«Environmental awareness and relationship to scientific knowledge: the case of children in the mining area of Provence.»

Database production with a spatial approach

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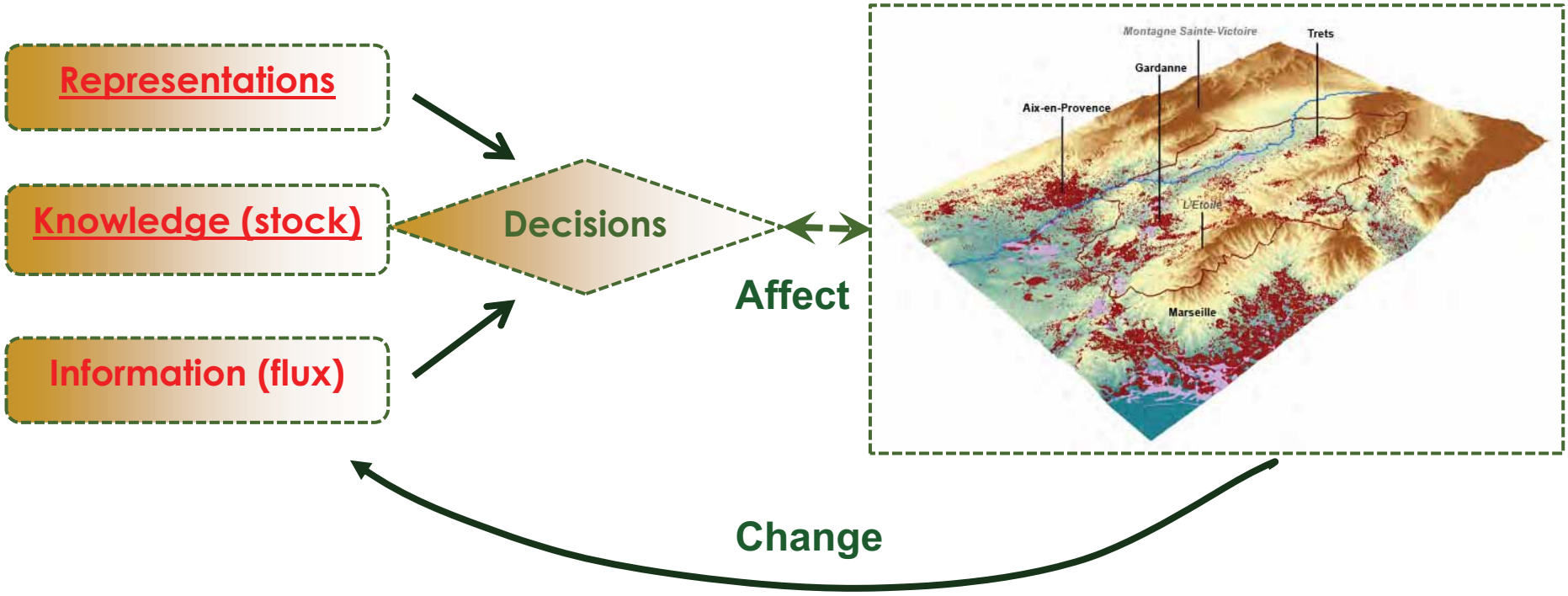
Interaction « man-Nature »



- How and to which extend the stock of knowledge includes the knowledge of this model?
- How deep is the awareness of environmental effects in decisions and how does this affects decisions?

Why to study environmental representations?

- They determine **attitudes** and **utility**, (adhesion, indifference, rejection vis-a-vis environmental actions) and eventually, they command individual and collective **decisions and determine Man-Environment Interactions**

Ex : What is this lake?

Anais (political ecologist) a « national park » to be sanctuarized
Bob, (IMBE), a juicy ecosystem for publications
Camille, (CEREGE): An extinct volcano or a meteor crater: to be explored for its structure
Edouard, (Boy Scout) :A camping place for next summer
Frantz (NL tourist): A place for sailing
Desna (Iroquois Indian living there): a reserve of fish
Galia (civil servant at Water Agency): A water reserve for supplying downstream populations
Hubert,(Forest guard): A dangerous zone to control access

Why to study children's environmental representations? …

Sander Van der Leeuw, Aveiro 2013

Pre-1980's	1980's	1990's
Culture is natural	Nature is cultural	Nature and culture have a reciprocal relationship
Humans are *re*-active to the environment	Humans are *pro*-active in the environ-ment	Humans are *inter*-active with the environment
Environment is dangerous to humans	Humans are dangerous for the environment	Neither are dangerous if handled carefully, both if that is not the case
Environmental crises hit humans	Environmental crises are caused by humans	Environmental crises are caused by socio-natural interaction
Adaptation	Sustainability	Resilience
Apply technofixes	No new technology	Minimalist, balanced use of technology
'Milieu' perspective dominates	*'Environnement'* perspective dominates	Attempts to balance both perspectives

Environment: qu'es aco ?

Environment

Generic definitions : Reference to a set of issues

New Environmental Paradigm (Dunlop et al), Stern report, MEA

- Environment = Nature as a provider of resources and generator of welfare for Man
- Environment = milieux =Nature at risk, threatened by anthropogenic action
- Environment = source of risks for human deeds (eccorev)
- Environment = ecosystemic services

Subjective definition : Reference to a specific human person or group of human persons

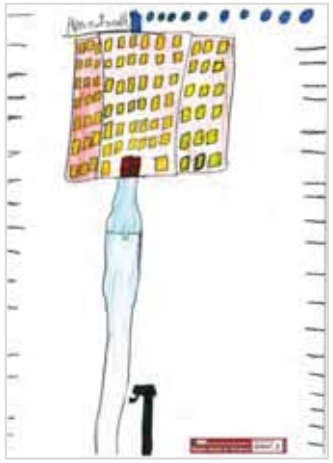
- Environment = collection of objects surrounding the subject(s) inert objects, living objects, other human beings…

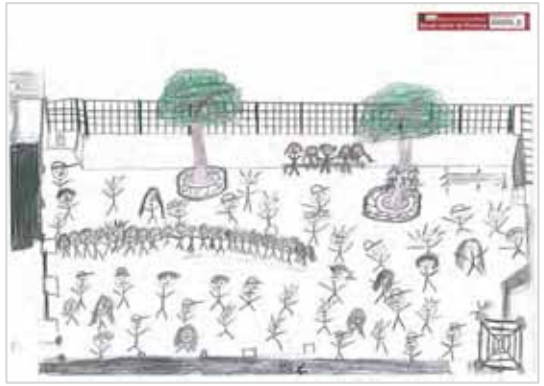
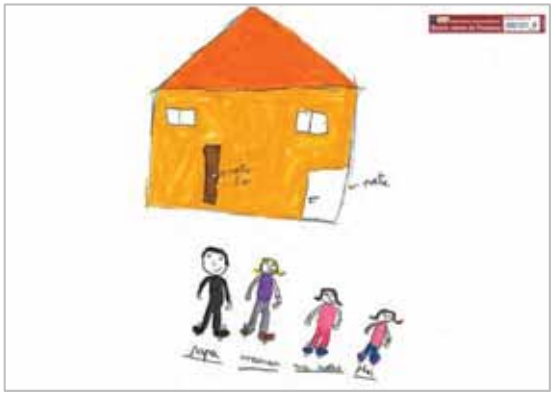
Representations

« Bio-physical » reality
Sciences of Matter, Earth and Life

« Represented »
Social Sciences

- How to measure distance ?
- Which factors determine it?

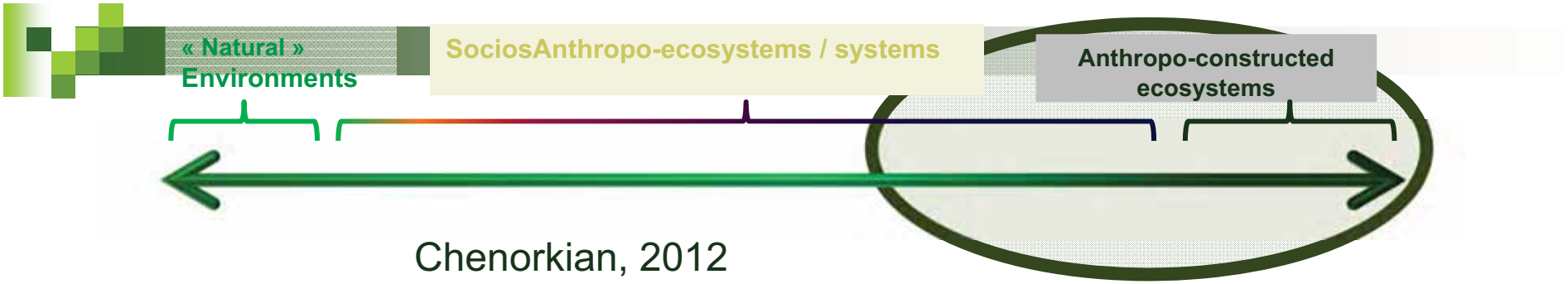





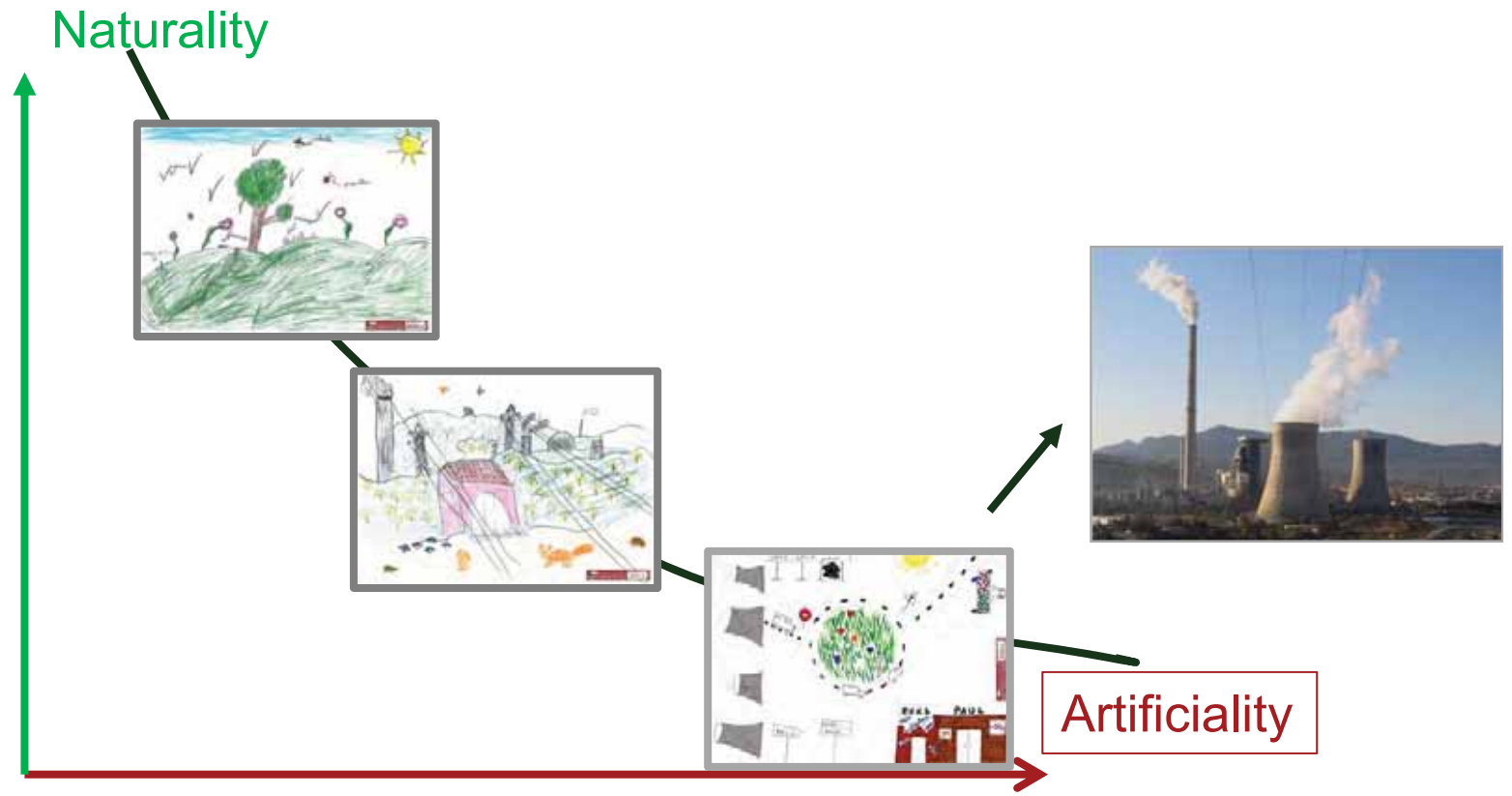

USINE
HARIBO!

PAUL



Chenorkian, 2012

Two dimensions of a subjects' environment Naturality-Artificiality



Foundations of Environmental Representations

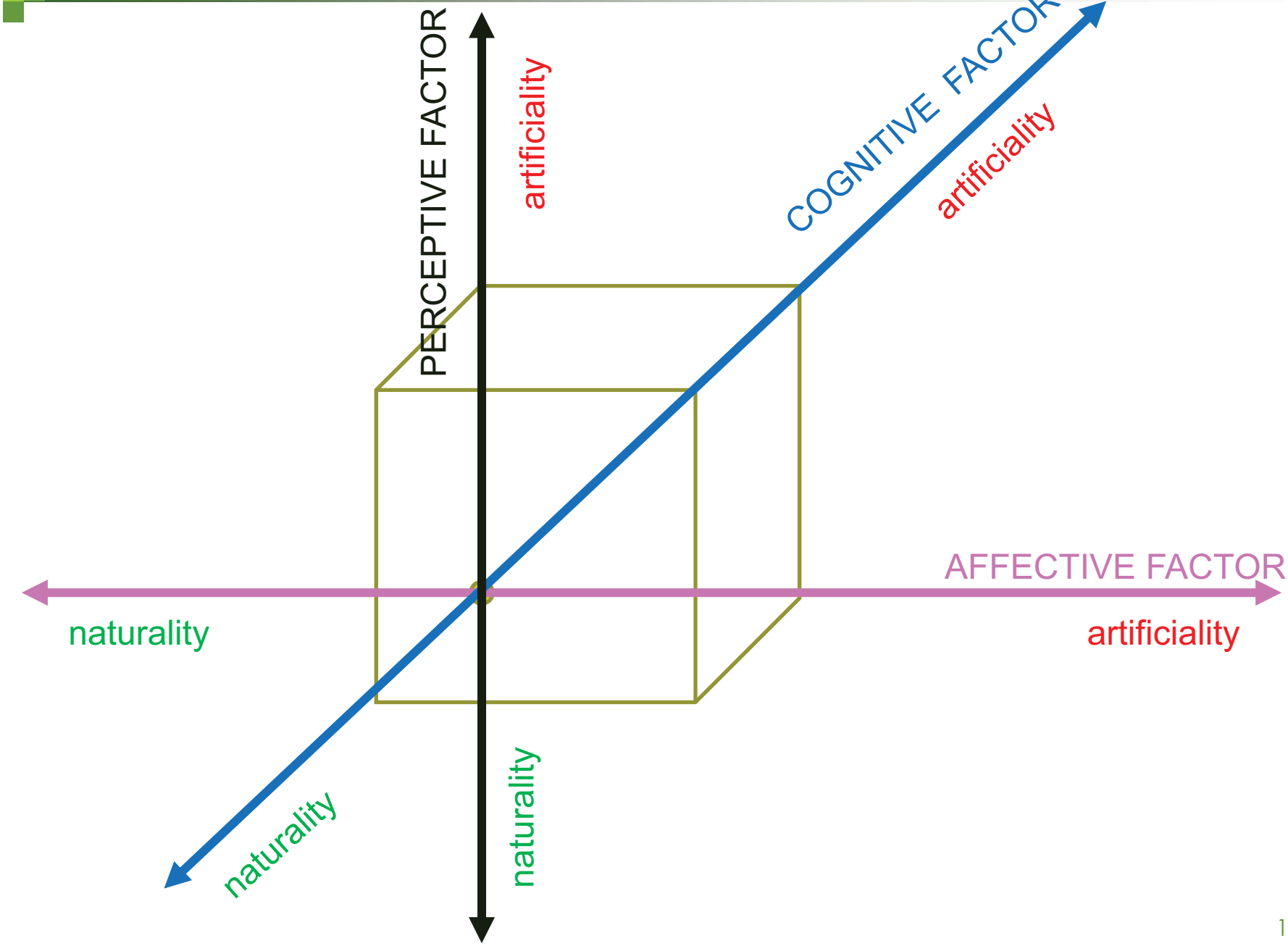
The distance between objective and subjective representations rests upon three factors:

- Perceptive: individual physiological factors

  (ex : perception of odors, pollution, noise, shapes, ….)

- Affective: Sense of Welfare, Emotions, Preferences Like-Dislike Likert-type scale,

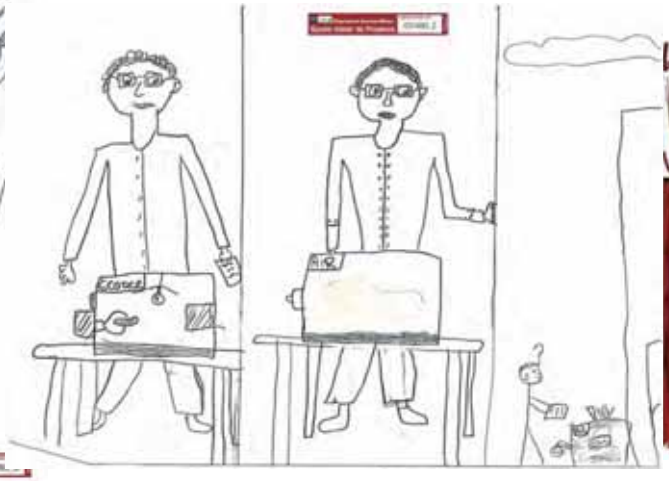
- Cognitive and experiential: mix of heritage from school, family, and autonomous experience.


PERCEPTIVE FACTOR
artificiality
naturality
COGNITIVE FACTOR
artificiality
naturality
AFFECTIVE FACTOR
naturality
artificiality

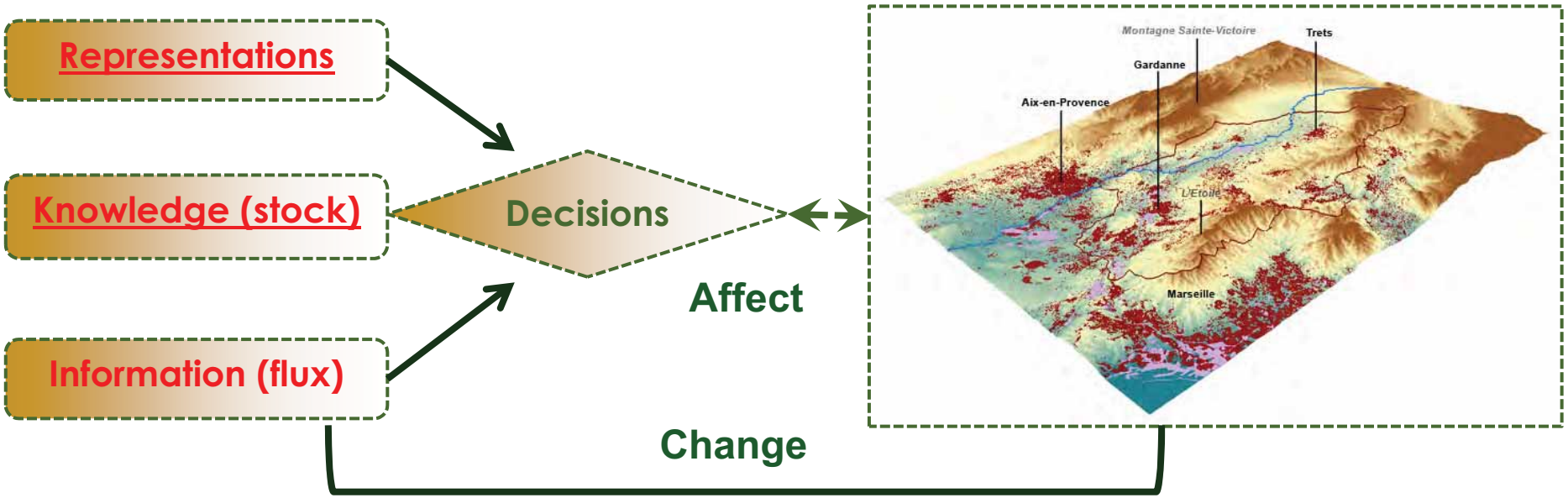
Cognitive Factor Assessment

- Perceptive and affective factors can be directly assessed in the expressions of the subjects.
- Cognitive factor is more delicate since it pertains to what has been « learnt » about the environment
- One way to assess more precisely the cognitive factor is to ask the subject to provide a representation of an object which he/she is usually distant of, or unfamiliar with, but which is a matter of « knowledge » The question is implicitly: *«What do you **know** and how do you **reason** about this object? »*


LABORATOIRE →
SPÉCIALISTE↓



Why to study children's environmental representations?



- Decision makers/leaders of tomorrow
- Holders of parental representations
- Measures over the long term (panel)
- Homogeneity
- Usefulness of the data (field education)
- Prospective / scenarios
- Originality

Understand the interaction process **« man-Nature »**

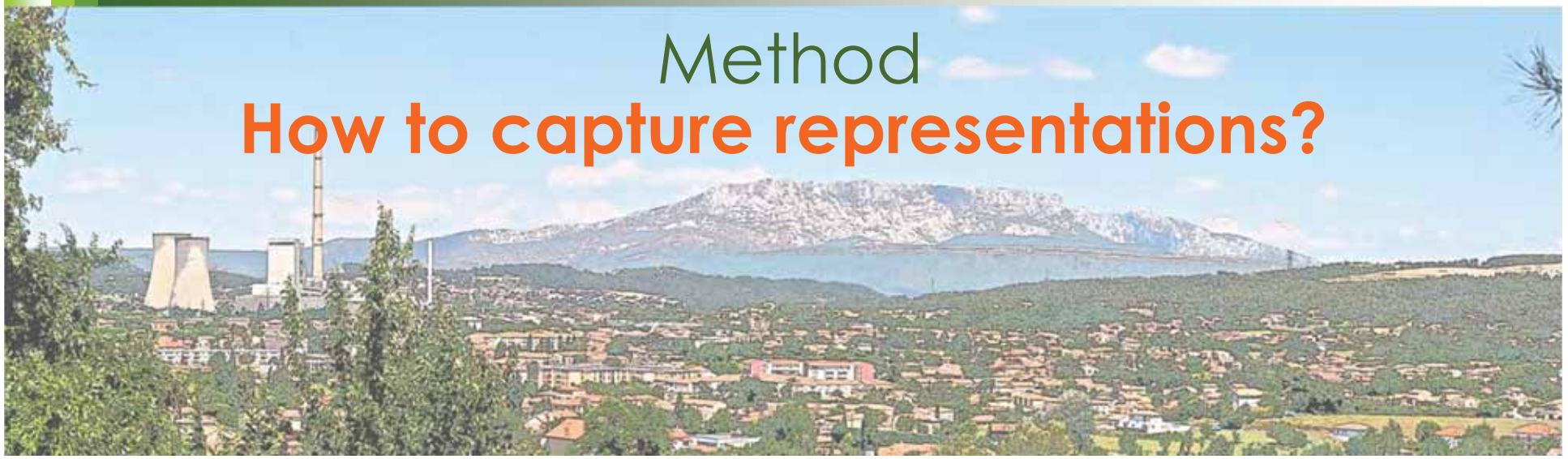
Problematic

1. **What are the environmental/science representations by children of mining area?**
2. **Do representations depend on variables** (social background, link with the territory, industry, coal activity...)?

Hypothesis

Representations are different following several variables:

- place of residence
- territorial and social origins
- link with the history of mining
- industries
- …



Method
How to capture representations?

Environment

- Perception about Environmental Problems in Elementary Schools (Sadik et al, 2007)
- Analysis of the Environmental Problems Pictures of Children from Different Socio-economical Level (Sadik, et al., 2011)
- Children's drawings about the environment (Barraza, 2005)
- Gaining representation of Chidrens's and Adults' Constructions of Sustainability Issues (Barraza, Robottom, 2008)

Représentation de la science

- DAS-T (Chambers, 1983)
- DAST-Checklist (Finson, et al. 1995)
- DAES-T (Thomas et al., 2003)

----- Drawings -----

Survey:

28 elementary schools

2238 children (8-10 years)

821 answers (37,49%)

50% F - 50% M

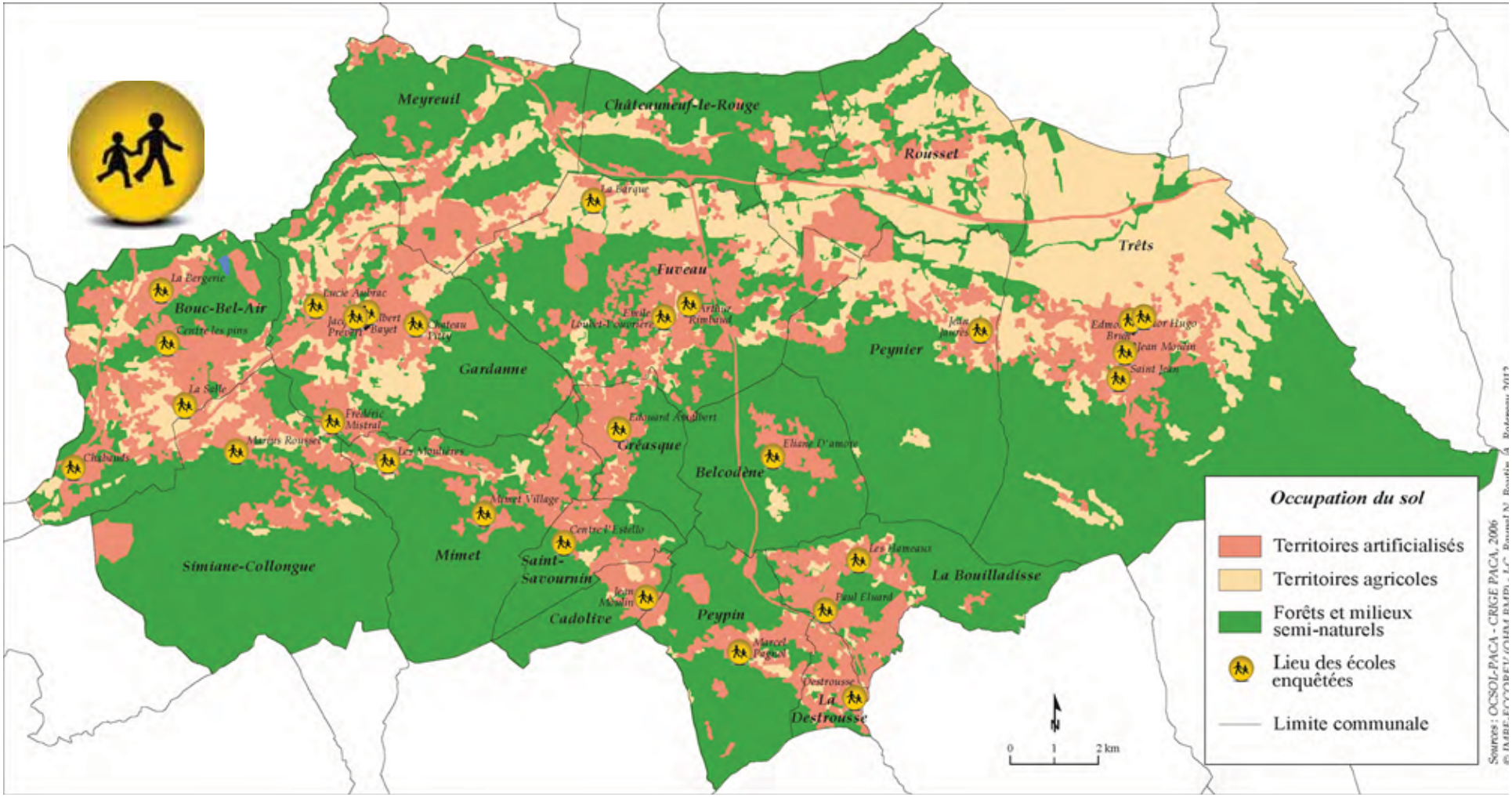
Questionnaire data base

- School
- Gender
- Residence
- Transportation
- Parental social status
- Territory / Mining links

Protocol

On a sheet of A4

1. Draw your environment
2. Draw an environmental scientist
3. Give a **short description** for each



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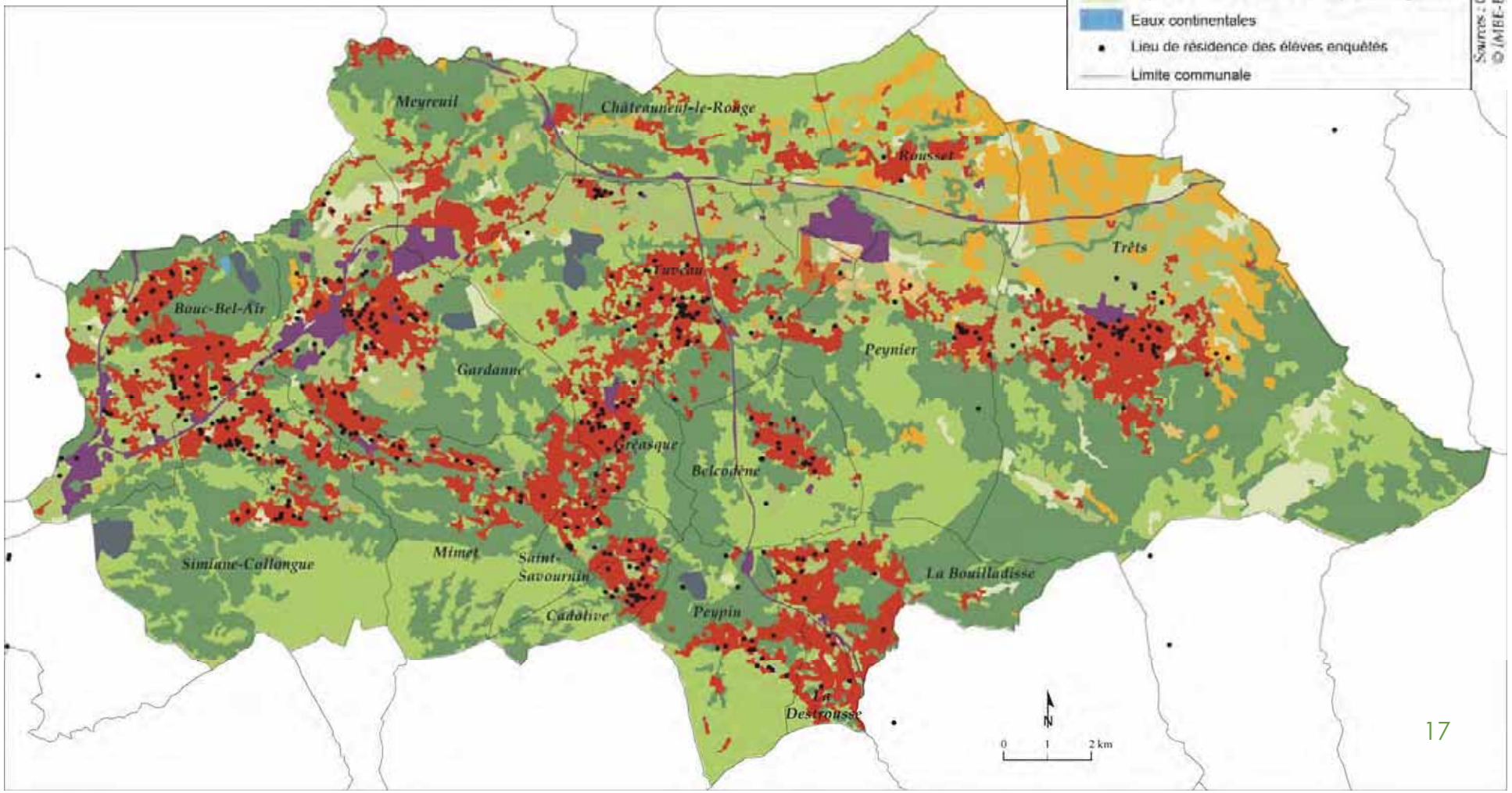
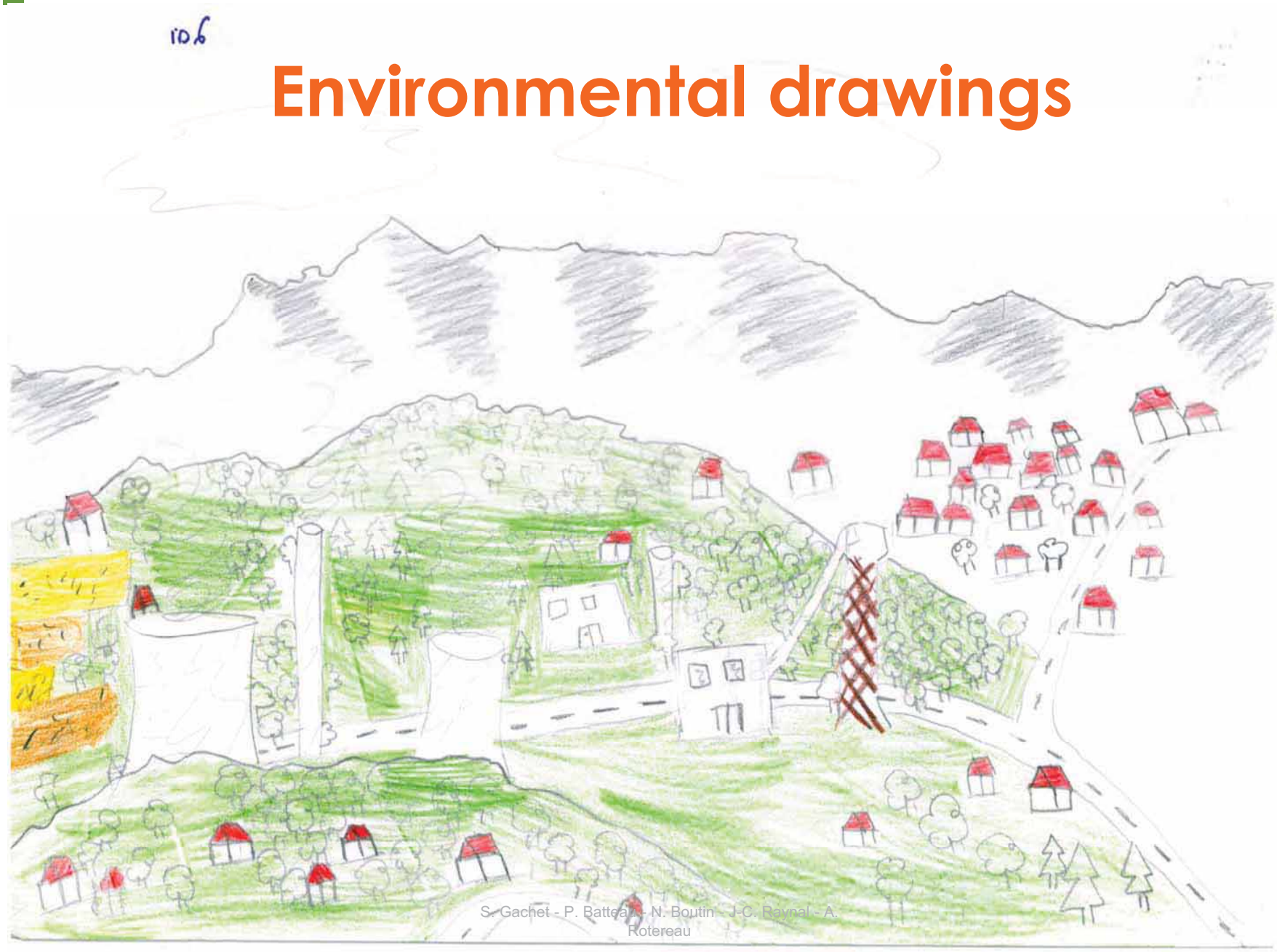


Environmental drawings



Expert typological analysis

Classification

• PHYSICAL	Artificial / natural landscapes
• COAL MINING HERITAGE	Coal mining design (forms, builds, dumps, houses)
• INDUSTRIAL	Energy plant, industries, storage…
• BIODIVERSITY	Fauna, flora
• ENVIRONMENTAL ISSUES	Global/regional or local issues, planetary system
• SOCIAL	Social representation (family, friends, school, etc.)
• LUDIC	Playground, leisure, games, etc.

Dominant

Present

Absent

Expert typological analysis

Bonjour Nathalie !

Liste des classements effectués

Sélection du n° de dessin souhaité :

0017

ATTENTION : L'image n° 0017 à déjà été classée !

Image N° : 0017
Sexe : un garçon
Ecole : GARDANNE, Ecole LUCIE AUBRAC
Commentaire : J'habite au milieu de la colline et je vois les arbres, les lignes électriques, la cheminée de la centrale, le pilon du Roy, les cheminées de Péchiney, le terril de Bivers, le puy de la mine, les lavandes de mon jardin. Il y a plein d'animaux sauvage : renard, lapin, tortue, hérisson, sanglier. Quand je ferme les yeux je vois que j'ai de la chance.

Thématique du dessin :

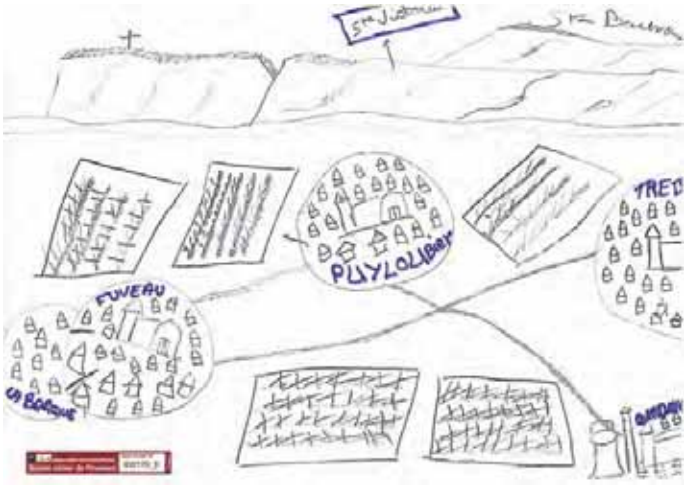
	Dominant	Présent	Absent	Sans réponse
Physique (réseau de circulation, paysages artificialisés ou non : territoires urbanisés/agricoles/forêts/montagnes/milieux naturels/surfaces en eau, etc.)	○	○	○	◉
Industriel (centrale électrique, usines, entrepôts, friches industrielles, etc.)	○	○	○	◉
Héritage minier (chevalements, puits/tunnels, terrils, cités minières, toutes représentations de l'histoire minière)	○	○	○	◉
Biodiversité (faune/flore : végétaux, champignons, animaux hors animaux de compagnie, insectes, etc.)	○	○	○	◉
Grandes thématiques environnementales (planète en tant que système, problématiques, risques et catastrophes pour l'environnement : pollution, déchets, climat, incendies, érosion de la biodiversité, etc.)	○	○	○	◉
Social (représentation de la famille ou de la maison familiale ou de l'école, amis, voisins, animaux de compagnie, environnement domestique, etc.)	○	○	○	◉
Ludique (aires de jeu, loisirs) : foot, tennis, parcs de loisirs, piscines, randonnée loisir, camping, etc.)	○	○	○	◉
Inclassable / hors sujet	○	○	○	◉

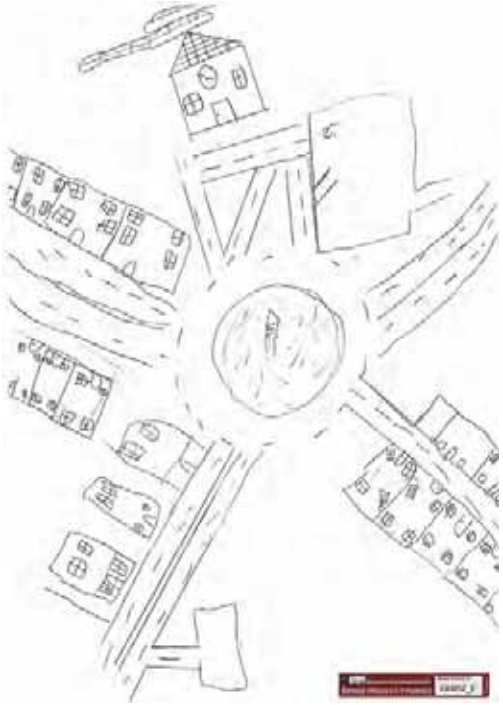
Dessin polychrome ? ○Oui ○Non

Degré de sophistication du dessin ?

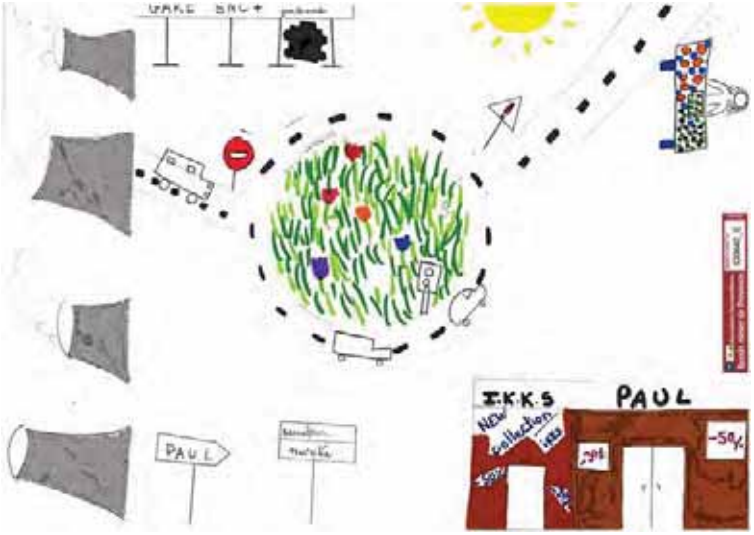
Valider

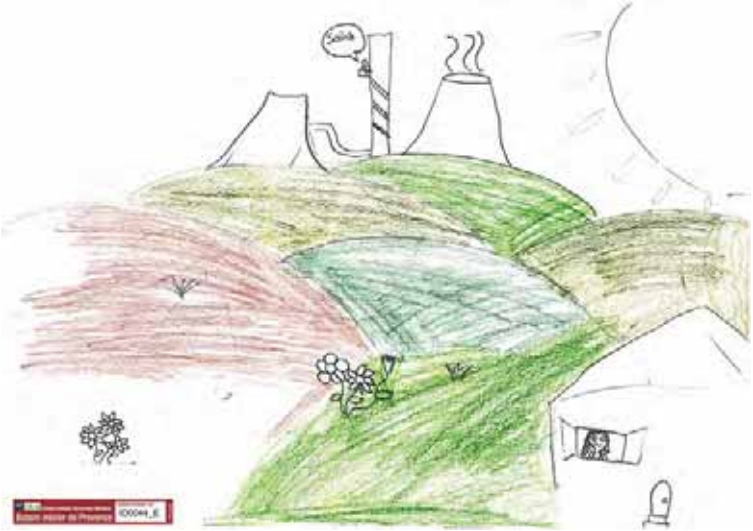
« Physical »



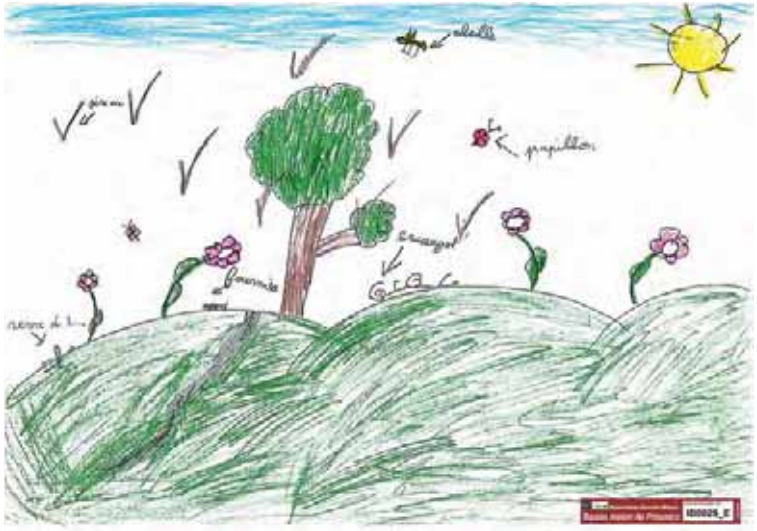


Industrial

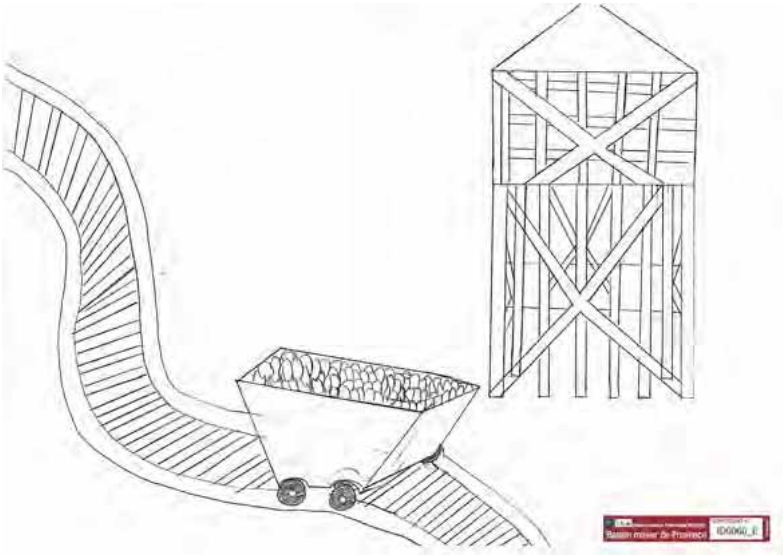


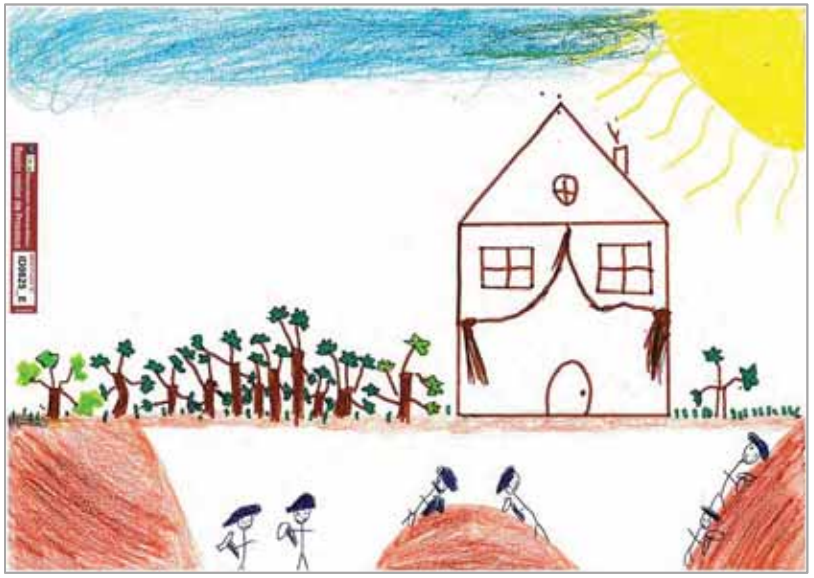


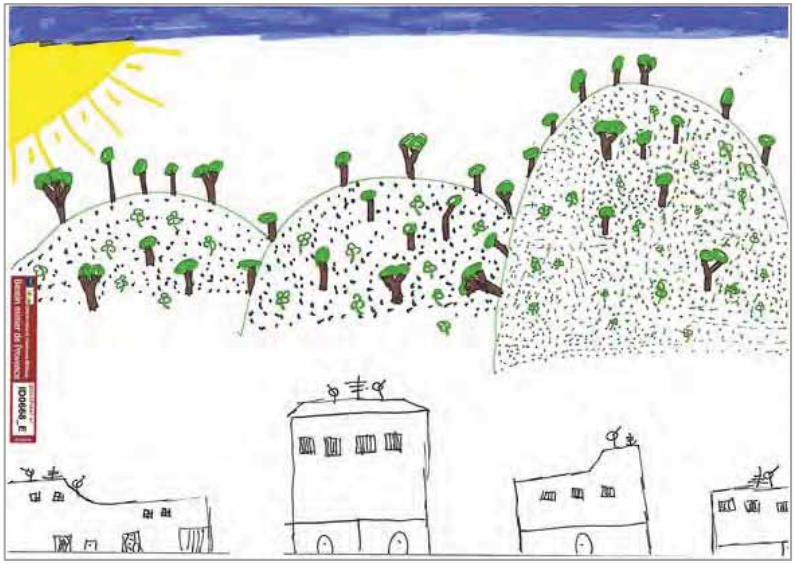
Biodiversity



Mining heritage



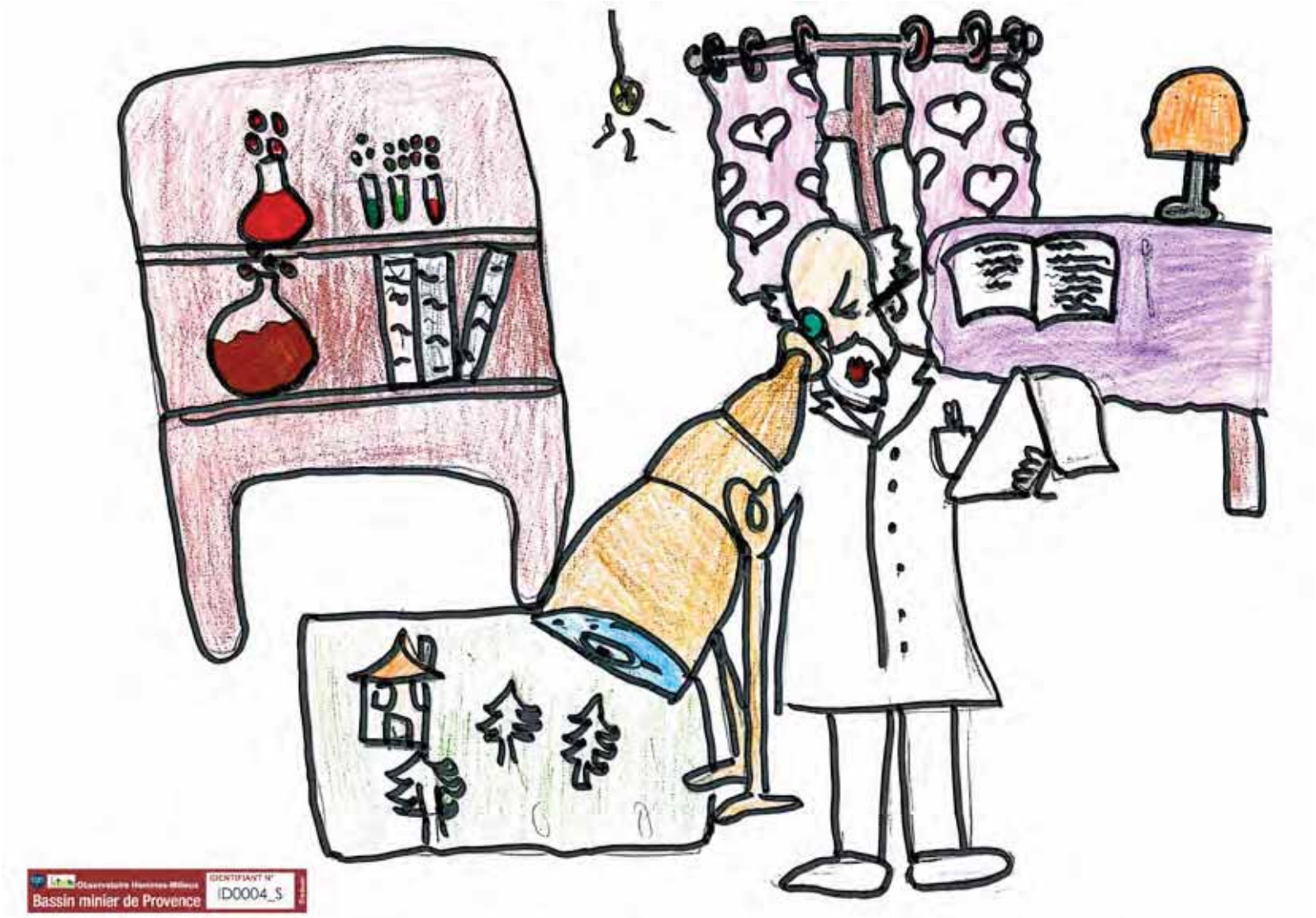




Environmental and global issues

J'aimerais que les chasseurs arrêtent de chasser les oiseaux, les pauvres, ils nous ont rien fais. si vous laissez les oiseaux il seront comme le dessin, voila.

Environmental scientist drawings



2. Draw an environmental scientist (DAEST)

Analysis

- Chambers (1983) 7 indices
- Thomas (2003) additional images

STANDARD IMAGE:
1. Lab coat
2. Eyeglasses
3. Facial growth of hair
4. Symbols of research
5. Symbols of knowledge
6. Technology
7. Relevant captions

ALTERNATIVE IMAGES:
8. Gender:
   a. Male
   b. Female
   c. Gender neutral
9. Ethnic background:
   a. Caucasian
   b. African-American
   c. Asian
   d. Ethnic neutral
10. Age:
   a. Middle-aged
   b. Elderly scientist
11. Indications of danger
12. Presence of light bulbs
13. Mythic images
14. Indicators of secrecy

ADDITIONAL IMAGES OF AN ENVIRONMENTAL SCIENTIST:
15. Savior image

16. Natural setting(s) of work:
   a. Water environments
   b. Mountains
   c. Trees/forest
   d. Soil/dirt
   e. Wildlife
   f. Urban/city
17. Nature of scientific work:
   a. Observing
   b. Measuring
   c. Testing samples with scient
   d. Collecting data
   e. Experimenting
   f. Reporting
   g. Work cooperatively

18. Type of scientist:
   a. Wildlife biologist
   b. Aquatic scientists
   c. Forester
19. Emotions:
   a. Joy and hope
   b. Sadness

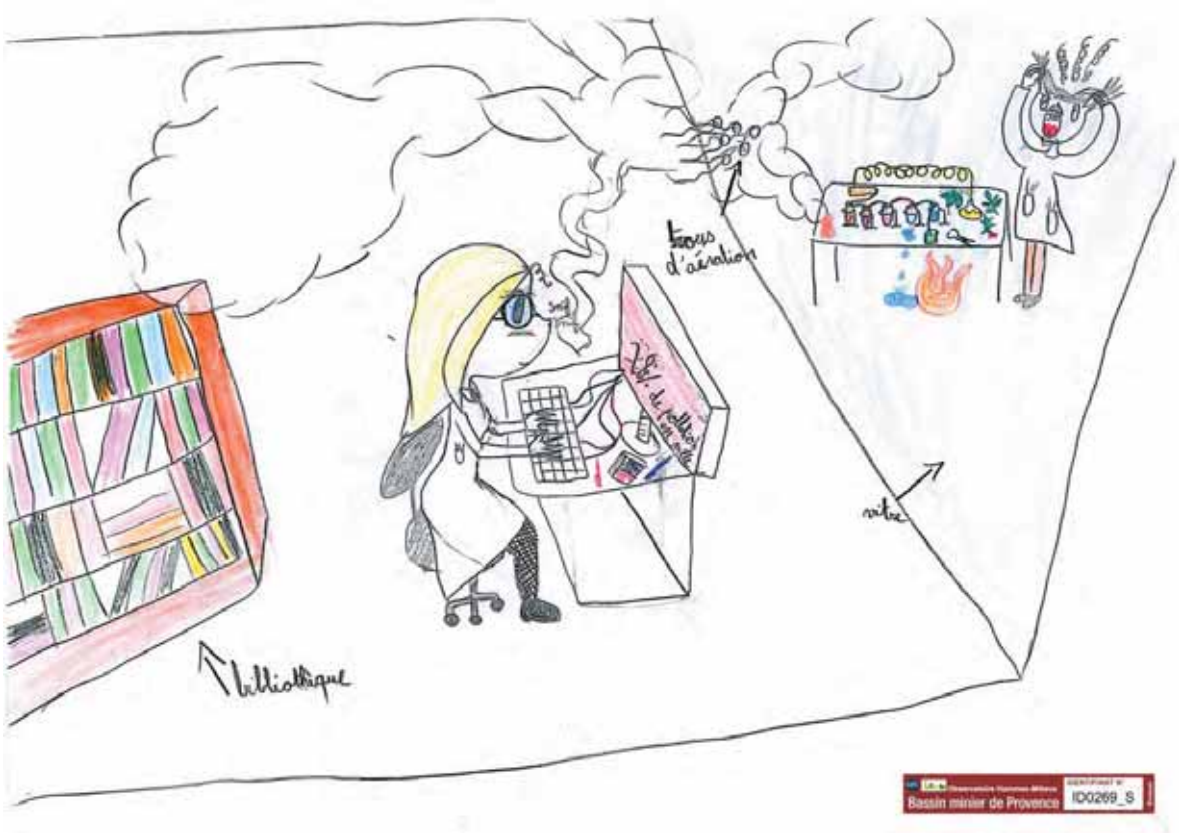
TOTAL SCORE: 19
Score of:
Standard images: 7
Alternative images: 7
Additional images: 5

Thomas et al. 2003 The Draw an Environmental Scientist (DAEST)

Comments

Je vais dessiner une scientifique devant son ordinateur avec marqué la pollution dans le village, dans les villes, et tout ca dans son ordinateur. Elle le notera sur son petit carnet et continuera ses recherches.

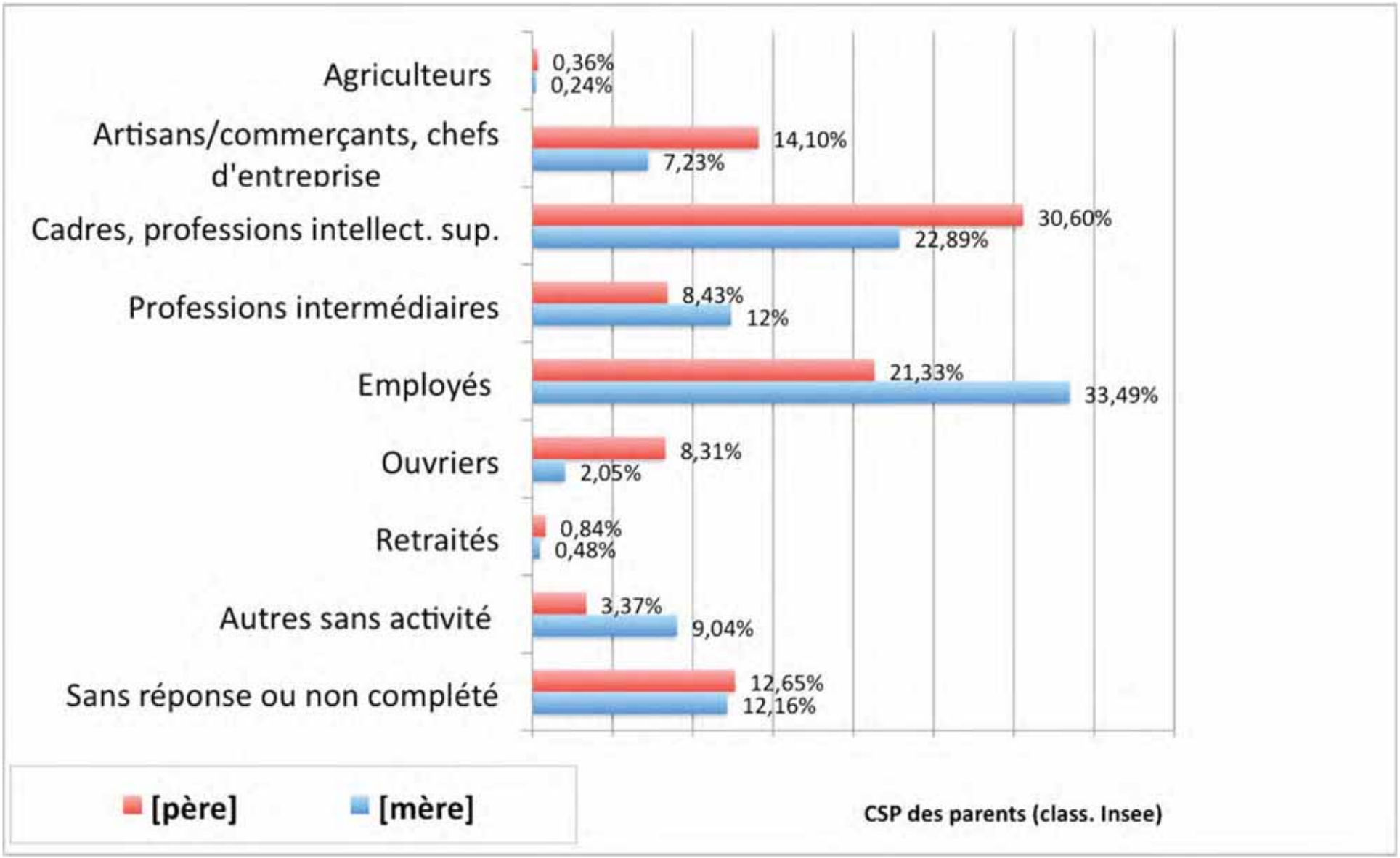
Id 269, 10 ans,
Ecole élémentaire de Belcodène
OHM-BMP – INEE/CNRS – FR 3098 ECCOREV



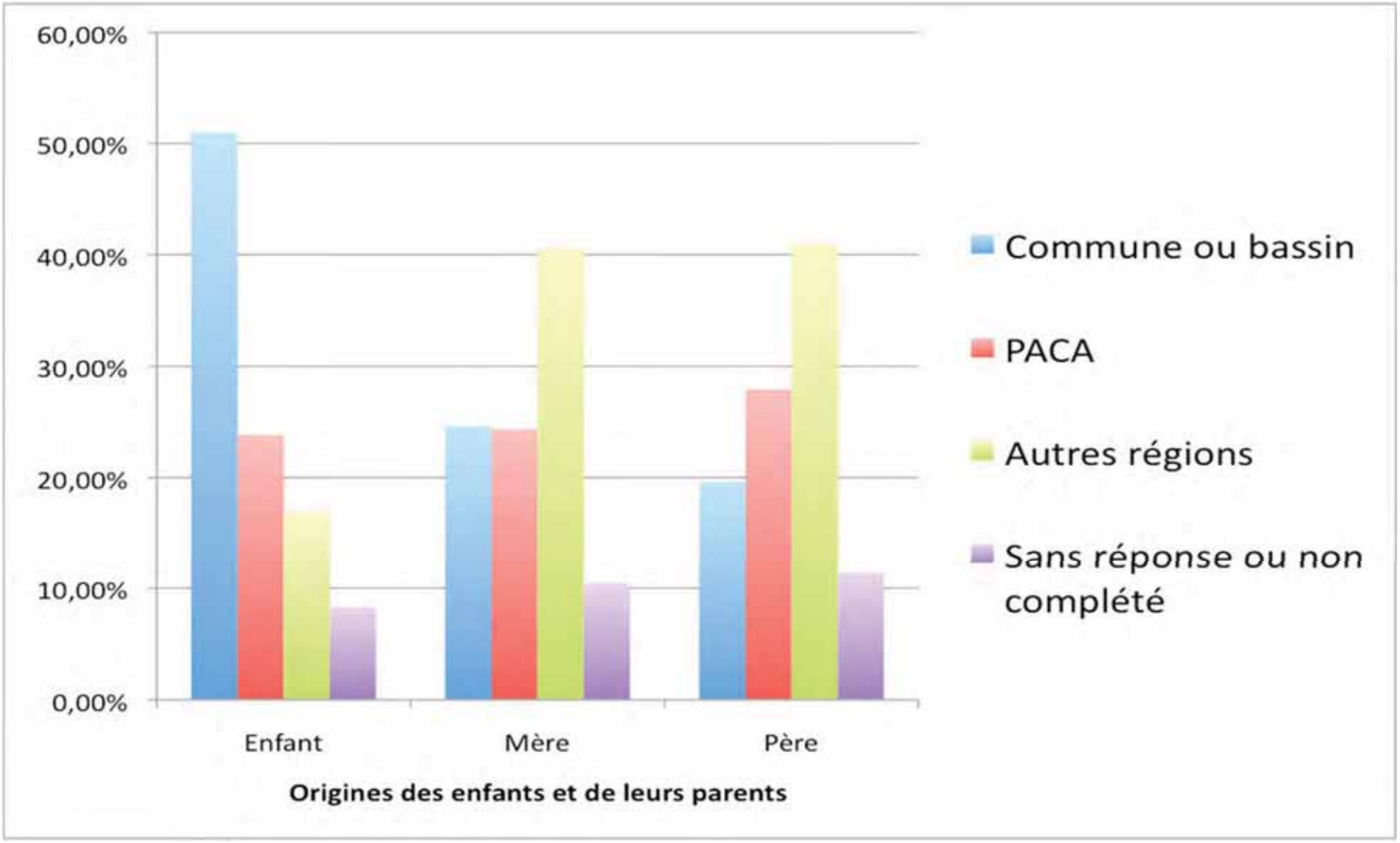
Some results

1. Questionnaire
2. Environmental drawings
3. Environmental scientist drawings

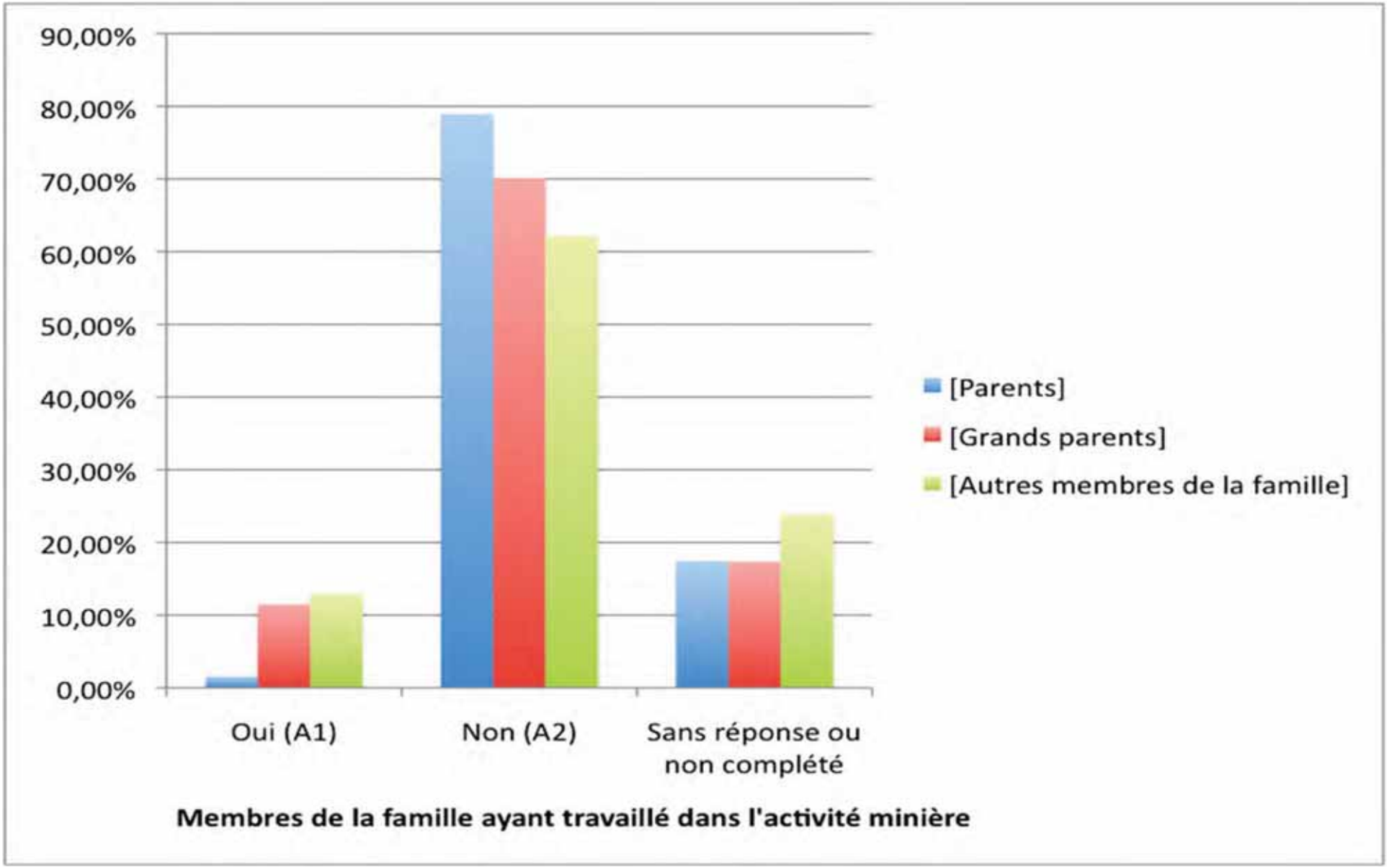
Parental CSP



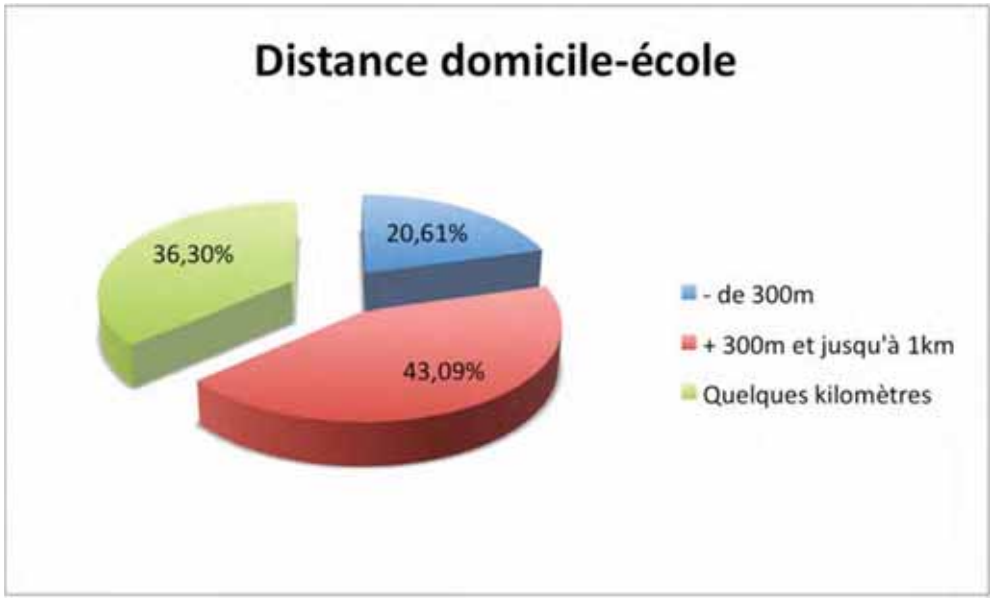
Origines

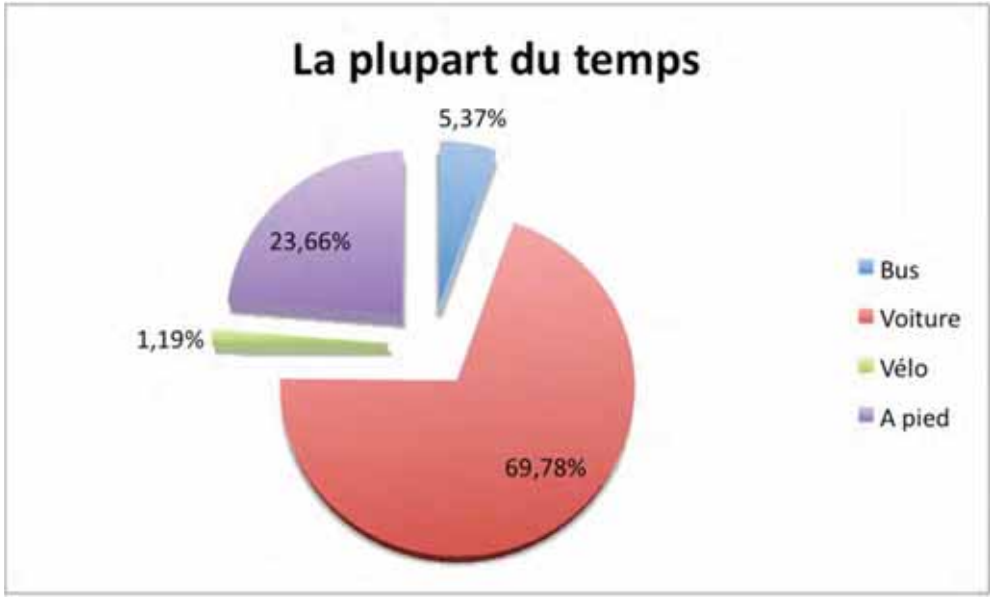

60,00%
50,00%
40,00%
30,00%
20,00%
10,00%
0,00%
Enfant
Mère
Père
Commune ou bassin
PACA
Autres régions
Sans réponse ou non complété
Origines des enfants et de leurs parents

Mining heritage

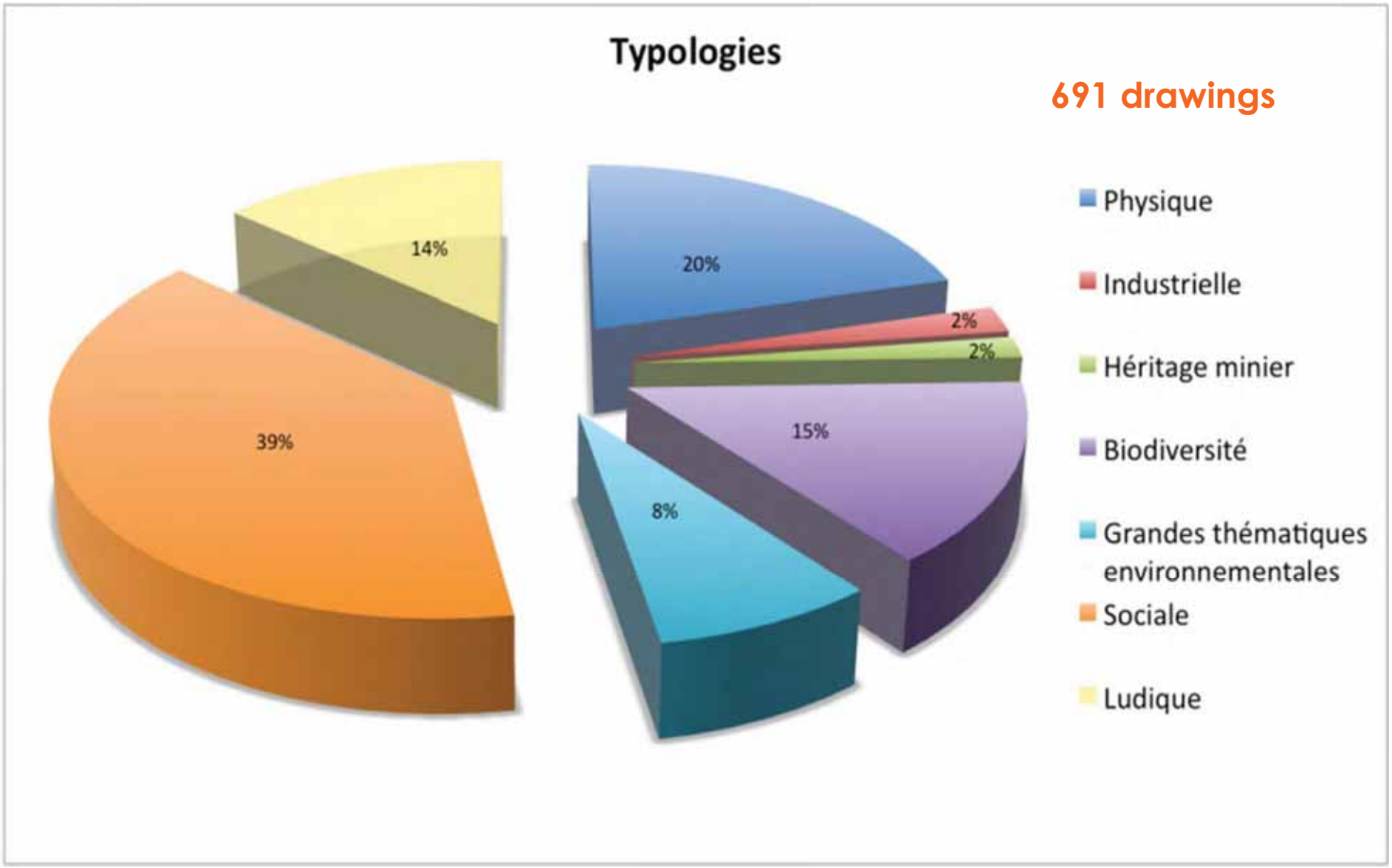


Mobility - Transportation



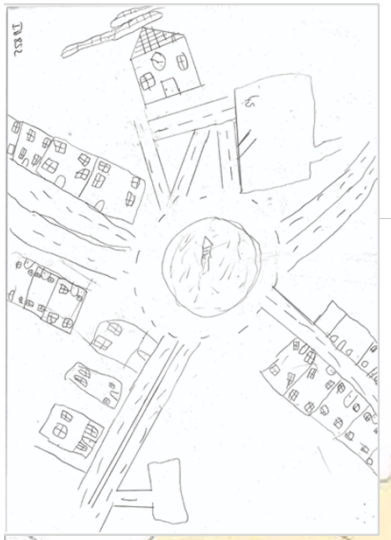


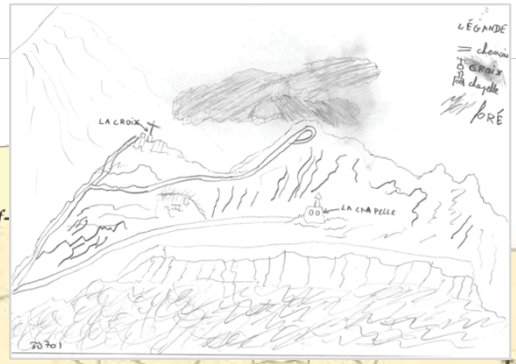
1. Determinants of environmental representation in young children



Operating GIS data base

« *Physical map* » by town





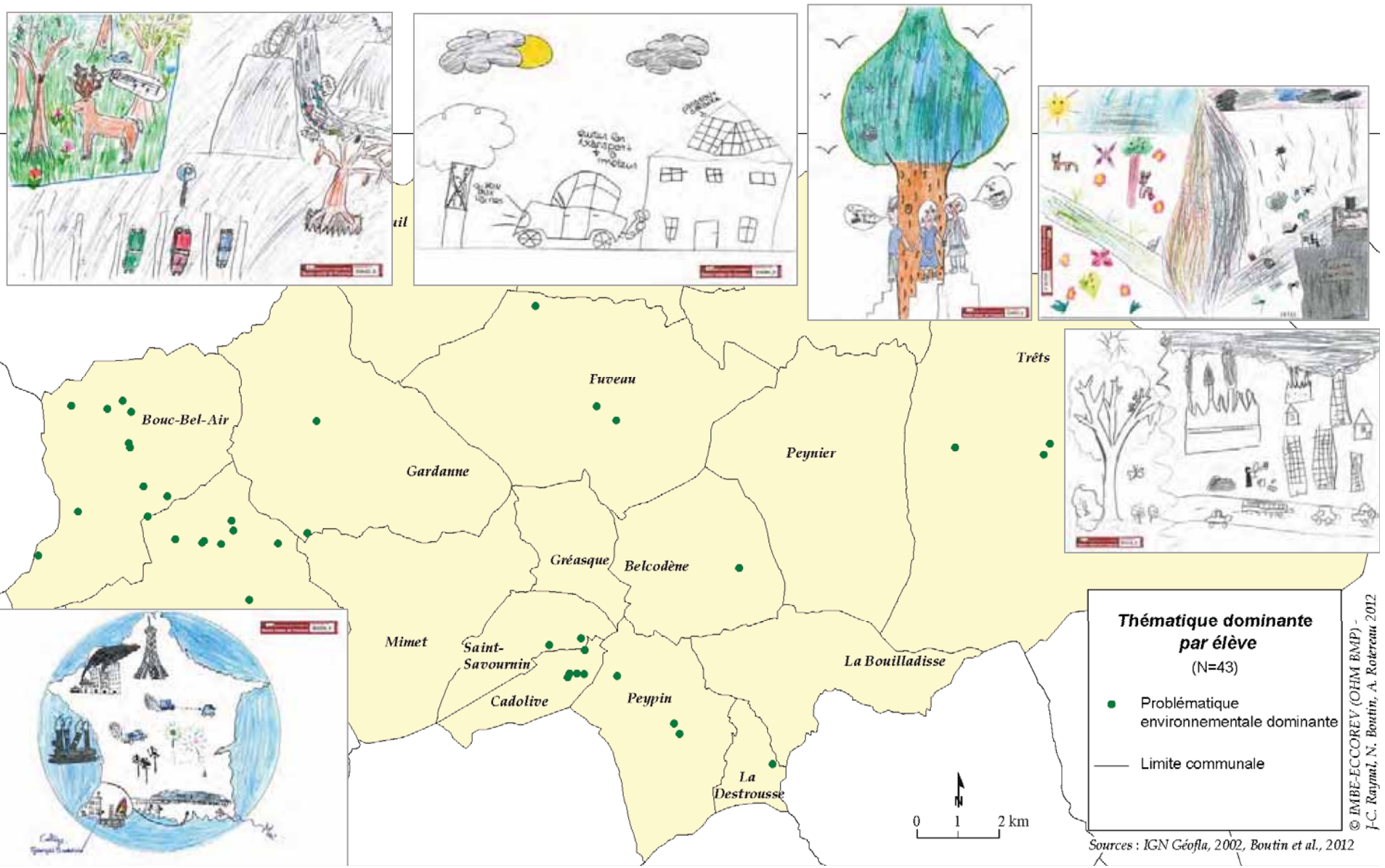
« *Industrial map* » by school

Sources : IGN Géofla, 2002, Boutin et al., 2012

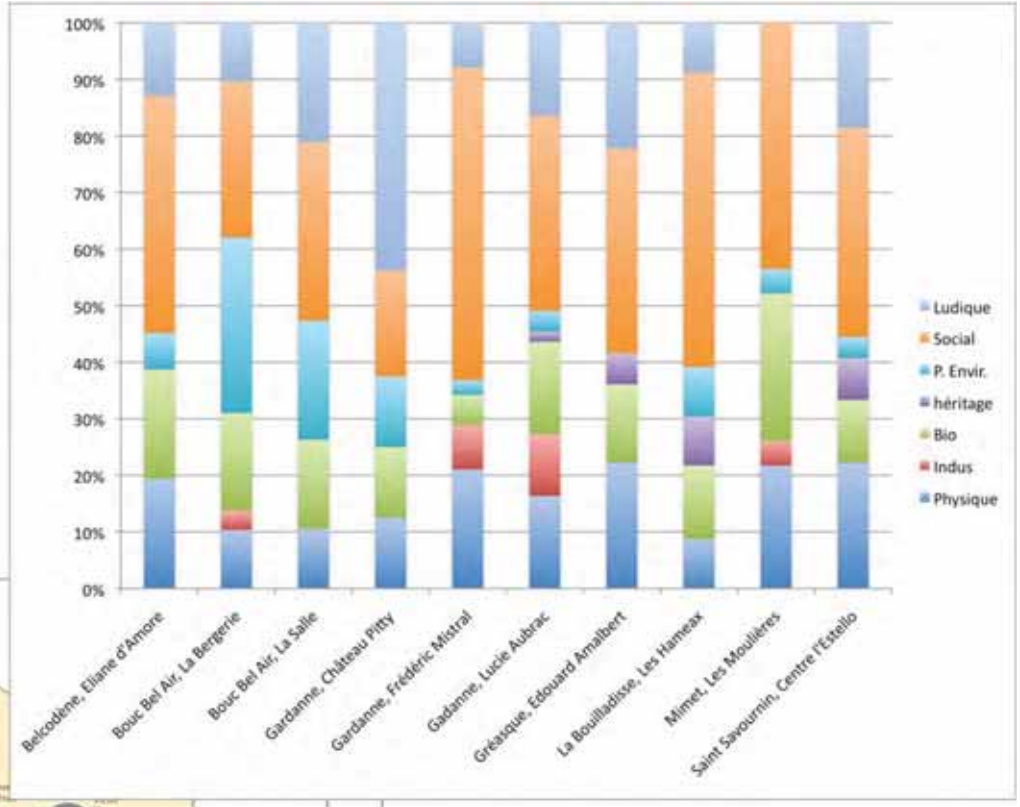
« Coal mining heritage »
by school

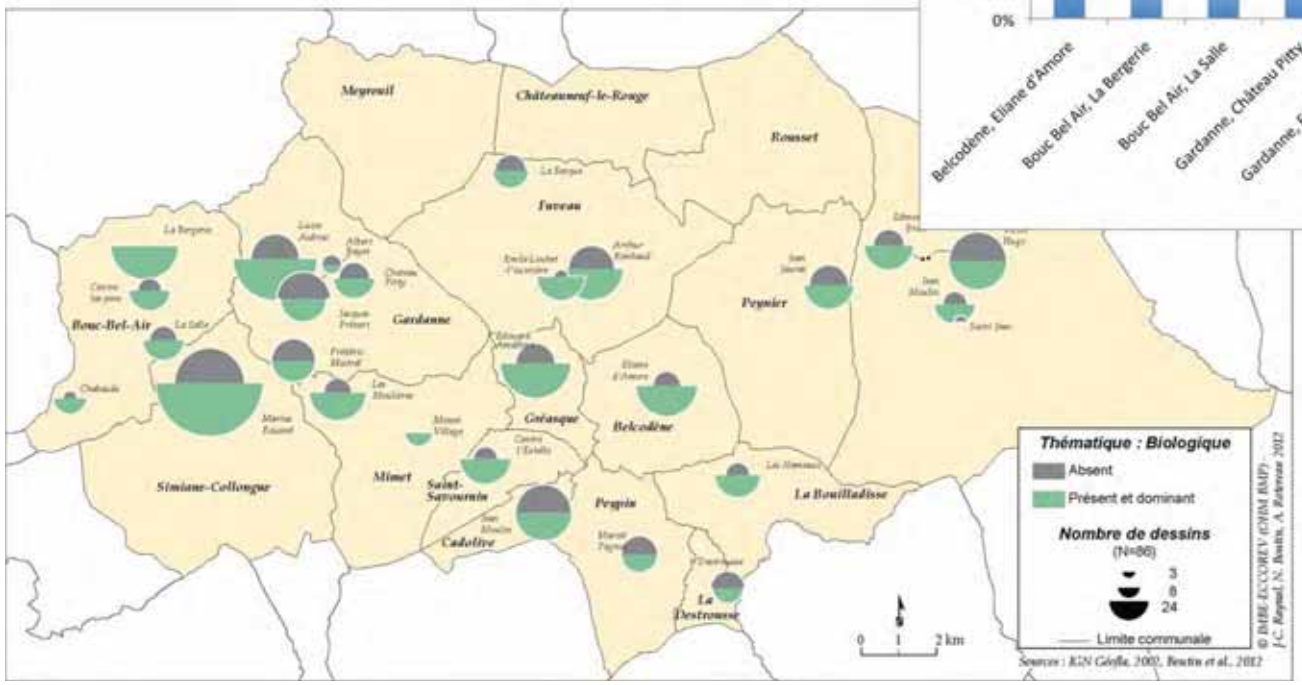
Sources : IGN Géofla, 2002, Boutin et al., 2012

Environmental dominant distribution

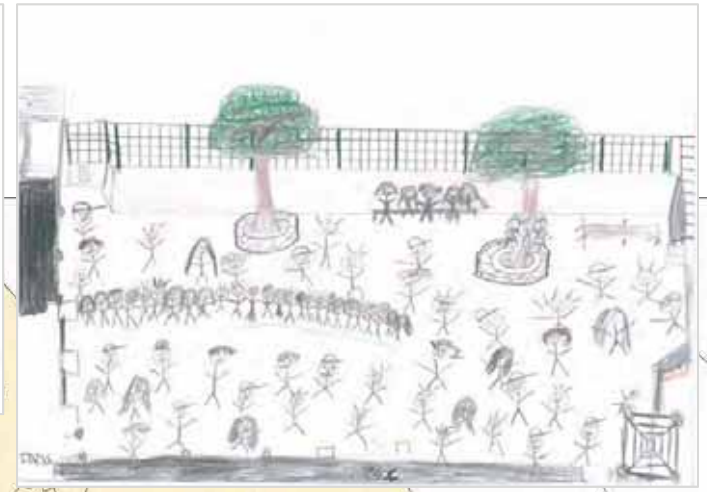


« *Biodiversity map* » by school





Social dominant distribution



Fuveau
Trêts
Bouc-Bel-Air
Gardanne
Peynier
Gréasque
Belcodène
Mimet
Saint-Savournin
Cadolive
Peypin
La Bouilladisse
La Destrousse

0 1 2 km

Thématique dominante par élève

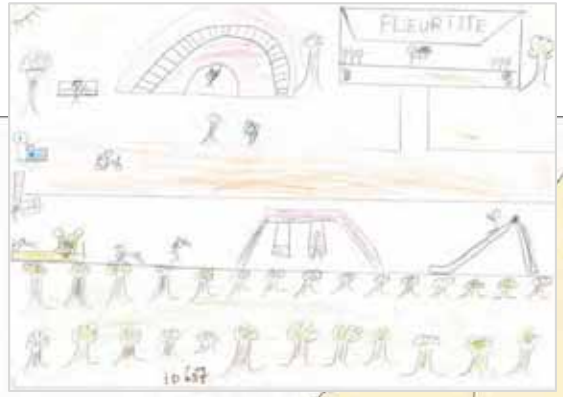
(N=213)

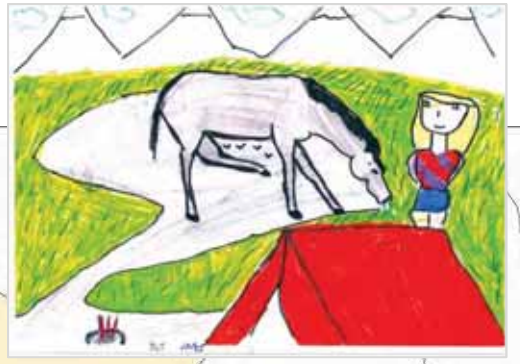
Sociale dominante

Limite communale

Sources : IGN Géofla, 2002, Boutin et al., 2012

Ludic dominant distribution





Luveau
Trêts
Bouc-Bel-Air
Gardanne
Peynier
Gréasque
Belcodène
Mimet
Saint-Savournin
Cadolive
Peypin
La Bouilladisse
La Destrousse

0 1 2 km

Thématique dominante par élève
(N=213)

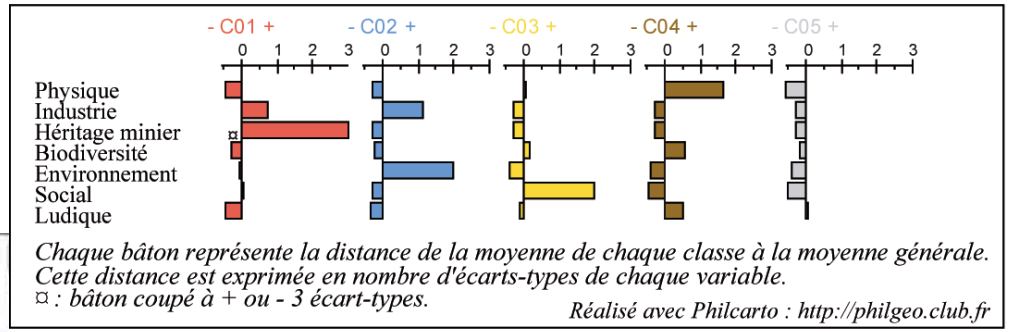
Sociale dominante

Limite communale

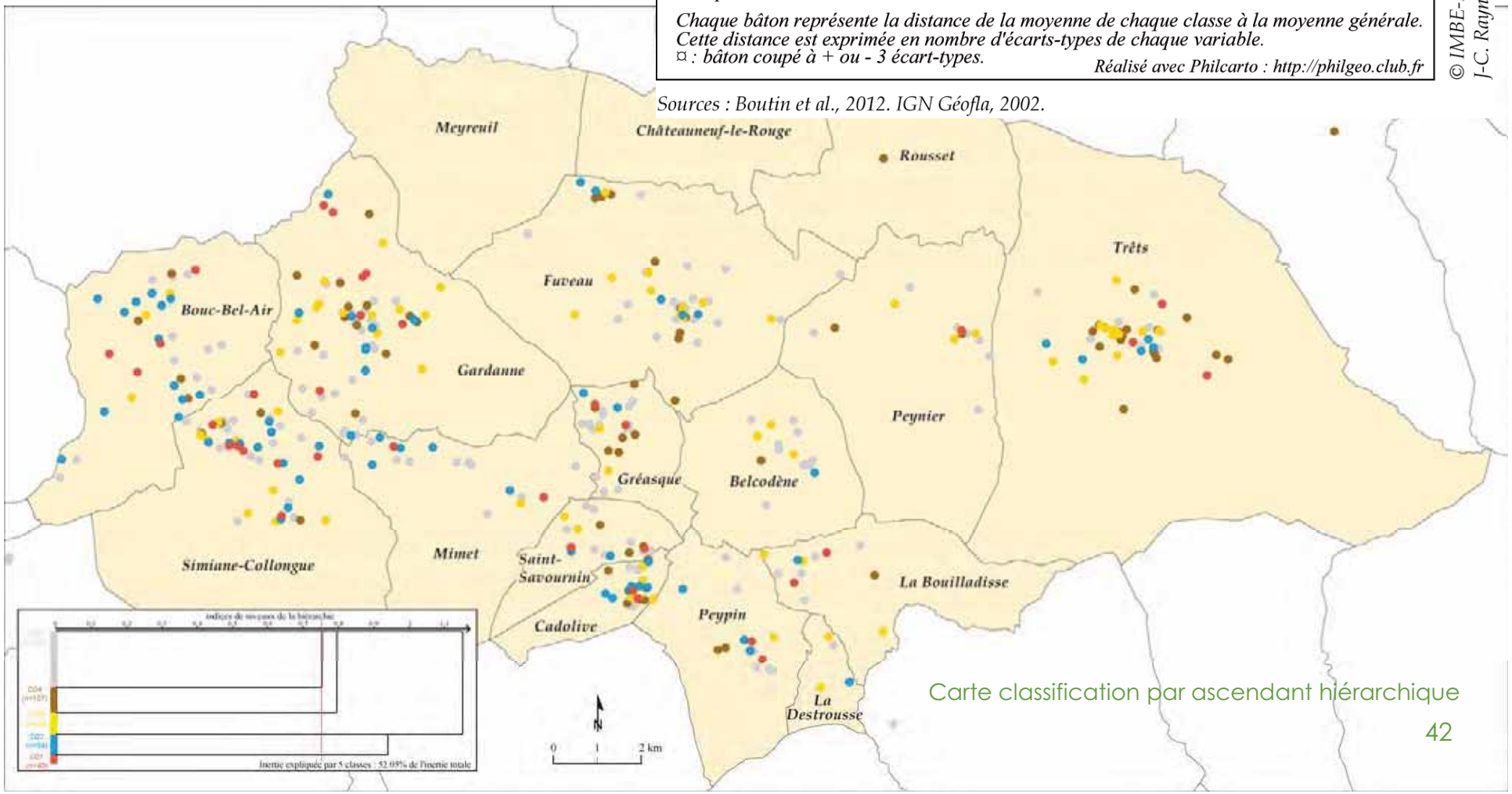
Sources : IGN Géofla, 2002, Boutin et al., 2012

Cluster analysis (HAC)

- Classe 1 40 : héritage minier et industriel
- Classe 2 94 : environnement et industriel
- Classe 3 94 : social
- Classe 4 107 : physique, bio., ludique
- Classe 5 244 : uniforme



Sources : Boutin et al., 2012. IGN Géofla, 2002.



Carte classification par ascendant hiérarchique

2. Draw an environmental scientist (DAEST)

Littérature

- **Chambers** (1983)
4,807 (ages 6/11 ans)

- **Symington & Spurling** (1990)

- **Newton and Newton's** (1992)
1,143 ((ages 4-11)

- **Matthews** (1994)
132 (ages 7,8,10)

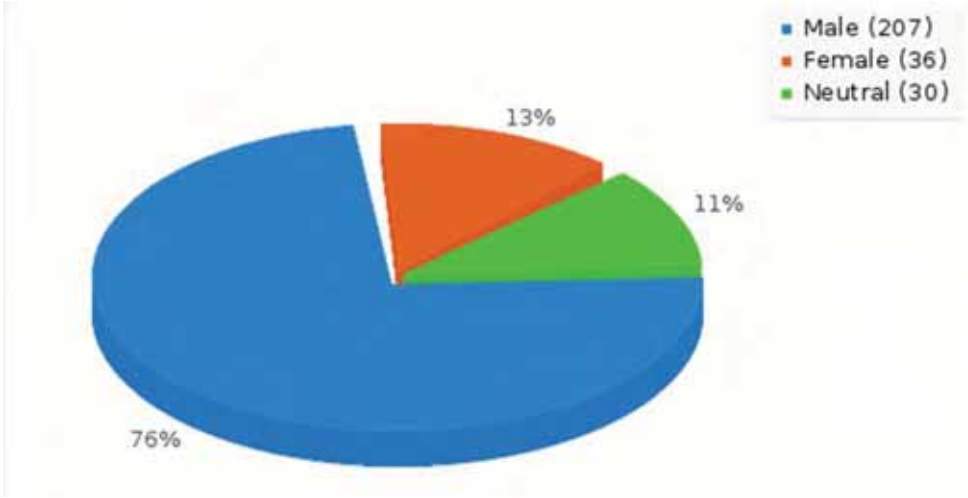
Dès 6 ans acquisition du stéréotype
Mais résultats fortement corrélés avec le niveau socio-éco de l'école (retard dans les écoles les + pauvres)

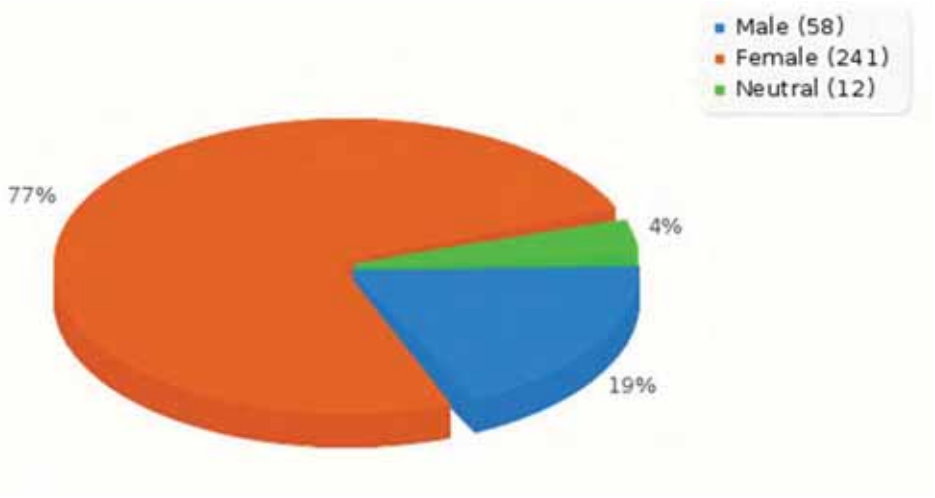
Pas de différence significative entre les représentation de élèves (dès 9 et +) et adultes scientifiques.

Les scientifiques travaillent dans leur laboratoire… les chimistes sont les + représentés…

•49% filles mais seulement **0,56%** scientifiques femmes (toutes dessinées par des filles). (Chambers)
•**83% scientifiques mâles** (Newton)
•**66% M** / 34 F (Matthews)

Gender (scientist)

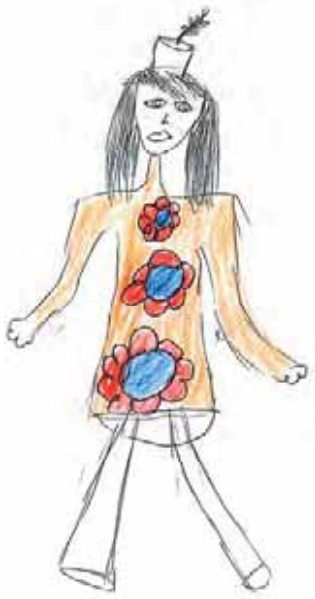




Boys 273 (46,75%)

Girls 311 (53,25%)

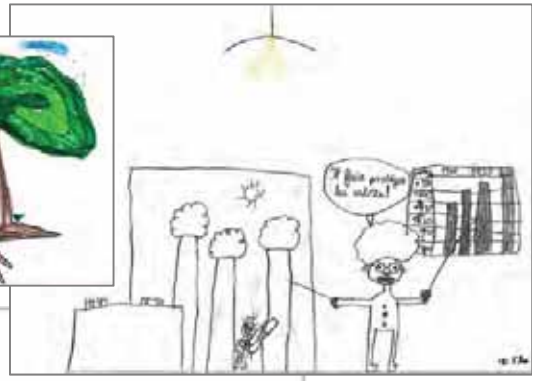
Endowed with supernatural attributes (+12%)

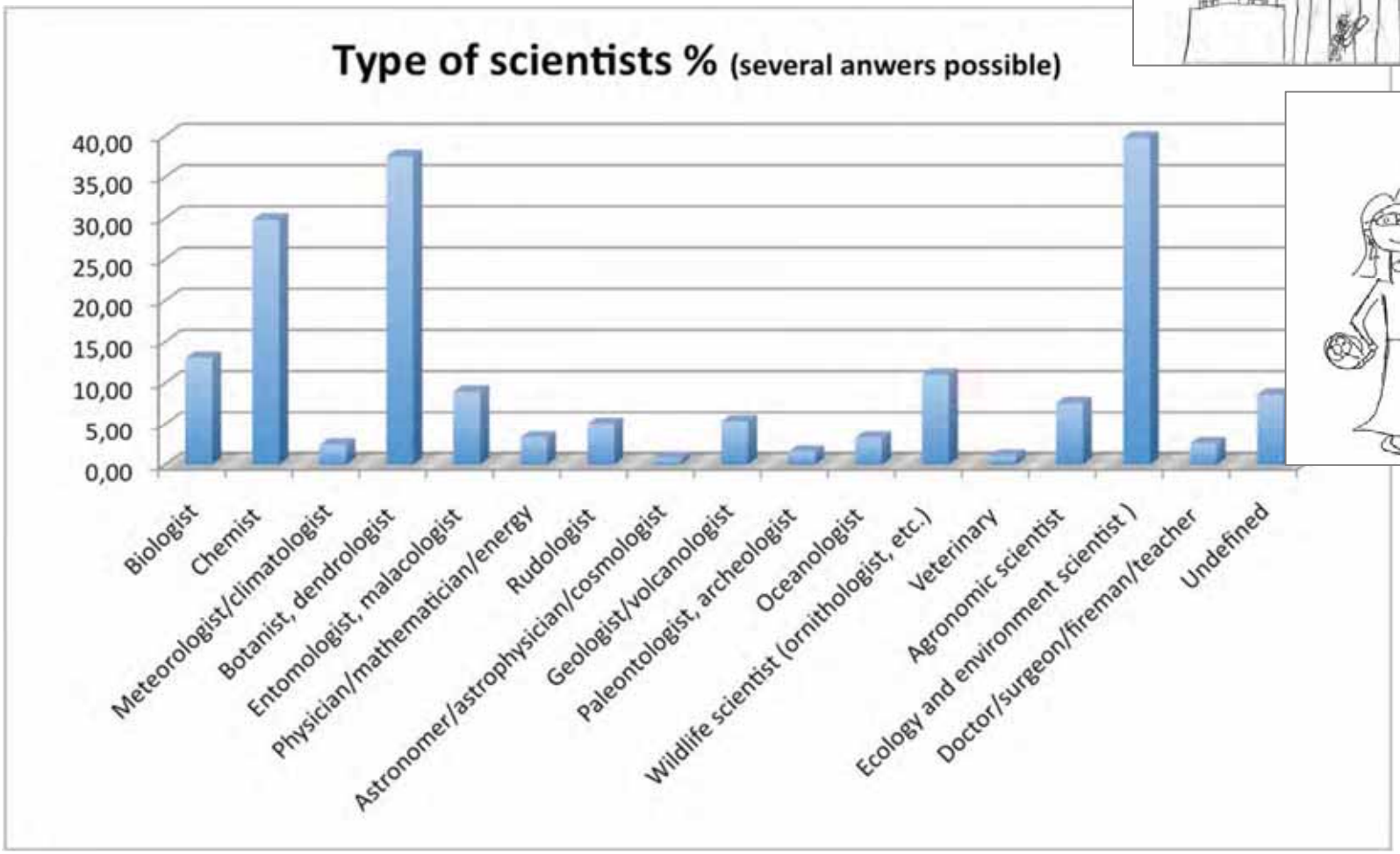


Field

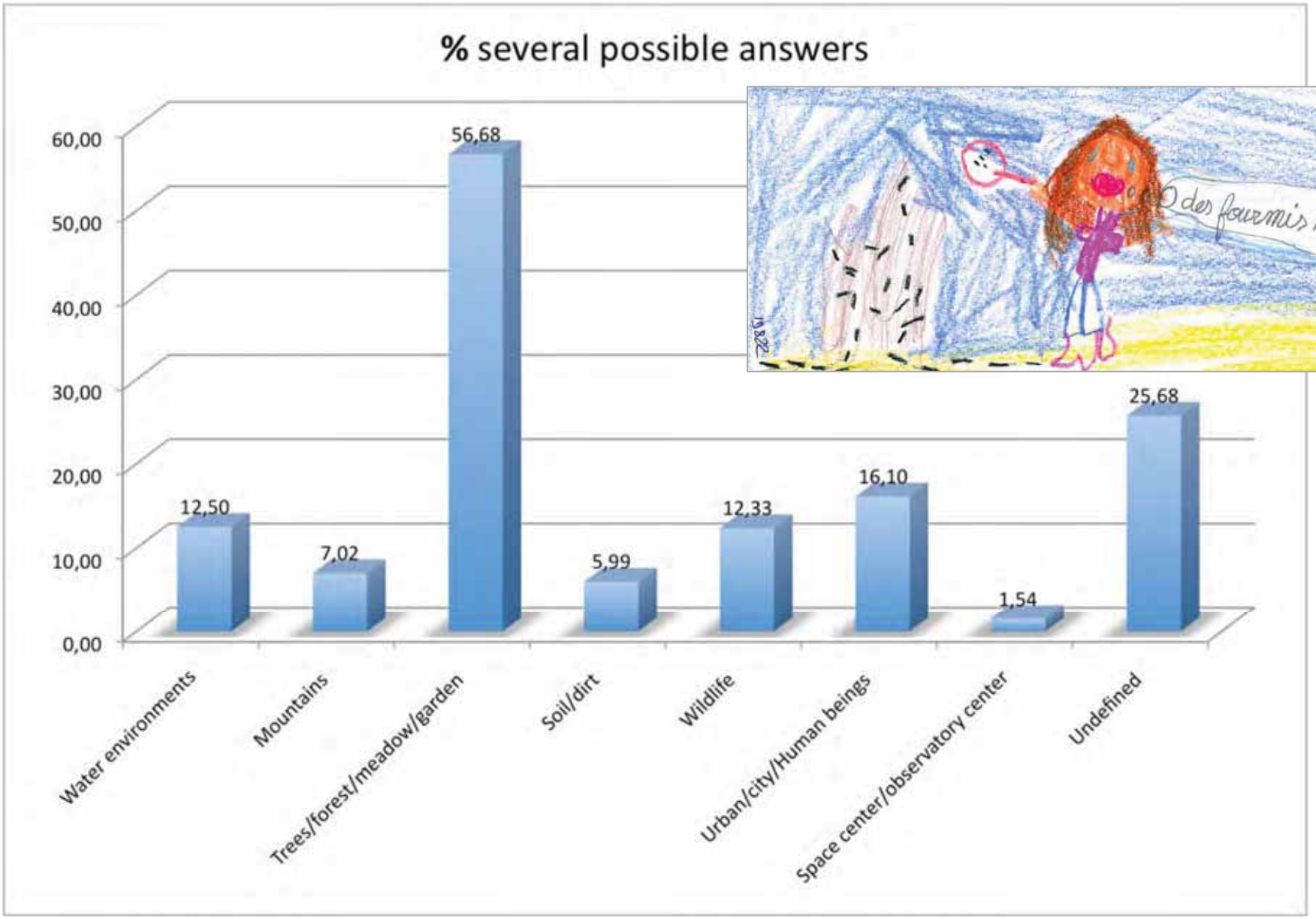




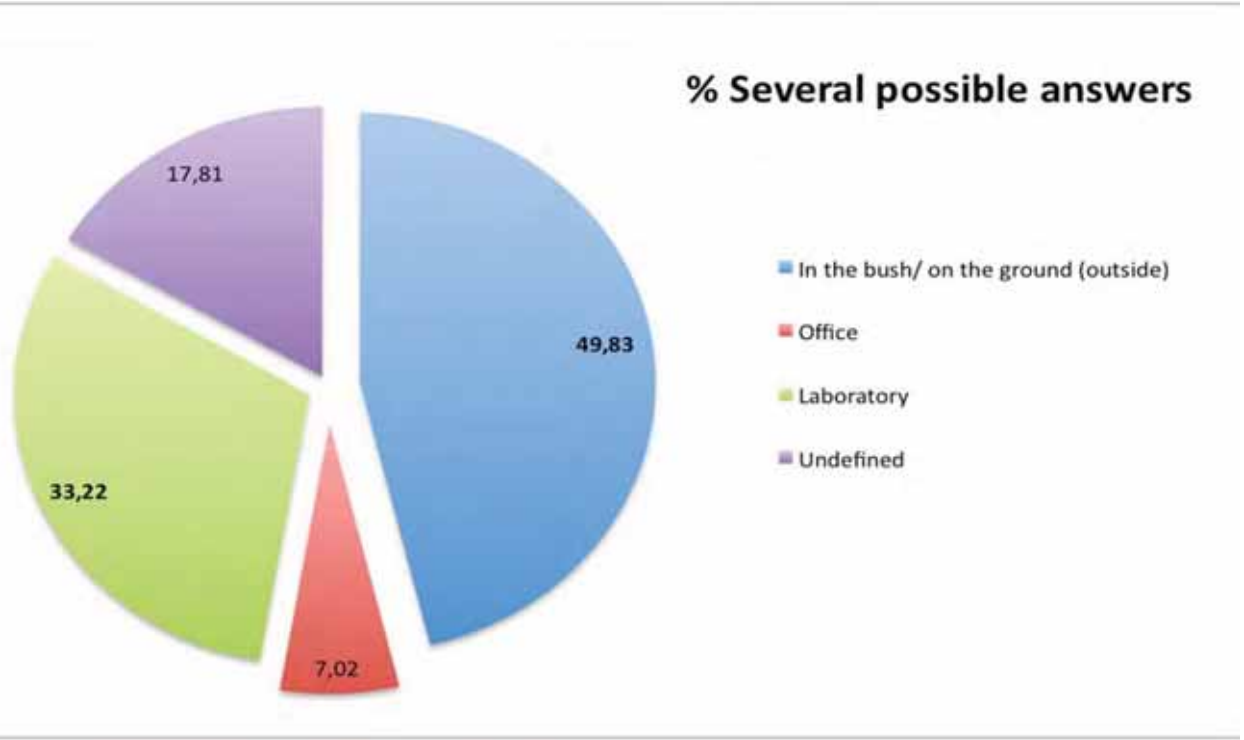


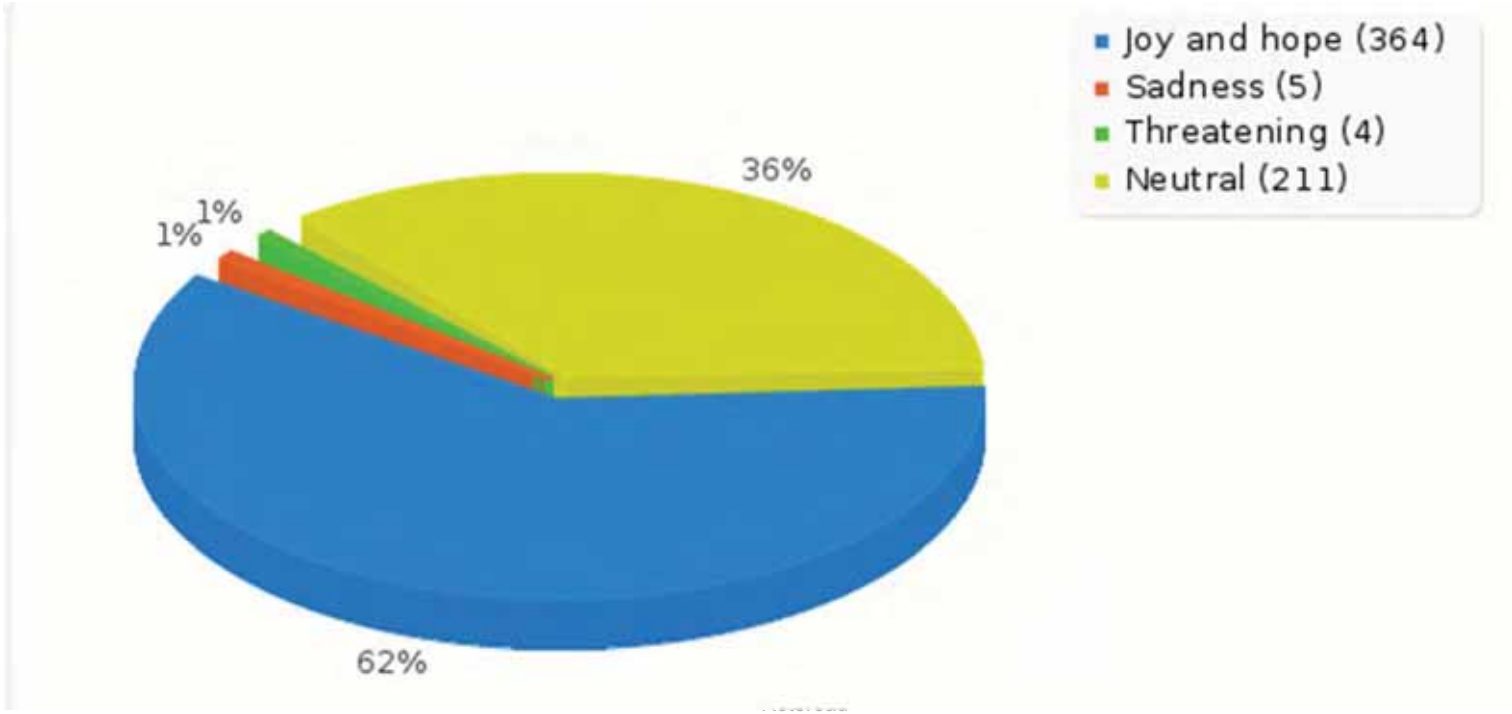

Type of scientists % (several anwers possible)
40,00
35,00
30,00
25,00
20,00
15,00
10,00
5,00
0,00
Biologist
Chemist
Meteorologist/climatologist
Botanist, dendrologist
Entomologist, malacologist
Physician/mathematician/energy
Rudologist
Astronomer/astrophysician/cosmologist
Geologist/volcanologist
Paleontologist, archeologist
Oceanologist
Wildlife scientist (ornithologist, etc.)
Veterinary
Agronomic scientist
Ecology and environment scientist)
Doctor/surgeon/fireman/teacher
Undefined


J'étudie les plantes.


% several possible answers
60,00
50,00
40,00
30,00
20,00
10,00
0,00
12,50
7,02
56,68
5,99
12,33
16,10
1,54
25,68
Water environments
Mountains
Trees/forest/meadow/garden
Soil/dirt
Wildlife
Urban/city/Human beings
Space center/observatory center
Undefined

Laboratory / on the field




Joy and hope (364)
Sadness (5)
Threatening (4)
Neutral (211)
36%
1%
1%
62%

Perspectives

1. Quantitative analysis
2. Annoyance: adult/children's perception and representation
3. Relationship Man-nature: children and adults
4. And furthermore….

Perspectives

APR OHM-BMP 2013

- **EAIF : Territory, an influential factor in understanding the level of environmental awareness of children.**

J. Claude Raynal – P. Batteau – N. Boutin – A. Rotereau – C. Napoleone

« *The New Environmental Paradigm* »

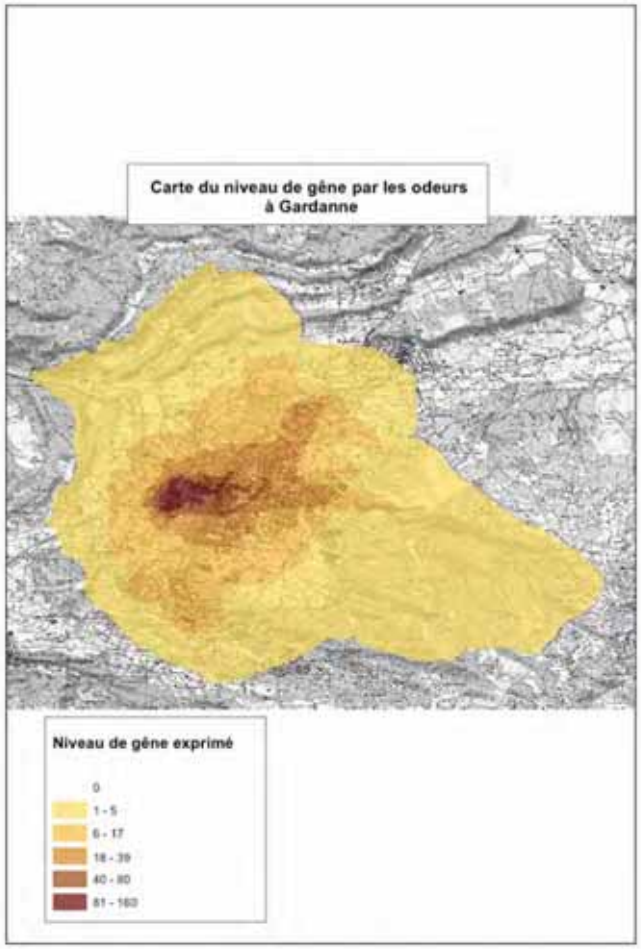
or

Drawings

Perspectives

- **Environmental annoyances: what differences between adult/children**

A. Arnaud – J. Claude Raynal – P. Batteau – N. Boutin



- (1) Are citizens of Gardanne city affected by noise, odor, or visual industrial buildings, involved by industrial plants still operated in the former mining area of Provence?
- (2) Do children of Gardanne city, express these form of disturbance or pollution when they are asked about their surrounding representation?
- (3) What factors influence the perception and representation of landscapes (age, gender, socio-professional category or link/origin with the area)?
- (4) Do the "new users" of the territory, those more affected by externalities generated by industries, contribute to the ongoing processes of change for land use and landscape?

Perspectives

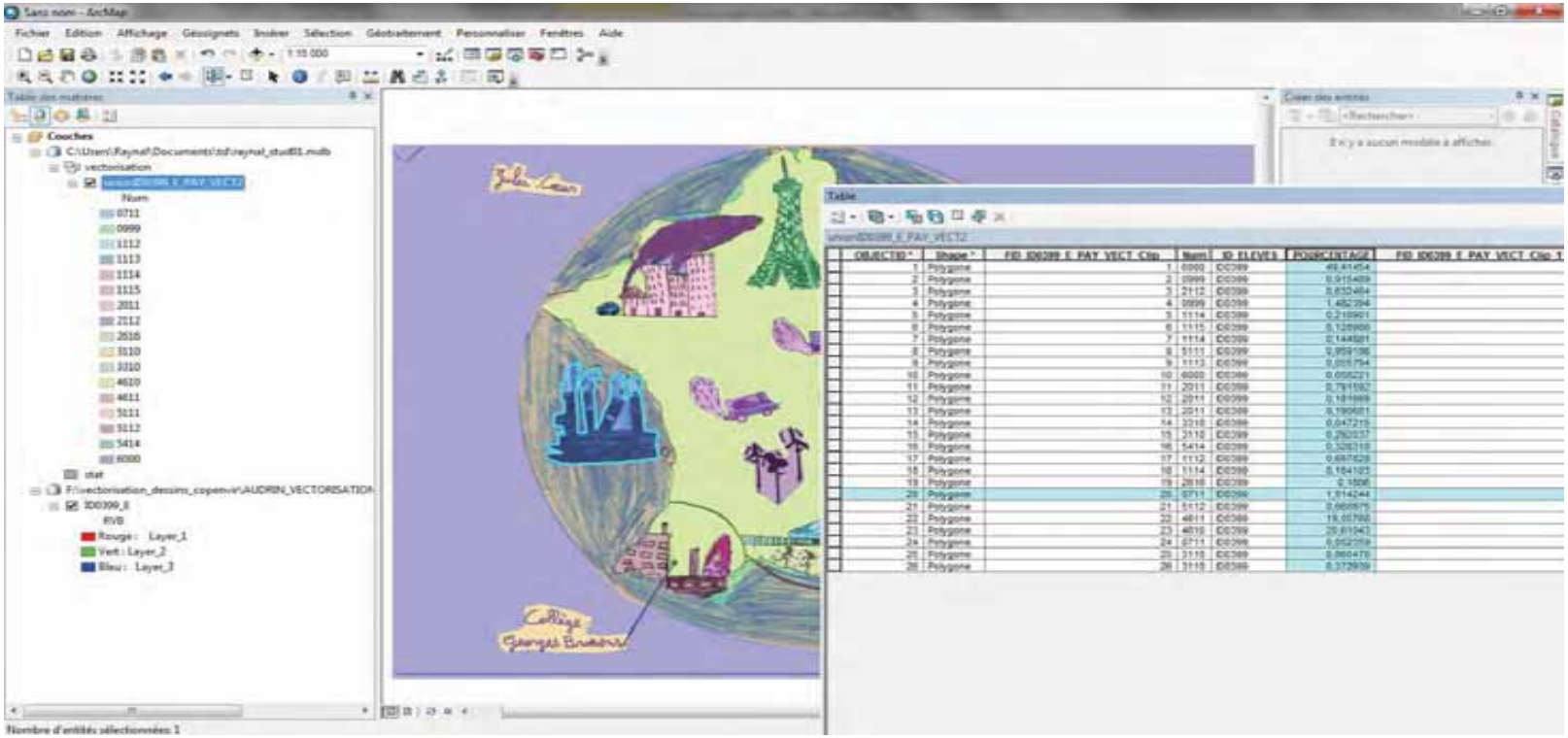
- **Children and environment: do childrens' drawings tell us something about Man-environment relationship?**

P. Batteau – N. Boutin – JC Raynal – A. Rotereau

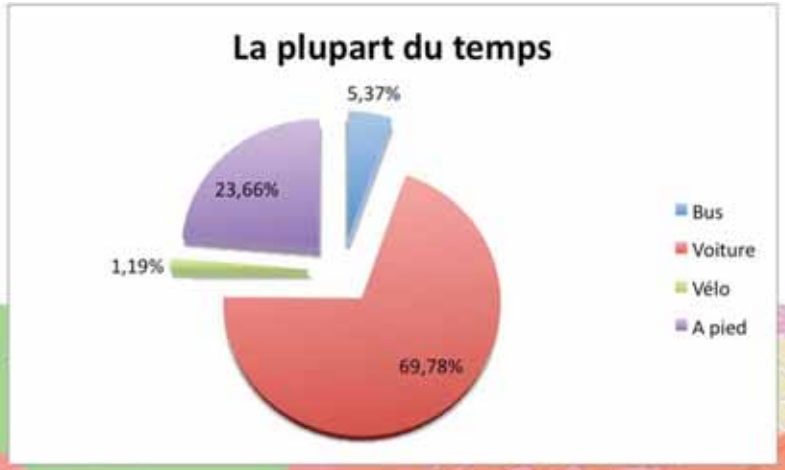
Perspectives

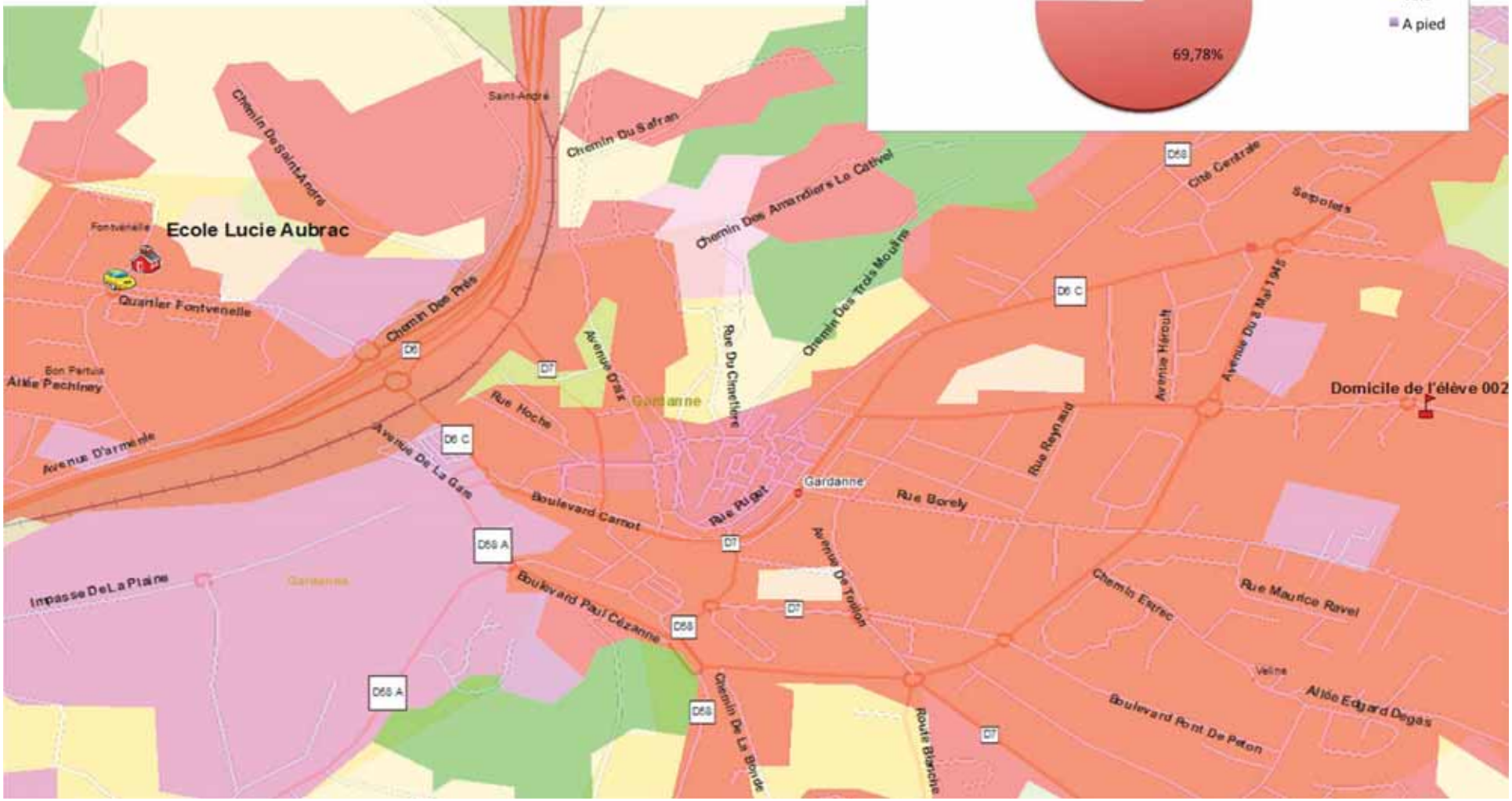
J. Claude Raynal – P. Batteau – N. Boutin – A. Rotereau

- **ArcMap Analysis**



And furthermore….





Merci de votre attention.