



Acculturation and consumption of foodstuffs among the main indigenous people in Chile

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ABSTRACT

Despite interest in studying food purchasing behaviour of ethnic minorities, there is little research on the purchasing habits of indigenous peoples. The objectives of the present study were to determine differences in food consumption habits in non-Mapuche (Chileans), and people of Mapuche origin (the largest aboriginal group in Chile) who vary in their acculturation orientations, and to evaluate the effect of socio-demographic variables on the acculturation of Mapuche individuals. A personal questionnaire was administered to a sample of 400 people in the Araucanía Region and 400 in the Metropolitan Region of Santiago, Chile, stratified by ethnic group. The frequency of consumption of fish and seafood, fruit, "mate" (a typical herbal infusion), soft drinks, and meals in restaurants differed between non-Mapuche and Mapuche with differing acculturation orientations. Acculturation was significantly associated with the consumption of fish and seafood, mate, and meals in restaurants, and with the consumption of ethnic foods. Using the socio-demographic information, a binomial logit model was proposed for unordered (nominal) data, which proved significant as a whole ($P < 0.01$). Mapuche people who are under 35 years, belong to a higher socio-economic status and reside in an urban area (large or small cities), are more likely to be assimilated to Chilean culture.

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1. Introduction

Acculturation is the process of cultural and psychological change that follows intercultural contact (Berry, 2003). Cultural changes include alterations in a group's customs as well as in their economic and political life. Psychological changes include alterations in individuals' attitudes towards the acculturation process, their cultural identities (Phinney, 2003), and their social behaviours in relation to the groups they are in contact with (Berry, Phinney, Sam, & Vedder, 2006). Early research had assumed that immigrants would inevitably be absorbed into the receiving society in a unilinear, unidirectional process (Gordon, 1964). However, Berry (1980) proposed that there are two independent dimensions underlying the process of acculturation: individuals' links to their cultures of origin and to their societies of settlement. In this framework, two issues

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are raised: the degree to which people wish to maintain their cultural heritage and identity, and the degree to which people seek involvement with the wider society. When these two issues are crossed, an acculturation space is created with four sectors, within which individuals may express *how* they are seeking to acculturate. *Assimilation* occurs when there is preference for interacting with the wider society combined with little interest in cultural maintenance. *Separation* occurs when cultural maintenance is sought while avoiding involvement with others. *Marginalisation* is when neither cultural maintenance nor interaction with others is sought. *Integration* is when both cultural maintenance and involvement with the wider society are sought (Berry et al., 2006).

Several studies report that variation in home and dominant cultural identity and participation are due in part to demographics (Laroche, Kim, & Tomiuk, 1998; Peñaloza, 1994) such as age and socio-economic status (Cleveland, Laroche, Pons, & Kastoun, 2009; De Mooij, 2004; Jamal, 1998; Phinney, 1990) and gender (Bethel & Schenker, 2005; Sarmiento & Cardemil, 2009). However, other variables are also relevant to acculturation.

Food preferences are among the most widely accepted indicators of ethnic involvement (Phinney, 1990). Alimentary practices are a fundamental part of social groups' cultural identity, and culture as a whole is decisive in the formation and maintenance of behaviours and attitudes towards food (Rozin, 1990; Rozin & Schiller, 1980). Ethnic foods are those regarded as unique to a particular cultural group, religion, nation or heritage. Ethnic food preferences and choices are important aspects of the cultural heritage they represent. Foods regarded as ethnic in a culture vary over time and according to the acculturation of the group that consumes them (Dwyer & Bermúdez, 2003). Food attitudes are formed early in childhood and are reinforced by a blending of family, social and cultural influences, which makes food habits one of the most resilient of all habits in acculturation contexts (Rozin, 1990; Rozin & Schiller, 1980).

Eating habits (consumption of ethnic foods versus foods from the dominant culture) have been used by various authors as an indicator of acculturation in ethnic minorities around the world (Chung, Kim, & Abreu, 2004; Cortes et al., 2003; Lim, Heiby, Brislin, & Griffin, 2002). Other studies indicate that changes in food consumption are a result of the acculturation process (Arredondo, Elder, Ayala, Slymen, & Campbell, 2006; Nan & Cason, 2004; Song et al., 2004; Sukalakamala, Brittin, & Fada, 2006). Altogether, this research is based on the assumption that people who live in a foreign culture adopt its social, economic and political stances thus modifying the stances from their own culture (Chen, Unger, & Johnson, 1999; Cuellar, Arnold, & Maldonado, 1995). Although this is a flexible approach compared to the studies that use food consumption as an indicator of the degree of acculturation, it also indicates that there might not be total consensus on whether acculturation is a cause or an effect of food consumption behaviour.

Nevertheless, most of the studies that relate the process of acculturation and food consumption have been conducted on immigrant ethnic minorities, and not on native ethnic groups, which represent an important proportion of the population in some countries, particularly in South America. In this context, the process of acculturation in native ethnic groups is expected to have been more traumatic than for immigrants. While in most cases the immigrants have chosen this condition seeking a better quality of life and new opportunities, the acculturation process has been imposed on native ethnic groups through colonisation. This has occurred in several populations around the world, and the low number of studies focusing on these ethnic minorities, specifically indigenous populations, is striking.

Among the native peoples of America, the Mapuche ("people of the earth") comprise the largest aboriginal group in Chile and one of the largest on the continent. When the Spanish conquerors arrived in the 16th century, the Mapuche were living between the Aconcagua valley and the Chiloe archipelago, in what is now Chilean territory. Those who lived in the southern area of the Biobío River clung to their independence and fought off the Spaniards in the so-called War of Arauco that lasted for three centuries. The Mapuche maintained their independence until the latter part of the nineteenth century, when they became subject to the government of the Republic of Chile in a military campaign. The hunting and vegetable production that formed the basis of their economy in the sixteenth century gave way to a farming and livestock-raising economy in the eighteenth and nineteenth centuries, and then to peasant smallholdings after their forced re-settlement in land assigned by the Chilean government (Bengoa, 2000). This has led over the years to a high degree of sub-division of property, and the migration of younger generations to the cities. As a result, the Mapuche population today is mainly urban, although in many cases they retain links to the communities from which they originate.

Since the time of National Independence, the Mapuche language or Mapudungun ("language of the earth"), as the rest of Mapuche culture, economy and society, was affected by the policies of the emerging Chilean nation that tended towards homogenising the country culturally and linguistically. A direct result of this was banning the speaking of Mapudungun in schools, where disciplinary measures were in place for teachers and students that used words from their language, and they were subjected to ridicule by classmates (Alvares-Santullano & Forno, 2008). During the twentieth century, the Mapuche went through a process of assimilation into the dominant society, yet manifestations of cultural resistance and conflicts for recognition of their rights and recovery of their independence and territory continued (Bengoa, 2000). The Mapuche people have always fought for the preservation and projection of their "world" and their "country", and this is currently in the form of a social and political movement to defend their culture, territory and ancestral identity (Tricot, 2009). Although they are spread over the whole country, the greatest concentrations are in the Araucanía Region (33.6%) and the Metropolitan Region of Santiago (30.3%), mainly in urban areas which are home to nearly two thirds of the total population (MIDEPLAN, 2005).

Some authors have suggested the existence of a gradual process of collective assimilation of the Mapuche into the mainstream Chilean culture, associated with changes in eating habits, among other customs (Raschey & Ripio, 1997; Saiz, Cornejo, Fuchsloger, Holzapfel, & Scheel, 1998). Prior to 1960, access to food was based on agricultural production and the practice of gathering fruit and other species from the native forest. The multiplication of means of transport and road

construction during the 1980s and 1990s allowed foodstuffs and related products (mate, sugar, oil, pasta, rice, etc.) to be brought from the cities and introduced into the communities, and these have now become essential in every family's diet (Ibacache, 1990; Peredo & Barrera, 2005). Grebe (2000) suggests that migration from rural to urban zones and from the Araucanía to the capital is a significant factor affecting the increasing intercultural contact, as well as the lack of continuity and maintenance of Mapuche culture by the migrants.

The Surveys of Family Budgets makes it possible to ascertain the eating habits of socioeconomically stratified Chilean homes (National Statistics Institute, 2007), but this information is lacking other relevant classification variables such as ethnic origin. Considering the above, the objectives of this study were: (1) to determine differences in food consumption habits in non-Mapuche and Mapuche with different acculturation orientations to the Chilean culture, both in the Araucanía Region and the Metropolitan Region of Santiago, Chile; and (2) to evaluate the effect of socio-demographic variables on the acculturation of Mapuche individuals by applying a binomial logit model.

Based on the investigations that relate acculturation and the consumption of both ethnic and dominant culture foods among immigrant minorities, the present work's primary hypothesis is that the consumption of foods included in the Surveys of Family Budgets and the consumption of traditional Mapuche food are related to the Mapuche individual's degree of involvement in Chilean culture. At the same time, considering the changes that have occurred among the Mapuche population in regard to area of residence and language (Alvares-Santullano & Forno, 2008; Bengoa, 2000; Grebe, 2000; MIDEPLAN, 2005), the second hypothesis is that demographic variables are expected to influence the acculturation of the Mapuche into the Chilean culture.

2. Methods

2.1. Sample and procedure

A self-reported questionnaire was administered to a sample of 400 people in the Araucanía Region and 400 in the Metropolitan Region (Santiago). This number was obtained using the stratified random sampling formula with simple allocation for non-finite populations ($N > 100,000$), considering 95% confidence and 5% estimation error with P and q of 0.5 (Fernández, 2002). Using this principle, 200 non-Mapuche and 200 Mapuche were surveyed in each region.

In the Araucanía Region the survey was administered on the streets near the rural bus station in the regional capital, Temuco, in order to reach Mapuche residing in rural zones that travel to Temuco to shop and for other reasons. In the Metropolitan Region it was administered in districts where the Mapuche population is concentrated (primarily Santiago, Puente Alto, La Florida and La Pintana). All participants signed informed consent statements before responding. Both surveys were administered between August and October 2008, after validation of the questionnaire by a pre-test with 80 participants. The pre-test was done in Temuco, using the same method of addressing the participants as in the final survey. As no problems were detected, no changes were required in either the questionnaire or the interview procedure. The questionnaires obtained in the pre-test phase were not incorporated into the analysis of the results. The execution of the study was approved by the Bioethics Committee of the Faculty of Farming, Livestock and Forestry Sciences at the Universidad de La Frontera.

2.2. Instrument

The instrument for collecting the information was a questionnaire with mixed questions regarding the household's consumption of 12 groups of foodstuffs and drink used by the National Statistics Institute in the Surveys of Family Budgets (National Statistics Institute, 2007): bread; cereals and pasta; meat; fish and seafood; milk, cheese and eggs; oil, butter and margarine; fruit; green vegetables and tubers; sugar, coffee and tea; mate; soft drinks; and restaurant meals. These groups of food and drink represent the eating habits of the dominant Chilean culture. The response alternatives were: no consumption, occasionally, once per week, two or three times per week, daily.

For those individuals who identified themselves as Mapuche, an adaptation of the Mapuche acculturation scale developed by Saiz et al. (1998) was administered, which proposes a bidimensional acculturation model. In this respect, Koneru, Weisman de Mamani, Flynn, and Betancourt (2007) have all indicated that although most available instruments measure acculturation as a unidimensional construct, there is strong evidence to indicate that "acculturation" is bidimensional. The authors of this scale obtained a Cronbach's α coefficient of 0.90 and 0.78 for the Mapuche and Chilean sub-scales, respectively (Saiz et al., 1998). The scale consists of 20 items to assess the degree of involvement in Mapuche and Chilean cultures, in aspects related to use of Mapudungun or Spanish, friendship with Mapuche or Chileans, participation in Mapuche ceremonies and organisations (example: Did you have Mapuche friends in school? Did you have Chilean friends in school?). In order to avoid circularity in the results, items related to alimentary aspects were eliminated from the scale. Of these items, thirteen correspond to the Mapuche sub-scale and seven to the Chilean sub-scale (all closed-ended questions: yes or no). Thus the average of each participant is calculated for each sub-scale, and a division is then generated at the mid-point split of the responses of each in order to assign each participant to a category of high or low involvement in Mapuche culture and high or low involvement in Chilean culture. The mid-point split is a scalar constant value equal 0.5, as defined by the authors of the scale. This distinguishes four types of acculturation: integrated or bicultural (high degree of involvement in both Mapuche and Chilean culture), marginal (low involvement in both Mapuche and Chilean culture), separated (high degree of involvement in Mapuche culture and low involvement in Chilean culture) and assimilated (low degree of involvement in

Mapuche culture and high involvement in Chilean culture). In order to estimate the reliability of both the Mapuche sub-scale and the Chilean sub-scale Richardson and Kuder's (1939) KR-20 coefficient was used, as suggested by Saiz et al. (1998).

People identifying themselves as Mapuche were asked if they consumed a group of traditional food and drinks (closed-ended question: yes or no). Traditional Mapuche foods were selected on the basis of results obtained in four focus groups, each consisting of 10 Mapuche residents of the Araucanía Region, of varying sex, age, income level and area of residence (rural and urban). The foods identified using this procedure were: mudai (alcoholic drink made of crushed, chaff-free wheat which is boiled and fermented for several days), sopaipillas (dough made with wheat-flour, yeast, salt and warm water, cut into rounds and fried in oil or fat), tortilla de rescoldo (type of bread prepared with wheat-flour and cooked in hot embers), catutos or mültrün (parboiled wheat, ground and moulded to an elongated shape), pantrucas (square-shaped dumplings made of wheat-flour and egg, cooked in stock), charqui (sun-dried, salted meat), horsemeat, apol (lamb's liver with hot pepper, cumin, salt, coriander and oil), ñachi (lamb's blood with salt, coriander, hot pepper, lemon and oil), müllokin (little balls of ground, boiled peas) and merkén (hot pepper toasted whole, ground with coriander seed, salt and pepper). According to the results from the focus groups, not all of these Mapuche foods are necessarily prepared at home but can be purchased fully prepared, especially in the Metropolitan Region. Some of these traditional foods identified are exclusive to Mapuche cuisine (catuto and müllokin), are associated with Mapuche ceremonies (catuto, horsemeat and mudai), or are mainly consumed in rural environments (apol and ñachi). However, other foods are consumed habitually, even by non-Mapuche (sopaipillas, pantrucas, tortilla de rescoldo, charqui and merkén). For this reason, before these foods were included in the survey, the literature was reviewed in order to corroborate the Mapuche origin of all the foods identified in the focus groups (Bengoa, 2000; Comisión de Trabajo Autónoma Mapuche, 2003; FAO/Fundación de Comunicaciones del Agro, 2008; Jelves, Ñanco, Coliñir, & Morales, 2002; Montecino, 2004; Sadler & Obach, 2006; Sepúlveda, 2005). Nevertheless, it was decided to omit the sopaipillas and horsemeat from this study based on the results obtained by Reyes (2010) in the Araucanía Region. In this research, the acceptance of Mapuche foods by Mapuche and non-Mapuche people was compared (200 non-Mapuche and 200 Mapuche). It was concluded that ethnic origin is significantly associated with the consumption of tortilla de rescoldo, pantrucas, merkén, charqui, ñachi, apol, mudai, müllokin and catutos, but not with the consumption of sopaipillas and horsemeat.

Questions for socio-demographic classification were included in the questionnaire: gender, age, number of household members, area and region of residence, marital status, occupation and level of education of head of household, and possession of 10 domestic goods. The two latter variables allowed the socio-economic status (SES) to be determined according to Adimark (2004), corresponding to ABC1 (high and upper middle), C2 (middle-middle), C3 (lower middle), D (low) and E (very low).

2.3. Statistical analysis

The SPSS 16.0 statistics programme was used. In the present study the Cronbach's α coefficients for the Mapuche sub-scale and Chilean sub-scale were 0.809 and 0.577, respectively. These are lower values than the obtained by Saiz et al. (1998) while developing and validating the Mapuche acculturation scale. Also, it is worth noting that Cronbach's α coefficient for the Chilean sub-scale was lower than it would normally be acceptable.

The results of the acculturation scale enabled to identify 38% of the Mapuche sample as assimilated and 60% as integrated or bicultural. The proportion of separated and marginal Mapuche was only 2.0% in total, with no significant differences by region of residence ($\text{Chi}^2 = 3.437$, d.f. = 3, $P = 0.329$).

Considering the low presence of Mapuche classified as "marginal" and "separated", it was decided to carry out the statistical analyses based only on the assimilated and bicultural Mapuche ($n = 392$). To determine differences in the frequency of consumption of different types of food between non-Mapuche and Mapuche according to their degree of acculturation, contingency tables and Pearson's Chi^2 statistic were used (Pérez, 2005). To determine the magnitude of the association between the food and drink consumption of the different groups and the acculturation of the Mapuche, a risk estimate was made using the odds-ratio (OR) (Pérez, 2005), considering "consumption" to be any response other than "no consumption":

$$\text{OR} = \frac{\text{Assimilated(Consumption)}/\text{Assimilated(No-consumption)}}{\text{Bicultural(Consumption)}/\text{Bicultural(No-consumption)}} \quad (1)$$

The same analysis was performed to determine the magnitude of the association between the acculturation among the Mapuche and the consumption of traditional foods. The confidence intervals were estimated at 95% for each OR ($\text{IC}_{95\%}$).

To evaluate the effect of socio-demographic variables on the degree of Mapuche acculturation, a binomial logit model was proposed for unordered (nominal) data (Greene, 1999). Mapuche acculturation was defined as the dependent variable of the model, with two possible values (dichotomous variable): Assimilated = 1 and Bicultural = 0. The explanatory variables (binary) of the model were: socio-economic status (SES): 0 = C3, D, E, 1 = ABC1, C2; age: 0 \geq 35 years, 1 \leq 35 years; area of residence: 0 = in a rural village, in the countryside; 1 = in a large city, in a small city. Tests were done with other categorical explanatory variables referring to demography (gender, family size, education, occupation and marital status) and geography (region of residence), but these did not prove statistically significant.

Table 1

Percentage description of the sample. La Araucanía and Metropolitan Regions, Chile, October 2008.

Characteristic	Total sample	Non-Mapuche	Assimilated Mapuche	Bicultural Mapuche	P	
Gender	Masculine	40.3	38.5	47.0	39.0	0.170 ^a
	Feminine	59.7	61.5	53.0	61.0	0.118 ^b
Age	Under 35	41.8	40.7	57.0	33.9	0.000 ^a
	35–54	44.1	44.2	37.7	47.9	0.000 ^b
	55 and older	14.1	15.1	5.3	18.2	
Family size	1–2 members	21.2	26.2	18.5	14.4	0.000 ^a
	3–4 members	50.1	43.0	57.0	58.1	0.515 ^b
	5 or more members	28.7	30.9	24.5	27.5	
Area of residence	In a large city	72.0	73.8	73.5	67.8	0.000 ^a
	In a small city	17.9	20.2	18.5	13.6	0.022 ^b
	In a rural village	3.5	2.5	3.3	5.5	
	In the country	6.6	3.5	4.6	13.1	
Education	No formal education	0.6	0.2	0	1.7	0.000 ^a
	Incomplete elementary	4.5	2.7	5.3	7.2	0.030 ^b
	Complete elementary	5.9	4.4	7.9	7.2	
	Incomplete secondary	8.5	8.1	7.3	9.7	
	Complete secondary	32.1	28.1	28.5	41.1	
	Incomplete technical collage	8.1	7.9	11.3	6.4	
	Complete technical or incomplete university	21.5	21.0	27	18.6	
	Complete university or higher	18.8	27.4	12.7	8.1	
Occupation	Self-employed	21.6	18.5	25.8	24.2	0.003 ^a
	Business owner	2.7	4.0	1.3	1.3	0.262 ^b
	Private-sector worker	46.6	47.4	48.3	44.1	
	Public-sector worker	16.9	20.0	15.2	12.7	
	Retired	7.7	7.2	6.6	9.3	
	Seeking employment	3.2	1.7	1.3	6.8	
	Other working situation	1.4	1.2	1.5	1.6	
Socioeconomic status	ABC1	28.5	40.5	25.2	10.2	0.000 ^a
	C2	28.5	28.1	31.8	27.1	0.000 ^b
	C3	29.0	22.5	27.8	41.1	
	D	10.7	7.4	13.9	14.4	
	E	3.2	1.5	1.3	7.2	
Marital status	Single	26.3	25.4	35.1	22.0	0.091 ^a
	Married	50.0	48.1	45.0	56.4	0.047 ^b
	Separated	4.7	5.4	3.3	4.2	
	Divorced	0.8	1.2	0	0.4	
	Widow	2.9	3.0	1.3	3.8	
	Co-habiting	15.4	16.8	15.2	13.1	

^a P-Value corresponds to the asymptotic (bilateral) significance obtained in Pearson's Chi² test, when comparing the composition of the non-Mapuche, assimilated Mapuche and bicultural Mapuche samples.

^b P-Value corresponds to the asymptotic (bilateral) significance obtained in Pearson's Chi² test, when comparing the composition of the non-Mapuche, assimilated Mapuche and bicultural Mapuche samples.

3. Results

3.1. Sample description

The socio-demographic description of the sample used is shown in Table 1. Across the whole sample, the majority of present conditions were: women, age under 55, households with three to four members, residents in urban areas, completed secondary education or incomplete university education, privately employed, socio-economic status ABC1, C2 and C3, and married. For the comparison of the samples of non-Mapuche, assimilated Mapuche and bicultural Mapuche, differences were detected by occupation ($P \leq 0.05$), age, family size, area of residence, education and socio-economic status ($P \leq 0.001$); these factors drew out mainly the differences between non-Mapuche and bicultural Mapuche. Among the Mapuche, acculturation orientations (bicultural versus assimilated) varied by area of residence ($P \leq 0.001$), education, marital status ($P \leq 0.05$), age and socio-economic group ($P \leq 0.001$).

3.2. Consumption habits for foods included in the Surveys of Family Budgets

Table 2 presents the frequency of consumption of the groups of food and drinks among the non-Mapuche surveyed, and according to Mapuche acculturation. Differences were observed in the frequency of consumption of fish and seafood, fruit

Table 2

Frequency of consumption of different foods (%) in the non-Mapuche sample and according to the degree of acculturation of Mapuches in La Araucanía and Metropolitan Regions, Chile, October 2008.

Food groups	Frequency of consumption ^a					OR ^b	IC _{95%}	
	0	1	2	3	4		Inf.	Sup.
Bread (<i>P</i> = 0.682)								
Non-Mapuche	0.7	0.5	0.5	3.2	95.1	0.638	0.040	10.282
Assimilated	0	0	0	2.0	98.0			
Bicultural	1.3	0	0.4	2.1	96.2			
Cereals and pastas (<i>P</i> = 0.122)								
Non-Mapuche	0.5	4.5	17.0	58.3	19.8	-	-	-
Assimilated	0	2.0	23.2	60.9	13.9			
Bicultural	0.4	3.8	27.1	52.5	16.1			
Meat (<i>P</i> = 0.369)								
Non-Mapuche	1.2	4.0	14.3	62.2	18.3	-	-	-
Assimilated	0.7	4.6	17.2	58.3	19.2			
Bicultural	0	3.7	23.3	58.1	15.3			
Fish and seafood (<i>P</i> = 0.003)								
Non-Mapuche	9.1	44.0	35.1	10.6	1.2	0.455	0.233	0.889
Assimilated	14.6	39.7	33.1	10.6	2.0			
Bicultural	7.2	59.7	22.5	9.7	0.8			
Milk, cheese, eggs (<i>P</i> = 0.164)								
Non-Mapuche	0.5	2.0	6.4	31.6	59.5	-	-	-
Assimilated	0	4.6	7.3	35.8	52.3			
Bicultural	0.4	3.0	5.9	41.9	48.7			
Oils, butter and margarine (<i>P</i> = 0.855)								
Non-Mapuche	0.7	1.5	0.5	11.4	85.9	0.317	0.028	3.527
Assimilated	1.3	1.3	0	12.6	84.8			
Bicultural	0.4	1.7	1.3	10.6	86.0			
Fruits (<i>P</i> = 0.019)								
Non-Mapuche	1.0	4.4	4.7	35.6	54.3	0.637	0.089	4.569
Assimilated	1.3	6.6	5.3	29.8	57.0			
Bicultural	0.8	3.8	6.8	48.3	40.3			
Vegetables and potatoes (<i>P</i> = 0.840)								
Non-Mapuche	0.5	2.0	4.0	30.6	63.0	0.638	0.040	10.282
Assimilated	0.7	2.0	2.0	32.5	62.9			
Bicultural	0.4	0.4	3.8	30.1	65.3			
Sugar, coffee, tea (<i>P</i> = 0.405)								
Non-Mapuche	0.5	0.2	0.5	2.7	96.0	0.317	0.028	3.527
Assimilated	1.3	0	0.7	4.6	93.4			
Bicultural	0.4	0.8	0	5.5	93.2			
Mate (<i>P</i> = 0.000)								
Non-Mapuche	64.4	13.3	3.5	5.4	13.3	0.471	0.306	0.727
Assimilated	43.0	14.6	4.0	7.9	30.5			
Bicultural	26.3	20.8	8.5	16.5	28.0			
Soft drinks (<i>P</i> = 0.000)								
Non-Mapuche	9.6	17.2	8.9	28.6	35.6	0.786	0.415	1.491
Assimilated	12.6	15.9	11.3	25.2	35.1			
Bicultural	10.2	31.8	14.8	23.7	19.5			
Restaurants (<i>P</i> = 0.000)								
Non-Mapuche	46.4	34.5	10.6	5.7	2.7	2.308	1.521	3.502
Assimilated	43.0	45.6	4.0	2.0	5.3			
Bicultural	63.6	30.5	4.2	1.3	0.4			

P-Value corresponds to the asymptotic (bilateral) significance obtained in Pearson's Chi² test taking the non-Mapuche, assimilated Mapuche and bicultural Mapuche samples into consideration.

^a 0: does not consume; 1: occasional consumption; 2: consumption once a week; 3: consumption two to three times a week; 4: daily consumption.

^b Ratio of the advantages of acculturation (assimilated/bicultural).

($P \leq 0.05$), mate, soft drinks, and meals in restaurants ($P \leq 0.001$). With regard to fish and seafood, the highest proportion of assimilated individuals do not consume these foods or do so once per week, most non-Mapuche consume them once per week, while the greatest proportion of bicultural persons consume fish and seafood occasionally. The daily consumption of fruit was higher among non-Mapuche and assimilated Mapuche, while the predominant consumption among bicultural Mapuche was two or three times per week. The greatest proportion of non-Mapuche and assimilated Mapuche does not consume mate, while consumption among the bicultural Mapuche, which was two or three times per week, was significantly higher. The greatest consumption of soft drinks was daily among non-Mapuche and assimilated Mapuche and occasionally among the bicultural. For meals in restaurants, the highest proportion of the non-Mapuche eat in restaurants two or three times per week or once per week, the assimilated Mapuche mostly eat out daily and occasionally, whereas a high proportion of the bicultural do not eat in restaurants.

Table 3

Proportion of consumption of traditional Mapuche foods (%) according to the degree of acculturation of Mapuches in La Araucanía and Metropolitan Regions, Chile, October 2008.

Traditional food	Mapuche	Assimilated	Bicultural	P	OR ^a	IC _{95%}	
						Inf.	Sup.
<i>Mudai</i>	24.3	6.0	36.0	0.000	0.113	0.055	0.232
<i>Tortilla de rescoldo</i>	61.5	43.0	73.3	0.000	0.275	0.179	0.424
<i>Catutos or mültrün</i>	28.4	8.6	41.1	0.000	0.135	0.072	0.252
<i>Pantrucas</i>	74.2	60.9	82.6	0.000	0.328	0.205	0.524
<i>Charqui</i>	47.0	31.1	57.2	0.000	0.338	0.220	0.520
<i>Apol</i>	14.0	6.0	19.1	0.000	0.269	0.127	0.568
<i>Nachi</i>	24.8	12.6	32.6	0.000	0.297	0.171	0.516
<i>Müllokin</i>	19.1	9.9	25.0	0.000	0.331	0.180	0.608
<i>Merkén</i>	59.4	42.4	71.6	0.000	0.291	0.185	0.457

^a Ratio of the advantages of acculturation (assimilated/bicultural).

The OR values, taking the bicultural Mapuche as a reference, would indicate that assimilated Mapuche present a lower probability of consuming bread; fish and seafood; oil, butter and margarine; fruit; green vegetables and tubers; mate; soft drinks (OR < 1), but a higher probability of eating in restaurants (OR > 1). Nevertheless, association with assimilation was obtained only for the consumption of fish and seafood, mate, and meals in restaurants. Based on the above, it may be stated that assimilated Mapuche are less likely to consume fish and seafood and mate than bicultural individuals, while the reverse is true for meals in restaurants, i.e. assimilated individuals are more likely than bicultural ones to eat out. In addition, risk estimates were performed at the same socio-economic status (SES): at the high level (ABC1 and C2) and low level (C3, D and E). Only significant OR values were obtained for meals in restaurants in the high SES (OR = 3.211, IC_{95%} (1.713, 6.017)) and for the consumption of fish in the low SES (OR = 0.236, IC_{95%} (0.096, 0.578)). This indicates that in the high SES, assimilated Mapuche are more likely to eat in restaurants than bicultural Mapuche, whereas in the low SES, assimilated Mapuche are less likely to consume fish than bicultural Mapuche.

3.3. Consumption of traditional Mapuche food

Table 3 shows the proportion of Mapuche surveyed who stated that they consumed the traditional foods named in the questionnaire, the most important of which are pantrucas and tortillas de rescoldo. The foods consumed by the smallest proportion of individuals were apol and müllokin. The Chi² test distinguished significant differences in the consumption of all the traditional Mapuche foods according to acculturation orientation ($P \leq 0.001$). As expected, in every case a greater proportion of bicultural Mapuches consume traditional foods. With these OR and IC_{95%} values, taking the bicultural Mapuche as the reference in this case, it can be concluded that assimilation is significantly associated with the consumption of all the foods considered. Thus assimilated Mapuche are less likely to consume typical food than bicultural Mapuches (OR < 1).

Considering all the traditional Mapuche foods and all the groups taken from the Surveys of Family Budgets, using the calculation of the coefficient phi demonstrated a statistically significant association ($P \leq 0.001$) between acculturation and the type of food consumed. The consumption of traditional Mapuche foods was greater than Chilean foods among bicultural Mapuche, whereas among assimilated Mapuche food consumption from the dominant culture and traditional Mapuche foods was similar. Relating traditional food consumption between the bicultural and assimilated groups, an ODS of 3.403 was observed in the bicultural and of 1.514 in the assimilated group, which determines a statistically significant OR of 2.248 ($P \leq 0.001$). This indicates that bicultural Mapuche are 2.3 times more likely to consume traditional foods than assimilated Mapuche. If food consumption from the Surveys of Family Budgets is related between the bicultural and assimilated groups, a statistically significant OR of 2.218 is obtained ($P \leq 0.001$), which indicates that assimilated Mapuche are 2.2 times more likely to consume foods from the dominant Chilean culture than bicultural Mapuche.

3.4. Nominal binomial logit model generated

The nominal binomial logit model (unordered data) as a whole proved significant ($P \leq 0.01$), meaning that it is a good predictor according to the tests used: likelihood ratio statistic (LR) and Hosmer–Lemeshow's (Table 4). The signs of the coefficients of the demographic variables are consistent with the differences in the composition of the assimilated and bicultural samples. The variables age ($P < 0.01$), socio-economic status ($P < 0.05$) and area of residence ($P < 0.10$) were statistically significant, and the positive sign of the coefficients ($\beta = 0.802$, $\beta = 0.516$ and $\beta = 0.649$, respectively) indicates that if the individuals are under 35 years, belong to the higher socio-economic status (ABC1 and C2) or live in a large or small city, there is an increased likelihood of their being assimilated. The value of $\text{Exp}(\beta)$ shows the magnitude by which this likelihood increases 2.23, 1.68 and 1.91 times, respectively. The total prediction capacity of the model generated is 65.4%.

Table 4

Results of the binomial logistic model generated for Mapuche assimilation with socioeconomic variables.^a La Araucanía and Metropolitan Regions, Chile, October 2008.

Dependent variable: Degree of assimilation	Model statistics				
	Beta	Wald	gl.	Sig.	Exp(B)
SES	**0.516	5.099	1	0.024	1.675
Age	***0.802	13.149	1	0.000	2.230
Area of residence	*0.649	3.197	1	0.074	1.914
Constant	***−1.620		1	0.000	0.198
LR ^b			31.732***		
Hosmer–Lemeshow test ^c		Chi ² = 1.707	gl. 4		Sig. 0.789

^a Significant variables and models for the level * $P < 0.10$; ** $P < 0.05$; *** $P < 0.01$ based on the Wald statistic for the significance of variables and the Likelihood Ratio and Hosmer–Lemeshow tests for the goodness of fit of the models.

^b LR (likelihood ratio) test or logarithm of the likelihood quotient. Significant model at the level *** $P < 0.01$ since calculated Chi² is less than tabulated Chi² with $N-p$ degrees of freedom, where N is the number of cases ($N = 400$) and p is the number of estimated parameters ($p = 4$). Therefore, the null hypothesis is accepted that the observed likelihood does not differ from 1 (the value of the likelihood for the model that is perfectly fit).

^c Hosmer–Lemeshow goodness-of-fit test; in this case the absence of significance indicates a good fit of the model, i.e. the null hypothesis cannot be rejected that there is no significant difference between the observed values and those that the model predicts.

4. Discussion

The present work concentrates on food consumption habits in non-Mapuche and Mapuche, whose acculturation to the predominant Chilean culture is also evaluated, in two regions of Chile. The significant proportion of those surveyed classified as assimilated Mapuche and the low presence of those separated concur with the results obtained by Saiz et al. (1998) in a sample of students of Mapuche origin, in which 69% were classified as bicultural, 25% assimilated and 6% separated. This might be explained by the mainly urban composition of the Mapuche sample (90.2%), because migration from rural to urban areas is an important factor that affects the increasing intercultural contact (Grebe, 2000). At the same time, it might be associated with those policies dating back to the Chilean independence which tended towards culturally homogenising the country (Alvares-Santullano & Forno, 2008), reinforced in the mid-twentieth century with plans for the integration of the indigenous population into the wider society through an attempt at acculturation, so as to reduce ethnic identities (Grebe, 1996). The results of this investigation indicate that these policies have been effective, while it is also expected that the more migration from the country to the city, the greater the presence of assimilated Mapuche. This will result in a loss of Mapuche culture (language, traditional food, traditional ceremonies and celebrations, among others) and in the cultural diversity that has characterised Chile. It would therefore be desirable for this type of study to be developed at regular intervals to provide an indication of how assimilation trends are increasing.

The greater consumption and likelihood of traditional food consumption together with a lower consumption of food from the Chilean culture among the bicultural Mapuche, and the opposite behaviour of assimilated Mapuche, bears out the first hypothesis raised in this investigation; i.e., there is a relation between the Mapuche's degree of involvement in Chilean culture and their eating habits. Although these results are similar to previous studies (Arredondo et al., 2006; Nan & Cason, 2004; Song et al., 2004; Sukalakamala et al., 2006), the originality of this research lies in having found similar behaviour regarding the differentiated adoption of the eating habits of the dominant culture by an indigenous minority in its own country of origin, the Mapuche in Chile, for whom the process of acculturation was not a choice but an imposition.

The greater consumption of traditional food among the bicultural Mapuche is consistent with studies which conclude that greater involvement with the native culture has a positive effect on the consumption of traditional foods (Carrus, Menci, & Caddeo, 2009; Redwood et al., 2008). Nevertheless, it should be pointed out that the most commonly consumed traditional foods are easy to prepare, the ingredients are cheap and easily available, e.g. tortillas de rescoldo and pantrucas are made from wheat flour, or they can be purchased in the formal market or from street vendors, e.g. charqui and merkén. In other words, the Mapuche maintain their traditional eating habits by consuming foods that are easy to obtain or prepare and are reasonably priced, and not those which involve complex preparation or ingredients which are hard to obtain (e.g. apol and ñachi). This is logical when considering that the majority of participants live in urban areas and that bicultural Mapuche present a high degree of involvement in both Mapuche and Chilean cultures; therefore, they consider the practice of buying food as a part of their involvement in the Chilean culture. In addition, the choice of cheap food is consistent with the greater presence of participants of low SES among the bicultural Mapuche.

One remarkable result is the lower consumption of food from the Chilean culture among the bicultural Mapuche, despite their heavy involvement in Chilean culture. Although the cause will have to be looked into in greater detail in future investigations, we hypothesise that this is related to the type of most commonly consumed traditional meals, because this is about habitual consumption within the Mapuche culture and not about foods associated with celebrations or rituals of this ethnic group, as would be the case of mudai and catutos (consumed during the celebration of the Mapuche New Year). Therefore, if the bicultural Mapuche regularly consume traditional foods, the logical result would be that they partially replace foods from the Chilean culture.

Considering the food consumption habits of the Surveys of Family Budgets, it should be noted that the greatest proportion of non-Mapuche and assimilated Mapuche consume fruits daily, while the bicultural Mapuche consume fruit mainly two

or three times per week (56.9%). Taking into account the fact that the World Health Organisation recommends the daily consumption of fruit and vegetables, it may be suggested that assimilation might be beneficial in terms of nutrition for the Mapuche. This result contradicts the findings of various authors (Franzen & Smith, 2009; Himmelgreen, Daza, Cooper, & Martínez, 2007), who have indicated that acculturation has negative effects on diet and health. In this respect, it is probable that a greater involvement of bicultural and assimilated Mapuche in Chilean culture has made them more open to campaigns to promote the consumption of fruit and vegetables as the best way of improving health and preventing diseases. In addition, when dealing with a mainly urban sample, the availability of fruit becomes independent of the season, contrary to what happens in the countryside, thereby facilitating its purchase and greater consumption. Nevertheless, there is also evidence of a reduction in the consumption of fruit and vegetables associated with low socio-economic levels (Pomerleau, Lock, Knai, & McKee, 2005), which would explain the lower frequency of fruit consumption among bicultural Mapuches.

One interesting aspect is the association between assimilation and the consumption of mate, which is not part of the traditional Mapuche culture but rather a custom acquired in the 1980s (Ibacache, 1990). Likewise, the association between the degree of assimilation and the lower proportion of bicultural Mapuche who eat out in restaurants may indicate that, despite their high degree of involvement in Chilean culture, bicultural Mapuche have been less affected by the changes occurring in food consumption habits since the mid-twentieth century, which include the growing habit of eating out (Casotti, 2005). However, the result again may be associated with the lower socio-economic status of bicultural Mapuche, implying a lower availability of resources to put towards eating out. This subject needs to be clarified by further studies, considering that one recent development has been the emergence of restaurants which incorporate traditional foods of the Mapuche culture into their menus.

The results of the proposed logit model confirm the relationship between acculturation and some demographic characteristics (Laroche et al., 1998; Peñaloza, 1994) and validate the second hypothesis of this study. With regard to age, the greater likelihood that Mapuche under 35 will be assimilated aligns with the results of Cleveland et al. (2009), who found that age was negatively correlated with acculturation and positively correlated with traditional ethnic food consumption. Older individuals are more committed to definite ways of life and are generally more suspicious of and resistant to new perspectives and material possessions (De Mooij, 2004). In agreement with this, Jamal (1998) reported that dominant culture foods were perceived by the younger Pakistanis in the United Kingdom as a way of conforming to the mainstream culture. In these terms, this result for the Mapuche indicates a break in the transmission of the cooking practices of the Mapuche culture between the generation aged over 35 and younger generations, which is consistent with the higher proportion of participants under 35 in the sample of assimilated Mapuche.

Likewise, the greater probability of Mapuche being assimilated if they are in the higher socio-economic status (ABC1 or C2) is consistent with the results of Cleveland et al. (2009), who found that household income was positively correlated with acculturation and also with mainstream culture food consumption. This is consistent with the greater presence of assimilated Mapuche belonging to the higher-income SES, which gives them access to a more varied diet, as was observed in the frequency of fruit consumption, and also probably a greater pleasure in eating in restaurants more frequently than bicultural Mapuche. Phinney (1990) indicates that wealthier individuals are less susceptible to ethnic conformity pressures, their higher income may be indicative of more successful economic integration into the mainstream society, and thus produces greater contact with and exposure to the mainstream culture and mainstream foods.

Similarly, a greater probability of Mapuche who live in urban areas (small and large cities) being assimilated concurs with Grebe (2000), who suggests that migration from rural to urban zones is an important factor affecting the increasing intercultural contact, and also the lack of continuity and maintenance of Mapuche culture by the migrants, including food. This is consistent with the higher proportion of assimilated Mapuche that reside in urban areas (92%) compared to bicultural Mapuches (81.4%). It must be remembered that historically the Mapuche were linked to rural life, earning their livelihood from hunting and vegetable production in the sixteenth century, and then becoming farmers and animal breeders in the eighteenth and nineteenth centuries. The forced re-settlement of the Mapuche to land assigned by the Chilean government has led over the years to a high degree of sub-division of property (Bengoa, 2000) and the migration of younger generations to the cities; as a result the Mapuche population today is mainly urban (MIDEPLAN, 2005).

Contrary to the indications of Grebe (2000), that migration from the Araucanía to the capital increases the intercultural contact, the region of residence was not significant in the proposed logit model. It might therefore be suggested that the lack of continuity and maintenance of Mapuche cultural eating habits are not associated with the region where the participants reside. Nowadays this is probably due to the opportunity to buy fully prepared Mapuche foods, particularly in the Metropolitan Region. Also, in this study gender was not significant in the logit model, which contradicts results from other studies that have shown that females are more affected by the acculturation process than males (Bethel & Schenker, 2005). It is thought that females acculturate faster than males, creating a mismatch in gender role expectations between males and females, ultimately leading to family cultural conflict (Sarmiento & Cardemil, 2009). However, both Mapuche and Chilean cultures are sexist even to the present day, which may partly explain the lack of differences in the degree of involvement in the Chilean culture between male and female Mapuche in this research.

The composition of the Mapuche sample is one of the limitations of the study because it was not possible to investigate the behaviour of separated Mapuche. This will have to be dealt with in future research that will need to include specific samples of Mapuche living in the countryside, where it is possible to expect a lower degree of assimilation to the Chilean culture. Another limitation of the study was the low level of internal consistency of the Chilean sub-scale used to measure the degree of assimilation of the participants.

Therefore, differences were detected in the consumption habits of the foods included in the Surveys of Family Budgets between non-Mapuche, assimilated Mapuche and bicultural Mapuche. The bicultural Mapuche are more likely to consume traditional foods than the assimilated Mapuche. Acculturation is related to socio-economic status, age and the area of residence. Mapuche people who are under 35 years, belong to a higher socio-economic status and reside in an urban area (large or small cities), are more likely to be assimilated to Chilean culture. Considering the increasing access of young Mapuche people to higher education, and therefore the increasing likelihood of reaching higher socio-economic levels, it is to be expected that the process of acculturation will expand in the near future. This means that there is a pressing need to develop measures to preserve the Mapuche culture in all its aspects and especially the level of cultural food identity, which is a coordinating axis of many of the practices that define cultural belonging as well as an important part of the particular ethnic-cultural diversity of Chile.

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