Food choice and emotions: Comparison between low and middle income populations

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ABSTRACT

Food choice motives and food-related emotions in two income households were evaluated. 320 women between 22 and 55 years, half low income (LI) and half middle income (MI), from two Argentine cities, small and large, participated in this study. For food choice 23 motives were considered, using a Best–Worse questionnaire. Regarding emotions, respondents checked all-that-applied of 33 emotions for 6 emblematic foods. Results were analyzed by generalized linear models and correspondence analysis. While differences between cities were small, differences between income levels were important.

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1. Introduction

FAO (2012) defined food security as "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food *preferences* for an active and healthy life." The word 'preference' was highlighted because, in spite of the fact that millions of LI people are food insecure in our country and in the world, there are relatively few studies of food acceptability focused on this wide sector of the population.

Food choice and acceptability have been studied in LI populations. For example, Antin and Hunt (2012) applied an ethnographic method to study food choice in Afro-American LI women; and Miewald, Ibanez-Carrasco, and Turner (2010) conducted group surveys to investigate food choice among LI HIV-positive people living in Canada. In Argentina Sosa, Martínez, Márquez, and Hough (2008) researched the adequate scale and location to measure food acceptability; and Sosa and Hough (2006) measured sensory acceptability of menus and snacks forming part of a food-aid program. Nuss et al. (2012) studied the acceptability of maize (*Zea mays*) biofortified with provitamin A carotenoids among 3–5 year rural Zambian children. De Steur, Gellynck, Feng, Rutsaert, and Verbeke (2012) measured willingness to pay for folate biofortified rice using an auction procedure in the Shanxi Province of China. For a broader coverage of food choice in LI populations Hough

and Sosa's (2014) recent review can be consulted. Comparisons between LI and MI populations regarding food choice questionnaires and emotions have not been made.

Steptoe, Pollard, and Wardle (1995) developed a questionnaire to analyze food choice motives. This questionnaire has been the basic research tool used by different authors to study MI population's food choice motives (Ares & Gámbaro, 2007; Lindeman & Vaananen, 2000; Lusk, 2011; Share & Stewart-Knox, 2012). In the published research where a food-choice questionnaire has been applied (Ares & Gámbaro, 2007; Share & Stewart-Knox, 2012; Steptoe et al., 1995) respondents used a numerical scale for each one of the motives. An alternative to numerical scales is the Best–Worse type of questionnaire (Jaeger, Jørgensen, Aaslyng, & Bredie, 2008), which so far has not been used to study food choice motives. Jaeger et al. (2008) proposed its use to measure food acceptability and concluded that improved sample discrimination was achieved and that in general respondents found the method friendly. Since there is only one way to choose an element as the "most important" then bias in the use of scale is not possible. Orme (2013) indicated that this makes the method suitable for population comparison studies, since populations of different income levels, ethnic background or educational levels could use numeric scales in a different way.

In the last years there have been a number of publications in the field of food-related emotions (Cardello, Meiselman, Schutz, Craig, & Given, 2012; King & Meiselman, 2010; Thomson & Crocker, 2013). In all cases the research has been performed in developed countries and with middle or middle-to-high income populations. It can be hypothesized

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that emotions evoked by food in LI people are different from those evoked in MI people, due to difficulties and frustrations in being able to achieve a sufficient, safe and nutritious diet.

The aims of this work were the following: (a) to study food choice motives and food-related emotions in LI and MI people of Argentina, and (b) to analyze if there were differences in motives and emotions between the population of a small town and that of a big metropolis. A supplementary aim was the novel application of the Best–Worse method to collect the food-choice data.

2. Materials and methods

2.1. Survey population

In Argentine households women are the main food providers, thus regarding food choice they are generally the main deciders. Due to this women were recruited as respondents. A total of 320 women aged 25–55 years were surveyed. Of these, half were from LI households and half from MI households; and half were from 9 de Julio and half from La Plata. 9 de Julio is a city with 40,000 inhabitants located 250 km to the west of Buenos Aires in a rural area. In 9 de Julio the ethnic origin (majority white Caucasian), the products in supermarkets and exposure to nationwide media are similar as to the rest of the Argentine. La Plata is a major city with 600,000 inhabitants, 60 km from Buenos Aires and its population can be considered typical of Greater Buenos Aires. The choice of these two cities was to have a sample from a rural city and a major metropolis. Respondent's income level was determined by means of a questionnaire which took into account education level, occupation of the principal home supporter, automobile model and electrical appliances.

LI respondents were recruited in Community Centers situated in their neighborhood and that is where they answered the survey on laptop computers. They received a $10 gift in recognition to their participation. MI respondents were recruited from our consumer database in the city of 9 de Julio and among government administrative employees and teachers in the city of La Plata; they were contacted by email, answered the income level questionnaire and, if qualified, were invited to answer the survey through the Internet. As an incentive to participate they were entered into a draw for a bicycle and an electric kettle.

2.2. Survey development and implementation

Steptoe et al.'s (1995) original food-choice questionnaire was taken as basis for the motives used in this study. The questionnaires used by Ares and Gámbaro (2007) and Elorriaga, Colombo, Hough, Watson, and Vázquez (2012) in Uruguay (neighbor to Argentina) and Argentina, respectively, were also consulted.

To study the emotions associated with food, we considered lists published by different researchers (King & Meiselman, 2010; Laros & Steenkamp, 2005; Thomson, Crocker, & Marketo, 2010) classified as: positive, negative and ambiguous.

The published food-choice and emotion-related questionnaires have been used with MI populations. To explore possible motives and emotions in LI people we conducted a focus group study (Morgan & Krueger, 1998) with 12 LI women from the town of 9 de Julio. In the first part of the focus group we inquired about buying habits, storage, cooking, nutritional composition and exchange with other family members concerning food. This helped us uncover food-choice motives. To investigate emotions, half the participants were asked to list enjoyable meals and associated emotions; the other half did likewise but with foods they didn't like. Photos of different types of food were also presented for participants to elicit emotions. Piqueras-Fiszman and Jaeger (2014, 2015) have shown the effect the context and appropriateness have on elicited emotion responses, which are not situational invariant. Thus, when focus-group participants were asked, for example, to list enjoyable meals and associated emotions, it is probable that

some of the emotions were related to the positive context of the enjoyable meal, not necessarily to the foods themselves. This was not considered a problem in our study as respondents were asked to freely check the emotions they felt when observing the picture of a food product; some of the emotions would be related to the food itself and others to imagined context.

Based on the focus group results the published food-choice questionnaires were modified by adding some items and deleting some of the original items. An effort was made to not have more than 25 motives to avoid making the Best–Worse questionnaire too much of a burden for respondents. The final 23 motives are shown in Fig. 3. Ares and Gámbaro (2007) used a food-choice questionnaire with 22 items for Spanish-speaking Uruguayan respondents.

From the focus group results and published emotion questionnaires we developed a list of 33 emotions, classified in the following categories:

— Positive: *Active, Adventurous, Desire, Enthusiastic, Free, Friendship, Fun, Goodness, Good humored, Happy, Interested, Loving, Peaceful, Pleasant, Satisfied, Secure, Sharing and Welfare.*
— Negative: *Abandoned, Aggressive, Anguish, Annoyed, Disgusted, Disappointed, Guilty, Rejection and Sad.*
— Neutral: *Apathy, Bored, Eager, Indifferent, Lack of interest and Nostalgic.*

Due to the different linguistic connotations, in this study adverbs and nouns were mixed to facilitate language comprehension. Also we shall refer to these terms as emotions, although some might be more strictly defined as moods as pointed out by King and Meiselman (2010). *Indifferent* and *Lack of interest* have a similar meaning, however in the focus group they were mentioned separately and thus we chose to retain both terms.

To design and field the survey (Best–Worse and emotions) Sawtooth software version 8.2.2 was used (Sawtooth Software Inc., Orem, Utah, USA). To implement the Best–Worse methodology, each respondent received 20 tables, each of them with 4 motives. The number of motives per table and the number of tables per respondent were selected based on Orme's (2013) recommendations for an efficient design. For each table the respondent had to choose the *Most Important* and the *Least Important* motive (among the 4 from the table) when choosing a food product. As an illustration, Fig. 1 shows one of the tables presented by the software.

To inquire about food-associated emotions six photographs of emblematic food products shown in Fig. 2 were presented. The six food products were chosen based on the criteria that they were well known to both income groups and that they represented emblematic categories (see Fig. 2). Each photograph was presented with the list of 33 emotions and respondents had to "check all that apply" (CATA: King & Meiselman, 2010). They received a general instruction: "Now we want to know what emotions you associate with foods. Please observe the different photographs and choose the emotions you associate to each one of them. A food product or beverage can generate multiple emotions, so please mark all those you consider". And then for each photograph: "Check all the emotions you feel when observing this photograph". The six photographs were presented to respondents in random order, and the 33 emotions were ordered alphabetically.

2.3. Statistical analysis

Since each respondent received 20 tables of 4 motives each; and since there were 320 survey respondents, this meant that each of the 23 motives was presented, on average, 1113 times. The frequencies with which each motive was selected as the most and least important were analyzed using a generalized linear model (GLM:

Fig. 1. Table presented to respondents to evaluate the most important and least important motive when choosing a food.

McConway, Jones, & Taylor, 1999) considering the Poisson distribution and the logarithmic link function. The dependent variable was the frequency of choice; explanatory variables were income level (low and medium), city (La Plata and 9 de Julio) and the type of response (most and least important). The model included the main effects and two way interactions.

Considering the emotions, in the present study we had the following variables: product (see Fig. 2), income level (low and medium) and city (La Plata and 9 de Julio). For each product, a respondent can either check or not-check an emotion thus generating a binomial response. This type of data can be analyzed by a GLM (McConway et al., 1999) using the binomial distribution and the logit link function. For each emotion the

response variable was the number of checks given by respondents; and the explanatory variables were product, income level and city.

For both the motive and emotion models, significant effects were determined using a stepwise multiple regression (McConway et al., 1999), considering the main effects and two way interactions in the maximum model. Once the significant model had been determined, the percent checks were estimated with corresponding 5% least significant differences.
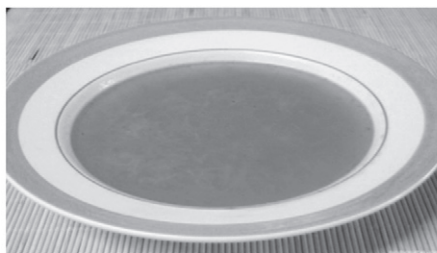
Correspondence analysis (CA: Clausen, 1998) has traditionally been used to analyze CATA data (Meyners, Castura, & Carr, 2013; Ng, Chaya, & Hort, 2013). In our case we had three categorical variables (product, city and income level), thus we applied multiple CA (Le Roux & Rouanet,
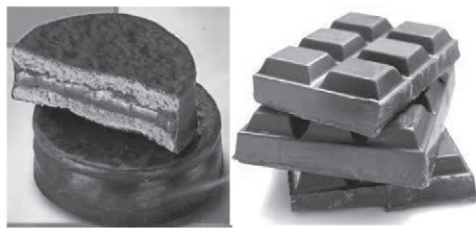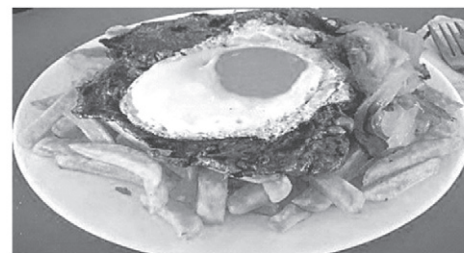

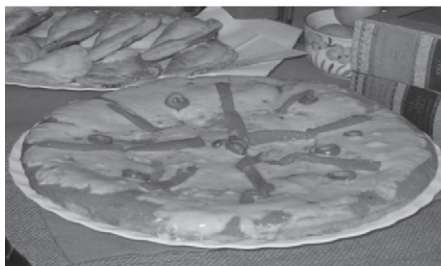Alfajor and chocolate (Indulgence - *Choco*)

Beer and wine (alcoholic Beverage – *Beer/Wine*)

Soup (routine , blan)

Steak, potato chips and fried egg (high in energy and rewarding - *Steak*)

Pizza and empanadas (finger food - *Pizza/Empa*)

Yogurt (healthy)

Fig. 2. Photos of food presented to evaluate the associated emotions.

2010). Both the GLM and multiple CA showed that differences between cities (La Plata and 9 de Julio) were minimum, thus data were grouped over cities leaving only two categorical variables, product and income-level. CA is used basically as a visual tool and as differences between income levels were visualized better by performing a separate CA for both income levels, we preferred two separate simple CA's than a single multiple CA.

The GLM and CA calculations were done with Genstat version 16 (VSN International, Hemel Hempstead, United Kingdom).

3. Results and discussion

3.1. Food choice motives

As illustrated in Fig. 1, the Best–Worse methodology applied to food choice motives allowed respondents to choose a motive as being the most or least important in each table of 4 motives. There were a total of 320 respondents; half from 9 de Julio and half from La Plata; half LI and half MI; thus there were 80 in each segment. Since each respondent received 20 tables of 4 motives each; for the 80 respondents in a segment, each of the 23 motives was presented, on average, 278 times. For one of the motives, *Easy/quick-to-prepare*, Table 1 illustrates the type of data obtained. The number of times each motive was chosen as the most or least important, as a function of city and income level was analyzed by a GLM as explained in the statistical analysis section.

Fig. 3 presents the GLM response frequency predictions by income level and type of response for different motive categories. These categories were decided by the researchers based on the categories used by Steptoe et al. (1995) and on the meaning of each motive. City X type of answer interaction was significant for *I-can-buy-it-close-to-my-house-or-job* and *Low-in-fat*. However, their magnitude was small and thus we can consider the city effect as minimal and it is not represented in Fig. 3. Significant effects of each motive are indicated in the figure.

The mood motives *According-to-how-I'm-feeling* and *Makes-me-feel-good* (Fig. 3-a) did not present income level differences, both levels considered them of little importance when choosing food. This lack of importance of mood related motives was also found by Elorriaga et al. (2012) in their study with health science students in Argentina. The motives *I-like-it* and *My-family-likes-it* were important to both income levels. LI respondents did not consider *I-like-it* as important as MI respondents. This difference can be due to the fact that LI women, with a limited food budget, cannot consider their own personal preferences and have to give way to satisfying the family as a whole when choosing a food product or meal. In other studies (Ares & Gámbaro, 2007; Elorriaga et al., 2012) sensory related motives were also found to be important.

In the Convenience and Familiarity category (Fig. 3b), MI respondents considered *Know-brand/origin* as more important than LI respondents. However, LI respondents considered *It's-what-I/we-usually-eat* as more important. *I-can-buy-it-close-to-my-house-or-job* and *Easy/quick-*

to-prepare were of little importance to both income levels. Regarding *I-get-it-where-I-shop-regularly*, respondents were segmented; in both income levels some respondents found this motive important and others less important.

Fig. 3c, corresponding to the Price category, shows that LI respondents considered *The-money-I-have-at-that-time-of-the-month* and, to a lesser extent *Cheap* and *On-sale* as important; in contrast with MI respondents who considered these motives of little importance. Steptoe et al. (1995) found that better-off individuals placed less emphasis on the importance of price on food selection. Antin and Hunt (2012) found that LI Afro-American women's diets were healthier at the beginning of the month; towards the end of the month diets changed as the priority was getting enough food till the next pay-day. In our study, *The-money-I-have-at-that-time-of-the-month* was an important motive for LI respondents; this could have a direct impact on their possibility of choosing a healthy diet towards the end of the month. *Good-value-for-money* was considered important for both income levels; however, interpretation could be different. For LI respondents it could mean choosing the best quality among the cheaper products; while for MI respondents it could mean choosing the cheapest product among those considered of better quality. Better quality is most probably related to brand for MI respondents as the motive *Know-brand/origin* was considered important to them (see Fig. 3b).

In the Health category (Fig. 3d) LI respondents considered *Lots-of-vitamins-minerals-and-proteins* as more important than *Part-of-a-healthy-diet*, while for MI respondents it was the inverse. In relation to the price-related motives (Fig. 3c), LI respondents probably knew that they could not really afford a healthy diet while leading them to feel that their basic nutrients, such as vitamins, were in danger and thus they considered this motive as important. On the other hand, MI respondents felt quite safe about their basic nutrients, while *Part-of-a-healthy-diet* includes other concepts important to them such as not putting on weight or keeping fit. This last interpretation is reinforced by *Low-in-calories* being more important to MI than to LI respondents. Regarding *Causes-satiety-and-gives-energy* and *Low-in-fat*, respondents were segmented; in both income levels some respondents found these motives important and others less important.

Within the Natural Content and Safety category (Fig. 3e), both income levels considered *Produced-taking-care-of-the-environment* of little importance. In Argentina there are very few products labeled with environmental-type messages, thus consumers, even if they were sensitive to environmental issues, would not know what to look out for. In other countries such as the UK, many foods are labeled as "organic", others as "fair trade" (wine, chocolate or coffee) or "free range" (eggs). This low importance of environmental issues related to food production were also found by Elorriaga et al. (2012), in their study on food choice among Argentine students. The motives *Adequate-"best-before…"-date* and *Made-and-kept-hygienically* did not present income level significant differences, both levels considered them very important when choosing food. Regarding *No-artificial-or-chemical-additives* and *Produced-naturally*, respondents were segmented; in both income levels some respondents found these motives important and others less important.

We received no negative feedback from respondents regarding the Best–Worse questionnaire. The results were reasonable and allowed distinguishing food-choice motives between respondents from different income levels. Thus the Best–Worse methodology would seem adequate for population comparison studies, since populations of different income levels could use numeric scales in a different way.

3.2. Emotions

Some emotions received few selection ticks in the CATA questionnaire, showing that they were not associated with the presented

Table 1
Number of times the motive *Easy/quick-to-prepare* was chosen as the most and least important for each consumer segment.

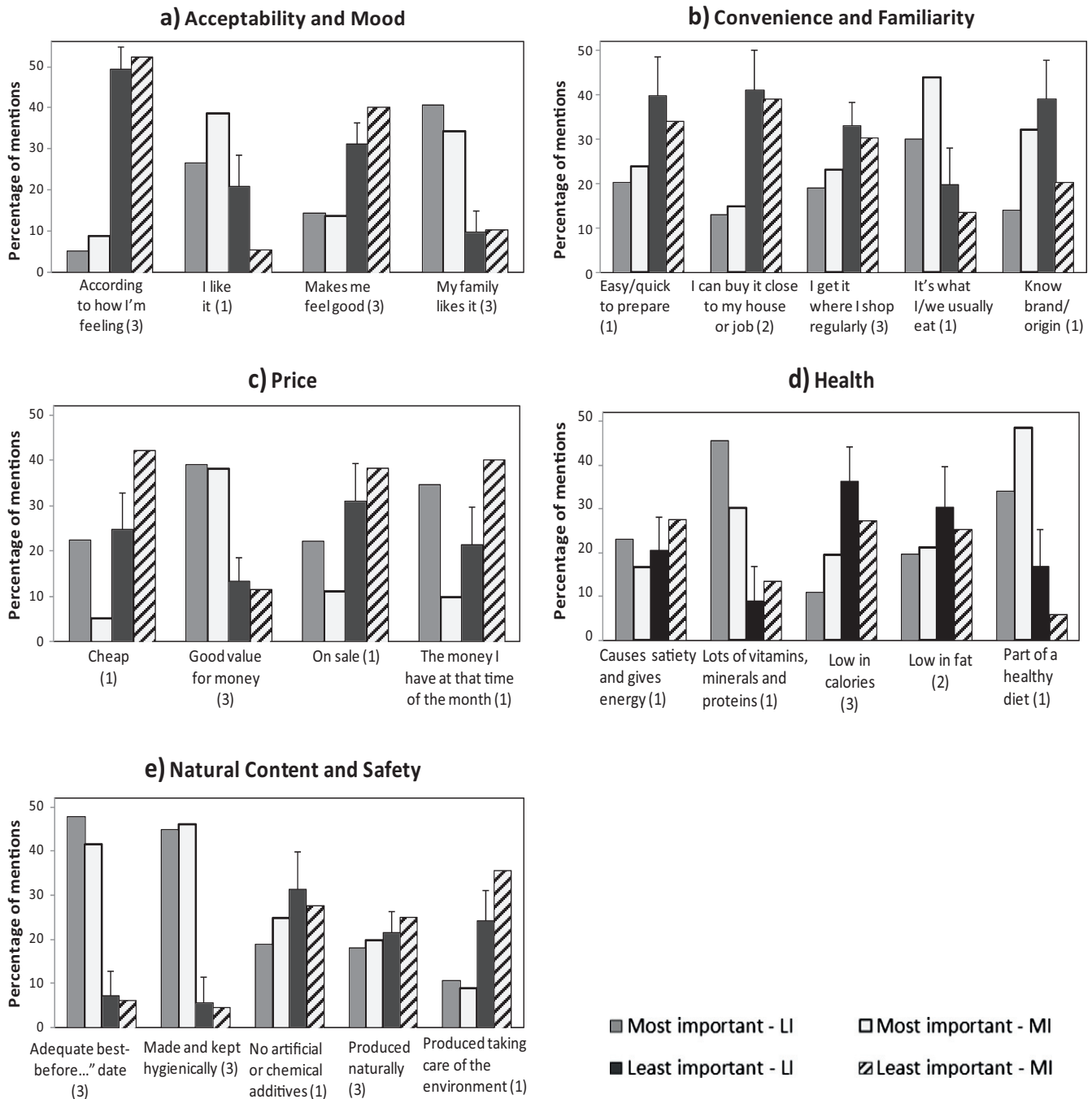|	Low income		Middle income	
	9 de Julio	La Plata	9 de Julio	La Plata
Most important	54	61	80	56
Least important	121	105	85	109
Number of times the motive was presented	283	284	289	284

Fig. 3. Predicted percentage of mentions for different food choice motives. The resulting statistical significances of the different motives were: (1) Income level X type of answer interaction; (2) city X type of answer interaction; (3) type of answer main effect only.

products. The criteria we adopted to include an emotion was for it to comply with the following conditions for at least one of the income levels:

(a) More than 10% of the total possible selections. As there were 160 respondents for each income level, and 6 food products, the total possible selections were $160 \times 6 = 960$; thus this condition was ≥96; or

(b) More than 15% of the total possible mentions for only one food. Per each income level and each product, there were a total of 160 possible selections; thus this condition was ≥24 for a single food.

Using these criteria the emotions with low selection frequencies were: *Abandoned*, *Adventurous*, *Aggressive*, *Apathy*, *Free*, *Goodness* and *Nostalgic*. These emotions were not considered in further analysis.

Fig. 4 presents the correspondence analysis maps for both income levels. Circles have been drawn to graphically show emotions associated with different products. The most distinctive difference between both maps corresponded to emotions associated with beer/wine. For LI respondents these were negative emotions such as *Annoyed*, *Disappointed* and *Rejection*; while for MI respondents they were positive emotions such as *Fun*, *Friendship* and *Sharing*. Some LI women verbally expressed that the negative emotions associated with beer/wine were due to their children and/or partners having trouble in their drinking. MI women
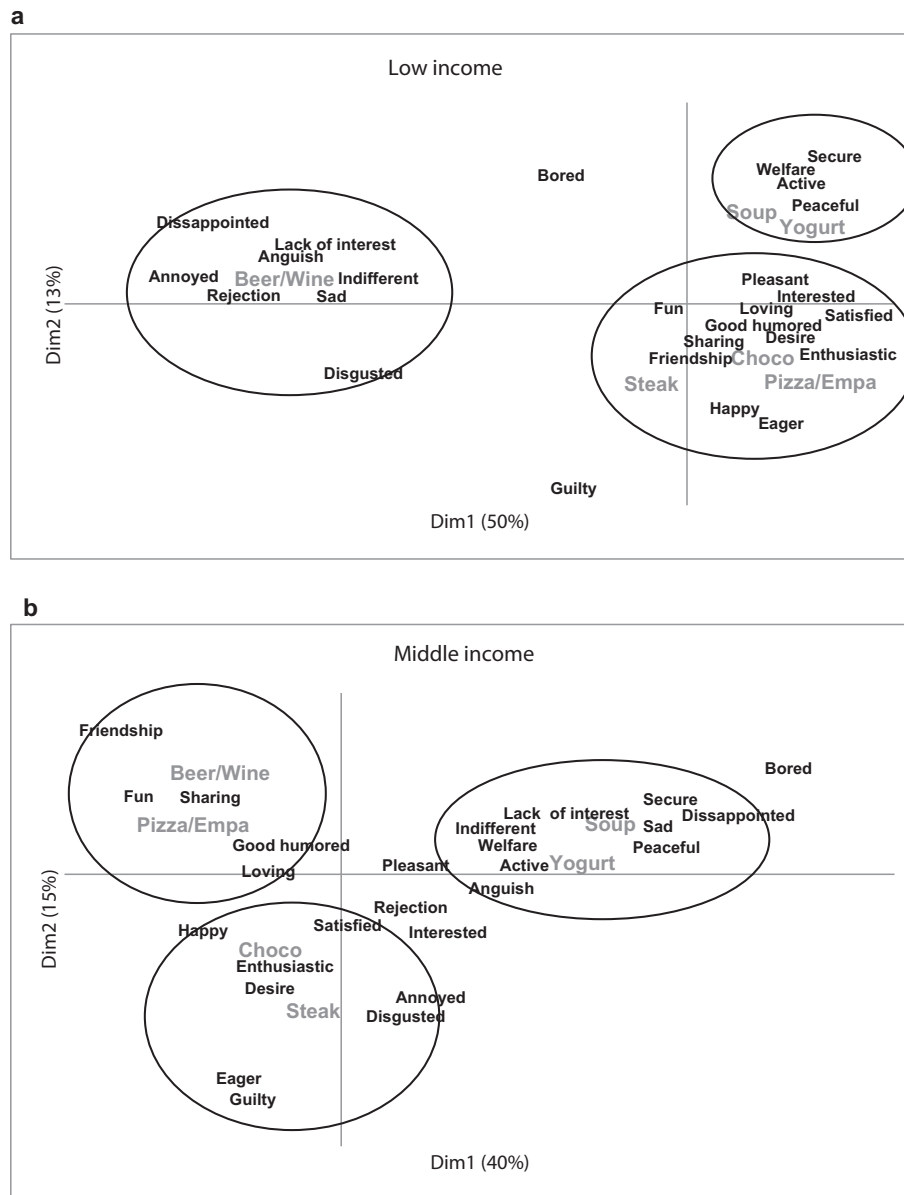
a

Low income

Bored

Secure
Welfare
Active
Peaceful
Soup
Yogurt

Dissappointed
Lack of interest
Anguish
Annoyed Beer/Wine Indifferent
Rejection Sad

Pleasant
Interested
Fun Loving Satisfied
Good humored
Sharing Desire
Friendship Choco Enthusiastic
Steak Pizza/Empa
Happy
Eager

Disgusted

Dim2 (13%)

Guilty

Dim1 (50%)

b

Middle income

Friendship

Beer/Wine
Fun Sharing
Pizza/Empa
Good humored
Loving

Bored

Lack of interest Secure
Indifferent Dissappointed
Welfare Soup Sad
Active Peaceful
Yogurt

Pleasant
Anguish

Rejection
Satisfied
Happy Interested
Choco
Enthusiastic
Desire
Steak Annoyed
Disgusted

Eager
Guilty

Dim2 (15%)

Dim1 (40%)

Fig. 4. Correspondence analysis map of emotions and food for low-income (a) and middle-income (b) respondents. Keys to food abbreviations are in italics in Fig. 2.

could also have similar negative experiences with their children or partners; whether to a lesser degree to LI women or whether they are not as willing to express it would have to be investigated.

The World Health Organization (2004, 2011) analyzed the relationship between alcohol and poverty. High-income countries generally have the highest alcohol consumption. However, it does not follow that high income and high consumption always translate into high alcohol-related problems and high-risk drinking. On the other hand, the lower the economic development of a country or region, the higher the alcohol caused mortality and burden of disease and injury per liter of pure alcohol consumed. Additionally the economic consequences of expenditures on alcohol are especially significant in high poverty areas. These include lowered wages (because of missed work and decreased efficiency on the job), lost employment opportunities, increased medical expenses for illness and accidents, legal cost of drink-related offenses, and decreased eligibility of loans. Thus, due to both health and economic reasons, it is not surprising that the LI women in our survey associated alcohol beverages with negative emotions. As seen in Fig. 3c *The-money-I-have-at-that-time-of-the-month* was an important food-choice motive for LI respondents. If the

month is advanced, and part of the scarce money is being spent on alcohol, negative emotions are bound to appear. In previous research on food-related emotions alcoholic beverages were not included (King & Meiselman, 2010; Laros & Steenkamp, 2005). The present study indicates the importance of including this category specially when comparing food-related emotions over different demographic groups.

As shown in Fig. 4 (a and b), soup and yogurt were grouped together by both income groups. However, associated emotions did not follow the same pattern. LI respondents had positive emotions: *Active*, *Peaceful* and *Secure*. MI respondents associated these everyday wholesome products with some negative emotions like *Sad* and *Disappointed*.

The steak menu was associated with *Guilty* by both income groups. The MI respondents most probably expressed *Guilt* due to the high calorie and fat content of the menu and this corresponds to the importance they attached to a healthy diet in their food choice (see Fig. 3-d). Price related food-choice motives were important for LI respondents (see Fig. 3-c), thus the *Guilt* emotion associated with the steak menu could in part be due to having to spend too much of their limited income in consuming it. *Eager* was also associated with this menu and with chocolate, possibly for similar reasons
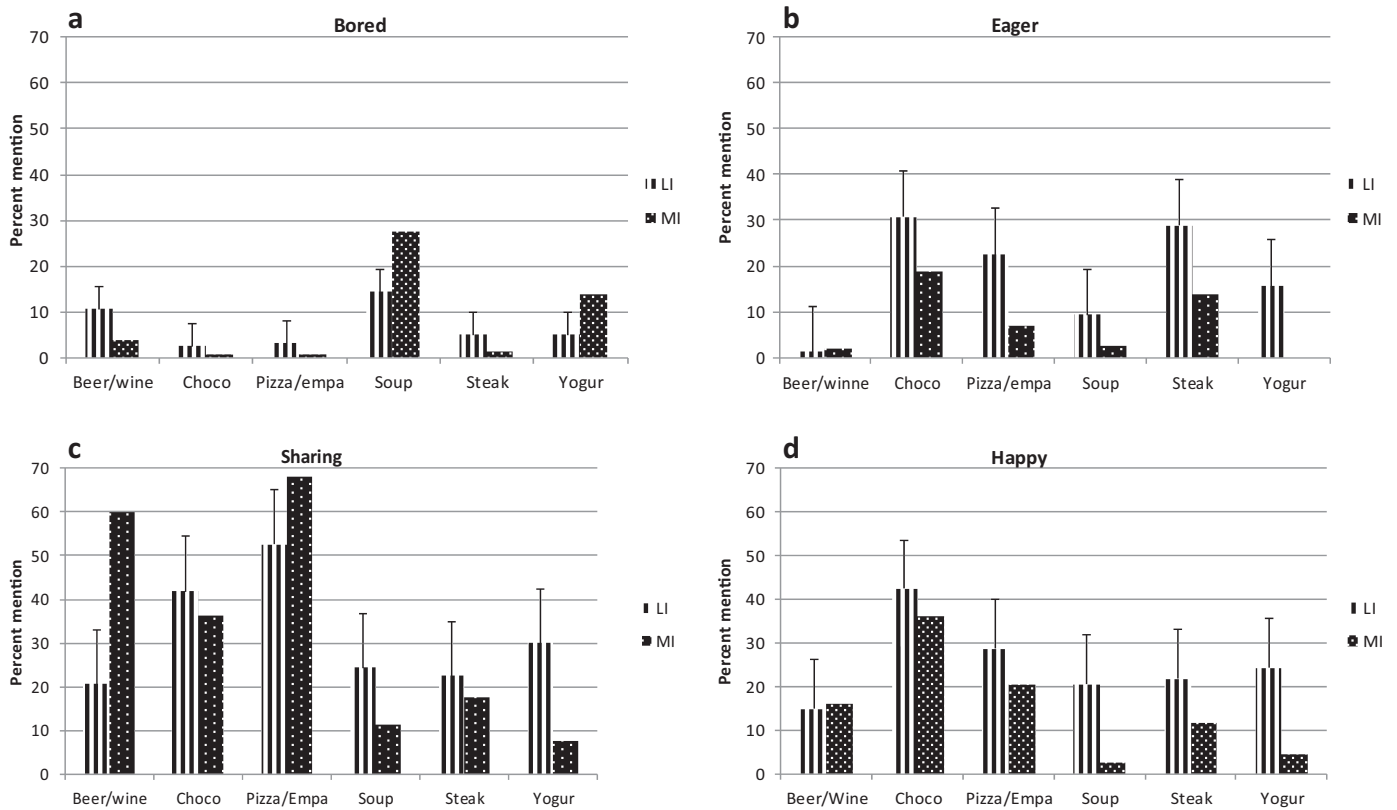
Fig. 5. Mention percentage for product X income level interaction in 4 emotions. Bars indicate the minimal significant difference (P < 5%) between income levels.

as *Guilty*. These products, together with pizza/empanadas, were also associated with positive emotions for the LI respondents, such as: *Friendship*, *Happy* and *Sharing*. The pizza/empanadas, a typical party menu, together with wine/beer were associated with *Friendship*, *Fun* and *Sharing* by the MI respondents. Thus products that were likeable to both income level groups, elicited somewhat different emotions. King and Meiselman (2010) found similar emotions associated with chocolate and pizza.

The GLM analysis of the frequencies of CATA checks showed that: (a) differences between towns and corresponding interactions were not significant, except for *Annoyed*, *Eager* and *Sad*; however, these effects were of low magnitude; (b) for the following emotions: *Abandoned*, *Active*, *Adventurous*, *Enthusiastic*, *Disgusted*, *Free*, *Goodness*, *Happy*, *Indifferent*, *Interested*, *Lack of interest*, *Nostalgic*, *Satisfied* and *Secure* the product and income level main effects were significant; for the rest of the emotions the product X income-level interaction was significant.

Correspondence analysis as depicted in Fig. 4 shows an overall multivariate picture, however some nuances of individual emotions did not show up. Fig. 5 presents four emotions where the product X income-level interaction was significant showing an interesting tendency not observed in Fig. 4. MI respondents felt *Bored* (Fig. 5a) with soup and yogurt while LI respondents felt *Happy* (Fig. 5d) and *Sharing* (Fig. 5c) for these same products. For LI women, soup meant having a hot plate of food on the table to share with the family; while for MI women soup represented a boring alternative to other more exciting menus. Some LI women commented that yogurt could make them feel *Eager* because their children liked it and wanted it but was often beyond their food budget. Yogurt is not always accessible due to its price, and thus when it is available LI women feel happy and willing to share it, especially with their children, see Fig. 3c as an indication of *Price* importance in food choice for LI respondents. Fig. 5c also shows how beer/wine led MI respondents to feel *Sharing*, while LI did not feel the same way.

The mood motives *According-to-how-I'm-feeling* and *Makes-me-feel-good* (Fig. 3-a) were considered of little importance when choosing food. Thus it would seem that present mood (*According-to-how-I'm-feeling*) or an anticipated emotion (*Makes-me-feel-good*) do not play a part in food choice. However, respondents, when confronted with actual food products, certainly associated them with different emotions. From these results the following questions arise:

— Should more specific emotions be included in a food-choice questionnaire? For example: "It makes me feel happy", or "To relieve my boredom".
— In our food-choice questionnaire (see Fig. 1) respondents had to mark the most and least important motives when choosing a *generic food*. Should the questionnaire be focused on specific foods? For example: "mark the most and least important motives when choosing a yogurt", with the caveat that an option of "never eat or buy yogurt" should be included.
— In our questionnaire food-choice motives came before emotions. If the CATA emotion questions had preceded the Best–Worse motive questions, would the mood motives have been considered more important?

4. Conclusions

The overall conclusions were:

(a) Negative emotions were checked more frequently by LI respondents than by MI respondents.
(b) Income level was an important factor in food-choice motives.
(c) Differences between respondents from a small town and that of a big metropolis were small.

(c) The Best/Worse method was found to be effective in implementing a food-choice questionnaire with respondents from different income levels.

We recruited adult women for the present study because they are the main food providers in Argentine households. It would certainly be of interest to include adult men, children and adolescents in a study on how income level influences food choice and emotions.

The present study has shown that when considering food-choice motives and food-associated emotions in the design of food products and health-promotion strategies, income level of the targeted population should be taken into account. Further research on the reasons why certain motives and emotions were important to different income groups is necessary; it is also necessary to explore further links between choice and emotions.

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