OBSERVING CHANGES IN CANADIAN DEMAND FOR FOOD DIVERSITY OVER TIME

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ABSTRACT

Research on food diversity is interdisciplinary in nature, and is highly relevant for different research fields. Eating a variety of foods has been linked to the nutritional well-being of the household. From an economic perspective, food diversity can be used to derive important conclusions regarding the economic well-being of a population under study. This paper attempts to fill two main research gaps. The first objective of this paper is to analyze the demand for food diversity in Canada for the first time. This includes observing the extent of food diversity and the identification of respective socio-economic determinants. The second main objective is to compare changes in the cross-sectional demand for food diversity over time using three data sets of the Canadian Food Expenditure Survey (1984, 1996 and 2001). Food diversity is measured twice, with a measure used in nutritional studies and an economic diversity measure to draw conclusions for both research fields. Results show that in all years the demand for diversity (both indices) is positively influenced by income, age, and household size. We observe a significant quadratic influence of income in all models. Over all years, males and singles have a lower demand for food diversity than females and married Canadians. In addition, the region the household lives in is a strong predictor of food diversity. We observe changes in demand for food diversity in Canada. It is shown that the demand for food diversity decreased from 1984 to 1996 and 2001.

INTRODUCTION

As omnivores, humans require diversity in their diet. Eating a variety of foods reduces the negative consequences associated with a monotonous diet: the risk of excessive contaminant intake from any single food source (Krebs-Smith *et al.* 1987) and the risk of morbidity (Jansen *et al.*, 2004) and mortality (Michels and Wolk 2002). Due to evidence from various nutritional studies food diversity itself is regarded as a proxy for dietary quality (Ruel 2003).

The American food industry considers increasing demand for food diversity as one of its most important consumer trends (Connor and Schieck 1997), driving the production, processing, and distribution of many food products in other countries as well (Moon *et al.* 2002). The extent to which a nation's citizens consume a diversity of goods has been linked to the economic well-being of a country (Theil and Finke 1983). A number of cross-sectional studies conducted in the US and Europe show that e.g. income and household size increase the demand for a varied diet (Jackson 1984; Moon *et al.* 2002).

Research on food diversity is interdisciplinary in nature, and is highly relevant for different research fields, including economics and nutrition. Not only is it possible to derive important conclusions regarding the economic well-being of a population, it also reflects the nutritional well-being of the population under study. This is especially valuable if food diversity can be observed over time. Finally, analyzing diversity is relevant for entrepreneurs in helping them optimising their marketing strategies.

This paper attempts to fill two main research gaps in diversity studies. Although most of the research on food diversity has been conducted for the United States (Jackson 1984; Stewart and Harris 2005), empirical evidence on the demand for food diversity in Canada is missing. Since the consumption structures between the US and overall Canada might be similar, it is likely that the differences between the Canadian provinces are quite distinctive. The first objective of this paper is therefore to analyze the demand for food diversity in Canada for the first time. This includes observing the extent of food diversity and the identification of respective socio-economic determinants. Due to the interdisciplinarity of food diversity research, the results are used to derive both economic and nutritional conclusions. The second main research gap in the demand studies for food diversity is methodological. As pointed out by Thiele and Weiss (2003), analyzing the demand for food diversity using panel data would be interesting to eliminate unobservable time-invariant individual effects. Panel data would additionally allow observing trends in food consumption

and inertia in consumption behaviour. However, given that panel data for individual consumption behaviour is rare, the next obvious step is to compare changes in the cross-sectional demand for food diversity over time. The second main objective of this paper is to provide evidence on changes in Canadian demand for food diversity over time using three cross-sectional data sets.

The remainder of this paper is as follows. Section 2 describes the importance of food diversity from both nutritional and economic perspectives. Section 3 describes the theory and section 4 explains the data and methodology used. Section 5 summarizes the results. The paper ends with conclusions in Section 6.

THE IMPORTANCE OF FOOD DIVERSITY IN NUTRITION SCIENCE AND ECONOMICS

Worldwide, food diversity is a common recommendation for a healthy diet. In 2006, as listed by the Food and Agriculture Organization (FAO), 36 countries promoted to eat diverse with their dietary guidelines (Drescher 2007). One reason is that eating different foods secures the consumption of all essential nutrients the human body needs for survival (Royo-Bordonada *et al.* 2003). Apart from that, instead of consuming high amounts of the same food, eating as many different foods as possible prevents from consuming excessive amounts of nutrients from single foods (Krebs-Smith *et al.* 1987). A great number of studies on the relationship between food diversity and dietary quality show that high food diversity is associated with increasing nutrient adequacy, making food diversity itself a proxy of dietary quality (Ruel 2003). Food diversity has also been linked to better dietary status (for example Bernstein *et al.* 2002 for elderly people). Accordingly, consuming a high diversity of foods is associated with reduced mortality (e.g. Raynor *et al.* 2005). One study finds that variety in vegetable intake reduces the risk of overall cancer by about 36% (Janssen *et al.* 2004). While McCrory *et al.* (1999) demonstrate that a high diversity of energy-dense foods (e.g. sweets and snacks) comes along with increasing body fatness; the same study observes a negative association

between body fatness and diversity of nutrient-dense foods. This is why international food guidelines recommend a high diversity of nutrient-dense foods such as fruits and vegetables.

Food diversity has repeatedly been studied under economic considerations. Already in the 19th century, Senior phrases: "It is obvious that our desires do not aim so much at quantity as at diversity… Two articles of the same kind will seldom afford twice the pleasure as one..." (Senior 1836, p. 11f.), establishing the "Law of Variety". In order to explain a lack of consumer's brand loyalty, marketing researchers often refer to the so-called variety-seeking behaviour. Variety-seeking behaviour describes the phenomenon that consumers seek change, meaning that they have a need for diversification (van Trijp and Steenkamp 1992). Variety-seeking behaviour is especially important with regard to foods, as the consumer buys foods based on habitual purchase decisions. Consumers' involvement in buying foods is very low. In order to overcome the boredom of buying the same butter brand again, consumers seek diversification.

The American food industry considers the demand for food diversity as one of the most important consumer trends (Connor and Schieck 1997). Likewise in other countries, the demand for food diversity is the driving force behind production, processing, and distribution of food products (Moon *et al.* 2002). Different studies show that the national extent of food diversity demanded is higher in countries with higher income per head (Theil and Finke1983; Falkinger and Zweimüller 1996). According to Jekanowski and Binkley (2000), diversity of food expenditures decreases with an increasing number of low-income consumers in the market. Thus, there is a link between the economic well-being of a country or the consumer and demand for diversity.

In recent years, an increasing number of studies mainly conducted in the United States and Europe show that typically variables such as increasing age, being female, increasing education and increasing household size are all positively associated determinants of food diversity demand on household level (Lee and Brown 1989; Moon *et al.* 2002; Thiele and

Weiss 2003). A main common finding is further that higher income or expenditure leads to a higher consumption of (food) diversity (Jackson 1984; Lee and Brown 1989).

Food diversity does not only give important information about the economic situation, it can also provide information on the nutritional well-being of a household. This paper refers to both research fields to make comprehensive conclusions on the Canadian demand for food diversity over time.

THEORY

With respect to diversity, the traditional demand theory suggests that the consumer has an inherent preference for diversity in his choices. The consumer demands additional goods each time he/she is exposed to a wide bandwidth of goods stemming from product differentiation and innovation (Falkinger and Zweimüller 1996). This assumption is also implied in the axiom of convexity (of preferences) that states that the consumption of combined goods is preferred to a consumption of the same amount of any single item. However, since the traditional model assumes homothetic preferences (i.e. constant income elasticities), increasing income has no impact on the demand for diversity. With homothetic preferences, increasing income leads to a constant increase in food expenditure, and in this case the traditional theory delivers no explanation for a change in diversity.

Different extensions of traditional demand theory to model consumer demand for food diversity have been put forth. In 1996, Benassy derives a parameter which reflects the utility gain the consumer obtains from consuming diversity instead of consuming a single item. Based on the household production theory, Gronau and Hamermesh (2001) refer to the impact of time constraints to explain the demand for diversity in activities. However, in line with previous diversity studies (Moon *et al.* 2002; Thiele and Weiss 2003), we refer to the most often applied extension of the traditional demand of consumer theory namely the "hierarchical model of consumer demand" (Jackson 1984). Referring to Maslow's hierarchy of needs,

Jackson works with a hierarchy of purchases (Jackson 1984). One assumption of the hierarchical model of consumer demand is that the consumer buys additional goods not until he/she earns a certain amount of income. At low levels of income the consumer purchases only a limited set of foods. Jackson names purchases made at low levels of income, where only a small number of different foods are purchased "necessities." Given that consumer's income reaches higher levels, new and additional goods are purchased. Jackson calls these additional goods "luxuries." Jackson (1984) assumes hierarchical preferences which are functions that change the set of purchased goods with increasing income. According to the hierarchy of purchases, the increase in diversity proceeds in a certain order that is influenced by prices. It is concluded that diversity increases asymptotically with income at a decreasing rate and thus, income impacts the consumption process. Demand for any good depends on the position of the good in the hierarchy of purchases, and on the consumer's budget constraint.

METHODOLOGY AND DATA DESCRIPTION

In this paper, food diversity is measured twice. The majority of nutritional studies use diversity measures that belong to the mathematical class of count measures. With count measures, diversity becomes higher the higher the number of foods eaten is. Our second measure to quantify food diversity is the Berry-Index (Berry 1971). This measure is applied predominantly in economic studies. The Berry-Index calculates from $BI = 1 - \sum_{i=1}^{n} s_i^2$, where for our purposes s_i is the consumption share of food i in gram with regard to the total consumption bundle. Due to the definition of the Berry-Index, diversity is higher the more foods are eaten in equal (quantitative or expenditure) shares of all foods eaten. Since the Berry-Index lies in the boundaries of 0 and 1-1/n (with n = number of food items distinguished in the data set), the Berry-Index can only be compared over different data sets

provided that the number of foods distinguished is the same in all data sets. Using both indices allows us to relate the findings to the respective research fields.

The data used to analyze Canadian demand for food diversity is the Canadian Food Expenditure Survey provided by Statistics Canada. Observing changes in demand over time is possible by using three different cross-section data sets from 1984, 1996 and 2001. In order to make the Berry-Index comparable over all years, the number of foods counted in each year needs to be the same. Therefore, certain foods from each of the datasets were excluded. 9.2% of foods have been deleted from the 1984 data set, 5.38% for 1996 and 1.68% for 2001, respectively. However, it is shown that the share of each of the deleted foods on the total quantities of foods is only marginal and thus negligible. Using the daily quantities consumed for the same 176 foods, the two diversity indices are calculated for 5,360 households in 1984, 10,459 households in 1996, and 4,885 households in 2001.[2] Each Food Expenditure Survey contains various socioeconomic characteristics of the household. Table 1 gives the descriptive statistics of the variables used.

Insert table 1 about here

We conduct different multiple regressions using the Berry-Index and a simple count of food items as dependent variables and socio-economic variables as explanatory variables. The Berry-Index is normalized to the 0-1 interval. In order to assure the assumption of normality, we use the logit transformation which applies a 0-1 bound variable into a variable bounded between minus and plus infinity (Greene 1997; Thiele and Weiss 2003). The transformation of the Berry-Index is achieved by $TBI = \ln\left(\left(BI/\left(1-BI\right)\right)\right)$. Afterwards, it is possible to run an OLS regression.

[2] It has to be noted that for comparison reasons, also the count measure is calculated based on constant total number of foods.

Altogether, we run two different specifications for each index to compare changes in diversity demand in Canada. First, we analyze the demand for diversity separately for each year (1984, 1996, and 2001). Second, we run a combined regression over all years.

RESULTS

Table 2 shows the results of the OLS regression on the determinants of food diversity as measured by the count measure in Canada over time.

Insert table 2 about here

Below, the results are compared to findings from other economic studies. It is worth noting that these studies are conducted in countries other than Canada with different consumption structures. Moreover, we compare results for different diversity measures.

With respect to the characteristics of the household, table 2 reveals that in all single year regressions and in the overall regression an increasing number of adults in the household increase the number of different foods eaten. Thus, the more adult people live in the household, the higher the quality of the diet based on the count measure. The impact of the number of adults is always highly significant. This finding is in line with previous studies reporting that a higher number of people in the household increase the demand for diversity (Lee 1987; Moon *et al.* 2002).

Also, the number of children in the household has a significant positive effect on the number of food items eaten over all years as well as in the combined regression. Thus, the more children live in the household, the more concerned the parents are to provide a diet of high quality (i.e. a high number of different foods). Using the Berry-Index, also Thiele and Weiss (2003) show that German children aged between 7 and 13 and those between 14 and 17 have a significant positive impact on diversity in food purchases.

As expected, increasing income increases the demand for food diversity measured as the number of foods eaten. Apart from that, we observe a quadratic influence of income on

food diversity in 1984, 1996, 2001 and the overall regression, i.e. the number of foods eaten, initially increases with increasing income and declines after reaching a certain maximum. The number of different foods eaten increases at a decreasing rate.

Results from table 2 show that the region the household lives in has an impact on the quality of foods demanded. Households living in the Atlantic region have a significantly higher demand for food diversity than households living in British Columbia. Households in Québec have a significantly higher dietary quality (i.e. number of foods) than households living British Columbia in 1996, 2001 and in the overall regression while in 1984; there is no difference between households in British Columbia and Québec. This indicates that the diet quality of Québec households has been increasing since the 1980s. Contrary, Canadian households located in the Prairies have a significantly lower demand for food diversity than households in British Columbia in all years except for 1996. If a household lived in Ontario in 1984, the demand for food diversity was lower compared to a household which lived in British Columbia at that time. After 1984, there was no significant difference in the demand for food diversity between households from Ontario and British Columbia. Also, Thiele and Weiss (2003) observe regional differences in the demand for food diversity in Germany.[3]

Results in table 2 show that single households demand a significantly lower number of foods than non-single Canadian households.

Another influencing factor on the demand for food diversity is the marital status of the household. Over all years, married Canadian households have a higher diet quality, i.e. demand a higher number of foods compared to non-married households.

A reason for running a combined regression of all years is to observe in which year the demand for food diversity has been the highest. Compared to 1984, the demand for food

[3] There are no significant variances between the main economic variables (income, age, number of children in the household) and the different provinces. Thus, the geographical differences in the demand for food diversity (both indices) must be influenced by other factors than geographical income or age differences (e.g. cultural differences). However, since the data set does not provide further information, it is a question for future studies to identify these factors.

diversity was lower in 1996 and 2001. The fact that the demand for diet quality in Canada decreased from the 80s to the new century gives reason to question the latest Canadian health policies and should encourage future studies on the reasons for it. Due to the regional differences, our findings are especially important for provincial policy makers.

As expected, the demand for food diversity in Canada increases with increasing age over all years and in the combined regression. With respect to diversity in fruit and vegetable consumption, Stewart and Harris (2005) observe a similar relationship. However, Thiele and Weiss (2003) report a quadratic influence of age on food diversity demand, thus the demand for food diversity decreases up to a minimum of 46 years and increases afterwards. However, we could not observe a quadratic influence of age in any of our diversity models (results not shown). Being male results in a lower number of food products demanded in Canada across all years compared to being female. Also Lee (1987) shows that females have a higher demand for food diversity than males in the US.

The explanatory power of all models is quite low. Similar values have been reported from other cross-sectional studies (e.g. Thiele and Weiss, 2003). The highest explanatory power is reported for the single year regression of 1984 with 29%.

Table 3 shows the results of the OLS regression on the determinants of food diversity in Canada over time using the Berry-Index as diversity measure.

Insert table 3 about here

Overall, the results of the OLS regression on the Berry-Index leads to similar findings than those in the count measure models described above. For all years and additionally in the combined regression, the more adult people live in the household the higher is the Berry-Index. Thus, more adults in the household lead to more diverse diet.

Throughout the years, an increasing number of children increase the demand for food diversity as measured with the Berry-Index. Obviously, a higher number of children in the

household enable household economies of scale in food consumption (see also Thiele and Weiss 2003).

The influence of income is repeated from the count measure model and previous diversity studies: Higher income increases the demand for food diversity, but at a decreasing rate. The quadratic influence of income is significant in all years.

Compared to households located in British Columbia, households living in the Atlantic region have no significantly different demand for food diversity, except for the year 1996, where Atlantic households have lower Berry-Index values. Households living in Québec have significantly lower Berry-Index values in 1984 than in British Columbia while starting in 1996; the demand for food diversity is higher than in British Columbia. Obviously, there was a shift in the economic well-being of Québécois occurring between the 1980s and 1990s. Households that live in Ontario and in the Prairies region have a lower demand for food diversity than British Columbians in all years but 2001, where there is no significant difference in the Berry-Index. Also, Moon *et al.* (2002) report regional differences in food diversity demand for Bulgaria as well as Thiele and Weiss (2003) for Germany.[4]

Non-single households have a lower demand for food diversity except for 1996.

Again, repeating the results from the count measure models, married Canadian households have a higher demand for food diversity than non married households. However, in 1996 there is no significant difference between married and non-married Canadians.

The combined regression on the Berry-Index shows that the Berry-Index was higher in 1984 than in any of the following years. The results suggest that there was not only a decrease in the nutritional well-being (based on the count measure) but also the economic well-being (based on the Berry-Index) in Canada since the 1980s.

[4] See footnote 3.

Increasing age increases the demand for food diversity in Canada in 1984, 1996 and 2001. This result is also shown in the combined regression. Male Canadians have a significantly lower demand for food diversity than female Canadians.

The explanatory power of the Berry-Index regression models is lower compared to the count measure models. Approximately 10% of the explanatory variables are able to explain the variation in the Berry-Index. An explanation might be that the count measure and the Berry-Index are two different mathematical types of diversity measures. Since the Berry-Index is a bounded variable and the count measure is a continuous variable, the variation in the count measure models and thus, the explanatory power must be higher by definition.

CONCLUSIONS

This study observes changes in Canadian demand for food diversity over time. Based on Jackson's hierarchical model of consumer demand, we apply OLS regressions on two different food diversity indices: the count measure, predominantly used in nutritional studies shown to have strong links to high diet quality as well as the (transformed) Berry-Index, an economic index shown to be higher in countries with better economic status. Socio-economic variables such as income and region are used to explain variations in both diversity indices. Altogether, we ran two models for both indices. In the first model, single year regressions are conducted (for 1984, 1996 and 2001), whereas in the second model a combined regression including the observations from all years is applied.

As expected, in all years the demand for diversity (both indices) is positively influenced by income, age, and household size (i.e. number of adults and children in the household). We observe a significant quadratic influence of income in all models. Males and singles have a lower demand for food diversity than females and married Canadians. In addition, the region the household lives in is a strong predictor of food diversity. Except for 1984, households in Québec have a significantly higher demand for food diversity (both

indices) than households living in any other province. Second, we run a combined regression including all years. The results for the socio-economic determinants on demand for food diversity are mainly repeated from the single year regression. However, it is shown that the demand for food diversity (both indices) was higher in 1984 compared to 1996 and 2001. That the demand for food diversity is lower in 1996 and in 2001 calls into question the current economic but also nutritional well-being of Canadians.

Likewise, the fact that the demand for diet quality in Canada decreased from the 80s to the new century gives reason to question the latest Canadian health policies and should encourage future studies on the reasons for it.

Future studies should observe whether or not the decline in the Canadian demand for food diversity might be explained by other trends in Canadian food consumption, such food away from home consumption (as reported by Statistics Canada 2006) or other trends (e.g. convenience).

There is no considerable difference in neither changes in the demand for food diversity nor determinants on food diversity using the count measure or the Berry-Index. This indicates that both indices are equally suitable to reflect food diversity. The only noticeable difference is evident in the explanatory power which is higher with the count measure. Whether this means that the count measure is more suitable for observing changes in food diversity demand over time or whether this is due to differences in their ranges should be answered in future diversity studies.

Since we found changes in demand for food diversity over time with cross-section data, this study renews the conclusion drawn in Thiele and Weiss (2003): a panel data study on food diversity would allow giving more precise insights into what makes changes in (Canadian) demand for food diversity.

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Table 1: Descriptive Statistics Of Variables Used In OLS Regression

Variable	Description	Mean (Std.dev)				Min (Max)			
		1984	1996	2001	Combined	1984	1996	2001	Combined
Berry-Index	Diversity measure calculated from $BI = 1 - \sum_{i=1}^{n} s_i^2$ where s_i is the share of food i on total quantities.	0.88 (0.11)	0.88 (0.11)	0.88 (0.10)	0.88 (0.11)	0.02 (0.98)	0.02 (0.98)	0.03 (0.98)	0.02 (0.98)
Count Measure	Diversity measure – is the number of different foods eaten by each household	31.90 (15.75)	29.69 (14.53)	29.77 (14.22)	30.28 (14.82)	2 (90)	2 (98)	2 (78)	2 (98)
Age	The age of the reference person	44.99 (16.36)	47.52 (0.60)	48.70 (15.72)	47.15 (15.97)	20 (76)	24 (80)	24 (80)	20 (80)
Adult	Number of adult persons in the household	2.06 (0.95)	1.67 (0.60)	1.66 (0.60)	1.77 (0.73)	1 (8)	1 (4)	1 (4)	1 (8)
Children	Number of children in the household	0.63 (0.98)	0.86 (0.99)	0.80 (0.98)	0.79 (0.99)	0 (7)	0 (4)	0 (4)	0 (7)
Income	Income – personal income in the past 12 months, income of all family members	30,788.24 (20,052.55)	43,742.64 (35,913.04)	46,504.511 (28,404.49)	41,921.28 (31,245.91)	357.00 (162,000.00)	300.00 (848000.00)	5,000.00 (100000)	300 (848000.00)
Income 2	Squared income	1349942106.94 (1912989251	320304122 7,53 (11748035	300000000 (316300000	273365104 2.83 (87668892	127449.00 (262440000 00.00)	90000.00 (719104000000,00)	2500,0000 (100000000)	90000.00 (719104000000,00)

		.65)	720,41)		58.60)				
Atlantic	Dummy variable is set equal to 1 if the household is living Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick and is 0 otherwise	0.17 (0.37)	0.23 (0.42)	0.13 (0.34)	0.19 (0.39)	0 (1)	0 (1)	0 (1)	0 (1)
Québec	Dummy variable is set equal to 1 if the household is living in Quebec an is 0 otherwise	0.17 (0.37)	0.16 (0.36)	0.24 (0.43)	0.18 (0.38)	0 (1)	0 (1)	0 (1)	0 (1)
Ontario	Dummy variable is set equal to 1 if the household is living in Ontario and is 0 otherwise	0.23 (0.42)	0.26 (0.44)	0.31 (0.46)	0.26 (0.44)	0 (1)	0 (1)	0 (1)	0 (1)
Praries	Dummy variable is set equal to 1 if the household is living in Manitoba, Saskatchewan, Alberta and 0 otherwise	0.31 (0.46)	0.23 (0.42)	0.23 (0.42)	0.25 (0.43)	0 (1)	0 (1)	0 (1)	0 (1)
BC	Dummy variable is set equal to 1 if the household is living in British Columbia and is 0 otherwise	0.12 (0.33)	0.13 (0.33)	0.08 (0.27)	0.12 (0.32)	0 (1)	0 (1)	0 (1)	0 (1)
Male	Dummy variable is set at 1 if the reference person is male and 0	0.69 (0.46)	0.48 (0.50)	0.42 (0.49)	0.52 (0.50)	0 (1)	0 (1)	0 (1)	0 (1)

	otherwise								
Female	Dummy variable is set at 1 if the reference person is female and 0 otherwise	0.31 (0.46)	0.52 (0.50)	0.58 (0.49)	0.48 (0.50)	0 (1)	0 (1)	0 (1)	0 (1)
Single	Dummy variable is set equal to 1 if the household is a single household and 0 otherwise	0.16 (0.37)	0.14 (0.34)	0.14 (0.35)	0.15 (0.35)	0 (1)	0 (1)	0 (1)	0 (1)
Other_marstat	Dummy variable is set equal to 1 if the household is not a married (common-law) nor single household 0 otherwise	0.20 (0.40)	0.22 (0.41)	0.22 (0.41)	0.21 (0.41)	0 (1)	0 (1)	0 (1)	0 (1)
Married	Dummy variable is set equal to 1 if the household is a married or common law household and 0 otherwise	0.64 (0.48)	0.64 (0.48)	0.64 (0.48)	0.64 (0.48)	0 (1)	0 (1)	0 (1)	0 (1)
Year 1996	Dummy variable is set equal to 1 if the household was surveyed in 1996 and 0 otherwise	n.a.	n.a.	n.a.	0.51 (0.50)	n.a.	n.a	n.a.	0 (1)
Year 2001	Dummy variable is set equal to 1 if the household was surveyed in 2001 and 0 otherwise	n.a.	n.a.	n.a.	0.24 (0.43)	n.a.	n.a	n.a.	0 (1)

Table 2: Results Of The OLS Regression On Food Diversity (Count Measure) Over Time

	1984	*1996*	*2001*	*Overall*
Variable	**Coeff.**	**Coeff.**	**Coeff.**	**Coeff.**
Constant	17.46	11.10	11.10	15.88
	(14.62)**	(13.01)**	(7.57)**	(24.83)**
Characteristics of the household				
Adult	3.44	5.64	3.60	4.31
	(13.62)**	(18.88)**	(7.98)**	(23.47)**
Children	3.45	3.57	3.46	3.51
	(15.91)**	(23.48)*	(15.30)**	(32.34)**
Income/1000	0.208	0.09	0.169	0.103
	(7.63)**	(15.79)**	(5.98)**	(22.76)**
Income2 /1000	-1.143E-6	-1.187E-7	-6.393E-7	-1.460E-7
	(-4.37)**	(-8.22)**	(-2.62)*	(-10.05)**
Atlantic	-0.65	1.23	2.76	1.45
	(-0.63)	(2.23)*	(3.01)*	(3.45)*
Québec	-0.10	4.01	4.36	3.25
	(-0.17)	(9.75)**	(5.75)**	(10.38)**
Prairies	-2.59	-2.03	-0.88	-1.78
	(-4.11)**	(-4.50)**	(-1.07)	(-5.21)**
Ontario	-1.99	-0.53	-0.49	-0.48
	(-3.45)*	(-0.18)	(-0.52)	(-0.11)
Single	-6.54	-3.15	-4.66	-4.57
	(-10.07)**	(-6.90)**	(-6.65)**	(-14.11)**
Other_marstat	-5.64	-3.28	-4.51	-4.39
	(-8.76)**	(-7.82)*	(-7.32)**	(-15.08)**
Year 1996	n.a.	n.a.	n.a.	-2.93
				(-10.59)**
Year 2001	n.a.	n.a.	n.a.	-3.26
				(-11.47)**
Characteristics of the reference person				
Age	0.10	0.09	0.10	0.10
	(7.58)**	(8.66)**	(6.77)**	(13.34)**
Male	-1.17	-1.61	-2.24	-1.65
	(-2.46)*	(-6.30)**	(-5.90)**	(-8.78)**
Adj. R^2	0.29	0.27	0.27	0.27

Note: t-values are displayed in parentheses. All analyses were adjusted for sample weights. ** p<0.01, * p<0.05

Table 3: Results Of The OLS Regression On Food Diversity (Berry-Index) Over Time

	1984	***1996***	***2001***	***Overall***
Variable	**Coeff.**	**Coeff.**	**Coeff.**	**Coeff.**
Constant	1.995	1.51	1.48	1.77
	(29.44)**	(30.61)**	(17.05)**	(4.67)**
Characteristics of the household				
Adult	0.05	0.20	0.09	0.12
	(3.68)**	(11.44)**	(3.41)*	(10.86)**
Children	0.04	0.07	0.08	0.07
	(2.98)*	(8.40)**	(5.95)**	(10.90)**
Income/1000	0.008	0.003	0.010	0.004
	(5.20)**	(10.55)**	(5.92)**	(15.63)**
Income2 /1000	-4.692E-8	-4.496E-9	-5.403E-8	-5.870E-9
	(-3.16)*	(-5.39) **	(-3.74)**	(-6.95)**
Atlantic	-0.10	-0.07	0.06	-0.03
	(-1.76)	(-2.18)*	(1.12)	(-1.38)
Québec	-0.07	0.13	0.18	0.10
	(-2.06)*	(5.26)**	(4.09)**	(5.64)**
Prairies	-0.22	-0.14	-0.66	-0.14
	(-6.08)**	(-5.44)**	(-1.37)	(-6.81)**
Ontario	-0.18	-0.11	-0.03	-0.10
	(-5.49)**	(-5.00)**	(-0.58)	(-5.54)**
Single	-0.30	-0.05	-0.16	-0.15
	(-8.17)**	(-1.89)	(-3.83)**	(-8.13)**
Other_marstat	-0.29	-0.05	-0.17	-0.15
	(-7.79)**	(-1.93)	(-4.60)**	(-8.97)**
Year 1996	n.a.	n.a.	n.a.	-0.13
				(-7.79)**
Year 2001	n.a.	n.a.	n.a.	-0.12
				(-7.26)**
Characteristics of the reference person				
Age	0.06	0.006	0.06	0.06
	(7.58)**	(9.55)**	(6.84)**	(13.84)**
Male	-0.09	-0.09	-0.12	-0.09
	(-3.24)*	(-6.06)**	(-5.22)**	(-8.59)**
Adj. R^2	0.10	0.10	0.11	0.10

Note: t-values are displayed in parentheses. All analyses were adjusted for sample weights. ** p<0.01, * p<0.05