69	3.91 ± 0.97 ^b	3.60 ± 1.19	3.60 ± 0.77	3.60 ± 0.97 ^c
50-59	4.00 ± 0.82	4.22 ± 0.85	4.10 ± 0.83 ^b	4.00 ± 0.65	4.17 ± 0.94	4.08 ± 0.80 ^b
60+	4.67 ± 0.97	4.37 ± 1.01	4.50 ± 0.99 ^a	4.48 ± 1.12	4.56 ± 0.97	4.52 ± 1.03 ^a
All	4.14 ± 1.05 ³	3.99 ± 0.94 ³	4.06 ± 0.99	3.83 ± 0.84 ³	3.80 ± 0.92 ³	3.81 ± 0.88

¹ These values correspond to mean body shape ratings gathered using the figure rating scale in Figure 1 ± SD.

² Within the combined columns, values not sharing a superscript differ significantly ($P < 0.05$).

³ Mean desired future male and female body shape ratings did not differ significantly ($P > 0.05$).

a future body shape of 6, but who rated their current body shape as 3, were assigned a satisfaction level of -3 . Similarly, those individuals who rated their current body shape as 6 but wanted to be a 3 were also assigned a satisfaction level of -3 .

Independent variables in the multiple regression models for SATIS2 and HEALTHY2 included current body shape, BMI, the linguistic acculturation variable, age, sex and education. Additional regression models were then generated which removed current body shape from the regression when it was found to be a strong predictor, because it was felt that its presence might alter the relationships of other variables.

Two-way ANOVA models were used to test for sex and age group differences in the presence and severity of obesity (as defined in Table 2), BMI, perceived current body shape (*a*), future body shape (*b*), and healthy male (*c*) and female (*d*) body shapes. Significant differences between subgroups were determined using Duncan's multiple-range tests ($P < 0.05$; SAS Institute).

The protocol for this project was reviewed and approved by the University of Toronto Research Ethics Committee.

RESULTS

Perceptions of current body shape. Means of perceived current and desired future body shapes, calculated from the corresponding numeric values shown in Figure 1 are presented by age and sex in Table 3 along with significant group differences from ANOVA. All age \times sex interactions were found to be insignificant. The mean current body shape rating for males (4.67 ± 1.33) did not significantly differ from that of females (4.56 ± 1.41). The test for differences among age groups revealed that current body shape ratings of the middle age groups (30–59 y) were significantly greater than those of both the oldest and youngest age groups (10–19 y) and (60+ y). The youngest two age groups (10–19 y), (20–29 y), and the oldest age group, (60+ y) did not differ in their current body shape ratings.

There was a strong correlation between perceived body shape and BMI in this population. Figure 2 presents the mean male and female BMI for the population choosing each of the figures to represent their current body. A correlation analysis found that BMI significantly ($P = 0.0001$) correlated with current body figure ratings in both males (0.75) and females (0.76). Figure 2 shows a gradational increase across body figures 2–8, with a slight decrease in the BMI of the females who rated themselves as the largest figure (none of the males selected this figure to represent themselves).

Perceptions of desired body shape. Females had a significantly slimmer desired body shape (3.61 ± 0.88) than males (4.11 ± 0.94) (Table 3). The oldest two age groups, (50–59 y) and (60+ y) desired a larger future

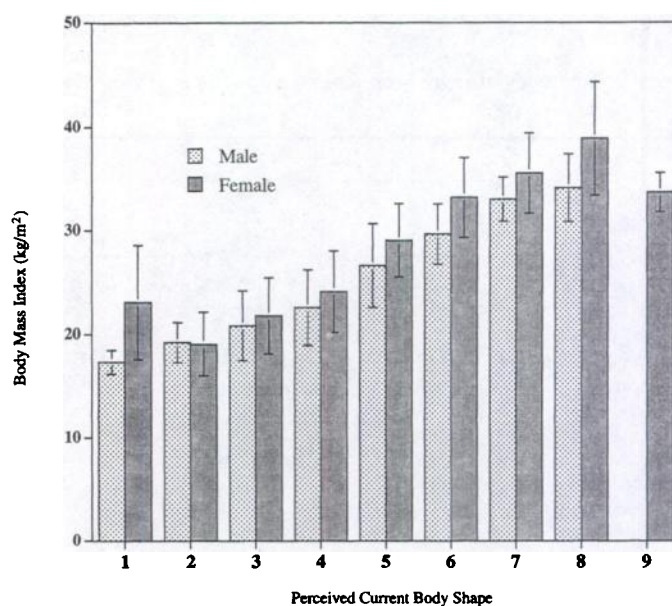


FIGURE 2 Body mass indices of males and females in an Ojibway-Cree community ordered by current body shape ratings on the nine-figure rating scale shown in Figure 1. Values shown are means \pm SD, $n = 713$.

body shape than all of the age groups under 50 y. On average, females desired a future body figure about one figure smaller than their perceived current figure. Males also desired a smaller body figure in comparison with their perceived present figure, but this difference was only half a figure smaller than their current figure.

Perceptions of male and female healthy body shape. The female idea of healthy male body shape (3.99 ± 0.94) did not differ significantly from that of males (4.14 ± 1.05) (Table 4). Similarly, male ratings of healthy female body shape (3.83 ± 0.84) did not significantly differ from female ratings (3.80 ± 0.92). However, the oldest age group (60+ y) chose significantly larger healthy male and female body shapes than the other age groups. Among the healthy female body shapes, the age group (50–59 y) also had a significantly greater mean rating than the other groups, with the exception of the youngest (10–19 y) age group.

Determinants of body shape preferences. Table 5 shows the results of multiple regressions conducted using the linguistic acculturation, age, sex, BMI, education, current body shape and future body shape variables as determinants of body shape perceptions. Respondents aged 10–19 y were removed from the regression analyses because we were concerned that adolescents comparing themselves with adult body shapes were considering additional factors, such as desired total growth, in addition to perceived body shape. This led to a reduction in the sample size from 793 to 479 people in the final regression models. Future community-based studies of body image should consider incorporating adolescent figures such as those developed by Collins (1991) into their design.

TABLE 5
Summary of regression models used to predict current, desired future, and healthy body shape ratings in the Ojibway-Cree community of Sandy Lake, Ontario

Determinant	Body image type (standard beta coefficients)						
	Current	Future	Future (current removed)	Healthy man	Healthy man (future and current removed)	Healthy woman	Healthy woman (future and current removed)
	Adj. $R^2 = 0.601$	Adj. $R^2 = 0.112$	Adj. $R^2 = 0.099$	Adj. $R^2 = 0.189$	Adj. $R^2 = 0.046$	Adj. $R^2 = 0.243$	Adj. $R^2 = 0.096$
Linguistic acculturation	0.065	-0.029	-0.016	-0.076	-0.081	-0.125*	-0.138*
Age (years)	-0.032	0.171**	0.016*	0.067	0.133*	0.129*	0.200**
Sex (1 = male, 2 = female)	-0.186***	-0.247***	-0.283***	0.104*	-0.015	0.111*	0.013
BMI	0.791***	-0.102	0.052	-0.200**	-0.155**	-0.059	-0.122*
Education	0.052	-0.021	0.031	-0.003	0.011	-0.015	-0.008
Perceived current body shape	N/A	0.196*		0.030		-0.107	
Desired future body shape	N/A	N/A	N/A	0.401***		0.411***	

¹ This table shows the results of regression models for future and healthy body shape ratings including and excluding perceived body shape as an independent variable. Values shown are standardized beta coefficients.

² BMI, body mass index; N/A, not applicable; *significant at $P < 0.05$; **significant at $P < 0.005$; ***significant at $P < 0.0001$.

The regression model for perceived current body image accounted for 60.1% of the variance. Not surprisingly, BMI was a highly significant predictor of the variance ($P < 0.0001$). Sex was also a significant ($P < 0.0001$) predictor of the current body shape perception: males and those with greater BMI were more likely to choose larger figure drawings to represent their current body shape.

Our second regression model, which used the same independent variables to predict desired future body shape, accounted for 11.2% of the variance. Significant predictors of desired future body shape in this model included sex ($P = 0.0001$), age ($P = 0.0071$), and current body shape perception ($P = 0.0058$). Males were more likely to desire a larger future body shape than females. Not surprisingly, those with a more full current body shape were more likely to desire a (relatively) larger future body shape than those with thinner current body shapes. A regression model, excluding current body shape because of possible effects of other variables (age and BMI) in its determinance, accounted for a smaller proportion (9.9%) of the variance, with age and sex remaining significant predictors.

Our models were more successful in predicting ratings of healthy female ($R^2 = 0.243$) than male ($R^2 = 0.189$) body shapes. In both models, desired future body shape was the strongest significant ($P < 0.0001$) predictor, indicating that people's concepts of healthy body shape were similar to that of future desired body shape. Sex was also a significant ($P < 0.05$) variable in both models, indicating that males chose larger body shapes to represent their conception of healthy than females. In the model for healthy male body shape, BMI was a significant ($P = 0.0012$) negative predictor: those individuals with large BMI chose smaller male figures as

healthy. Linguistic acculturation was a significant ($P = 0.036$) predictor of healthy female body shape. Those who relied more on communication in Oji-Cree and less on communication in English tended to choose a larger figure to represent a healthy First Nations woman.

When future and current body shape were removed from the regression models, the ability of the model to predict the variance greatly decreased. In the model for healthy male body shape, R^2 fell to 0.046. While age became a significant predictor ($P < 0.05$), sex was not significant. However, BMI continued to be a strong ($P < 0.005$) predictor of healthy male body shape. The adjusted model for healthy female body shape accounted for 9.6% of the variance, with linguistic acculturation and age remaining significant variables. In addition, BMI was a significant predictor of healthy female body shape. As in the adjusted model for healthy males, sex ceased to be a significant predictor.

Obesity and BMI distribution in the population. Table 2 shows obesity distribution among males and females by age group. Participants were classified as being normal (BMI < 27 kg/m²), obese (BMI 27–31 kg/m²), or markedly obese (BMI > 30 kg/m²). Females were significantly more obese than males ($P < 0.05$). The youngest age group (ages 10–19 y), were significantly less obese than all other age groups. Age groups above 40 y were significantly more obese than those under 40 y.

The mean BMI of females (27.4 kg/m²) was significantly greater than that of males (25.6 kg/m²). The BMI of the four age groups above age 29 did not significantly differ, but were significantly greater than the two younger age groups (10–19 y) and (20–29 y).

Satisfaction with current body figure. Overall, 16.4% of the population was satisfied (as defined) with

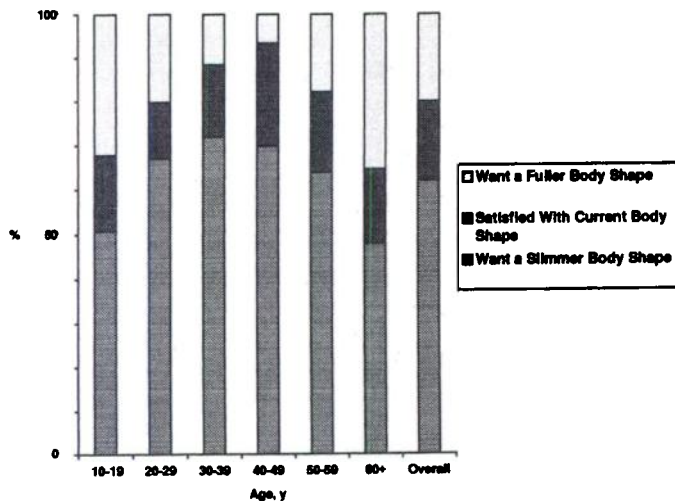


FIGURE 3 Satisfaction with current perceived body shape in an Ojibway-Cree community. Satisfaction was determined by taking the difference between current body shape ratings on a figure-rating scale, and the desired future body shape. Those with no difference were defined as satisfied; those wanting a slimmer or fuller figure were defined as unsatisfied.

their current body shape, 61.3% of the population desired a thinner shape, and 22.3% sought a fuller body shape. Satisfaction with current body size differed by sex and age in this population. While equal proportions of males and females were satisfied with their current body size, relatively more women than men wanted a slimmer body size in the future, whereas relatively more men than women wanted a fuller body shape ($\chi^2 = 8.938, P = 0.011$).

Figure 3 shows the age distribution of satisfaction with current body shape. Among the age groups, the percentage of persons satisfied with their current body size ranged from 12.8 to 23.7%. Satisfaction with current body size did not vary linearly with age. Middle-aged persons in their 30s and 40s were relatively more likely to desire a slimmer body size than persons in their teens and those age 60 y and above ($\chi^2 = 42.384, P = 0.0001$).

A regression model incorporating current body shape, BMI, linguistic acculturation, age, sex and education as predictors of satisfaction (SATIS2) had an adjusted R^2 of 0.1845. In this model, only perceived current body shape was a significant negative predictor of satisfaction ($P < 0.0001$). This indicates that those who perceived their current body shape as being large also appear to be more dissatisfied than those with a thinner self-perception. After removing the strong effects of the current body shape variable, the model accounted for 14.7% of the variance. In this model, BMI was significantly ($P < 0.001$) negatively associated with satisfaction. People with lower BMI appear to be more satisfied with their current figure than people with greater BMI.

Perceived healthiness of current body shape. Age and sex distribution of what was perceived to be a healthy body shape relative to current body shape

showed age and sex distribution similar to that for satisfaction. Overall, only 13.1% of the population perceived their current shape as healthy. This was fairly constant across sex and age groups. Significant differences were not observed between males and females ($\chi^2 = 5.380, P = 0.068$). However, the proportion of those who chose a slimmer body shape to represent their concept of a healthy First Nations male or female showed the same trend as that seen for satisfaction, peaking at the 40–49 y age group. Greater proportions of people in the younger and older age groups chose a figure larger than their own to represent a healthy same sex First Nations person ($\chi^2 = 40.895, P = 0.0001$) (**Fig. 4**).

A regression analysis of the variable HEALTHY2 was conducted with the same independent variables as used for SATIS2. The model incorporating current body shape as an independent variable had an adjusted R^2 of 0.1215. Significant variables included current body shape ($P < 0.0001$) and age ($P < 0.05$). Thus, younger people (who were also thinner), chose thinner body shapes than people who were older (and larger). In a model excluding current body shape ($R^2 = 0.0947$), only BMI was significantly ($P < 0.0001$) negatively associated with healthiness. That is, people with a large BMI tended to think of their own bodies as less healthy than those with a small BMI.

DISCUSSION

Geographically, Sandy Lake is an extremely isolated reserve, yet the majority of households in the community own televisions and video cassette recorders and are presumably exposed to some degree to Western ide-

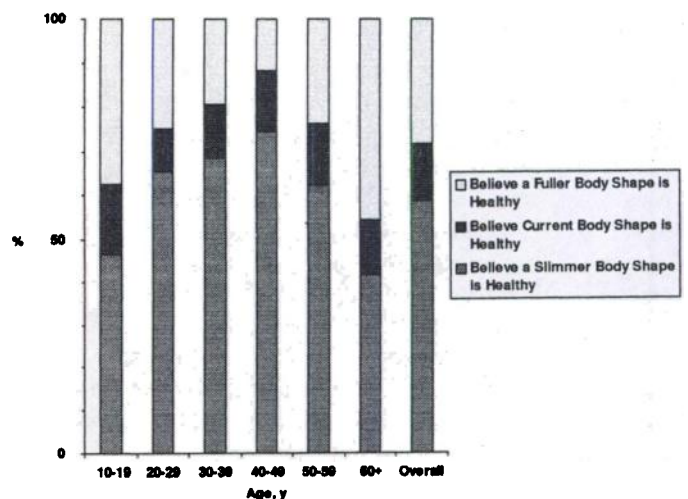


FIGURE 4 Perceived healthiness of current body shape in an Ojibway-Cree community. Participants were asked to select the figure corresponding to a healthy First Nations male and female. Those who selected the same figure as their current figure were defined as perceiving their current figure as healthy.

als of thinness. Many community members, mostly male and now middle aged, were educated off of the reservation. Still others make frequent trips out of Sandy Lake for supplies or visits. Thus, varying degrees of exposure in the community to Western culture exist.

These varying levels of acculturative influence appear to have manifested themselves in at least two ways that were significant for this study. The first is the matter of language. Older, female residents of Sandy Lake are less likely to be able to speak, read or write in English—when compared with younger and male residents. The second is in terms of the degree of acceptance of Western ideals regarding what is considered an attractive, healthy body shape.

At this point, it is useful to compare our findings with those from other studies conducted in other populations using the same set of figures. It is important to point out the other studies mentioned here are undergraduate populations (mostly American), and fairly homogenous in age, whereas our population included a wide variety of ages. Our mean current body shape perception (4.7) for males was greater than those previously reported among various undergraduate male populations: 4.1 (Fallon and Rozin 1985), 3.7 (Hallinan 1988), and 3.7 (Hallinan et al. 1991). While this is not surprising given the high prevalence of obesity in Sandy Lake, it is interesting that the ideal future body shape of males in our study (4.2) was comparable to results of 4.1, 3.7 and 3.7, respectively, found in the other studies. Thus, although males in Sandy Lake perceive their current body shape to be larger, the desired future body shape is similar to that of American male college students. It should also be re-emphasized that our sample was taken across a variety of age groups in contrast to the comparison studies.

Perceptions of female Sandy Lake residents of their current body shape (4.6) are greater than those reported in other studies: 3.6 (Fallon and Rozin 1985) and 3.7 (Hallinan 1988). On the other hand, women in our study also had a larger mean desired future body shape (3.6) than reported in the other studies (2.8 and 3.1). While Sandy Lake females appear to be affected by a Western desire for a slimmer body figure, their ideal figure is still larger than that reported in Western populations. This comparison would tend to indicate a higher level of acculturation among males than females in this population. On the other hand, it is interesting to point out that although both current and ideal female body shapes are larger in our studies than previously reported, the difference between the two is comparable between Sandy Lake women and women in other studies. On average, women in our study and the others wanted to move down about one figure on the scale.

Males and females in Sandy Lake hold similar conceptions of what a healthy First Nations man or woman should look like. The mean healthy body figure for both sexes corresponds approximately to figure draw-

ing 4 shown in Figure 1. However, those in the oldest age group (60+ y) selected significantly larger healthy male and female body shapes than the other age groups, supporting the hypothesis of a larger "traditional" concept of body image in the elder segment of the community. Open-ended interviews provided us with additional support for this interpretation. Referring to the thinnest figure, one respondent commented, "The [thinnest figures] don't look healthy, some people need some fat on them." Another older person commented while looking at the figures that when she was eight years old, she had tuberculosis, and was very skinny. Thus, the presence or history of infectious disease in the community might be a possible explanation for the avoidance of extremely thin healthy figures, particularly among the older generation. Another possible explanation might be the relatively larger physical appearance of the older community members (i.e., they may choose larger healthy shapes than others because such shapes are similar to their own).

Given the extensive literature documenting higher rates of body image discontent among women compared with men, it is interesting that we found similar rates of satisfaction in males and females. This may have been partially due to our rather strict definition of satisfaction: participants were classified as "dissatisfied" if they did not choose the same figure to represent their current and ideal body shape. Furthermore, it should be noted that very few people (16.4%) were satisfied with their current body size or thought that they had a healthy body size (13.1%). Although a greater proportion of males than females wanted fuller body shapes, the vast majority of both sexes wanted a slimmer body shape.

Regression results help us better understand the relative importance of factors influencing body image in this population. The most consistently significant predictor of body image was sex of the respondent. Females were more likely to select thinner body shapes to represent their current figure than males. Being female was also a significant predictor of desire for a thinner future body shape. However, when asked to select healthy male and female body shapes, females were more likely to choose larger shapes than males.

Interestingly, education was not a factor significantly predicting current, future or healthy body shape in any of the models. This may mean that body image perceptions are not acquired as part of the educational process.

The linguistic acculturation variable did not enter significantly into any of the regression models except in the choice of body shape of a healthy First Nations woman, where it was a significant negative predictor. In other words, people who spoke less English (and more Oji-Cree) thought that a healthy First Nations woman should have a larger body shape. In this model, older age, female sex and future body shape were also significant positive predictors. This makes sense be-

cause younger women are more likely to use English as a means of communication and also may be more likely to view thinner body shapes as attractive due to acculturative influences. Another way of viewing these results is that older, Oji-Cree speaking women in particular are more likely to describe a healthy woman as being larger. From these findings, it is possible to conclude that acculturative influences regarding body shape have a greater effect on women than men.

It is clear from these findings that in addition to variation according to age and sex, body image perceptions (current shape, desired shape, healthy male and female shapes) are strongly interrelated. For instance, a respondent's desired future body shape was the best predictor of what was perceived to be a healthy body shape for both men and women.

These findings provide valuable information for planning diabetes interventions in this setting. Knowledge of local standards of attractive and unattractive body shapes in a culture are useful for planning educational interventions. The sociocultural theory of body image states that people have ideals of body shape influenced by society and that they will act to achieve these ideals (Heinberg 1996). At a minimum we have learned that considerable variation exists in this setting as to what is considered an ideal/healthy body shape. This suggests that interventions aimed at reducing obesity in this population will have to orient educational efforts differently for different age and sex groups.

For example, we may want to emphasize the advantages of exercise in several ways to different age groups in the community. In regard to cognitive-behavioral perspectives on body image change, Freedman (1990) notes, ". . . Perhaps there has been too much emphasis on exercising for fitness and health rather than for fun and fulfillment." She suggests that inactive clients might be better encouraged to increase activity not by focusing on weight loss, but by getting to know their body and feel better. Such an emphasis might be very useful in our interventions in Sandy Lake, particularly if directed towards older community members who were less likely to desire a change in their body shape. Positive mental health benefits and an emphasis on a return to physical activities associated with the traditional active lifestyle could be geared towards the older population, whereas we might want to emphasize the potential of exercise to affect body shape to the younger population.

Intervention approaches to obesity prevention and control in the community may have to differ by sex as well. Men desired a future body shape only half a figure smaller on average than their current perceived figure, whereas women desired a future body shape a full figure smaller. Among middle-aged women, the desired future body shape was one and a half figures smaller. Again, an approach for males might most effectively be directed towards healthiness and being "in shape," rather than on becoming thinner.

For women in Sandy Lake, it might initially appear that an obesity intervention strategy would focus on the importance of looking thinner. On the other hand, we recognize the need to be sensitive in dealing with issues regarding body image in our intervention, particularly to avoid the perpetuation of unnatural body ideals existing in Western culture. It is clear that among women there is a strong desire for smaller body sizes. Developing appropriate strategies that will decrease obesity rates, but will not push local women even further towards Western ideals of female thinness remains a challenge.

In summary, our study indicates that the existing body image concepts in an Ojibway-Cree reserve appear to be related to both age, gender, and objective (BMI) and perceived (current, desired future) measures of body size. It is clear that body image perceptions are not homogeneous within the community. Sandy Lake is undergoing substantive changes in cultural norms. The older generation is somewhat buffered from Western influences by a language barrier, but this is no barrier for younger people whose primary language is English. The smaller desired body shape identified in younger people is consistent with differential levels of acculturation by age. Knowledge of differences in body image perception within the community can help target educational interventions to specific groups who might be motivated to change or are at greater risk for problems such as obesity, diabetes and cardiovascular disease. It can also help us develop appropriate messages for targeted groups.

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