



# Segmentation of organic food consumers based on their attitudes, values and environmental beliefs

## *Segmentación de los consumidores de alimentos orgánicos según sus actitudes, valores y creencias ambientales*

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### Abstract

The objective of this work was to segment consumers based on their attitudes, values and environmental beliefs in the purchase decision of organic products in the northern zone of Sonora, to provide recommendations to the actors (public and private organizations) that involved in the organic food market. To do this, an Exploratory Factor Analysis (AFE) was initially carried out and then a cluster analysis to segment the consumers by their attitudes, values and beliefs. Two segments were identified (environmentally participative and environmentally consistent). This finding presents opportunities and challenges for private and public organizations, for the first considering consumer segments in the area,

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they may devise marketing strategies on organic products and for the second ones, they must include environmental education in their stimuli to improve awareness of people.

*JEL code:* M310, Q100

*Keywords:* Marketing; Attitudes; Consumers; Beliefs; Values.

## **Resumen**

El objetivo de este trabajo fue segmentar a los consumidores según sus actitudes, valores y creencias ambientales en la decisión de compra de productos orgánicos en la zona norte de Sonora, para proporcionar recomendaciones a los actores (organizaciones públicas y privadas) que intervienen en el mercado de alimentos orgánicos. Para ello, se hizo inicialmente un Análisis Factorial Exploratorio (AFE) y después un análisis clúster para identificar los segmentos de los consumidores por sus actitudes, valores y creencias, se identificaron dos segmentos (participativo ambientalmente y consistente ambientalmente). Este hallazgo presenta oportunidades y retos para las organizaciones privadas y públicas, para las primeras, al considerar las agrupaciones de los consumidores, podrán diseñar estrategias de marketing sobre los productos orgánicos y para las segundas, deben incluir la educación ambiental en sus estímulos para mejorar la concientización de las personas.

*Código JEL:* : M310, Q100

*Palabras clave:* Marketing; Actitudes; Consumidores; Creencias; Valores.

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## **Introduction**

In the last few decades environmental issues have gained importance among the organizations, incentivizing the development of production processes that contribute to the sustainability of the economy and society (Salgado *et al.*, 2006). This scenario was originated first, by the increasing concern of the people regarding the rapid deterioration of the environment by human action (Fraj, 2003), and second, the widespread acceptance of the concept of sustainable development as one that meets the needs of present generations without compromising the ability of future generations to meet their own needs (Brundtland, 1987). Sustainable development relies on three interconnected pillars: environmental quality, social justice, and economic prosperity (Elkington, 1997). From a marketing perspective, the three Ps have been considered (profit, people, and planet) (Placet *et al.*, 2005), which give feedback to each other

and which must be simultaneously fulfilled (Balderjahn *et al.*, 2013).

In this context, organic agriculture is a production alternative that combines environmental, social, and economic objectives (Romero Valenzuela, *et al.*, 2016). Such is its relevance that by 2015, 179 countries in the world carried out organic activities with a total of 43.7 million hectares; close to half of this area is in Oceania, a fourth part in Europe, and a little less in Latin America. Australia is the country with the greatest area being used organically (7.6 million ha). An example in Europe is Spain (2 million ha), and one in Latin America is Argentina (3 million ha) (IICA, 2016, IFOAM, 2016). In the case of Mexico, it has 200,039 producers (FIBL, 2017), from which 88.3 are getting certified (SAGARPA, 2016). In particular, the state of Sonora has an organic surface between 1972 and 3140 hectares, divided into 7 municipalities (SAGARPA, SIAP, 2016), which are among the 4 main producer states of organic meat (SAGARPA, SIAP, 2017) with a growing trend. Furthermore, it has innovated in basic foodstuffs, such as organic wheat. Although no data have been presented regarding the level of organic consumption at a state level, the national demand grows 10% annually (Ramírez, 2016), national sales in self-service stores have increased 20%, 10% in specialized stores (SAGARPA, 2013), while the increase in environmental conducts went from 53.9 (2012) to 55 (2014) in a scale of 41-65 points according to National Geographic's Greendex (2014). Conversely, those countries with more organic productions have fewer environmental conducts to Mexico. For example, Spain (51.3) and Australia (50.4). This reflects the progressive importance of the organic market in Mexico and the opportunity presented to producers in Sonora to do business in the internal and external markets.

From a consumer behavior point of view, there are two situations present: on the one hand, homogenization and, on the other, differentiated consumption (organic food) aimed towards new sectors of consumers (Gutiérrez *et al.*, 2012). In this sense, studies on the behavior of the environmental consumer have been addressed from a sociodemographic view. However, after an exhaustive analysis, Schlegelmilch *et al.* (1994) indicate that sociodemographic variables explain less than 10 percent of variation in the ecological behavior. This means that alone they cannot generate a sale of organic foodstuff, only with other conditions such as the availability of the product, sales, among others, where the effect should be direct (Orduña *et al.*, 2009). Even then, profiles based only on these variables have been created (Wier and

Calverlev, 2002) and have impacted the development of strategies for the positioning of these types of products. Regarding psychographic profiles, they have been based on values (Peattie, 2001; McCarty and Shrum, 1994; Stern *et al.*, 1993), beliefs (Crane, 2000; Chan, 1999; Vining and Ebreo, 1990; Alba and Hutchinson, 1987), attitudes (Dietz *et al.*, 1998; Schelgelmilch *et al.*, 1994), and lifestyles (Fraj *et al.*, 2004) as influencing variables of environmental behavior.

Studies on the environmental behavior of Mexican consumers, including the purchase of organic products, are incipient and have focused on environmental protective behaviors (Corral, 1996; Corral-Verdugo & Armendáriz, 2000; Corral *et al.*, 2009) and the motivators and inhibitors of ecological purchasing (Salgado and Beltrán, 2011; Aguilar Salinas *et al.*, 2012; Gutiérrez *et al.*, 2012; Carrete *et al.*, 2012; Salgado and Bravo, 2015; Díaz Viquez *et al.*, 2015; González *et al.*, 2015; Escobar-López *et al.*, 2017). The contribution of this work goes in this last area, by further addressing the application of behavior scales where consumer attitudes, values, and beliefs have been the most studied environmental variables (Ramsey and Rickson, 1976; Alba and Hutchinson, 1987; Vining and Ebreo, 1990; Stern *et al.*, 1993; Schlegelmilch *et al.*, 1994; McCarty and Shrum, 1994; Dietz *et al.*, 1998; Chan, 1999; Bechtel *et al.*, 1999; Crane, 2000; Peattie, 2001; Diamantopoulos *et al.*, 2003; Balderjahn *et al.*, 2013) and no consensus has been found on the influence of these variables in the purchase of organic foods as diverse contradictions concur (Grubor and Nenad, 2016), making it necessary to expand this area and, second, making it possible to identify the segments for a greater understanding of the consumer of organic products for the differentiation of the marketing strategies of the producers of the studied region.

Therefore, the aim of this work was to segment consumers according to their attitudes, values, and environmental beliefs when they make the decision to purchase organic products in the northern area of Sonora, in order to provide recommendations to the actors (public and private organizations) that intervene in the organic food market.

## **Literature Review**

In Marketing, behavioral patterns have received attention as they often serve as the basis for market segmentation (Holt, 1997). The concept of market segmentation was introduced as an alternative for product differentiation (Nair and Berthon, 2003), however, socioeconomic and

demographic variables have lost differentiation capacity and comparative advantage, especially because the segmentation derived from their use tends to homogenize business strategies (Rivas and Grande, 2004), giving greater advantage to the use of psychographic segmentation. In the environmental aspect, for authors Corral et al. (2009), Bratt (1999), Corral (1996), and Lee et al. (1995) there is no general category of “pro-environmental behavior” (PEB), but rather it is manifested as a set of independent multiple factors, although there is evidence that they could relate to each other (Diamantopoulos et al., 2003; Tracy and Oskamp, 1984). In such a way that a structure of diverse factors that influence the acquisition of organic foods appears, which is necessary to analyze. Among these factors the more studied are: attitudes, values, and beliefs (Ramsey and Rickson, 1976; Alba and Hutchinson, 1987; Vining and Ebreo, 1990; Stern et al., 1993; Schlegelmilch et al., 1994; McCarty y Shrum, 1994; Dietz et al., 1998; Chan, 1999; Bechtel et al., 1999; Crane, 2000; Peattie, 2001; Diamantopoulos et al., 2003; Balderjahn et al., 2013).

### *Attitudes, values, and beliefs*

One of the components is attitude, defined as the pre-disposition to evaluate a symbol, object, action, product, or brand either favorably or positively or, conversely, unfavorably or negatively (Shiffman and Lazar, 2010). It is characterized by its difficulty to measure, its rigidity regarding change when they are already formed, and the creation of stereotypes (Fraj et al., 2004). Attitude is an indication of behavior and not the behavior itself.

Ecological attitude has been studied throughout time as an important variable in the decision to purchase ecologically. One of the first studies concerning this subject (Maloney and Ward, 1973) was done focusing on a psychological perspective. In the attitudinal aspects of environmental behavior, the first variables used, characterized by Maloney and Ward (1973), were the verbal and real commitment of participation in pro-environmental activities, and the effect and knowledge of environmental problems.

Subsequent studies (Ahmed et al., 2001; Chan, 2001; Laroche et al., 2001; Kotchen and Reiling, 2000) have linked attitudes to socio-demographic variables, such is the case that people with a high level of income have more attitudes towards the purchase of organic foods. Starting from the proposition that as the income of the consumers increases, demand shifts

towards products that provide convenience and satisfy quality attributes; in this regard, it is attitudes that play a preponderant role in understanding the preferences of the consumer (Rodríguez, et al., 2002). As well as meanings linked to the affective aspects of the attitude and purchase of these foodstuffs. Thus, positive attitudes towards the environment are not necessarily indicative of high levels of environmental knowledge (Diamantopoulos et al., 2003; Bagozzi et al., 1992; Ramsey and Rickson, 1976), however, attitudes towards organic foods have a positive effect on purchasing intentions (Michaelidou and Hassan, 2008; Kim and Chung, 2011; Pino et al., 2012; Hsu et al., 2016).

Other aspects that significantly influence the behavior of people are values (Beatty et al., 1985; Yankelovich, 1981; Williams, 1979; Rokeach, 1973). Unlike other elements, values are learned during socialization processes, in which individuals follow collective norms that guarantee their integration in a group and the normalization of their personality (González, 2000). Schwartz (1994) defines human values as desirable objectives that vary in importance and serve as guiding principles in the lives of people. This is why it is considered that people are not born with values, but that they learn them through contact with other people (Rose and Shoham, 2000; Kahle and Goff, 1983). Personal values provide information on aspirations and goals that people evaluate as most important, thus allowing them to know and determine the motivations that influence their consumption decisions (Kahle et al., 2000). In this manner, values are fundamental to culture and exert a strong influence on the reception and perception of symbols and messages embedded in advertising (Watson et al., 2002). They are a significant influence on attitudes and behaviors (Ip, 2003). Therefore, values are subjective and emotional beliefs (Smith and Schwartz, 1997). In the case of consumers with stronger ecological values (those who can make change possible), they tend to make decisions consistent with sustainable consumption (Haws et al., 2010). Authors Thøgersen and Olander (2002), when analyzing values with ecological behavior, found that individuals are required to restrict selfish tendencies. On the other hand, Kim (2011) discovered a positive influence of collectivism on the ecological consumer towards self-transcendental values. However, neither the gender nor the scale of values presents a significant impact on the use of paper, for example, according to a study by Catlin and Wang (2013).

The modification of beliefs about the environment in society may have begun with the

scientific revelation of the harmful effects of environmental degradation (Heberlein, 1972), for example, on health, such as the use of pesticides in food products, swine fever, and avian flu, among others (Mesías Díaz, et al., 2012). These beliefs are part of the knowledge and assessments given by each individual about something (Ellen, 1994). Authors such as Schwartz (1970; 1977) in his Activation-Norm model analyze behavior as a function of beliefs about the consequences of actions and norms about personal responsibility to carry out specific actions in response. Catton and Dunlap (1978) and Dunlap and Van Liere (1978) developed a new model of human-environment relations called the “New Environmental Paradigm (NEP)”, focusing on beliefs about human abilities to alter the balance of nature, about the existence of limits on the growth of human societies, and about the right of human beings to govern Nature. The Dunlap and Van Liere NEP Scale (1978) has become the most widely used measure for ecological orientation. The theory of Value-Belief-Norm (VBN) towards the environment proposed by Stern et al. (1993) and Stern (2000) emerges later, measuring the beliefs associated with the consequences that environmental conditions may have for others, for oneself, or for the biosphere as a whole. They find that these beliefs are stronger in women than men. Therefore, the beliefs of the consumer are that they, as individuals, can help solve environmental problems (Roberts, 1996). Beliefs, therefore, have assumed a determining role in understanding the relationship between human beings and the environment.

## **Methodology**

### *Measuring instrument*

To comply with the aim of segmenting consumers according to their environmental attitudes, values, and beliefs in organic purchasing decision-making in northern Sonora, the literature was thoroughly reviewed and three scales were used: 1) Attitudes (Maloney *et al.*, 1975; 2), Values (Haws *et al.*, 2010), and 3) Beliefs (Dunlap *et al.*, 2000).

The measuring instrument is comprised of 3 parts: the first is the consumption habits of organic products; the second is comprised of the abovementioned 3 scales; and the third includes sociodemographic variables such as age, income level, and country of residence. This last variable was only used to filter other individuals in the border of Nogales, Mexico, and Nogales, Arizona. To ensure that consumers are understanding what is being asked of them,

the following line was included: “Organic product: it is a product free of pesticides and whose impact to the environment is minimal in its production process”.

The reviewed Environmental Attitude and Knowledge Scale (EAKS) developed by Maloney *et al.* (1975) measures attitude through the 3 levels of environmental commitment (it is comprised of 3 questions consisting of 10 items each): 1) verbal commitment, measures the intentional element; 2) real commitment, measures the behavior element; 3) affective commitment, measures the affective element (Table 1). Given that the 3 scales were originally written in English, the translation of the items was done to then carry out a pre-test with 25 people, in which some items were adjusted for their better understanding. The answers were scored using a 5-point Likert scale.

Table 1.  
EAKS items

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Verbal Commitment
1. I would be willing to use a bicycle or take the bus to go to work in order to reduce air pollution.
2. I would probably never join a group that is only concerned with environmental principles (I).
3. I would be willing to use a fast transportation system to help reduce air pollution.
4. I would not be willing to stop driving during a weekend due to a pollution alert (I)
5. I am not willing to stop doing things as I normally do for ecological reasons as I believe it is a Government matter (I).
6. I would donate a day's wage to a foundation to help improve the environment.
7. I would stop buying products from companies that pollute the environment, even if it were inconvenient to me.
8. I would write a journal regarding environmental issues.
9. I would probably not go from house to house distributing advertisements and information about the environment (I).
10. I would not pay an environmental tax for pollution even if it meant a reduction of the pollution problem (I).
Real Commitment
11. I have never purchased a product that had small polluting effects (I)
12. I follow up with the congressman that I voted for regarding environmental principles.
13. I have never written to a congressman regarding environmental issues (I).
14. I have contacted the Environmental Department of my Autonomous Community or City Council to learn about what I can do to reduce pollution.
15. I do not make any special effort to purchase products with recyclable packaging (I).

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16. I have attended a seminar offered by an organization that is especially concerned about the improvement of the environment.

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17. I have changed products for ecological reasons.

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18. I have never participated in any actions concerning environmental aspects (planting a tree, cleaning parks, etc.) (I).

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19. I have never attended a conference on ecology (I).

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20. I have subscribed to ecological publications.

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#### Affective commitment

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21. I feel that people worry too much about the existence of pesticides in foodstuffs.

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22. I get scared thinking that the food that I consume is contaminated with pesticides.

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23. I get angry thinking that the Government does nothing to help control the pollution of the environment.

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24. I am indifferent to what the following line reads “The world will perish in 40 years if we do not care more about the environment” (I).

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25. I get angry when I think about the damage caused to plants and animals due to pollution.

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26. I usually do not care about “noise pollution” (I).

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27. I get depressed on days when there is pollution in the environment (fumes, bad smells).

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28. When I think about the way industries pollute the environment I get angry and frustrated.

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29. I have never been affected by pollution as I think the issue is exaggerated (I)

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30. I almost never worry about the effects that smoke has on my family and myself.

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Note: (I) = The scores of these items are inverted. The items written in cursive get eliminated after the analysis of internal consistency.

Maloney *et al.* (1975)

The GREEN scale (Haws *et al.*, 2010) has been incorporated to measure the environmental values of the consumers. The consumers with the strongest values will tend to make decisions consistent with sustainable consumption. It is measured in 6 items. The responses were scored in a 5-point Likert scale (Table 2).

Table 2.

Items of the GREEN Scale

Source: Haws *et al.* (2010).

The	1. It is important for me that the products that I use do not damage the environment.
	2. I consider the potential impact of my actions to the environment when I make most of my decisions.
	3. My purchasing habits are affected by my concern for our environment.
	4. I am concerned about the waste of the resources of our planet.
	5. I would describe myself as environmentally conscious.
	6. I am willing to be inconvenienced in order to take actions that are more environmentally friendly.

New Ecological Paradigm (NEP) scale developed by Dunlap and Van Liere (1978) and updated in 2000 (Table 3) was used to measure beliefs. Originally, the instrument created to collect these general beliefs included a total of 12 items, but in the last revision of the scale three more items were included (Dunlap *et al.*, 2000).

Table 3.  
NEP scale

1. We are reaching the limit number of people that the earth can support.
2. <i>People have the right to modify the environment in order to adapt it to their needs.</i>
3. There are often disastrous consequences when people interfere with nature.
4. Human ingenuity will ensure that we do NOT make the earth an uninhabitable place.
5. People are seriously abusing the environment.
6. Earth has many natural resources, if we only learn how to develop them.
7. <i>Plants and animals have the same right that humans have to exist.</i>
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
9. Despite our skills, people are still subject to the laws of nature.
10. The so-called “ecological crisis” that humanity faces has been largely exaggerated.
11. The earth is like a spacecraft with very limited environment and resources.
12. <i>Human beings were destined to rule over the rest of nature.</i>
13. The balance of nature is very delicate and easy to alter.
14. Humans will eventually learn enough about how nature works to control it.
15. <i>If things run their course, we will soon experience an ecological catastrophe.</i>

Note: Items in cursive were eliminated after the internal consistency analysis.  
Source: Dunlap *et al.* (2000)

### *Participants*

The study was carried out among consumers in the northern area of Sonora. Interviewees of legal age were selected who have consumed organic food in the last 6 months. Through convenience sampling the survey was applied face to face in the main shopping centers in the north of Sonora. Convenience sampling is used in exploratory studies in order to have an approximation of the object of study (Grande and Abascal, 2014). For the calculation of the

sample, the data from the National Institute of Statistics and Geography (INEGI, for its acronym in Spanish) and the infinite population formula (Table 4) were used as reference.

Table 4. Data Sheet

Universe	Consumers in the north of Sonora
Level of confidence	95%
Possible error margin	of $\pm 4.36\%$
Sample	506
Sampling	Convenience
Data collection date	January-March of 2015

Source: Own elaboration

### *Data analysis*

Initially, univariate statistics were calculated in the SPSS statistical package version 20.0, with the aim of studying the individual behavior of the variables by having a first impression of the trend of the results (Pedret *et al.*, 2003). In order to increase the accuracy of the measurement, an internal consistency analysis was performed using Cronbach's alpha. Several factor analyses of the scales were carried out by the main component analysis extraction method with Varimax rotation, applying the Kaiser-Meyer-Olkin sample adequacy measure (KMO) and Bartlett's sphericity test with the purpose of purifying the scales and grouping the items in several factors. In order to identify consumer groups, a cluster analysis was carried out in two phases. First, a hierarchical cluster analysis was carried out to detect the segments through Ward's criterion (1963), which creates groups minimizing the intra-group variance and for each group that would result from the merger of two determined groups, it calculates its center of gravity, i.e. the mean of the group in each variable. Second, a cluster analysis of k-means was carried out with the objective of refining the segments by attitudes, values, and beliefs and to know their characteristics.

## **Results**

### *Socio-demographic analysis and consumption habits*

Regarding the socio-demographic results, the sample focuses on relatively young people, 39.1% are between the ages of 25-35, followed by 21.7% between 18-24, 19.6% between 36-44, 13% between 45-54, and the minority group being those between the ages of 55 and 64 and

older (6.5%). With respect to household income levels, 67.4% have a median household income level, 19.6% have a high median income level, 8.7% have a low median income level, and 2.2% have high and low levels. On consumption habits, 76.1% have consumed organic products in the past 6 months, of which 45.5% have consumed them frequently once a month, 22.7% daily, 18.2% once a week, and the rest (13.6%) once every 15 days. The main place of purchase of organic products are supermarkets (41.3%), followed by specialty stores (19.6%), from their own garden (10.9%) and, to a lesser extent, from a small neighborhood store and a producer with 8.7%, from a fruit store with 4.3%, and from online stores with 2.2% (Table 5).

Table 5.  
 Frequency and place of acquisition of organic products in the north of Sonora

	Yes	No
Has consumed organic products in the past 6 months	76.10%	23.90%
Frequency		
Daily	22.7	
Once per week	18.2	
Once every 15 days	13.6	
Once per month	45.5	
Place of acquisition		
Supermarket	41.3	
Specialized shop	19.6	
From their own garden	10.9	
Small shop in the neighborhood	8.7	
From the producer	8.7	
Fruit shop	4.3	
Online store	2.2	

Source: Own elaboration

The most consumed organic products in the north of Sonora are those unprocessed or under-processed. In first place are vegetables with 63%, followed by fruits with 52.2%, 30.4% are

bread, cereals, rice and pasta, followed by milk, yogurt, and cheese with 26.1%, 19.6% consume fats, oils, and sweets and finally, meats, poultry, legumes, nuts, and eggs with 8.7% (Table 6).

Table 6.  
 Most often consumed organic food in the north of Sonora

Organic products	Percentage
Vegetables	63.00%
Fruits	52.20%
Bread, cereals, rice, and pasta	30.40%
Milk, yogurt, and cheese	26.10%
Fats, oils, and sweets	19.60%
Meat, poultry, legumes, nuts, and eggs	8.70%

Source: Own elaboration

### *Consistency analysis*

The internal consistency analysis was carried out. The results of Cronbach's alpha of the EAKS subscales present very modest coefficients: verbal commitment  $\alpha = .675$ ; real  $\alpha = .609$ ; and affective  $\alpha = .631$ . Those items that did not relate well with the rest of the scale were disregarded, i.e. those items with greater internal consistency ( $> 60\%$ ) were considered in the case of exploratory studies (Miquel *et al.*, 1996). Fourteen of the 30 items were eliminated, reducing the final scale to 16 items (Table 7). The figures for the factors ( $\alpha = .675$ ;  $\alpha = .609$ ; and  $\alpha = .631$ ) are similar to those obtained in other studies (Fraj *et al.*, 2004; Fraj and Martínez, 2005; Nisbet *et al.*, 2009). In the case of the GREEN scale, a coefficient of  $\alpha = 0.773$  was obtained, similar to that of Bhatia and Jain (2013). The internal consistency is very good and it was not necessary to eliminate items. With respect to the NEP scale, 4 of the 15 items were eliminated with the following values: the reality of growth limits  $\alpha = .690$ ; the possibility of an ecocrisis  $\alpha = .586$ ; rejection of the exception  $\alpha = .526$ ; and the fragility of the balance of nature  $\alpha = .641$ . The scale has low to moderate internal consistency coefficients.

### *Factor Analysis*

An exploratory factor analysis that measures attitudes in three dimensions was carried out for the EAKS scale: verbal commitment, real commitment, and affective commitment. They were regrouped in 7 factors that explain 78.04% of the variance, presenting an adequate percentage according to the suggestion of Hair *et al.* (2005) and Del Barrio and Luque (2000). Bartlett's sphericity test was significant, and Kaiser-Meyer-Olkin's sample adequacy measure (KMO) obtained a value of 0.733, proving that there is a correlation between the variables to carry out factor analysis in the consumer sample. Thus, the verbal commitment is composed of 3 factors: F1 intentional commitment (3 items), F4 environmental collaboration (2 items), and F7 change in lifestyle (2 items). Real commitment was the dimension with most eliminated items leaving 1 factor: F6 environmental active participation (2 items). Conversely, in the affective dimension only two items were eliminated. It is comprised of 3 factors: F2 interest in the environment (3 items), F3 frustration with the actions of organizations (2 items), and F5 concern about pollution (2 items).

The GREEN scale is comprised by 2 factors: F1 environmental conservation (3 items) and F2 respect for the environment (3 items) that explain 71.77% of the variance. Bartlett's sphericity test was significant and Kaiser-Meyer-Olkin's (KMO) sample adequacy measure obtained a value of 0.731.

Regarding the NEP scale, based on the recommendation of the authors and in order to check dimensionality, a non-rotating factor analysis was carried out in order to demonstrate that the items are grouped into a single factor. The first factor has a 20% total variance extracted, suggesting that it cannot be considered as one-dimensional, compared to the 31.3% of the authors. To analyze the multidimensionality of the scale, factor analyses were performed with varimax rotation; the results show that the variables do not correlate very well with each other, since the KMO (0.679) is relatively low. The analysis extracted 4 of the 5 factors from Dunlap *et al.* (2000): F1 the reality of growth limits (4 items), F2 the possibility of an ecocrisis (3 items), F3 the rejection of the exception (2 items), and F4 the fragility of the balance of nature (2 items) and the facet of anti-anthropocentrism is eliminated. These factors explain a total extracted variance of 65.5%, which is considered acceptable (Table 7). Therefore, differences are found in the structure of environmental beliefs regarding the results obtained by Dunlap *et*

al. (2000): F1 the reality of growth limits (3 items), F2 the possibility of an ecocrisis (3 items), F3 the rejection of the exception (3 items), and F4 the fragility of the balance of nature (3 items) and anti-anthropocentrism (3 items).

Table 7.  
Factor Analysis

Attitudes	Variance	Values	Variance	Beliefs	Variance		
F1. Intentional Commitment	19.74%	F1. Environmental preservation	49.45%	F1. The reality of the growth limits	22.09%		
F2. Interest in the environment	16.28%	F2. Respect for the environment	22.31%	F2. Possibility of an ecocrisis	17.17%		
F3. Frustration caused by the actions of the organizations	11.80%			F3. Rejection of the exception	14.56%		
F4. Environmental collaboration commitment	9.52%			F4. The fragility of the balance of nature	11.76%		
F5. Concern about pollution	7.53%						
F6. Active environmental participation	6.87%						
F7. Change in lifestyle	6.28%						
<b>Total Variance: 78.04%</b>				<b>Total Variance: 71.77%</b>		<b>Total Variance: 65.58%</b>	
Kaiser-Meyer-Olkin sample adequacy measurement (KMO):	0.733			0.731		0.679	
Bartlett's sphericity test:	9 2877.938 (p value: 0,000)	1244.178 (p value: 0,000)		1436.939 (p value=0.000)			
Extraction method: Main component analysis. Rotation method: Varimax normalization with Kaiser.							
a. The rotation has converged in 5 iterations.		a. The rotation has converged in 3 iterations.		a. The rotation has converged in 5 iterations.			

Source: Own elaboration

### *Cluster analysis*

After this result, the factor scores obtained for each individual factor were used in a second phase as the basis for segmenting by cluster analysis. The number of segments was determined by means of the hierarchical cluster analysis, so that 2 segments with significant differences were identified within the 13 factors analyzed ( $p < 0.05$ ) with the following sizes: group 1, 319 individuals representing 63% and group 2, with 187 individuals comprising 37% of the total sample. The first segment is called environmentally participatory and is characterized by those people who have an interest in the environment (affective commitment), are an active environmental part (verbal commitment) who encourage collective participation and believe in the fragility of the balance of nature, although they consider that the balance of nature is strong enough to cope with the impacts of modern industrial nations and do not care about noise pollution, therefore, this group does not reflect environmental values.

The second segment is called environmentally consistent. Most of the factors are concentrated in this group with positive values, characterized by individuals who respond in a stable and reliable manner to environmental stimuli, who are frustrated by the negative actions (affective commitment) of organizations (industry and government), have a (verbal) commitment to environmental collaboration, are concerned about pollution in both food and air (affective commitment), and are changing lifestyles (verbal commitment). They give importance to the values of preservation and respect for the environment, believe that there is truth concerning the limits of growth, they give much importance to the possibility of an ecocrisis, but consider that human beings are learning how nature works to control it (rejection of the exception) (Table 8).

Additionally, the segments with the sociodemographic variables: age and income level were analyzed. To contrast whether there is association, the chi-squared test was carried out, finding significant relations. Both segments present significant differences (Table 9). For example, in the environmentally participative segment the average age is 36 to 44 years (78%) and 55 to more than 65 years of age, having an average income (76%). In the case of the segment that is environmentally consistent, the age is between 45 and 54 years (67%) and their income levels go from upper middle (29%) to high (6%).



Table 8.  
 Cluster analysis

	Segment 1	Segment 2	Sig.
<b>Attitudes</b>	63%	37%	
Intentional Commitment	-0.343	<b>0.58511</b>	.000
Interest in the environment	<b>0.10447</b>	-0.17821	.002
Frustration caused by the actions of the organizations	-0.09774	<b>0.16674</b>	.004
Environmental collaboration commitment	-0.07863	<b>0.13414</b>	.021
Concern about pollution	-0.31324	<b>0.53435</b>	.000
Active environmental participation	<b>0.19617</b>	-0.33465	.000
Changes in lifestyle	-0.14725	<b>0.25119</b>	.000
<b>Values</b>			
Environmental Preservation	-0.38398	<b>0.65502</b>	.000
Respect for the environment	-0.26218	<b>0.44725</b>	.000
<b>Beliefs</b>			
Reality of growth limits	-0.16551	<b>0.28234</b>	.000
Possibility of an ecocrisis	-0.46611	<b>0.79512</b>	.000
Rejection of the exception	-0.21428	<b>0.36554</b>	.000
The fragility of the balance of nature	<b>0.13747</b>	-0.2345	.000

Source: Own elaboration

Table 9.  
 Segments by age and level of income

Variables	Environmentally participative 63%	Environmentally consistent 37%	Test X <sup>2</sup>
Age			0.000
18-24 years	60%	40%	
25-35 years	61%	39%	
36-44 years	78%	22%	
45-54 years	33%	67%	
55-64 years	100%	0%	
65 or more years	100%	0%	
Income level			0.000
High	0%	6%	
Upper middle	14%	29%	
Middle	76%	53%	
Lower middle	7%	12%	
Low	3%	0%	

Source: Own elaboration

### Conclusions/ recommendations

The exploratory study has allowed knowing the segments of consumers according to the variables of psychographic type as the environmental attitudes, values, and beliefs. Sociodemographic variables were analyzed in order to have a context of the area studied, in which 7 out of every 10 interviewees have consumed organic products in the last 6 months, proving the growing trend in the sector. Although Sonora is not one of the main states with management of organic areas, the potential is very high.

From this perspective, the research provides guidelines for understanding and knowing the environmental behavior of consumers. In this sense, it can be seen that the more consumed organic foods in the region are vegetables and fruits, and to a lesser extent cereals, dairy products, sweets, and meats, reflecting that purchase decisions are made in favor of those options that are perceived with a lower risk of pesticide residues. This means that increasing

knowledge on the composition of food products and their effects on the body is manifested (Contreras and Gracia, 2005).

Unlike other studies carried out in the Mexican context that have found five and four groups respectively (González *et al.*, 2015; Escobar-López *et al.*, 2017), two segments were identified (environmentally participative and environmentally consistent). It is possible that this is due to the segmentation criteria developed: in the first, the variables of reduction, reuse, recycling, and purchase of ecological products were used and then profiled based on demographic variables, perceived efficacy, and environmental and social values and; and in the second, it was based on the Food Choice Questionnaire (FCHQ).

Going deeper into the analysis, the environmentally participative segment is the group with the youngest members, with average incomes, and who show ecological attitudes such as collaborating with recycling jobs and street cleaning, among other positive activities (verbal and affective commitment) to the environment (Chan, 2001). However, they are not consistent in their actions (they lack a real commitment), thus environmental values are not recognized and their beliefs are based on the assumption that the environmental problem is not so serious. Therefore, at the time of purchase, ethical dilemmas may arise that make it difficult to determine what is “right” and what is “wrong” (Leão de Carvalho *et al.*, 2015), so that the marketing efforts of the organizations must be greater in order to encourage the purchase of organic products.

In the case of the segment that is environmentally consistent, consumers are aware of the impact their actions have on the environment, and on the social and health problems in their locality; they are young adults and adults, but in a smaller proportion, since it is a smaller group. These results coincide with the studies by Díaz Viquez *et al.* (2015), González *et al.* (2015), and Escobar-López *et al.* (2017), which show that the age range of 36-54 years are potential consumers, because they are considered economically active, which in turn is expressed in medium to high income levels. In addition, they have values that can transform their behavior more positively, such a situation is an opportunity to exert an influence on the reception and perception of advertising messages by organic food producers as suggested by Watson *et al.* (2002), mainly for those processed products that are the least consumed. This group has strong beliefs about the impact of population growth and an ecocrisis.

Conversely, the anti-anthropocentrism phase is not identified among the segments of the area studied, consistent with the result of González *et al.* (2015), which suggests that one has a perspective or vision focused on the right of man over nature and living beings. This means that the people interviewed do not consider that human beings and animals/nature have equivalent rights and instead focus more on aspects that have to do with growth, ecocrisis, exception, and the balance of nature; discoveries similar to those of Bechtel *et al.* (1999). This finding presents opportunities and challenges for private and public organizations. The former will develop their marketing strategies on organic food in the area considering these segments basically for supermarkets, where organic products can be purchased as a healthy, practical, and time-saving option for consumers. Whereas the latter will be able to include environmental education in their stimuli to improve the awareness of the people, highlighting the influence of their consumption on the ecological conditions of the planet (Vanhonacker *et al.*, 2013).

As limitations of the research, when validating the scales, it is necessary to incorporate measuring instruments that have been developed and tested in other countries and in other cultures (Grande, 2014). For the case of the Dunlap scale, as well as the studies of Corral *et al.* (1997) and Vozmediano and San Juan (2005), it has been found that it varies according to the populations, there is no agreement on its factor character and, therefore, it is possible to modify the structure of environmental beliefs. In this sense, Dunlap *et al.* (2000) state that the decision to use the scale as a single variable or as a set of dimensions must be based on the results obtained in each particular work. Therefore, as future lines of research, other scenarios with similarities, like Latin American countries, can be analyzed to know their environmental attitudes, values, and beliefs and whether there are differences between them. Likewise, more variables could be related to environmental behaviors as scales that measure health awareness and consumer perception of food safety.

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