

Information, Habits, and Bottled Water Consumption in Mexico City

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Introduction

Over the last 30 years, Mexico has become the world's largest per capita consumer of bottled water.¹ Whether people have high or low incomes, this consumption has become a nationwide phenomenon. It can largely be attributed, on the one hand, to a lack of institutional information about the quality of the water distributed to homes, something that began in the 1980s, and, on the other hand, the solid publicity of multinational water bottling corporations.

Since Mexico City residents do not have complete institutional information and their ability to process what they do have is also inadequate, they exist in a different universe: the universe of perceptions, which keeps them away from the informed world and leads them to consume supposedly more reliable products, such as bottled water. This is why this consumption habit has become difficult to change.

This paper's objective is to analyze how, through the creation of mental models, a dearth of institutional information leads individuals to certain behaviors operating within a world of perceptions, reaffirming non-rational beliefs and creating habits involving bottled water that have become deeply rooted over three decades. Regardless of social class

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¹ In 2011, consumption per capita in Mexico City was 311 liters, the highest in the world.

or income levels, the public's perceptions have contributed to the creation of a huge market for bottled water. It is differentiated not according to quality or flavor, but by income, since the market offers bottled water for both high- and low-income consumers. This article focuses on Mexico City, where quantitative information is available that allows us to verify habits and consumption patterns.

The first part of this paper briefly reviews the distributors of tap water to homes in order to analyze how the lack of information from the responsible authorities has little by little created and reinforced new consumption habits. In the second part, I will analyze how new consumption habits are rooted in behavior and how they are reinforced by multinational corporations' market expansion strategies, turning us into the world's foremost consumer of water per capita. It should be pointed out that this topic has not been the object of much study in Mexico; today, bottled water is considered part of Mexicans' basic food basket and is not necessarily seen as an extraordinary expense.

Institutional Information about Water Quality

Until the early 1980s, the quality of water distributed to homes caused no uncertainty among the public; people had full confidence in the water that came out of the tap and they drank it without restrictions. The rules of the game established by the institutions were clear: the water that went through the city's pipes was of good quality and people were sure it was fit for human consumption. This is why, up until then, people in Mexico City habitually drank tap water.

The turning point in water consumption habits came in 1985: the event that marked that change was the earthquake that hit Mexico City, damaging the water pipelines and contaminating the water. At that time, the institutions in charge of water distribution recommended in different media campaigns that people boil or chlorinate the water before drinking it to avoid disease. However, once the pipes were repaired that same year, the public was not informed that they could once again drink tap water; therefore they thought they should continue chlorinating or boiling the water. Some higher-income consumers decided to purchase large 19-liter bottles of purified water called *garrafones*. However, at that time, this kind of purchase was considered a fad for the elite, which meant that the number of liters consumed per capita was not high enough to register an overall change in consumption habits. Popular consumption of bottled water did not become generalized until the late 1980s.²

Mexico City spearheaded the change from tap water to bottled water, and little by little it spread through the country until we became the world's largest per capita consumer.

Added to the earthquake, another factor was the outbreak of cholera worldwide in the 1990s. In 1991, 2,382 cases were confirmed in Mexico; this reinforced the fear of drinking tap water, intensifying bottled water consumption in Mexico (Greene, 2014).

Although these two events weighed heavily enough to impact the public, they are not enough to explain in and of themselves the shift to bottled water consumption throughout the entire country. The institutions in

² In the late 1980s, the only brand of *garrafones* that existed was the Mexican brand Electropura, a company later bought out by Coca-Cola.

charge of distributing water to homes bear enormous responsibility for not informing the public about the quality of tap water.

In the case of Mexico City, the institution in charge is the Mexico City Water System (SACMEX), whose mandate is to comply with the sanitation norm for drinking water established by the Ministry of Public Health (SSP).³ Even if the norm itself does not set very high standards for potable water, the authorities must inform the citizenry that it is drinkable; but it doesn't. I should point out that, generally speaking, Mexico City water is good quality and does comply with the norm, except in the eastern part of the city, specifically the borough of Iztapalapa, mainly because it comes from very deep wells and therefore has high mineral content and pH levels.

Among SACMEX's attributions is to inform the public about the quality of the water it distributes. However the information shared publically involves water consumption savings, not its quality. If a consumer wants to know more about quality, he or she must look up the Internet page; but, even that information is not up to date and many Mexico City residents have no Internet access. The lack of information about water quality exists almost everywhere in the country; very few operators report on the quality of water being piped into homes; in those places that they do, bottled water consumption is lower, such as the city of Monterrey.

The lack of information is a structural problem in Mexico's entire hydraulic system, and when information is given out, it is heterogeneous,

³ NOM-179-SSA1-1998, <http://www.salud.gob.mx/unidades/cdi/nom/179ssa18.html>, accessed August 8, 2016.

vague, unsystematic, sporadic, and inaccessible. This problem is endemic everywhere, from the federal body in charge of the country's water (CONAGUA), local governments, and water-basin bodies, to operators closer to the final consumer (Perevochtchikova, 2013).

The lack of free-flowing information about water quality has created uncertainty, so the citizenry has turned to other sources that it considers safer, like bottled water, whether from big multinational corporations or from small businesses called "purifiers" in Mexico.⁴ Both the big multinationals and the purifiers provide consumers greater certainty even if they do not comply with sanitation norm quality standards. This has turned Mexico City into the world's biggest consumer per capita of bottled water, at 300 to 590 liters a year (Montero, 2013).

But how can we explain this transformation of consumption habits? How did it come about and how did it become so firmly rooted among the population nationwide in only 30 years? How is it possible that Mexicans think purchasing bottled water as routine as buying bread or tortillas? How can people's mistrust of tap water be reverted? Where did this generalized idea of drinking bottled water come from? I believe that it comes from the individual mental models in which the institutional interaction makes every individual unique, but when people interact with other individuals, they become dependent on the mental models of others; this leads to a series of behaviors, experiences, dogmas, myths, beliefs, habits, etc., that at a certain point converge in similar mental models.

⁴ "Purifiers" are small business with little sanitation control that sell bottled water mainly in low-income areas the country over.

Habits, Mental Models, and Bottled Water Consumption

To understand the changes in forms of water consumption in Mexico, we must take into account institutions but also the characteristics of individuals as decision-makers according to the premise that they are beings with beliefs, feelings, and emotions that co-exist with their rationality. As Simon (1982) put it, they are the product of the human brain's limited rationality for processing a large amount of incomplete information from the world around them.

Approximating the cognitive process involved in individuals' decision-making will help us understand how institutions influence their choices and the effects they have on patterns of water consumption in Mexico.

To explain these evolving forms of consumption, let us consider three fundamental stages, in which different actors and economic circumstances impact in different ways the consolidation of bottled water consumption in Mexico. The first stage ranges from 1985 to 1990 and is characterized by a new situation in Mexico *vis-à-vis* the quality of tap water after the 1985 earthquake; it created a different perception of tap water given the lack of information and marked the first changes in habits. The second stage goes from 1990 to 2000 and is marked by the reinforcement of beliefs and the socialization of mental models regarding new forms of consuming water, beliefs that are in turn reinforced by the presence in Mexico of big multinational water bottling corporations. The third stage stretches from 2000 to 2016, a period in which habits and inertia become set with regard to forms of consumption of bottled water

and are reaffirmed by the silence of the institutions that provide tap water.

To begin this discussion, we have to use the institutions as our starting point; their simplest definition is that they are the rules of the game in human society that shape human interaction (North, 2012); they are conditional patterns of thought or behavior that can generate certain habits.

Before 1985, people did not mistrust either the institutions or the quality of the water distributed to homes in Mexico City. After Mexico City's 1985 earthquake and its resulting disasters, the institutions used different media to warn about the risks of drinking tap water, recommending boiling or chlorinating it. This generated a new rule to follow since, otherwise, people ran the risk of disease. However, once the pipes were repaired, the authorities did not inform the public about the quality of the water, creating an informational vacuum. Given the lack of official publicity campaigns about the good or bad quality of the water and the high level of uncertainty this created, people lost confidence little by little—rightly or wrongly—in tap water and began making their decisions based on their perceptions or incomplete, generally subjective, information.

This spreading change in habits explains why the individual, who is part of a society, is immersed in a culture that imbues him/her with symbols through which he/she sees reality around him/her (Alpuche, 2015: 49). The information available is incomplete and he/she does not have the ability to process what there is. It is difficult to know what the quality is of all the kinds of bottled water on the market or that of tap water; people

can also not know if what's being sold is by a monopoly or a duopoly. Individuals have the freedom to make their own decisions; however, since they are not informed of the quality of the water and the methods used for its purification (ozone, inverse osmosis, etc.), they navigate in another universe, that of the perceptions that move them away from the informed world and toward making supposedly better decisions that are actually subjective and uninformed. In any case, they resort to what they think is the safest, like bottled water, because the label on the bottle does give them information, even if it is not all exactly as it seems.

In this first stage of changes dominated by new realities and perceptions, a system of beliefs is consolidated that we call "first generation." This will make up the first mental model for interpreting reality with regard to the quality of tap water, marked by a search for supposedly safer alternatives such as bottled water. This also represents the beginning of the development of Mexico's bottled water market.

The lack of information and the interpretation of their surroundings lead individuals to order their perceptions, little by little generating a learning process (Caballero, 2005: 45), which slowly becomes embedded until it is a habit.

According to Hodgson (2007: 91), Charles Camic (1986: 1044) defines a habit as a more or less self-actuating willingness or a tendency to use a form of action previously adopted or acquired. Habits can be the result of following a rule, such as boiling water after the earthquake. However, given the lack of official information making it possible to return to habitual tap water consumption once the emergency was over, uncertainty little by little led individuals to continue consuming the water

they trusted most, be it boiled or chlorinated water and, later, bottled water. Uncertainty may provide the context in which certain habits and routines can prevail (Hodgson, 2007: 103). Habits become embedded and reinforced by institutions when they offer a cognitive structure that allows people to interpret data gathered through their senses and forge intellectual habits or routines, transforming the information into useful knowledge.

North (1994) quite rightly points out that history shows us that ideas, ideology, myths, dogmas, and prejudices are important, and we need to understand how they evolve (Caballero, 2005). In the Mexican context, the myth of bad-quality drinking water that emerged in the mid-1980s in Mexico City not only spread in the country's capital but nationwide in a span of 30 years. Little by little, it reinforced a new habit of bottled water consumption so deeply rooted that today, for a young person of 20, it is completely normal that bottled water be purchased for his/her home.

At the end of the 1980s, the interpretation individuals had of their surroundings, or how they perceived water in their homes, already reflected a learning process. The signals received through the senses incorporated experiences derived from their physical and socio-cultural or linguistic environment. This is how individuals create their mental models.

The mental models are internal representations that individual cognitive systems create to interpret the environment and the institutions are the external (to the mind) mechanisms individuals create to structure and order the environment. (Denzau and North, 1994: 2).

The institutions are not merely the organizations responsible for distributing water to homes; we also understand them as a population's shared behavioral regularities or routines. From the internal point of view, institutions are nothing other than mental models or shared solutions for recurring problems in social interaction situated in people's minds (Caballero, 2005: 47).

The first mental models involving the change in consumption habits favoring bottled water among Mexico City residents in the second half of the 1980s were configured around uncertainty. Rightly or wrongly, individuals interpret reality through mental models, making sense of what surrounds them, which is why they resort to a system of beliefs, myths, and ideologies to create individual mechanisms that allow them to structure and order their surroundings (Denzau and North, 1994: 1). Under conditions of uncertainty, individuals' interpretation of their surroundings will be reflected in the learning that results from their experiences. "Individuals with common cultural backgrounds and experiences will share reasonably convergent mental models, ideologies and institutions, and individuals with different learning experiences (both cultural and environmental) will have different theories (models, ideologies) to interpret that environment" (Denzau and North, 1994: 1). However, the reaction in their decisions given the lack of information is insufficient to make the interpretations of reality converge; this is where other actors enter the scene to reinforce and replicate these mental models.

The relationship between institutions and mental models is fundamental, but it is not the only element; other actors also intervene. However, the

link between the first two is the priority since the internal interpretation individuals create to decipher their surroundings is based on government information as well as formal and informal limitations.⁵ Institutions offer a cognitive structure that makes it possible to interpret data gathered by the senses and to establish intellectual or routine habits, transforming the information into useful knowledge (Hodgson, 2007: 57). This establishes a stable —though not necessarily efficient— structure in human interaction (North, 2012: 16).

Institutions not only underpin behavior related to decisions and actions, but also with learning and adaptation (Gandlgruber, 2010: 20), since we are all born and become socialized within a world of institutions.

Institutions mold individuals' minds since human interaction leads us to share experiences, beliefs, myths, etc. Through physical, linguistic, and sociocultural surroundings, these generate both direct and indirect learning for the individual within his/her surroundings. Thus, in order to cope with the stable structure in human interaction, individuals adapt to their surroundings and develop new mental models.

The mental models created by the mind and the institutions created by individuals are determining factors for understanding a behavior as singular as the generalization of bottled water consumption in Mexico. The Mexican experience shows that mental models emerge and are reinforced by new beliefs and the entry of new actors onto the scene.

⁵ Institutions limit individuals' behavior and actions. It is said that individuals are formally limited when their limitation is derived from following certain political, legal, economic, and contractual rules. For example, the Constitution is a formal limitation. Informal limitations come from the way individuals relate to one another; that is, informal limitations are embodied in customs, traditions, and behavioral codes. They come from socially transmitted information and are part of what we call culture (North, 2012: 55 and 67).

The second stage lasts from 1990 to 2000 and is characterized by a reinforcement of mental models and their socialization and replication. Several events in this period aided in strengthening the beliefs, habits, and mental models. Toward the end of the 1980s, we could already observe a first negative system of beliefs about the quality of tap water, nourished by the lack of information. Bottled water was consumed little—most people boiled or chlorinated their water—and mainly by high-income families, since it was considered an item for the elite and a mark of distinction. A single Mexican company operated in the market, and its sales were not large.

One event that reaffirmed the belief system about the bad quality of tap water and the fear of drinking it in the early 1990s was the confirmation of 2,382 cases of cholera in Mexico, which intensified the consumption of bottled water.

As with the case of the 1980s, once the emergency was over, no further information was given to the public. Given that absence and the high degree of uncertainty, the population did not trust the water piped into their homes and began making decisions based on their perceptions or incomplete, subjective information.

In the 1990s, another important actor that reinforced bottled water consumption habits were the multinational corporations. In that decade, the big multinationals like Nestlé and Danone were experiencing an important sea change in their business and expanded their bottled water market to the entire world through different trade alliances and institutional arrangements with their host countries. In addition to being their first world expansion in this market, at that time, they also began to

sell water that they obtained from public distribution networks, and not exclusively from springs. In that decade, Nestlé and Danone entered the Mexican market by acquiring Mexican brands, taking advantage of a very favorable window of opportunity created by the mistrust of potable water that came out of the tap in people's homes (Montero, 2015). We call that decade the one that reinforced the changes in water consumption patterns. While in the preceding decade the lack of information and the uncertainty facing families was solved by boiling or chlorinating water, in the 1990s, that uncertainty was resolved by the publicity of the big multinational corporations.

Since the Mexican institutions involved in the distribution of water to homes did not provide information about its quality, they negatively reinforced these mental models, while multinational companies gave out information about the water they were selling, thus generating positive reinforcement of the mental models but at the same time behavioral rules for all consumers.

From their own spheres of activity, both institutions and multinationals did nothing more than shore up the mental models that had been put in motion beginning in the 1980s. The former, by not offering information and remaining silent, and the latter, by constantly putting out information about bottled water in their advertising, reinforced the belief system and the mental models. Both generated a system of socialization of these mental models through the replication of experiences that gave rise to new learning.

Denzau and North (1994: 7) explain very well the relationship between learning and mental models. They mention that the first learning entails

developing a structure to make sense out of the varied signals received by the senses. The initial architecture of the structure is genetic but its subsequent development is a result of the individual's experiences. This architecture can be thought of as generating an even space which is used to interpret the data provided by the world. The experiences can be classified into two kinds: those from the physical environment and those from the socio-cultural linguistic environment. The first learning evolves like the mental models do; both are redefined by new experiences and nourish each other with other ideas, which is why we can call this direct learning. The second learning process preserves intact the categories and concepts, but provides changes to ideas about details and the applicability of existing knowledge; we can call this indirect learning.

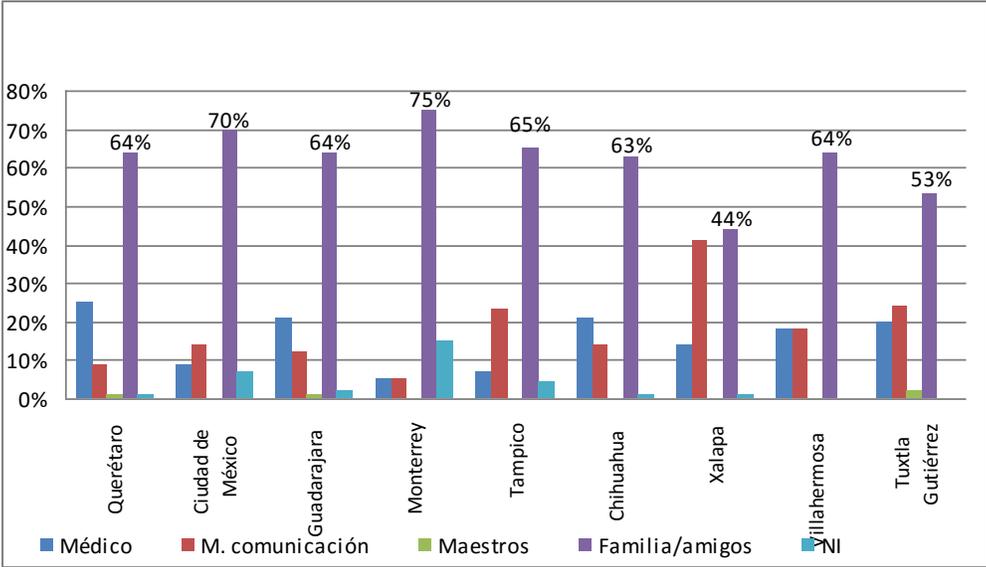
Since decision-making about drinking water is done in a context of uncertainty, it will depend on the surroundings, that is, on the signals received and the learning. What are the signals Mexicans have received and from whom?

A 2010 national survey carried out in Mexico by the Inter-American Development Bank shows that the recommendation to not drink tap water comes mainly from family and friends, who, strictly speaking, do not have information about the quality of the water, as shown in Graph 1. In second place, at a much lower percentage, the recommendation comes from doctors or the media. The reinforcement of positive mental models comes mainly from the bottlers, which is to their advantage, albeit not to that of the people receiving the advice. These data confirm that the process of socialization of the mental models does take place,

generating a new lesson at the same time that the habit of consuming bottled water is becoming more and more entrenched throughout the country.

Graph 1

Mexico. What is the main source of the recommendation not to drink tap water?



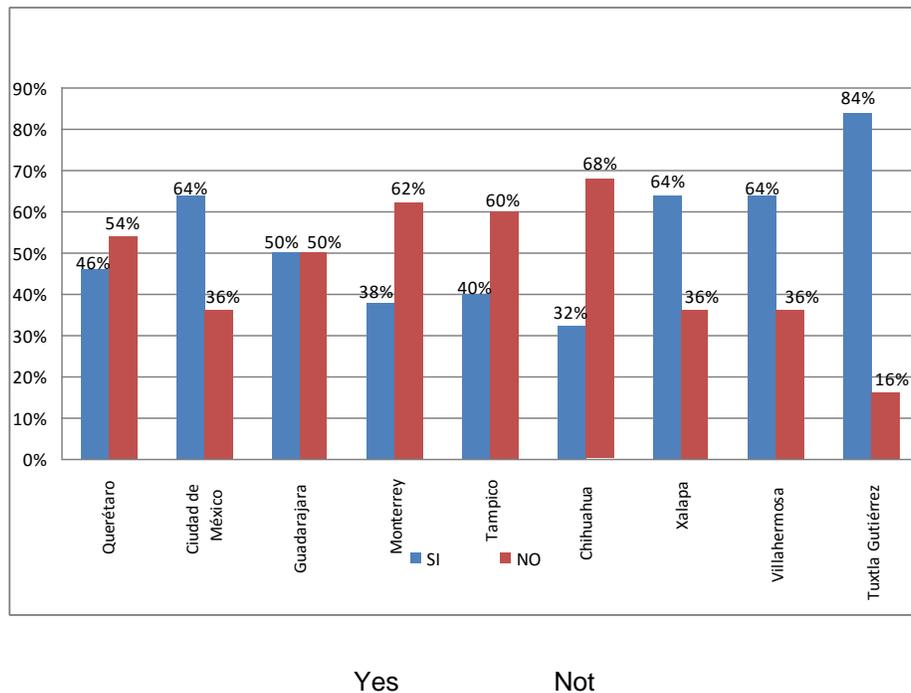
Doctor Media Teachers Family/friends Not specific

Source: IDB (2010).

This same survey asked if those polled had heard in the media that tap water is potable and safe to drink, and more than 70% of responses were negative. However, when asked if they had heard about the advantages of consuming bottled water, an average of 50% of respondents said yes, as shown in Graph 2.

Graph 2

Mexico: Have you seen or heard information or advertising in the media affirming the advantages of consuming bottled water?



Source: IDB (2010).

Individuals continue to reinforce their mental models due to the lack of institutional information and the excess of information from the multinationals. The learning created and embedded in this decade, particularly among younger generations, has created a new culture. The physical environment that we perceive through our senses is determined by consumption that differs greatly from that of 30 years ago, with the small detail that this represents an unnecessary expense of Mex\$230 a month for a family of four that purchases bottled water (this expense is equivalent to a monthly average consumption of 135 liters). At the same time the bi-monthly payment for drinking water from the local authorities does not exceed Mex\$150 for 1,000 liters. Mexicans do not perceive the

enormous difference between purchasing bottled water and paying for tap water. It is truly impressive to see just how much Mexicans have become habituated to this expense, that they consider it just like purchasing any other basic product like bread or tortillas. That is why we say that a new cultural environment has been created in which consuming bottled water is perceived as a habit that is part of Mexico's culture.

The third and last stage ranges from 2000 to 2016; in this period the consumption habits become firmly rooted, and a phenomenon we can call inertia has developed: that is, it has acquired movement of its own. In the current decade, we can observe that the habits continue to have the same strength; they are already embedded. Mexicans do not know exactly where this habit came from; they know nothing about their own habit. If you ask a family member who told you not to drink tap water, he or she will say that he or she heard it from another relative or friend, as shown in Graph 1.

Another noteworthy fact in this period is the multinationals' reorganization of their forms of governance, now characterized by their centralized management but developing activities very suited to the consumers in each country. In this decade, they have improved their internal management and their controls of world production, their way of operating abroad; they have developed techniques to be more in tune with their consumers in order to increase sales; they have taken advantage of incentives like the lack of information about the quality of tap water, as happens in Mexico and many other Latin American countries, and have forged favorable institutional arrangements.

Beginning in 2000, Coca-Cola and PepsiCo joined Danone and Nestlé in competing for new bottled water markets. The U.S. companies took advantage of the enormous distribution networks they had already developed for soft drinks, particularly in Mexico, to distribute bottled water (Montero, 2015). Mexico's market is very attractive because the habit of bottled water consumption is more than embedded: a culture of its consumption has developed. In addition, institutional arrangements favorable to the multinationals and Mexican institutions exist, since there are no limitations on the exploitation of water to be bottled, their main raw material, nor is there public information on how many liters they extract daily.

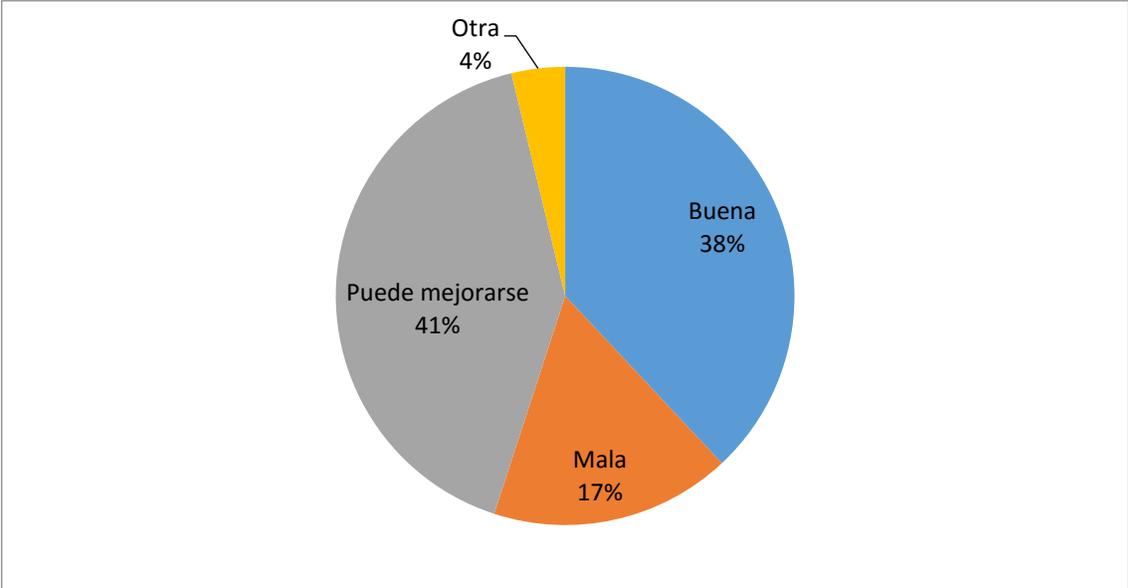
Successful advertising, favorable institutional arrangements, and their distribution strategies are some of the reasons behind their success. While the institutions provide no certainty about water quality, the multinationals have carried out advertising campaigns to foster the culture of health to reinforce consumer behavior habits. Thus, information and disinformation are linked and reinforce the system of cultural beliefs and social norms.

In a 2011 Autonomous Metropolitan University survey about perceptions and water consumption in Mexico City (Montero, 2013) of a representative sample of this great city, 89% of those polled said they did not consume tap water. This was despite the fact that 63% thought that the distributor of water to their homes complies with the quality norms required for human consumption. Despite the trust in the body that distributes the water, 85% of the homes purchased bottled water.

As shown in Graph 3, 38% of those polled in the same survey thought that the water piped into their homes is of good quality; 41% thought it could be improved; and only 17% thought it was of bad quality; 45% thought the flavor and aroma are good, but 89% do not consume tap water.

Graph 3

Mexico City. What do you think the quality of tap water in your home is?



(Good 38%, Bad 17%, Could Be Improved 41%, Other 4%)

Source: Montero (2013).

This survey shows that 27 percent of respondents prefer Danone’s Brand Bonafont; 4% prefer Coca-Cola’s Ciel; 8% drink E-Pura; and 8%, the brand Electropura (the last two belong to PepsiCo). Surprisingly, 30% said they purchase water from “purifiers.”

Purifiers are micro-businesses that emerged in 2000 to sell bottled water at a lower price than the multinationals. This means that their target customers are low-income homes and their distribution is very local. These micro-businesses have benefitted from the multinationals' publicity as well as the lack of institutional information about water quality. In 2014, 922 purifiers existed in Mexico City's Federal District (INEGI, 2015), concentrated mainly in low-income neighborhoods.

The advantage of these small businesses is that they sell purified water at a low price compared to the big companies selling bottled water. However, in most cases, their quality is far from compliant with sanitary norms. However, the fact that they are establishments with an —officially invalid— document attesting to the quality of their water is sufficient for consumers to purchase from them. In any case, to the consumer, their product seems safer than tap water, even though they most probably are unaware that reports on the quality of the purifiers' water are not monitored regularly by the relevant institutions.

Despite being regulated by the Ministry of Health's Federal Commission for the Protection of Sanitary Risks, these establishments do not comply with sanitary controls according to data reported in a survey by researchers from the National Polytechnic Institute (*Proceso*, 2015); in the samples collected for analysis, these researchers found coliform bacteria. What is surprising is that there have been no reports of massive sanctions applied to purifiers, and the public is not informed of these irregularities, which is why people continue to purchase this supposedly purified water.

Final Comment

The culture of the bottled water consumption has consolidated over the last 30 years. During that time, the mental models made up of beliefs, learning, and the physical, social, and cultural environment have been reinforced both by the institutions in charge of supplying water to homes by not providing information, and by the multinationals, which have generated rules of behavior that have taken root among consumers.

Is it possible to reverse the consumption of bottled water in the short term in Mexico? The habits are deeply rooted and require an institutional effort based on public policies to attack the basic problem of informing consumers. However, the issue of water quality seems to have dropped off the public policy agenda. The state has only focused on supplying and monitoring drinking water, without clearly informing about its quality. As an essential part of its activities and to ensure the human right to water, the government must inform the public about the quality of water being piped into their homes.

Naturally, the multinationals exert pressure for this not to happen and lobby decision-makers to put the brakes on these initiatives. For them these measures would represent the loss of millions in business if we consider that in Mexico City alone consumption per capita is 391 liters and sales come to more than Mex\$4 billion a year. This gives the impression that an activity like supplying drinking water is being left voluntarily to the private sector, mainly the big bottling companies, when strictly speaking it is one of the activities of the state. The power relations, the informal agreements, and the constant lobbying of decision-makers in Mexico by the multinationals are the main obstacle

we face in the way of having access to information and reversing water consumption habits in Mexico.

Despite the fact that Mexico City residents have a good impression of the water piped into their homes, they do not drink it; the habits are very firmly rooted. Reversing the experience of past generations that has been incorporated through culture and the knowledge accumulated over time is a difficult task requiring different actors like universities, the media, and political determination.

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