Documents de travail

«Do we need to be educated to have Green concerns?»

Auteurs

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Abstract

In the Unesco's report (2014), an essential role is given to education in the preservation of the environment, by improving understanding on environment deterioration or modifying individuals' behaviors. Indeed, many papers analyzed the importance of education on environmental sensitivity. However, they generally focus on only one environmental concern. The originality of our study is that it takes into account a large range of green concerns. We lead an exploratory analysis in order to try to answer to the following problematic: what are the effects of educational level and socio demographic characteristics on various green concerns? Preliminary results tend to confirm and highlight some relationships between education and environmental concerns. We especially underline that the more educated, the more open to global issues like biodiversity or climate change issues.

Keywords

Education, Environmental concerns, socio demographic characteristics

JEL codes

C38, I20, Q53, Q54

Introduction

In its report entitled "Sustainable development begins with education", Unesco (2014) gave a central role to education in the objectives of environmental preservation in a society, looking at pro environmental behaviors and real efforts accomplished towards environment. This report was based on the results of various international studies (PISA, global study of values; see the World Value Surveys conducted between 2005 and 2012), which showed that a higher level of education tends to increase concern regarding environmental issues. Indeed, education has direct and indirect effects on individual behaviors (Commission Bruntland, 1987; Unesco, 2014; Granon, 2015), but it also improves understanding of the risks linked to environmental deterioration[1]. For example, educated individuals have a higher chance to better grasp the consequences of climate change and then to take the right decisions and to adapt by reducing their vulnerability.

If many studies attest the importance of the level of education in the environmental concerns, the real effects of education on pro-environmental attitudes are not always significant and may sometimes be negative (Torgler & García-Valiñas, 2007; Meyer, 2015). Moreover, the causal effect is sometimes unclear because of omitted variables in the analysis (Meyer, 2015). In Meyer's paper (2015), many papers are identified giving a positive correlation between pro environmental behaviors in a specified context (recycling, purchase of eco labelled food, water or energy saving, and higher education. Most papers analysed the behaviour or the attitude an individual faced to only one environmental concern: green electricity, eco-food consumption, energy consumption, recycling, water savings, global warming and climate change (Ajaps & McLellan, 2015). Even if individuals are sensitive to many environmental issues, they can express more or less concerns depending on the type of environmental concern they are more confronted or sensitive to, without ignoring the other ones but being relatively less committed to change their behaviors in every issue.

One important point is to define 'education to environment': is it only giving information and knowledge on environmental concerns and issues or is it more than that? According to Ajaps and McLellan (2015), to promote pro environmental behaviors and to observe desired environmental attitude, three theories have to be taken together, none being able alone the basis for PEB: learning theory, the theory of planned behaviour and the value-belief-norm theory. Another important question is linked to a lasting change in behaviour which is important to consider as the duration of education matters as strongly as the duration of changes.

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[1] «Un des rôles clés de l'éducation consiste à améliorer la compréhension scientifique du changement climatique et des autres problèmes environnementaux » (Unesco, 2014, p.11).

Instead of focusing on only one environmental concern, this note aims at studying a large range of green concerns. Using a multiple factorial analysis, we analyse the effect of education and others demographic factors on environmental sensitivity: what are the main environmental concerns and how can we explain them taking into account that we exploit one database not specifically dedicated to that question? We tend to determine the various socio demographic profiles accordingly to different green concerns. We use a specific part of a French survey ("Generation 2013" provided by the Cereq), which is devoted to sustainable development. This note is organised as follows: in the next part, we detail the database and the methodology we used; then, we present our estimations and we discuss the preliminary results. The last part concludes.

Data and methodology

Data and descriptive statistics

Our data come from the survey "Generation 2013" provided by the Cereq (Centre d'Etudes et de Recherche sur les Qualifications), a French public establishment which depends upon the French Ministry of National Education, the Ministry of Economy, Industry and Employment and the Ministry of Labor, Social Relations, Family, Solidarity and Towns. It gives advices in educational policies and is an expert in the production of statistical series, at regional and national levels, as well as for quantitative research on education, insertion and employment. Among the usual statistics produced by the Cereq, we find investigations called « Generation ». These "Generation" investigations are surveys conducted every three years on individuals who left all levels of the educational system three years before. The first investigation was 'Generation 1992', conducted in 1995, and the last one, conducted in 2019, is 'Generation 2016'. They provide information on schooling, on professional insertion and about the socio-demographic characteristics of individuals. These surveys are devoted to the analysis of the schooling and professional insertion. They are not specifically devoted to environmental analysis. However, we use here Generation 2013, conducted in 2016 on 22,000 individuals who left education in 2013. Indeed, among these 22,000 individuals, a sample of 3533 individuals answered additional questions on sustainable development. We lead our analysis on this particular sample.

In this particular sample, individuals were especially asked to inform about their essential green concern. The question was: "*Among these various (identified) problems linked to the environment deterioration, according to you, which one is the most worrying?*". It was a closed-question with seven items proposed: Noise pollution, Biodiversity, Natural disaster,

Households waste increase, Water pollution (lakes, rivers), Air pollution, climate change and greenhouse effect.[2]

We study the effect of various determinants like socio demographic factors on these seven concerns: age, gender, highest diploma obtained by an individual, environmental studies, parents' level of education, living area during the sixth grade, actual living area, professional position, to have a chronic/lasting disease, number and type of protected areas in the living region. The highest diploma indicates the highest diploma owned by an individual. We distinguish three levels: *Without diploma and <baccalaureate, Baccalaureate, > baccalaureate*. Environmental studies indicates if an individual received training on environmental concerns and at which moment of his training he received it: *No environmental studies, Secondary environmental studies (the individual received environmental training only during his secondary studies), Higher environmental studies (the individual received environmental studies only during higher education) and Secondary + Higher environmental studies (the individual received environmental studies during secondary and higher education)*. The parents' level of education is the highest level of education reached by the father (if the information is not available, we took into account the mother's one). We distinguish two levels: *<baccalaureate and >baccalaureate*. The living area during the sixth grade and the actual living area are estimated with three modalities: *rural, urban area and high urban area (more than 500,000 inhabitants)*. Three modalities constitute the professional position: *executive, worker and others professions*. We also use variables giving information on the actual position of the individual. First of all, we take into account if a chronic/lasting disease affects an individual. Indeed, a sick individual may be more sensitive to environmental problem than a healthy one. Finally, we are interested in the natural context around the living area: the number and the type of protected area in the living region (*National park, Marine Natural Reserve, No protected area*)[3].

The analysis is lead on these 3533 individuals (25,378 with weighting) aged from 16 to 35 years. The sample is not gender balanced (28% of women). All levels of education are represented both at the individual and parents' level. Most people live in an urban area (76%) but in a lower size than during the childhood (84%). Three essential green concerns can be emphasized, grouping more than 70% of the individuals of the sample: Climate change and greenhouse effect (26%), biodiversity (24%) and water pollution (20%) (Tables 1 and 2).

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[2] We take these green concerns as they were given in the questionnaire. However, these categories can have some interactions as for example, natural disasters like windstorms are more and more correlated to climate change; or air pollution can impact climate change.

[3] We don't take into account the natural regional park because almost all regions are concerned and so, it's not a discriminant variable.

Table 1. Qualitative variables

Variable	Modalities	Nb (with weighting)	%
Green concern	Air pollution	2878	11,29
	Biodiversity	6135	24,07
	Climate change	6741	26,45
	Natural disaster	1484	5,82
	Noise	423	1,66
	Waste increase	2648	10,39
	Water pollution	5181	20,33
Environmental Studies	No	9992	39,20
	Higher Environmental Studies	6224	24,42
	Secondary +higher environmental studies	1040	4,08
	Secondary environmental Studies	8234	32,30
Highest diploma	= baccalaureate	7218	28,32
	> baccalaureate	10766	42,24
	Without diploma and < baccalaureate	7506	29,45
Gender	Female	7259	28,48
	Male	18231	71,52
Living area at the sixth grade	Rural area	3861	15,68
	Urban area	11898	48,32
	Urban Area >500000 inhabitants	8863	36,00
Parents' level of education	< baccalaureate	14524	63,41
	> or = baccalaureate	8382	36,59
Living area at the survey time	Rural	6221	24,51
	Urban < 500 000 inhabitants	9409	37,08
	Urban > or = 500 000 inhabitants	9748	38,41
Chronic/lasting desease	No	21441	86,02
	Yes	3485	13,98
Type of protected area	No	18722	73,77
	Marine Natural Reserve	2546	10,03
	National Park	4110	16,20
Professional position	Others	2136	8,38
	Employment	18531	72,70
	Unemployment	4823	18,92

Tables 2. Quantitative variable

Statistics	Age	Nb years of education	Nb years of environmental studies	Nb parks in the living region
Min	16	10	0	1
Max	35	20	8	12
1st Quartile	19	12	0	3
Median	21	12	2	4
3rd Quartile	23	15	3	6
Mean	20.97	13.58	2.09	4.71

In order to analyse the impact of personal characteristics on environmental sensitivity, we use a Multiple Factorial Analysis to draw the various individual profiles of green concerns. We proceed in three steps: in a first time, we determine three individual profiles: the socio educational profile, the socio economic profile and the geographical profile. In a second time, we bring together each profile and the various green concerns. Finally, we group all the profiles and the green concerns.

The various individual profiles of green concern: a MFA

The Multiple Factorial analysis (MFA) is a method of data analysis for **m** qualitative variables which exhaustively describes the phenomenon of study. Proposed in the 1960s by Benzécri, it has become the favoured method of data analysis, especially in sociology. It is based on the fact that the existence of common occurrences can highlight, in an inductive manner, and without any hypothesis, certain structures of dependence between variables. The objective is to transit from **m** dimensions to **2** synthetic dimensions while minimizing the loss of information. We represent all the modalities of all the variables on the same graph (Figure 1), in order to underline the role played by all modalities. Although the graph represents the essential result, one must take into account both the amount of information contained in the data (Relative contribution) and the contribution of the various modalities to the study (Absolute Contribution). The MFA takes place in four steps:

Eigenvalue analysis: Eigenvalues represent the amount of information contained in the data. It is advisable to select a number of eigenvalues implying the smallest loss of information. We use the Kaiser criterion: this consists in selecting the eigenvalues representing up to (1/P) % of the information, P being the number of variables. The number of the selected eigenvalues also represents the number of axes used for the graphical representation: if two eigenvalues are selected, this means that two axes (called factorial axes), that is to say one system, contain the bulk of the data information.

Contributions study: There are two contributions: the absolute contribution (CTA), which represents the weight of the modality of the variable in the definition of the factorial axis, and the relative contribution (CTR), which is the quality of representation of the modality along an axis. The critical values are respectively equal to 0.1 for the CTA (the definition of the axis, that is to say the information contained in this axis is due to less than 10% of the modality), and 0.3 for the CTR (the quality of representation of the modality upon the axis is smaller than 30%). If modalities present CTA and CTR as below the critical values, they are removed from the analysis. These values are weaker than those used in Simple Factorial Analysis because the MFA is a cautious method.

Graphical Analysis: We interpret the groups of modalities which appear on the system of axes. This part of the analysis is the most interesting, because it allows us to highlight the various profiles.

Projection of additional modalities: The analysis is carried out on a sample of the variables, called active variables, on which previous criteria are calculated (eigenvalues, contributions) and which determine the profile; the non-selected variables are called additional variables. They allow to refine the profile and to make the interpretation deeper; they are only taken into account in the graphical analysis and their selection is based on the test-value (Lebart, Morineau, Piron, 1995).

Here, we try to determine three individual profiles on sensitivity to environmental problems. For each profile, we consider different active and additional variables (Table 3).

Table 3. Variables used in each profile

Profile	Active variables	Additional variables
Socio Educational	Gender, Highest diploma, Environmental studies, Parents' level of education	Living area at the sixth grade[4] Green concern
Socio economic	Age, Gender, Professional position, Chronic disease	Green concern
Geographical	Actual living area, Number of protected areas in the living region, Type of protected area	Green concern

The socio educational profile

The analysis leads us to consider two eigenvalues which represent 76.6% of the initial information; the transition from m to 2 dimensions implies a loss of 23.4% of information. Within these two synthetic dimensions, the modality "*secondary and higher environmental studies*" is not well represented and must be removed from the analysis. The test value also implies the removal of the additional modality *"Green concern = waste increase"*.

The horizontal axis opposes on the left the lowest diplomas and on the right the highest diplomas whereas the vertical axis opposes at the bottom education without environmental studies and at the top, environmental studies (Figure 1). They allow us to emphasize three different profiles:

- Individuals with the highest level of education and who took environmental higher studies seem to be concerned with Water pollution and Climate change and natural disaster. They usually lived in rural areas during childhood and come from high social background.

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[4] The living area during the childhood is considered as an additional variable because if we consider it as an active one, it was not significant in the analysis and must be removed.

- Individuals with lowest diplomas who never took environmental studies. They generally come from a lower social background. They appear to be concerned with Air pollution and noise pollution.
- A third group highlights individuals concerned with the biodiversity. They usually possess baccalaureate and pursued secondary environmental studies. This group consists of individuals who possess agricultural baccalaureate.

Figure 1. Socio educational profile
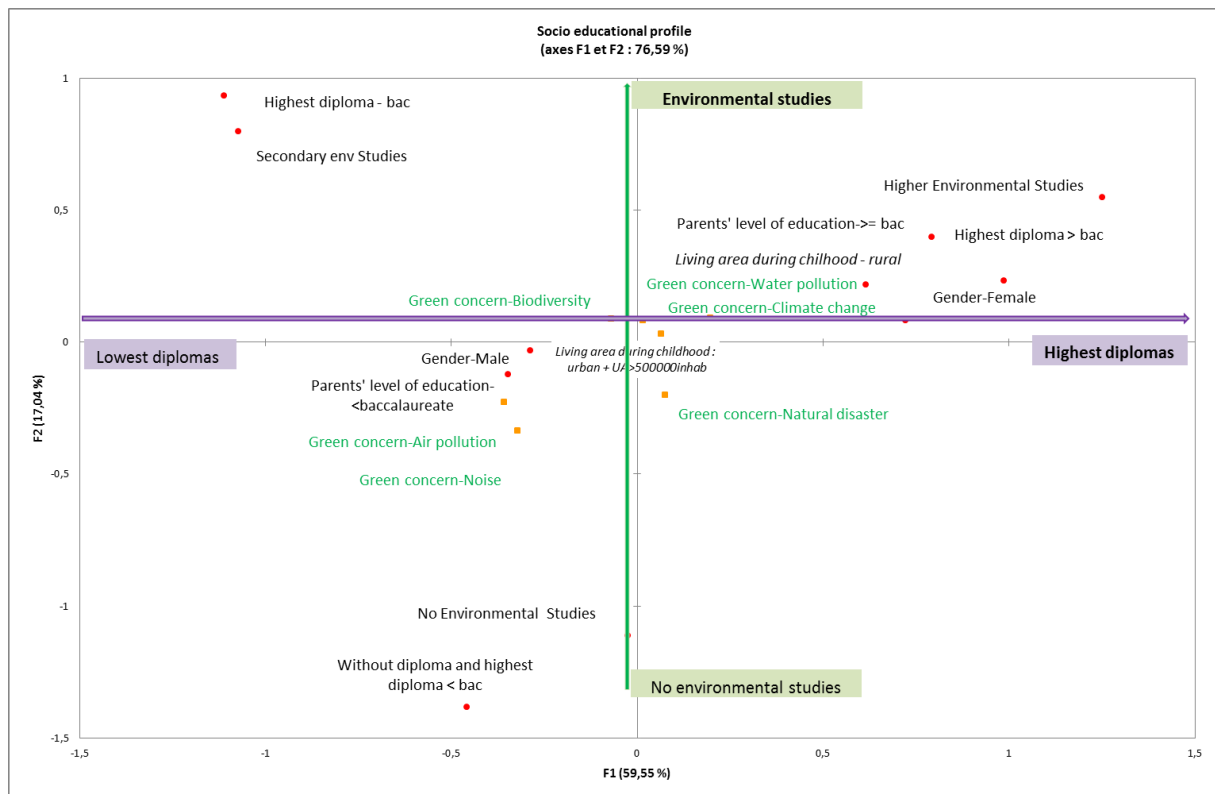
The socio economic profile

In this analysis, two eigenvalues represent 62.4% of the initial information; it implies a loss of 37.6% of information. The test value leads us to remove from the analysis the additional modality "*Green concern = waste increase*".

The horizontal axis opposes on the left the youngest and the men and on the right the oldest and the women whereas the vertical axis opposes at the bottom, people in employment and at the top, people who are no employed (Figure 2). Profiles are less apparent than in the previous profile. However, we can observe that people concerned with climate change and water pollution are those with a better professional status whereas those with a lower social position are concerned with Air pollution and noise pollution.

Figure 2. Socio economic profile
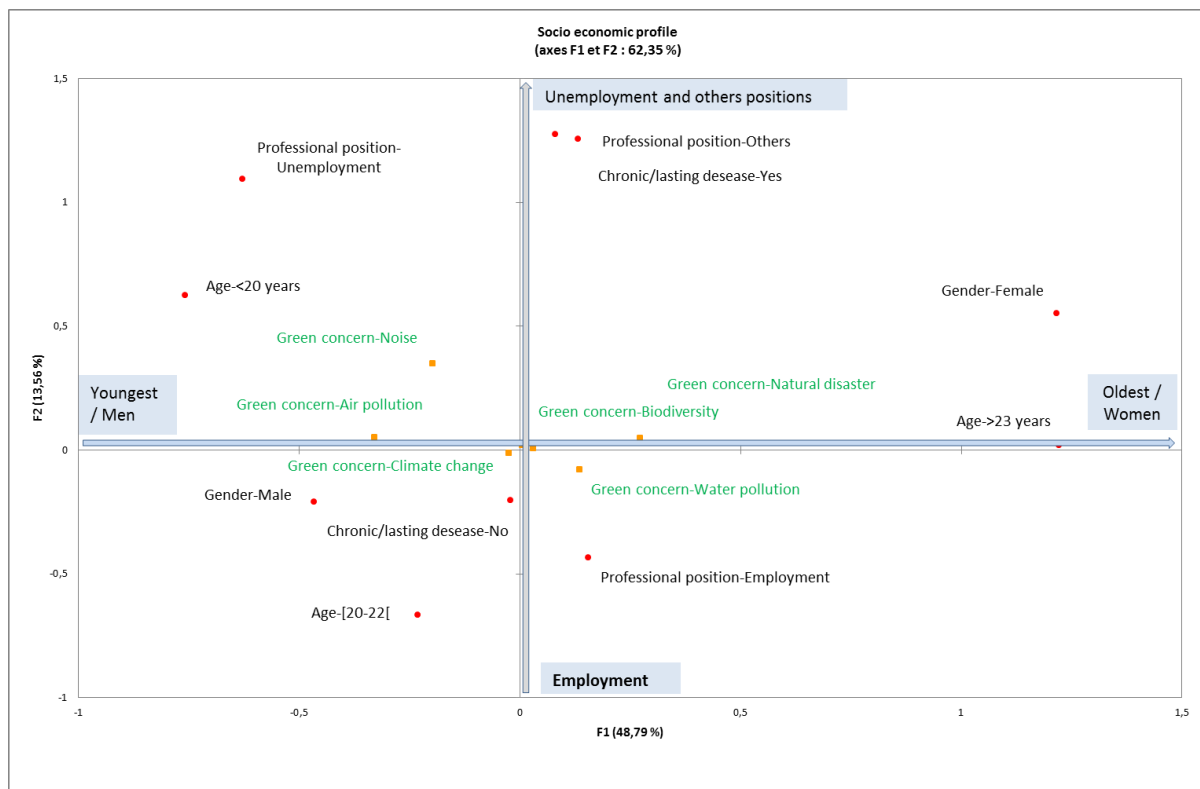
The geographical profile

In this analysis, 74.7% of the initial information appears with two eigenvalues that is to say a loss of 25.3% of information. Within these two synthetic dimensions, the modalities "*Actual living area=rural*" and "*Type of protected area = Marine natural reserve*" are not well represented and must be removed from the analysis. The test value also implies the removal of the additional modality "*Green concern = natural disaster*".

The horizontal axis opposes on the left a little number of protected areas and on the right a high number of protected areas whereas the vertical axis opposes at the bottom high urban areas and at the top little urban areas (Figure 3). This analysis shows that individuals who live in high urban areas and near protected areas are more sensitive to natural disaster, noise and air pollution.

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Figure 3. The geographical profile
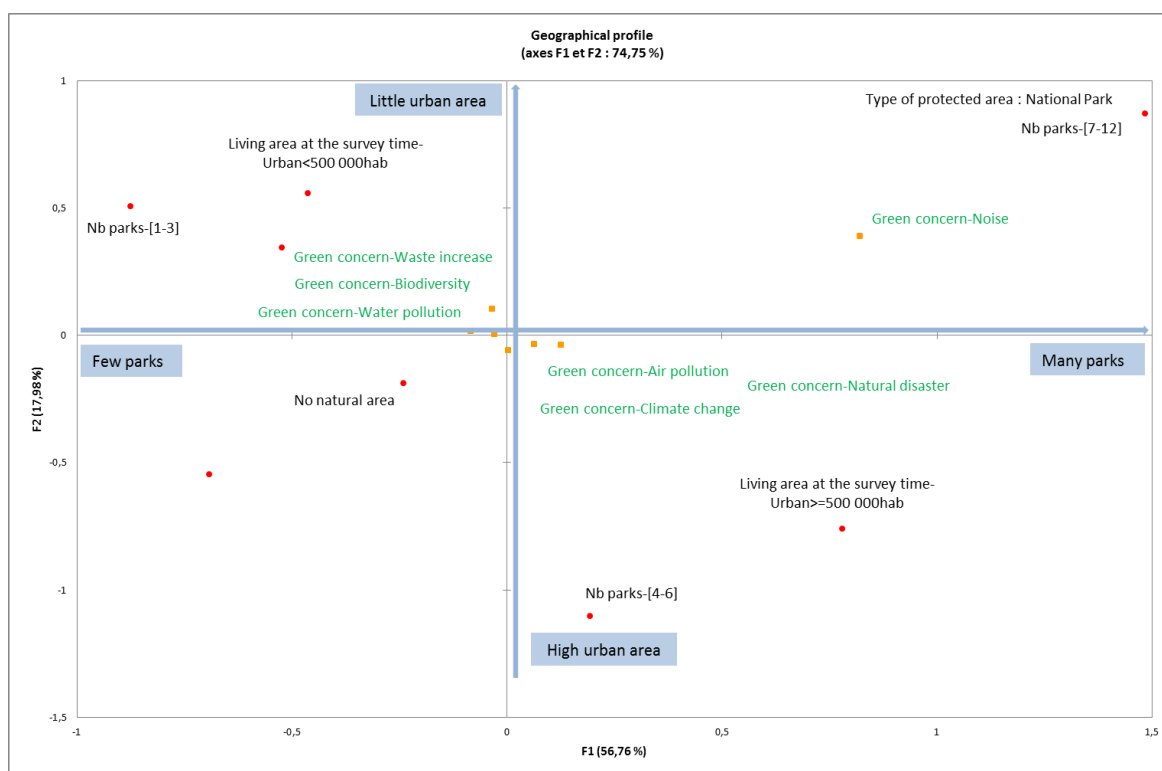
These results seem somehow consistent with some existing surveys on environmental concerns in France (CREDOC 2015; OCDE 2014) : 'The declared sensitivity to the environment is linked, in particular, to the fact that the French reside, for nearly half of them (49%) in a particular geographical area: i.e.near the coast (23%), either near a mountain (12%) or near a natural area that is protected (33%). This proximity to a remarkable natural area increases interest in the environmental issue' (Enquête CREDOC pour la future agence pour la biodiversité, 2015). In environmental sensitivity, the place of residence is important: the more sensitive to environmental issues are in urban areas (OECD, 2014).

Global profile

We group here in the same analysis all the variables. Only the green concern is considered as an additional variable. In this analysis three eigenvalues can be considered. So we take into account two graphical systems: the first one is constituted with the first and the second factorial axis and the second graphical analysis is formed with the first and the third factorial axis. The table 4 summarizes these two studies.

Table 4. The two systems of the global analysis

System	Axis 1 and 2	Axis 1 and 3
% of information	58.6%	49.4%
Modalities removed	Childhood living area = rural No environmental studies Secondary + higher environmental studies Chronic disease Age [20-22[Professional position (3 modalities) Type of protected area (3 modalities) Waste increase	Childhood living area (3 modalities) Secondary + higher environmental studies Chronic disease Age [20-22[Professional position = others Actual living area (3 modalities) Number of parks (3 modalities) Type of protected area (3 modalities) Noise

It appears that the educational profile seems to be essential in the environmental sensitivity (Figures 4 and 5). Individuals with the highest diplomas and who pursue environmental higher studies are more sensitive to global concerns as climate change and water pollution.

Individuals with lowest diplomas and who did not take environmental studies are more sensitive to local concerns as waste increase, noise pollution, air pollution.

The socio economic profile is quite similar to the educational profile: individuals with better professional status are those who are concerned with global issues. On the other hand, we note that the geographical profile has a significant influence with the local problematics.

Lastly, the various analysis allows us to establish a very particular profile of individuals who are sensitive to biodiversity. They usually possess agricultural baccalaureate and live more frequently in a rural area.
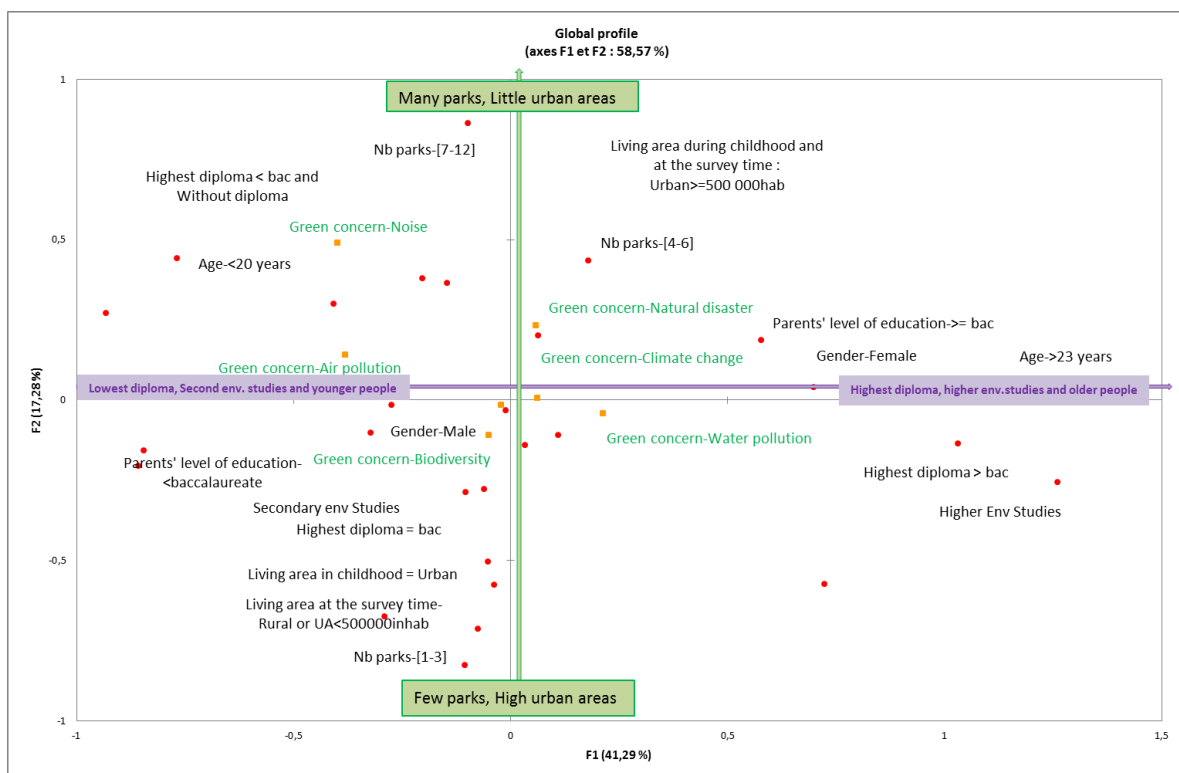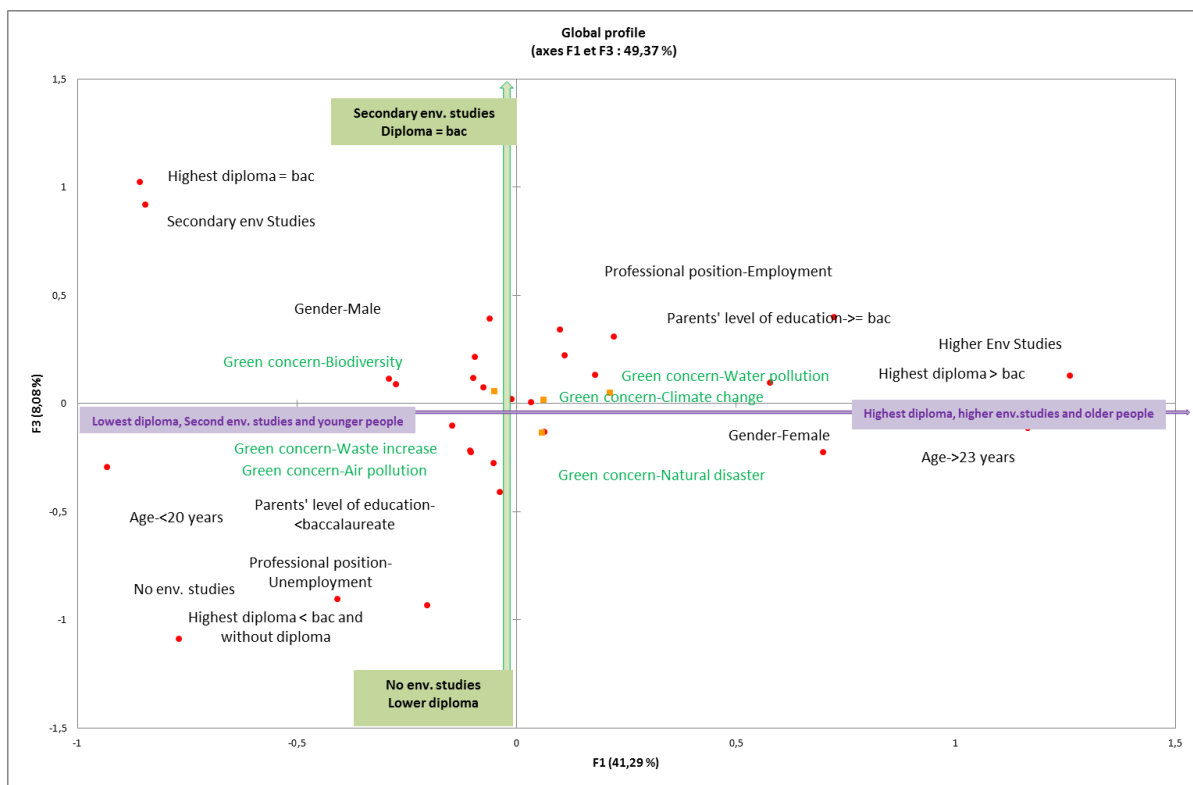
Figure 4. Global profile (Axis 1 and 2)

Figure 5. Global profile (Axis 1 and 3)

Conclusion

These preliminary results tend to show some concrete links between education and environmental concerns. Moreover, individuals who are interested in getting more education in environmental issues open their eyes on broader goods such as climate change, involving a larger scale. But our results show as well that education is one piece among other continuous variables like the living area (past and present) or the employment. If these data and surveys have to be improved getting more information on detailed questions regarding environmental concerns, this first analysis confirms that the more educated, the more open to global issues but education plays together with other variables that seem as important such as having a professional position, the living area or even some health events like asthma.

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