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Topics of Ethics of Science in the Context of Philosophy of Education

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Topics of Ethics of Science in the Context of Philosophy of Education

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Abstract

Ethics can be seen as a discipline of practical philosophy, which tries to answer the question: "how one should behave, to act correct." It can be divided into certain subgroups that certain common denominator - so we can talk about the ethics of scientific work, bioethics, medical ethics, journalistic ethics and many others. These sub-disciplines based on general ethical principles and knowledge that are further supplemented by specific area, according to the specifics of the topic.

The problem may be the very definition, according to which ethical principles or principles of action. There are four basic options. Normative ethics, which is based on the existence of rules that should always be followed. Another option is a utilitarian approach (coinciding with the teleological), which monitors the utility for the entire company, ie effects of negotiations. Third, today is a very progressive way of virtue ethics - scientist, student, and everyone should be especially good and virtuous. The behavior then follows from his character. The last option is situational ethics.

Ethics of science is the application part of ethics which heavily uses the normative rules of deontological ethics and tries to answer the question of how to work well in science. Most often, in this case, the issue of plagiarism but themes can be found much more: incomplete reporting of results, practical perform experiments, social responsibility or pseudoscience.

The paper will look for examples and opportunities to the topic of ethical behavior reflected in the teaching of science. The analysis of social responsibility for research that is now associated with the project such as Manhattan, should be an integral part of each student's thinking. It's not just about his training for ethical work as a scientist, but also on the ability of active participation in important social issues (such as nanotechnology, nuclear energy, global warming ...) and the ability to logically and ethically support by valid arguments.

Keywords: ethics, responsibility, ethics of scientific work

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Introduction

Ethics is the discipline of practical philosophy, which seeks to answer the question of how one should behave, to act properly. Furthermore, it can be broken down into specific subgroups that certain common denominator - we can identify the scientific work ethics, bioethics, medical ethics, journalistic ethics and many others. It should be borne in mind that we assume the general ethical principles and knowledge that are also considered to be related to a specific area, according to the specifics they bring.

Basic Concepts

Morale we understand a set of culturally based principles that society at that time understood as correct. (Sokol, 1998, 96) If a person behaves differently than dictates morality, society is usually identified as a person excluded, immoral, bad or corrupt. Morality does not say why the behavior is right or wrong. At some time it was acceptable to have slaves, but now it has completely unacceptable. While in ancient Rome by the middle class man could not do without slaves, today it publicly, no one, because it would be socially disqualified. In fact, almost any human behavior based precisely on morality. We do not have time to constantly think about why we do not steal one euro coin, fallen man in line at the store before us, but we know that we have to bring it to him. Morality is for the functioning of society is extremely important because it ensures the consistency and the possibility of social rituals.

On the contrary, morality is a matter of purely private and it is a concept that seeks to show that the conduct is or is not in accordance with our conscience. (Anzenbacher, 1990, 223) It is not important whether we act in a certain someone sees it or not, whether something is socially acceptable or not. Conscience is the concept of religious beliefs and the religious right has a major impact on what one considers moral and what is not. For some it may be eating pork immoral, even though in Central and Northern Europe there is nothing immoral. It is never possible someone other say: he is wrong - because we never know another person's conscience.

What is considered particularly dangerous for morale and important may become law if it can be a way to recover. The law used to be a man in society could count on how others will behave. And if not, there should be authority (police or military) to achieve redress. When you go down the street, you may not have to be worried that someone murders - murder is prohibited by law, and to the man who broke it, there is a nontrivial penalty. Not only as social morality, but also for example in the form of financial penalty or imprisonment. It is significant that as it develops morality, there is also the development rights. The law should, on the one hand, to good and to build a good society, on the other hand, the concept of good draws mostly from the general beliefs of society.

However, not everything that is considered immoral, it is also illegal. For example, lying is a typical example of what most people (in standard situations) is considered bad. That is not to lie, to teach children from an early age. But sometimes lies (almost) every lie is difficult to prove, it is not possible to record continuously all. Therefore, lying is not forbidden by law (to an ultra exceptions). Similar case, it is possible to find more. Sometimes, says the law is a minimum of morality. This statement is inaccurate for the existence of these asymmetries. (Putonova, 2007, 38)

While morality solves things serious etiquette is also trying to preserve some companies Accepted forms of behavior, but in less important situations. If one uses the wrong fork to fish or not know the proper seating, no real damage to society cause. Yet the label is an important layer of human behavior as it plays an important cultural role and socialization.

Ethics does not depend on the cultural context or historical context (or only minimally). It seeks universal answer to the question of how one should behave, to act properly. According to what should decide? What should pursue? What is it good? These are just some of the questions in ethics. If there is a historical transformation of ethics, in that you can see two important aspects. Be the terms of deepening reflection of existing systems and perspectives, or have to deal with ever new areas that previously did not exist - for example, in the twelfth century was not the topic of cloning, artificial insemination or even open access to scientific data.

Consequentialist and Deontological Ethics

We can distinguish between consequentialist and deontological ethics, as two basic forms of distribution approaches. Consequentialist ethics is based on the idea that the key to the assessment of good and evil act is an analysis of the consequences of behavior. For example, whether to switch to red after the transition is not a choice between compliance with the rules and their violation, but the important thing is why we want to go (If you help a person on the other side of the road for the wife to the hospital and so on. Situation is different than if you want to shorten the trip home). In contrast, deontological ethics, by contrast, seeks to define the rules and standards by which one should always behave, regardless of the consequences and impacts (never a good copy, cheat, lie, etc). Both ethical approach that we look more closely, have their advantages, but also disadvantages.

Probably the first one came with ethics based on consequentialist approach was Epicurus (4-3 cent. B.C.), which is the answer that the goal of life is to maximize pleasure. We should always act so that our pleasure was the greatest and what it diminishes the contrary minimized. (Long, 1986, 15-19) But Epicurus well observes that pleasure cannot bring lasting pleasure. True feelings of pleasure brings friendship, personal development or even culture. Though it all at first glance may act noble impression Epicureanism within the limits of interest in anything other than himself.

On this course builds utilitarianism. The founder is Jeremy Bentham (1789, based on the first book An introduction to the principle of morals and legislation), who builds David Hume and John Stuard Mill. The basic idea is to calculus likes and dislikes. You first need to be maximized, minimized the others. Unlike Epicurus does not have a calculus in terms of the individual but the entire society. One should always make decisions so that its behavior bear fruit whole. These theories suppress the role of the individual in favor of the body and may lead to rules like "if you cut down the forest, also flying chips" or "the end justifies the means", which can be difficult to accept.

Today is the most famous utilitarian Peter Singer, which deals with the issue of bioethics. (Singer, 2011) It raises the question whether it is possible according to cognitive functions to create a set of all elements to it were all men, but no animals. And he says that such a set does not exist. From this position, one of the great supporter of animal rights campaigner euthanasia or killing of children that would be born severely handicapped, as companies nor their parents will not bring positive calculus likes and dislikes.

One of the big problems of utilitarian theory is that as great to be a set of persons who have calculi download. Tim is second, with a view of how time should be selected. For example, the study brings pleasure in the short term, only a small number of students, but in the long term all. How long should thus be envisaged horizon?

The second ethical approach, which is competitive to consequentialist ethics is deontological ethics, sometimes referred to as normative. It is based on the idea that there are laws that should always be followed, regardless of the consequences of our actions. The most famous promoter of this direction is Immanuel Kant, who comes with his categorical imperative. It can be found in several versions. Perhaps the most illustrative are the maxim which are the principles that one should always behave - never lie, never talk dirty, always succor younger.

Kant puts in a certain contradiction of human affection and duty. (Strawson, 1994, 11) Man is obliged to behave correctly, follow the categorical imperative. Any deviation from this standard is perceived as a failure or ethical misconduct. Although this approach is heavily criticized by psychologists or sociologists, for example, the ethics of scientific work and most of applied ethics is precisely this approach emphasized. It is never permitted falsify the results, copy, etc.

Virtue Ethics

A completely different approach selects the virtue ethics, which is trying to find a definite boundary between the rules and the effects they will have an individual meeting. (Trianovsky, 1990, 335) This is one of the oldest concepts, which is connected with the names of Socrates, Plato and Aristotle, or even Thomas Aquinas. Thanks to him the whole concept very attached to the European Christian way of thinking. Just one person who is virtuous, that is equipped with certain qualities that guarantee good behavior in a sufficiently wide scale.

Probably the most personality who tried to systematically interpret the issue of virtue, Socrates was. Every man has a conscience (daimonion (Smith, 1990, 169)), which it warns of bad behavior. Man is obliged to act in accordance with this voice. (Dugnan 33) At the same time, but realizes that it is necessary to educate the conscience. If conscience knows what is good for egging the man and the way it is. Bad behavior stems from ignorance. (Smith, 1990, 211)

For Plato are two important aspects. The world consists of ideas. A man with an immortal soul, these ideas occurring in the world. Good is perceived as the highest idea, and you would be close to him. It also comes with four basic virtues - wisdom, courage, moderation and justice. The first three secondly reflect three basic power of the soul, it is also always typical for the different states in the ideal state. For example, the ruler must above all be wise and seek to develop wisdom. Guardian must be brave and artisan moderation. It is the duty of every State in this virtue is perfectly develop and care for her. Justice is the highest virtue, then, which is common for all the states and have it every good man.

Most of all, the doctrine of virtues developed by Aristotle. Each virtue is good only to a certain extent, but the extremes are contrary vices. For example, frugality is a virtue, not greed, courage, gambling has not. Virtuous in Aristotle's submission live in the middle of these extremes. (Vancura, 2002) So are indeed defined virtues - such generosity is located between extravagance and greed. The virtues of man must learn and gain the habit. It is therefore an automated action that leads to bliss.

Thomas Aquinas is the top representative of virtue ethics. Virtue is understood as acquired available to ethically good behavior, developing exercises. (Aquinas STh Q55a1)There are four cardinal virtues - prudence, justice, courage and temperance. Then there are three divine virtues which are transcendental character (faith, hope and love). All virtue is necessary to systematically develop, it is not possible to achieve hedonistic virtues in one of them and the rest are just the minimum. Also develops the concept of eternal and natural law, which is understood as a human reflection of God's perfection. (Aquinas STh Q94a2) The whole ethics Tomas could be summarized in the rule of natural law, "it is necessary to do good and not to engage in evil."

Ethics of Science

Ethics of science is the application part of ethics which heavily uses the normative rules of deontological ethics and tries to answer the question of how to work well in science. Most often, in this case, the issue of plagiarism but themes can be found much more - from incomplete reporting of results through practical experiments to even the societal responsibility or pseudoscience.

Pseudoscience

Pseudoscience is referred to a type of work that tries to show results similar to science, but they are not science.

Astrology is trying at first to work with the methods, uses data from observations, looking for models to describe the world around us. Relatively long while, there was no sharp distinction between astrology and astronomy and is widely known that Johannes Kepler formed horoscopes. Pseudoscience of astrology is that the positions of the constellations and planets move attach impact on human behavior and eventually to his fate. Constellations are yet only optical projection usually very distant stars of different spectral type, which together have much in common physically.

Alan Sokal is a professor of mathematics and physics who likes to read philosophical texts. Although his intellect or knowledge can be no doubt, as a number of texts published in prestigious journals did not understand. (Sokal, 1996b) In 1996, he decided to try to write one of the most important philosophical journals - Social Text - the experimental own article. (Sokal, 1996a) He took more or less random sentences from articles he did not understand, and put them behind him. In the text joined by several acclamation of the crisis in mathematics and political change impacts on classical quantum gravity. Article absurd but was admitted to the publication and Sokal relatively long had to claim that the magazine imprinted expression of the author, the full story is fictional set of disjointed assertions without meaning and significance.

Plagiarism

The most frequently mentioned areas of ethics of scientific work is plagiarism. Thus, the "Introduction intellectual work of another author, borrowed or imitated in whole or in part, as his own." Now this offense struck a number of prominent personalities, which meant to stop or at least a significant complication of political and social life. Mention may be Karl-Theodor zu Guttenberg Annette Schavan, Pál Schmitt, and many others.

Copying (as we also plagiarism mark) while the phenomenon is very complicated and uneasy. According to the majority of European standards is not plagiarism as "theme of the work itself, the daily report or other indication in itself, an idea, procedure, principle, method, discovery, scientific theories, mathematical, and a similar formula, statistical graphs and similar object itself.” This information can be a standard quote.

It must be said that in ancient times was often just the opposite trend. Authors not issued their works under his own name, but with the signing of their teachers or designs. (Sweeney, 1996, 78) Today's society is fundamentally different in that the information is the primary economic asset and in this respect they are an integral part of the wealth of the author, who is plagiarism damaged.

While the text or journalistic nonfiction cites at least, in a play text citations and footnotes increasingly important role. In terms of the ethics of science and it is interesting that they do not necessarily go just about marketing sources that refer to the original sources, but we can also meet with the opposing offenses. The first are auto quotes when the author tries to artificially (not always auto quotes problematic) to increase their citation texts and reinforce its reputation expert. The second offense is a marketing resource that actually apply to the topic and the author did not have in hand.

Modifying the Results of Research And Fabrication

The researcher is required to publish the full results, based on a true experiment carried out with all the relevant circumstances. Modifying the results so that was interesting and conclusive data, are undoubtedly among sins that are on one side of scientific work seem to appear relatively frequently, but it is extremely difficult to detect.

An example of the Czech is a case about Karel Bezouska. (Rychlik, 2013) The Czech biologist, published a paper in the journal Nature, in which he describes the results of an experiment with binding inhibitory NKR-P1 and the interaction between the studied ligands. Excellent results have made him one of the most respected Czech scientists who subsequently participated in many international projects.

The problem was that the experiment long time could anyone again. Created two teams - one under the leadership of Bezouska and the other under the patronage of Vladimir Kren - which were supposed to experiment done in parallel. During the execution was captured Bezouska as night manipulates samples, the team Kren. Year stretching dispute resulted in the release of Bezouska and challenge his colleagues about a significant revision of the joint scientific work.

Example shows that even the prestigious journal Nature, cannot be made immune to cleverly manipulate data. Experiments often lasts a very long time, are performed on devices or materials and technologies that are generally readily available and so on. Reviewers of experiments alone cannot verify and monitor a formal correctness or credibility of the results. Fabrication (production of fictional detection), editing or publishing the results only favorable data can be quite fatal consequences of what direction it will take and how science is moving forward quickly.

OpenAccess

An important issue is open access. Whether and under what conditions they get other members of the community to scientific results and data. This topic should be divided into two main areas - access to data from experiments or observations and publishing articles and access.

The issue of sharing data from a variety of measurement or observation is relatively new. As long as science was a matter of national imagined their investment in obtaining one of the major items in the budget. Everything was within the power of the local scientific community to develop and acquire. If there was any exchange of data, then it was the observation option, which was typical for astronomy and was rather a question of cooperation or barter than an open system of sharing data.

The major change in this area was the construction of large international teams that are involved, for example, experiments at CERN (CERN About

CERN) or international projects astrophysics. Science is increasingly international, and it is about cooperation. The second important aspect is the development of information and telecommunication technologies. Data is available much more than can any one team or one community realistically handle, and so growing interest in ensuring that the results of the evaluation involved many people as possible.

Level of involvement or disclosure may be quite different. In the simplest case, a free offer raw data download. The CERN may be a connection to the grid network, which uses distributed computing automatically analyzes the data. (CERN Memorandum of Understanding) Each institution may engage in the processing of the measurement. The third way which is a series of U.S. space projects is to publish data to the public for research or analysis after a withdrawal period (eg, one year). This time delay gives the opportunity to exclusively internal research scientists in the field of research priority, but at the same time allows the community with a certain time lag evaluate or analyze different parameters and data.

The publication of data is usually perceived as a certain ethical imperative. If the state of the public finances means some research is (usually) desirable that data accessible to anyone. Public resources should thus correspond to public data. The degree of exclusivity in experiments involving dozens of countries, it is very controversial and open sharing of data at different levels actively developing.

In terms of access to OpenAccess can identify two basic ways. (Jeffery, 2006, 10) Gold Road is an approach which publish articles publishers themselves. It's the ideal way that does not infringe the copyrights and helps both scientific communication, as well as to accelerate science. And systematically develops two basic reasons why the results of scientific work published.

The second way is Green road, where the articles published by the authors. (Jeffery, 2006, 10)This publication can be made either on the author's own website, or in any public open repository. Perhaps the best known example is Arxiv.org, which focuses on physics, mathematics and related disciplines. (ArXiv General Information About arXiv.) It contains about nine hundred thousand digital articles. A large part of the preprints (the time of the review process is often longer than a year, so preprint plays an important role in scientific communication), but there are also classic published articles, the updated and corrected version or texts which have never been published. With this repository is not necessary to have in large part the natural sciences prepaid quality magazines and just watch this free and open source.

Social Responsibility of Scientists

The theme, which is closely related to virtue ethics, social responsibility is a scientist. It is not just that the scientist observes all the ethical rules and regulations, but that he thought about his work in a broader context. At the simplest level you can discuss the question of resources - the price for the experimental equipment and time scientists (which the company paid training and gives him wages) corresponding to the value of research. An extreme example would be to compare the top of the experiment and the cost of cancer treatment, "LHC at CERN was approximately 8 billion USD. Breast Cancer Treatment costs about 5,000 USD per month. "Yet, the number of cycles of irradiation or friendly treatment of cancer are limited just financial costs.

It is therefore necessary to define criteria by which we assess the contribution of science to society. In this respect, plays a key role in the dialogue of science and culture and science popularization. The company must be convinced that the resources expended have a purpose. (de Chardin, 1990, 207) The benefit need not necessarily be applicable specific knowledge, but as "just" value of knowledge as such.

Equally thorny question of ethics is useful discoveries of all kinds, respectively, of the possibility of abuse. Among the best known examples of this type include the invention of dynamite, which helped accelerate the extraction of raw materials and had a great impact on workers' health and quality of life "normal" people. On the other hand, it has become one of the most devastating military means, which cost the lives of many people. (Fant, 2006, 94)

A second example of mid-century the Manhattan Project, which aimed at developing atomic bombs during World War II. The project was very controversial because it linked the study of nuclear fission (which was a top scientific achievement) and a military dimension. Insulated against the U.S. research built Niels Bohr, who demanded that participated in the development all not fascist states of the world, therefore the Soviet Union. Against the very concept of atomic weapons heavily featured Albert Einstein and many others. Project results are still controversial. (Byers, 2002)

The question whether it is ethical to develop weapons or not at this point we cannot deal with, but we would like to show some aspect of social research. No invention or discovery cannot be used for positive purposes only. Nuclear fission is a key source of energy that is relatively clean and safe in power, but also a real threat to the existence of mankind as a whole, for which could have devastating effects of nuclear war.

When developing or other scientific work, the various aspects to take into account and reflect on how in setting research goals and projects, as well as work with the results. For example, transparent process easy to create biological weapons (even if it was just a byproduct of other research) in public funds should not publish.

Nowadays it is one of the most serious questions the relevance of the findings to the environment and its environmental impacts. (Brown, 1987, 331-349) Every scientific worker of these connections must be aware of and during his work is adequately reflect.

Pedagogical and Educational Aspect

It may seem that science education is value-neutral. On the basis of selected examples but it demonstrates that the opposite is true. Is a pedagogical necessity to lead students to the ethical aspects of their work reflected in the course of their studies - for example, annual papers or lab reports. The ethics of scientific work, as it is seen today is enforced mainly two basic approaches - normative ethics of virtue or morality. Normative ethics is usually implemented in areas that are clearly codified by - laws, instructions for authors, etc. In contrast, virtue ethics becomes the ideal that everyone should have a scientist (or nominee scientific activities). Thus can be seen as a personality profile.

It is the teachers' responsibility to guide students not only to the knowledge of the individual standards or aspects that were described above, but also teach them to think comprehensively, find your own ethical position and argue it rationally. Ethics of science is one of the fundamental pillars underpinning European education, and therefore she should receive appropriate attention.

These themes, which have a political dimension - weapons development, global warming or the development of nanotechnology are topics which combine aspects of scientific, ethical and economic. Also, because of my work with this educational fields in the natural sciences irreplaceable role. Everyone, including scientist, bear social responsibility that is associated with his abilities, intellect and status. It is therefore his duty as much as possible to contribute to the knowledge of the world around us, but at the same time for him means a commitment to ethical work.

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This literature indicates that the networks of urban migrants operate differently from those built in Mexico´s rural settings. Explaining these differences, some scholars point to the more recent character of migrant urban networks (Flores et al. 2004), the "rural" origins of many urban migrants that eschew the construction of a sense of community in Mexican cities (López and Runsten 2004), the lack of trust in self-perceived violent contexts as the main reason for deterring information exchange in large Mexican cities (Mendoza 2009) and the individual values that are supposedly dominant in urban settings (Roberts et al. 1999, Hernández-León 2008).

These explanations give an idea about the reasons the urban social networks of migrants are weak and mainly structured along family and household lines. However little is known about the circumstances and the mechanisms of how social networks play a role in increasing the probability of international migration from urban Mexico. Stemming from the literature, here it is assumed that networks are organized following family and household lines (and not constructed at a community level), so we would expect that the households with international ties would behave in a different way from those without these connections. Furthermore, since urban ties are less dense and more specialized than rural networks, one may think that these ties and contacts are more likely to be organized around specific lines and subgroups in urban settings (as is the case with industrial blue collar workers in the Monterrey-Houston circuit, Hernández-León 2008). The weakness of social networks eventually raises the economic costs of migration, and prevents the expansion of migration to the less educated groups (Massey et al. 1987, McKenzie and Rapoport 2007). If this is true, we may expect a positive selection in the out-migration flows toward the better educated in urban settings.

In this context, this article focuses on the international migration out-flows from Valle de Chalco-Solidaridad, a municipality which is part of the Mexico City Metropolitan to the US. Valle de Chalco-Solidaridad is a very recent urban space that has been built on a lake bed that was drained only a few decades ago. This municipality has experienced a remarkable growth in its international migration figures, and it can be seen as an example of contemporary migration out-flows from urban Mexico. The municipality has grown as a consequence of internal migration flows, with its population increasing dramatically, from 219,773 in 1990 (Lindón 1999) to 357,645 inhabitants in 2010 (INEGI 2013). Thus, a "classical" process of suburbanization and peri-urbanization of Mexico City, with the poor that is put aside to isolated peripheries (Aguilar 2002), co-exists in the municipality with a diminishing process of urban-rural migration and increasing international out-flows to the USA.

By using quantitative and qualitative methods, the article reveals information about the functions and dynamics of urban social networks that are constructed by migrants as compared to rural-based migrant networks in the municipality. It also explores whether and, to what extent, territorial and place attachments are relevant in understanding social network formations. The article takes into account the theoretical framework of social networks in migration processes and sheds light, from a different angle, on a classical theory that has mainly been tested in rural settings in Mexico. The article also takes a geographical stance, since it evaluates the relevance of "place attachments" to understand migration processes. The geographical literature has extensively discussed on "place attachments" (aka "sense of place") since the mid-1970s (e.g. Relph 1976, Tuan 1977). Yet, with few exceptions, the analytical potential of this concept has to be explored in the study of international migration (Mendoza and Morén-Alegret 2013).

Methods

The paper is based on quantitative and qualitative data. As for the quantitative techniques, we use the May 2007 Survey "Migration, Place and the Employment in Valle de Chalco-Solidaridad (Estado de México)" (EMLE in its Spanish acronym) which was carried out by the Metropolitan Autonomous University. These data were complemented with qualitative information coming from thirty in-depth semi-structured interviews which were carried out at a later stage of the research process.

EMLE is a randomized closed-ended representative survey of 759 households from the municipality of Valle de Chalco-Solidaridad. Using probabilistic techniques, census blocks were randomly chosen from the cartography of the municipality by the census tracts. The 2007 EMLE was not specifically addressed to heads of the household, since it sought to collect migration information from all household members (plus a substantial range of everyday practices and opinions on places from people of both sexes and different ages).

The 2007 the EMLE questionnaire consisted of four parts. The first was a household roster that listed all household members at the time of the survey, in May 2007, and basic demographics for each person (e.g. sex, age, education level). A total of 759 households were surveyed, representing information on 3,488 individuals. Part two of the questionnaire specifically focused on US migration (first and last trips, work in the U.S., legal status and return). Specifically, out of 759 households, 146 had at least one member who had migrated to the U.S., representing 19.2 % of the total numbers. This figure went down to 8.0 % for those households with members who were in the U.S. at the moment of the survey. Most of the interviewees (70.3 %) had only made one trip, mainly in 2000-07 (half of the 203 US migrants made their first trip in this period). Part 3 of the questionnaire was specifically addressed to the heads of the household. Here data on the labour and migration trajectories of the household head and spouse were collected. Finally Part 4 took a geographical stance, with several questions on "place dependence" (e.g. places where they do everyday activities) and "place identity", revolving around opinions and feelings about the different places that formed migration trajectories.

Explaining the Models: The Odds for International Migration

The paper aims to assess the role of social networks in channelling urban emigration to the States. To do so, we constructed several logistic regression models designed to measure the probability of emigration, in which we take the household international migration (i.e. the presence of US immigrants and/or return migrants in the household) as a proxy for the existence of migrant social networks. This may help understand the way that these social networks operate, in the sense that we can compare patterns of migration behaviour depending on the fact of having (or not) migrant social networks in the household. Here we differentiate two types of households regarding migration: (i) those with any sort of migrants (i.e. any member of the household who is now in the U.S., or has been in the past), and (ii) households with return migrants. On this basis, we identified four distinct groups, depending on the type of household migration experience (i.e. households with/without US migration experience; households with/without return migrants). Out of 759 households, 19.2% had or had had a person who had participated in a migration stream to the U.S., and 11.7% had return migrants (Table 1).

The question on attachment to the U.S. which comes from a closed question is used as the dependent variable for constructing the logistic regression models. The dependent variable is constructed as a dichotomy variable from the possible answers. Only those who chose the phrase "If I could, I would live in the U.S." were considered to be would-be US migrants (1). The other place attachments (neutral –"I would like to visit the U.S., but I wouldn´t live in the country" and negative –"I am not interested in the U.S.") were classified as non potential emigrants (0). Only 10.7% of all the interviewees said that they would migrate to the U.S., if the possibility came up (Table 1).

Table 1. *Profile of the Interviewed Residents of Valle de Chalco-Solidaridad, by Type of Household*

	All Households	Households with migrants	Households without migrants	Households with return migrants	Households without return migrants
N	759	146	613	89	670
Migration					
International migrants in households					
No	80.8				
Yes	19.2				
Return migrants in households					
No	88.3	39.0			
Yes	11.7	61.0			
Socio-demographic variables					
Sex					
Female	65.1	58.2	66.7	56.2	66.3
Male	34.9	41.8	33.3	43.8	33.7
Education					
No education or unfinished primary	19.1	19.2	19.1	18.0	19.3
Primary education	34.9	37.0	34.4	37.1	34.6
Secondary education	34.8	37.0	34.3	36.0	34.6
University and above	11.2	6.8	12.2	9.0	11.5
Marital status					
Single (never married)	15.7	16.6	15.5	16.9	15.6

Married	57.7	56.6	57.9	61.8	57.1
Cohabitation (no married)	16.8	15.9	17.0	13.5	17.2
Widow / Divorced	9.9	11.0	9.6	7.9	10.1
Age (years at survey / average)	39.7	39.0	39.9	38.8	39.8
Territorial and place variables					
Place of birth					
Mexico City	56.0	50.7	57.3	51.7	56.6
Elsewhere in Mexico	44.0	49.3	42.7	48.3	43.4
Home attachment					
Weak	33.4	37.5	32.4	36.8	32.9
Neutral	44.9	45.4	44.9	47.1	44.7
Strong	21.7	17.4	22.7	16.1	22.4
Attachment to Valle Chalco					
Weak	43.0	54.3	41.3	55.2	41.4
Neutral	31.6	24.5	32.7	23.0	32.8
Strong	25.4	21.3	26.0	21.8	25.9
Attachment to the place of origin					
Weak	32.7	32.8	32.7	32.5	32.8
Neutral	42.6	45.3	42.0	45.0	42.3
Strong	24.7	21.9	25.3	22.5	25.0
Attachment to the US					
Weak	39.4	34.3	40.1	36.9	39.7
Neutral	49.9	36.7	51.8	34.5	51.9
Strong	10.7	28.9	8.1	28.6	8.4

Source: EMLE (May 2007).

With the dependent variable being the probability of migration to the U.S., and the household US experience used as a grouping variable, the independent variables were classified into two groups: (i) socio-demographic characteristics of the interviewed person; and (ii) territorial and place variables. Then we suppose that migration differs according to age, education and marital status. Only 11.2% of all the interviewees had university studies, whereas the percentage of those who had not finished primary school amounted to 19.1%. These figures are similar to the country as a whole (INEGI 2013). Married people dominate the survey, comprising more than half of all four groups. This is consistent with the average age of the survey, which is about 39-40 years in all cases (Table 1).

The different models for estimating the probabilities of migration to the U.S. allow us to identify differences in migration behaviour depending on household US experience. Following a classical approach in migration studies, some models only contemplate socio-demographic characteristics (plus the fact of having US migration experience in the household) as independent variables. For others we introduce territorial and place variables. This method of model construction implies two assumptions that need to be tested. First, in separating models according to the household experience, and the following networks theory and accumulative causation assumptions, we may think that emigration from households with emigration experience (either return or not) would have different characteristics from those without emigration. Secondly, controlled by territorial and place variables (home, Valle de Chalco-Solidaridad and birth place attachments), the hypothesis that those households in Mexico with higher territorial attachments in Mexico have lower probabilities of emigration to the U.S. can be tested.

Data show that the fact of having US migrants in the household increases the odds of international migration more than twofold (Table 2). These probabilities are even higher if the household contains return migrants (4.835

and 4.762; Table 3). The differences are minimal, however, when controlled by the three above mentioned territorial and place variables. This is to say that households that have relatives living in destination areas, or have members with experience in those areas, are more likely to send migrants than those who do not. In other words, the experience of international migration in the households facilitates further movement to the U.S. This is not new, as results are consistent with the large literature on migrant social networks.

The Irrelevance of "Place"

In the last section, we indicated that territorial and place variables played no significant role in the models, pointing to a general picture of "placelessness". This might reflect the poor working and living conditions, and the settlement history of the municipality of our study (Lindón 2005, Mendoza 2009) which indeed may be the case for many low-income suburbs in Mexican cities. Urban sprawl, lack of services, poor infrastructure, and precarious jobs are all reasons for low territorial attachment and emigration.

The idea of "placelessness" is being reinforced by information in the interviews. They generally agree on the lack of services in the area. Indeed, the only clear attachment which comes out in the interviews is home. This should be understood in the context of first local residents fighting to get their properties legalised (in many cases houses were built out of the state control), and basic services, such as water. Apart from recognizing the poor quality of the services, interviewees also point to the fact that, despite some urban improvement, Valle de Chalco-Solidaridad has gone through a process of rapid urban growth that is associated with crime and loss of any Atmosphere of comradeship normally built in adversity. For instance, an interviewee told us that Valle de Chalco-Solidaridad has changed to feel less secure and this is because of the "people who have arrived from other municipalities. They rent. Who knows what habits they have, or what tricks they know".

In this context of poor urban infrastructure, scarce work opportunities, in-migration from other parts of Greater Mexico City, and increasing crime, it is not surprising that many interviewees do not develop strong attachments to Valle de Chalco residents, keeping their relationships in the municipality to family and relatives. With few friends in town (only 47.3% of those surveyed declared that they had friend in Valle de Chalco, aside from their family), the idea of building a sense of community becomes remote.

Table 2. *Logistic Regression Models for Migration to the U.S., by Type of Household (all migrants)*

	All households		**Households with migrants**		**Households without migrants**	
	Model 1 *exp (β)*	*Model 2* *exp (β)*	*Model 3* *exp (β)*	*Model 4* *exp (β)*	*Model 5* *exp (β)*	*Model 6* *exp (β)*
Migration						
International migrants in househoulds						
No	ref	ref				
Yes	2.565***	2.713***				
Socio-demographic variables						
Sex						
Males	ref	ref	ref	ref	ref	ref
Females	0.527**	0.600*	1.199	1.086	0.486**	0.485**
Education						
Unfinished primary	ref	ref	ref	ref	ref	ref
Primary education	1.309	1.056	4.403*	3.732	0.703	0.645
Secondary education	1.104	0.993	9.753**	10.445**	0.594	0.460
University and above	0.988	0.679	15.358**	28.533**	0.398	0.207**
Marital status						
Single	Ref	ref	ref	ref	ref	ref
Married	0.533*	0.482*	1.779	2.698	0.275**	0.260**
Cohabitation (no married)	0.688	0.631	0.342	0.357	0.663	0.591
Widow / Divorced	0.736	0.697	1.382	1.759	0.553	0.559
Age	0.992	0.992	1.030	1.035	0.974	0.978
Territorial and place variables						
Place of birth						
Mexico City		ref		ref		ref
Elsewhere in Mexico		0.761		0.550		0.874
Home attachment						
Weak identification		ref		ref		ref
Neutral identification		1.269		1.259		1.550
Strong identification		2.063		1.377		2.847*
Attachment to Valle Chalco						
Weak identification		ref		ref		ref
Neutral identification		0.244***		0.435		0.126***
Strong identification		0.334**		0.524		0.212***
Attachment to place of origin						
Weak identification		ref		ref		
Neutral identification		0.962		0.245**		1.315

Strong identification		1.007		1.024		0.900
Constant	0.204**	0.413	0.011***	0.014**	1.010	1.914
	n=664	n=664	n=124	n=124	n=540	n=540

* < 0.1 ** < 0.05 *** < 0.01

Source: EMLE (May 2007).

Table 3. *Logistic Regression Models to the U.S., by Type of Household (Return Migrants)*

	All	**households**	**Households with return migrants**		**Households without return migrants**	
	Model 7	*Model 8*	*Model 9*	*Model 10*	*Model 11*	*Model 12*
	exp (β)	*exp (β)*	*exp (β)*	*exp (β)*	*exp (β)*	*exp (β)*
Migration						
Return migrants in households						
No	ref	ref				
Yes	4.835***	4.762***				
Socio-demographic variables						
Sex						
Males	ref	ref	ref	ref	ref	ref
Females	0.610*	0.597*	1.202	1.159	0.490**	0.489**
Education						
Unfinished primary	ref	ref	ref	ref	ref	ref
Primary education	1.125	1.144	5.835*	6.738*	0.702	0.603
Secondary education	1.315	1.110	20.312***	60.511***	0.697	0.541
University and above	0.812	0.741	25.001**	172.307***	0.396	0.210**
Marital status						
Single	ref	ref	ref	ref	ref	ref
Married	0.442*	0.448*	2.033	5.558	0.251***	0.236***
Cohabitation (no married)	0.650	0.619	0.402	0.554	0.603	0.473
Widow / Divorced	0.793	0.764	3.239	6.739	0.428	0.398
Age	0.993	0.995	1.112	1.091*	0.979	0.981
Territorial and place variables						
Place of birth						
Mexico City		ref		ref		ref
Elsewhere in Mexico		0.722		0.398		0.809
Home attachment						
Weak identification		ref		ref		ref
Neutral identification		1.136		0.831		1.428

Strong identification		1.931		1.535		2.728*
Attachment to Valle Chalco						
Weak identification		ref		ref		ref
Neutral identification		0.277***		0.929		0.117***
Strong identification		0.349***		1.440		0.220***
Attachment to place of origin						
Weak identification		ref		ref		ref
Neutral identification		1.011		0.103**		1.319
Strong identification		1.040		0.844		0.865
Constant	0.208*	0.365	0.002***	0.001**	0.958	1.886
	n =664	n=664	n=78	n=78	n=586	n=586

* < 0.1   ** < 0.05   *** < 001
Source: EMLE (May 2007).

Family versus Independent Migration: The Lack of Expansion Networks

In this context of lack of confidence and poor role of "place", it is not surprising that networks are constructed following family lines, instead of being shared by the community. The following extract illustrates the example of a working mother who cannot afford her current situation, and so she wants her son to follow his father to the States, instead of causing her further economic stress. This interviewee also illustrates the reality of many working poor on the periphery of large Latin American cities, for whom there is no escape from poverty:

> *Does your son work?*
> No, he is about to finish secondary school.
>
> *Wouldn´t you like your son to continue studying?*
> I cannot afford it. If he wants to study, this would be his choice. I´d rather he joined his father in USA (Luisa, 49, cleaner).

Since Valle de Chalco-Solidaridad is a recently created municipality, many families are split between their (rural) origin community and Greater Mexico City. In other words, for many their "community" is located in the rural areas where their family comes from. Indeed literature has shown that occasionally social networks that are used by Mexico City migrants in the US trace their roots back to rural areas (see, for instance, Rivera-Sánchez 2007, López and Runsten 2004). The following interview extract illustrates this pattern.

> *When did you leave your hometown?*
> I left it when I was 11 years old, with my father. Living conditions were tough down there (…) I am from a rural Oaxacan community. We had been here before for short periods, but we finally decided to move permanently to Mexico City.
>
> *We saw in your questionnaire that you had been to LA….*
> Yes. I´ve been to the States three times. The first time I went to LA was because I had an uncle. He had told me his wage. I came back to visit my family after two years, and I went back to the same job in LA, as a wetback. Finally I stayed there for five years. I decided to come back definitely to Mexico because of my family (Rafael, 41, shopkeeper).

Because information is not shared between neighbours, families organize their own "autonomous" routes; some of them having roots in rural areas, according to Rafael. There are no fixed circuits between Valle de Chalco-Solidaridad and the US destinations (as we can see for rural communities, Goldring 1992, Smith 1998). Indeed the survey analysis of the states to which the residents of the municipality migrate displays a wide range of options. Therefore half of the US migrants chose classical destinations (Texas, California and Illinois), but the other head to emergent states, such as Florida, Arizona, and the Carolinas. This dispersion has also been shown recently elsewhere in the literature (e.g. Massey 2008). In explaining this pattern, some authors argue that socials networks that are constructed by immigrants reach a point of saturation regarding employment and housing opportunities in traditional reception places (Light and Scheven 2008), so immigrants disperse. Our evidence suggests that the dispersion is also a result of the actions of migrant social networks, since they are organized along family lines, sometimes tracing back their roots to rural areas in Mexico.

Male Flows and Female Independent Networks

When migration decisions are taken within families, men generally take the lead in initiating international migration, as we saw in the example of Luisa in a past paragraph. Even though flows are greatly dominated by men (e.g. Massey et al. 2002, Aysa and Massey 2004), women already constitute 46.3% of the total Mexican-born immigrants in the US, according to the 2010 American Community Survey (US Bureau of Census, 2012). In line with the literature, according to our data, women have 40% less probability than men of deciding on an international move (Models 1 and 2 in Table 2; Models 7 and 8 in Table 3). Beyond that, our interest lies in exploring how social networks may help overcome (or not) gender barriers for migration, and evaluate if urban networks are organised along sex lines.

Therefore, when observing the odds of female international migration in the models depending on the household migration experience, we observe remarkable differences: Sex is not significant for households with migrants, whether they are return migrants or not, whereas in those without migration experience the variable is significant (Tables 2 and 3). For the latter group, the probability of migration for females is almost half that observed for men.

The next question to answer is why the variable "sex" is not significant for households with migrants. It seems that having migrants in a household helps women to emigrate. Maybe this is related to the role of social networks for urban migrants, which may operate in ways different to those of rural settings, with urban females having more autonomous social networks in cities, and being less dependent on the more numerous male networks. In fact, differences in the construction of immigrant’s social networks by gender have long been documented in literature (e.g. Menjívar 2000, Avenarius 2009).

What the survey suggests is corroborated by our interviews. Out of 30 interviews, we found two examples of female-independent networks. This is the case of Alma, 20 years old, who told us about her mother´s and sister´s emigration experience. Both of them are currently living in the States. In her own words:

> *How did your mother decide to migrate to the States?*
> Because of my sister who has been living in the States for eight years.
>
> *Did your sister support her financially to cross the border?*
> Yes, her husband did.
>
> *Was your sister the first of the family to leave Mexico?*
> Yes.
>
> *How did she manage?*
> A female cousin helped her out. Emigrating came up as a possibility for her and she took the chance (Alma, 20, housekeeper).

Education-Shaped Networks

Similarly to "sex", the variable "education" also shows different indicators, depending on the US household experience (yet on the opposite direction). For households with US migrants, education seems to be crucial to understanding the urban international out-flows (Tables 2 and 3). With the exception of Model 4 for students with primary education, the models of households with migrants always show that the likelihood of emigration to the U.S. increases with years of education (up to university studies). Thus the odds of those with primary schooling are higher than for those with no studies or unfinished primary education. For those with a university education, the probability of emigration is even higher, although we have to take a cautious approach here since the number of those with university diplomas is low. For the households without migrants, education does not generally play a significant role in explaining the probabilities of out-migration.

Our data suggest that formal education only has an effect on emigration when migrant social networks are in operation, with more educated migrants minimizing the risks of an (irregular) international crossing. By contrast, McKenzie and Rapoport (2007) found that the strengthening of social networks lowered the economic costs of emigration, and consequently expanded migration to less educated groups. In contrast, in communities with weak networks, a positive selection toward the better educated, who have a greater probability of making an international move, was observed.

Qualitative data also points to the direction of our survey. José Manuel, a university student, was reluctant to migrate. He finally did because his family insisted and he had an extensive support network in the US. After an unsuccessful try, he is currently pursuing studies at university:

> I´ve got a brother in New Jersey. He told me that I could join him, but I decided not to do so. I went to university. After a while, my sister decided to go to the States (…) My family insisted on me going with her, but I was not interested. (...) I wanted to finish university (…). Finally I decided to go North, and my family was happy, because I accompanied my sister on this unsafe risky trip (…). Later, the *migra* sent us back (José Manuel, 21, student).

Conclusions

These results shed new light on the mechanism through which social networks operate in urban settings. Even if a municipality that is very homogeneous in terms of (high levels of) poverty and (low) employment opportunities, we found variations on the socio-demographic profile of the would-be emigrants to the US depending on the household´s social networks. In other words, not everyone is susceptible to emigration, despite structural adjustments in the economy and a general landscape of relative privation. The picture depicted of the Mexican urban emigrant in our survey is far beyond the images of a lowly-educated young male that emerges from the rural area literature. Our data suggest that urban females may organize their own autonomous social networks, and that the higher educated in cities value their future in Mexico (and only try the adventure further north when they have the support of social networks).

As for territorial attachments, both the survey and the interviews show a general picture of "placelessness", with practically all the territorial and place variables playing no significant role in the models. Indeed, interviewees have a very low opinion of the U.S., which suggests that international migrants from urban cities are not lured by positive images, but by economic factors. This reflects the settlement history of the municipality of our study which may be the case for many low-income suburbs in Mexican cities. Urban sprawl, lack of services, poor infrastructure, and precarious jobs are all reasons for low territorial attachment and emigration. Nevertheless the migration experience remarkably increases positive views on the U.S., with individuals in households with international emigration experience having four times more favourable opinions on the States than those without emigration. This may encourage further emigration. Indeed these data challenge previous evidence on the inapplicability of the cumulative causation theory to urban-origin Mexican migration (Fussell and Massey 2004), even if cumulative causation seems to occur within the limits of the household and the family, and does not expand to the municipality.

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