Cognitive adaptation to climate change in contrasted environmental and cultural contexts

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Outline of the presentation ACOCLI (ANR)

I.

1/. Present situation

2/. Working model

3/. The notion of cognitive adaptation

II.

1/. Hypotheses

2/. The research

3/. Some examples

4/. Some conclusions

Present situation

- *Environment*: unpredictable climate changes, uncertainty, risk
- *Culture*: unpredictable cultural dynamics:
- political, technological, economic, religious
- Unpredictability of the capacity of resilience not only at a local but also at a global level.
- *Individual and groups*: difficulties of cognitive adaptation

4. Working model

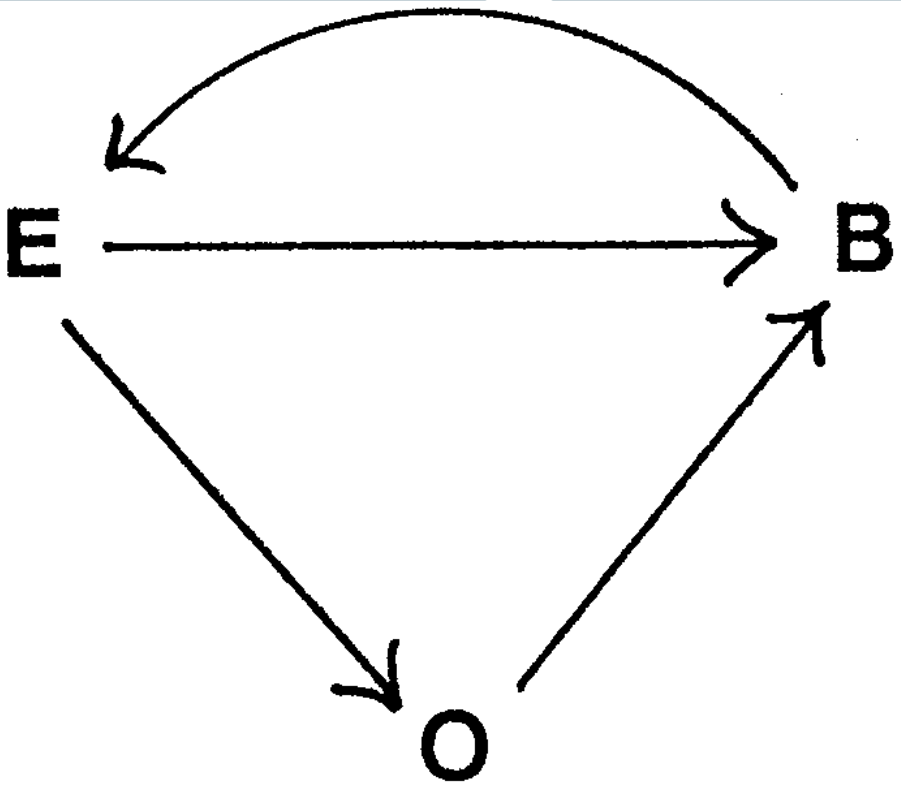
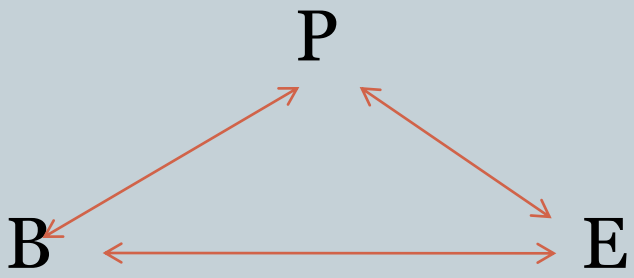


Figure 1. Model proposed by Wohlwill (1973) showing the relationships among Environmental (E), Behavioral (B), and Organismic (O) variables.

Reciprocal Determinism diagram Bandura (1986)

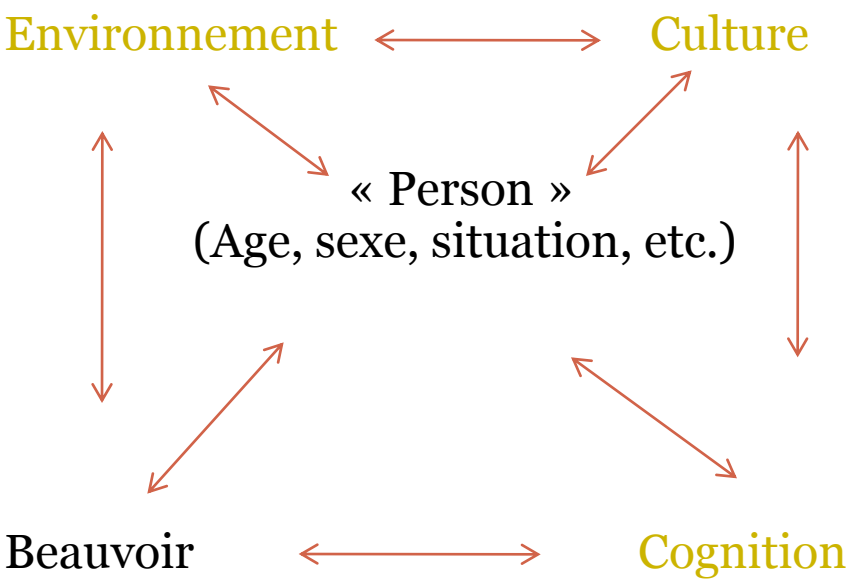


P= Person

B = Beauvoir

E = Environment

Our working model: integration of cognition, culture and the characteristics of the person



The notion of cognitive adaptation

- Human cognitive adaptation is a process of transformation mediated by culture for a better functioning between an organism and the environment.
- Thus culture is an active mediator between human populations and their environments.
- In this process, the cognitions better adapted to the constraints of environment will be retained by a kind of progressive selection, mediated by culture, for a better functioning between an organism and the environment.

Hypotheses

- We posit that the possibility of abrupt climate change and the lack of established cultural responses can produce, at the individual, level cognitive vulnerability, and difficulties of adaptation.
- We posit that the analytic way of thinking, dominant in occidental societies, constitutes an obstacle in the understanding of global warming.
- However we posit that important regional and developmental differences can be observed in the understanding of global warming.


TNT +
C'EST BIEN PLUS QUE LA TNT
ET C'EST GRATUIT !
LA TÉLÉ COMME VOUS VOULEZ
CANALSAT

The research plan*

Environments

1/. “High-risk”: New Caledonia, Ouvéa

2/. “Mid-risk”: French Guyana

3/. Region subject to major climatic hazards:
French Alps

4/. Protected environment: Paris

Research financed by the French National Agency of Research (ANR)

ACOCLI Fieldwork:
France and French overseas territories

New Caledonia, Ouvéa

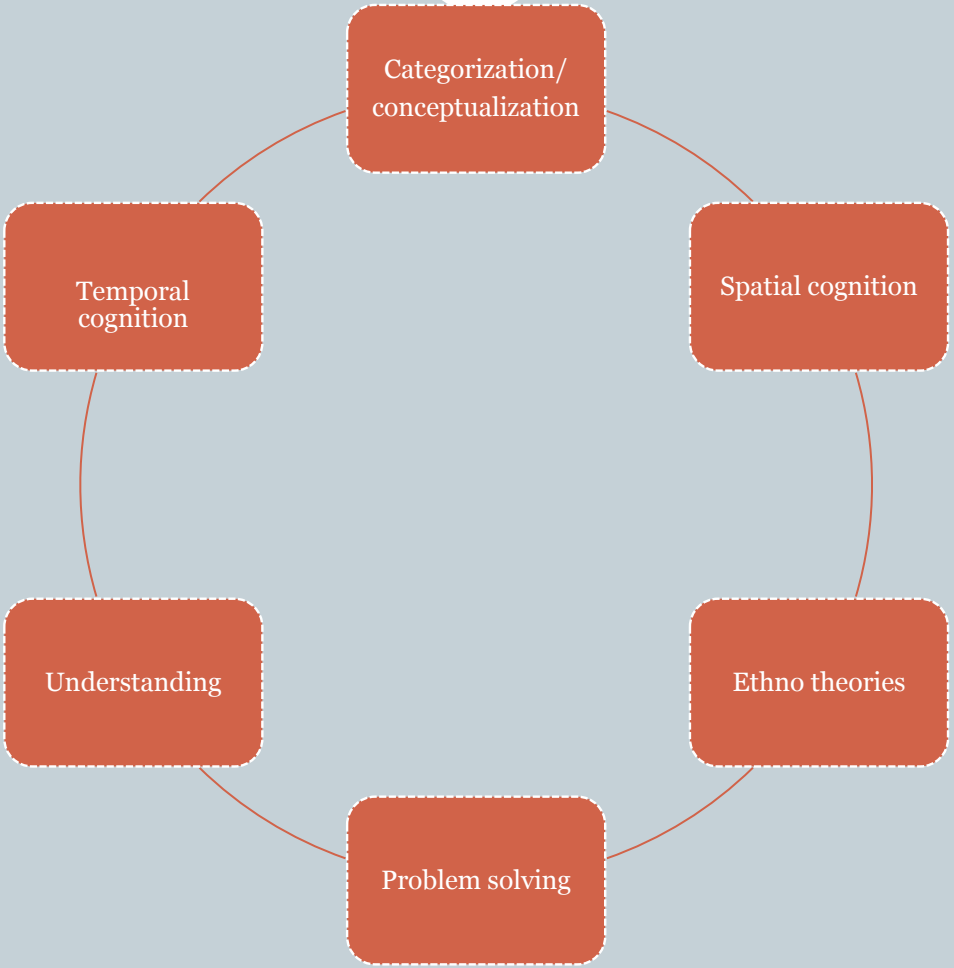
French Guyana (South America)

French Alps

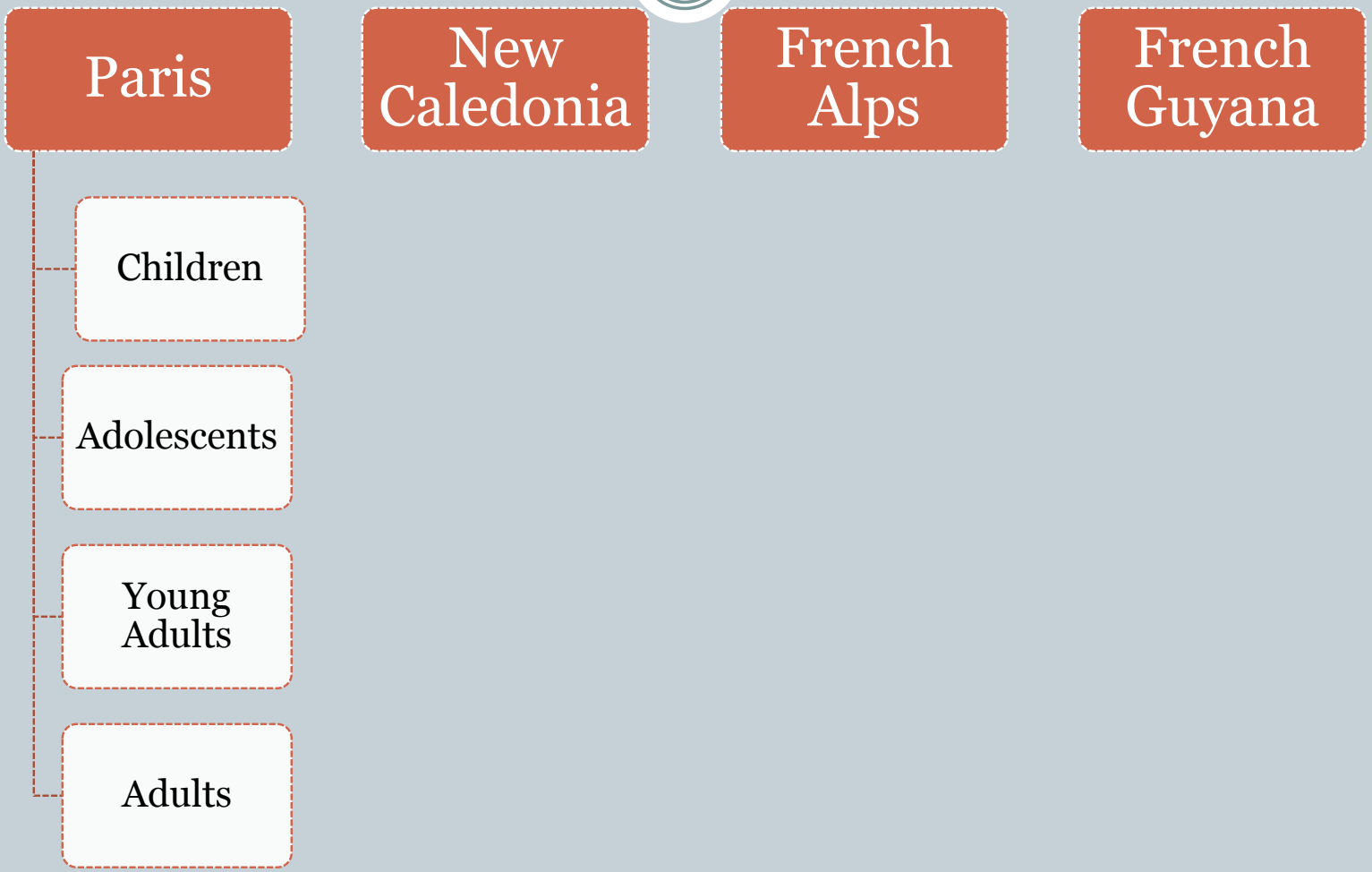
- Participants:
  - Children: min. 11 – max. 12 N= around 2000
  - Adolescents : min 15 – max. 17 N= around 2000
  - Young Adults : min 19 –max 35 N= around 2000
  - Adults: + 35 N= around 2000

- Methodology
  - Interviews
  - Open-ended questionnaires
  - Experimentation

Cognitive “fields”



Research plan



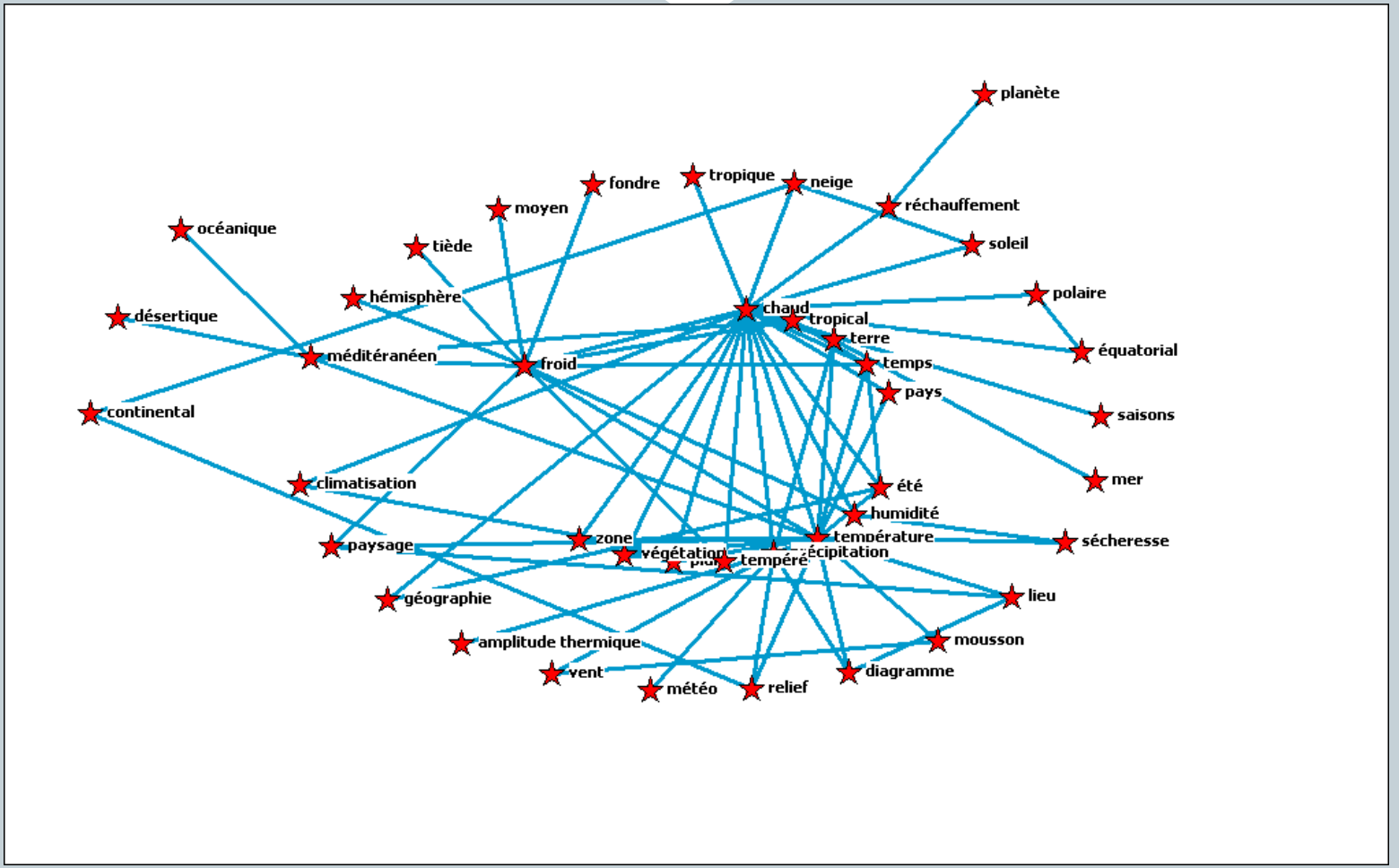
Some examples

- 1. Study on the conceptualization of climate and global warming
  - Associative tasks of three worlds

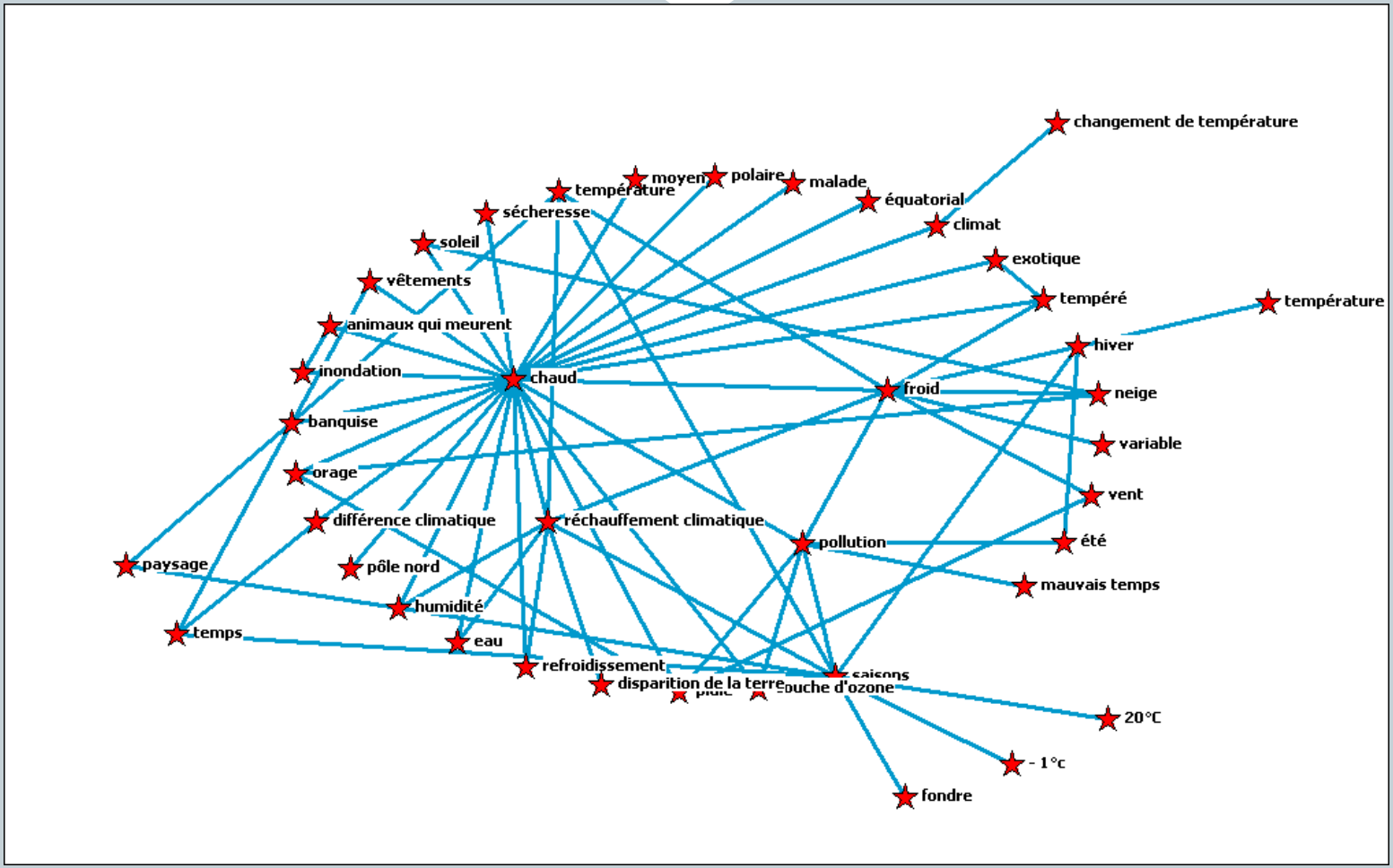
- Complexity and stability of the concepts:

		Concept		
Groupe	**Mesure**	**Climat**	Climat change	
12/13 ans	Indice « exrension»	0,21	0,46	
12/13 ans	Indice « Hapax »	0,46	0,65	

Semantic network of climate of Parisian children (N=95; M= 11.8)



Semantic network of climate change in Parisian children (N=95; M= 11.8)



Network's analysis of the concepts climate and climate change

Indices	Concepts	
	climate	Climate change
Diameter	5	5
Average distance	2.4797	2.4939
Density	0.0848	0.0783
Degree centralization	96.098%	97.155%
Closeness centralization	51.049%	55.387%
Betweenneess centralization	50.707%	67.730%
Number of Hierarchical cluster	1	1
Total nodes	42	39
Total links	73	58

Representation of climate

- Thematic categories in the definitions of children

Categories	Effectifs
	Childten M=11,8
Binary climate	14
Climate=weather	51
Different climates	16
Climate = global warming	10

Representation of climate change

Catégories	Effectifs	
	Children M = 9.5	Children M=11.8
I don’t know	23	0
Change of weather	57	45
Pollution	3	6
Climatic disorder	4	22
Global warming	8	22

Preliminary analyses of representation of human adaptability to global warming

- Sample : Adolescents New Caledonia (Nouméa) N= 50, M=15 year 2 month

Examples: Representation of climate (adults)

Paris

- Example 1. Female of 37 years, mother tongue: French - Paris, Ile de France)

- "It's just weather." (Paris, 2010)

New Caledonia

Example 2 – (Female 40 years old, mother tongue: Kumak, New Caledonia)

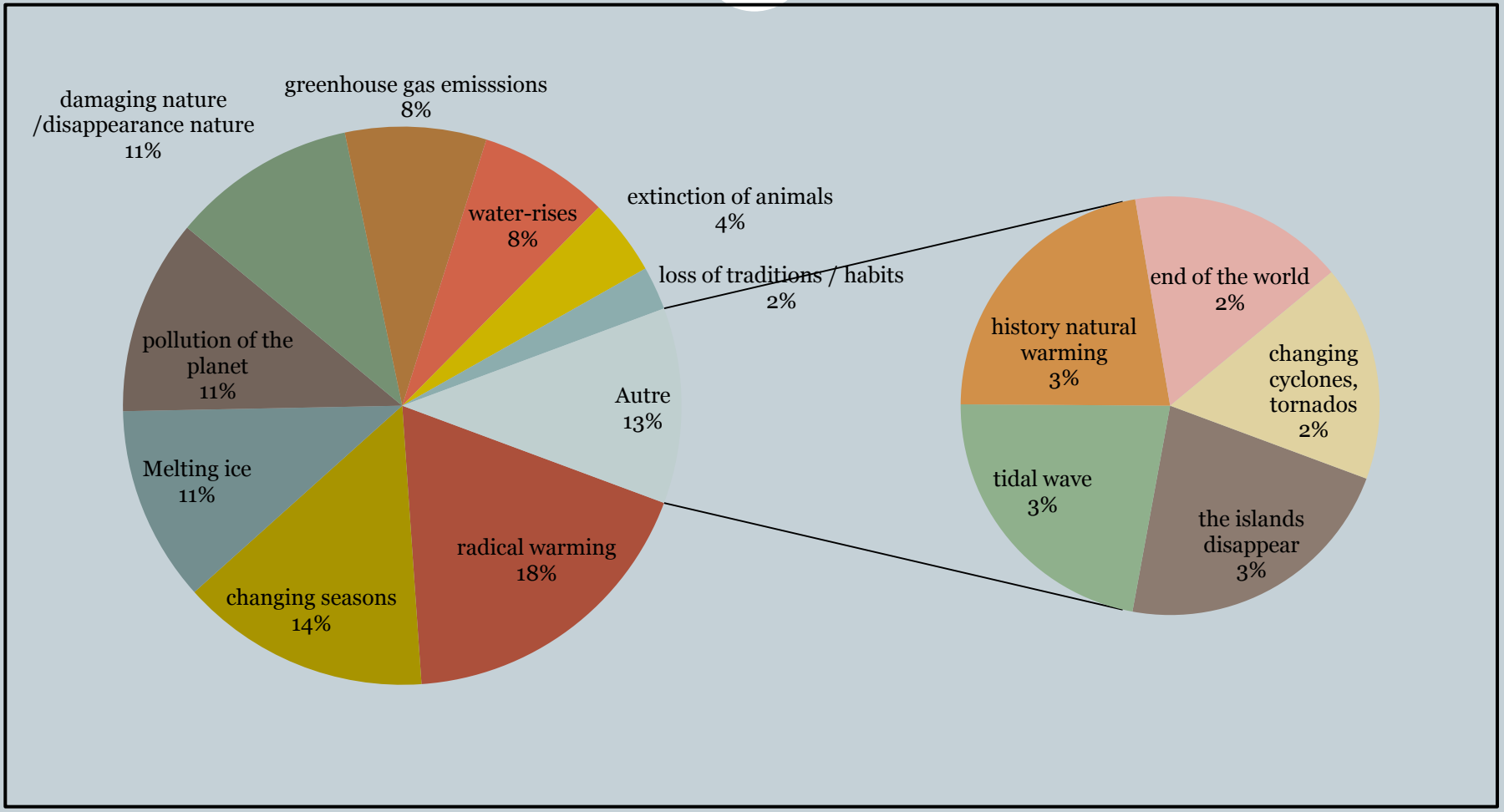
- “Climate for me is nature, the seasons and nature, I have no other words to say. In my culture, climate works with culture (agriculture), it works with our lifestyle, our habitat. Climate is also for crops such as yams, all works together. Personally, climate makes it a lot. We have a story in our clan, I had a great grandfather who had power over the sea, on the wind, and I cannot go into details because it is something that belongs to us. So climate is all that, but now all is coded and everything is displayed. But before old persons walked a lot with the weather observing trees from flowering, compared to all that.” New Caledonia, 2010)

Representation of climate change

"It's the weather that causes flooding." (Paris, 2010)

“It is warming, a hole in the ozone, global climate change is the change in temperature. What I can say? In our level here, there are things we live today and we did not experience 10 years ago. And climate change is also that we do a lot of prevention with children, even at the population level to try to change things in order to improve, not improve, but in order to stop what has already happened. And at our level do some things that are helpful for better living.” (New Caledonia, 2010)

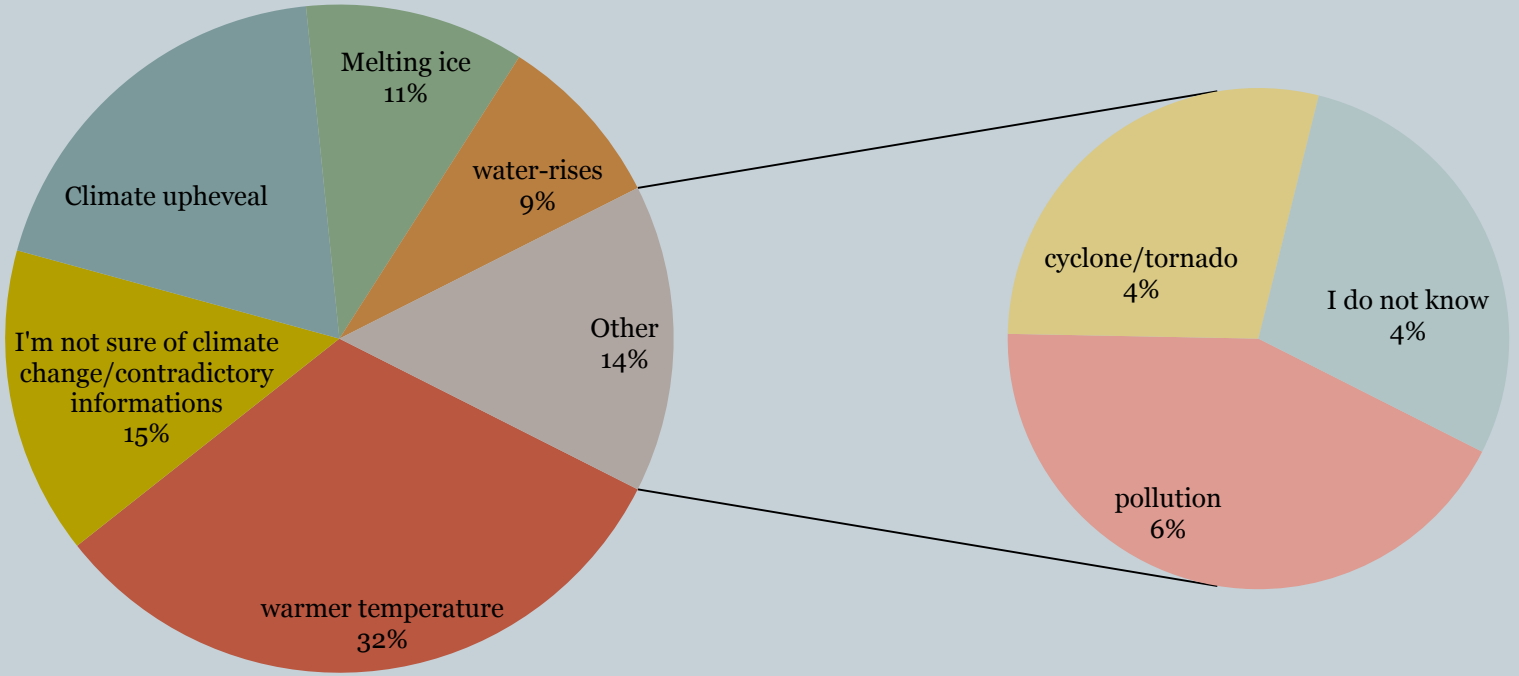
New Caledonia: present situation



- Presence in the representation of the five constituents of climate system:

- atmospheric phenomena (e.g., radical warming, natural warming, wind patterns, cyclones, tornadoes);
- surface water regimes (e.g. flooding, water table levels, watersheds, lakes, ocean levels);
- cryosphere (i.e., melting ice from glaciers and polar ice caps);
- lithosphere (terrestrial impacts, most notably on islands);
- biosphere (phenology, productivity and diversity of living species and systems, e.g. fruiting of trees; marine ecosystems).

Paris : present situation

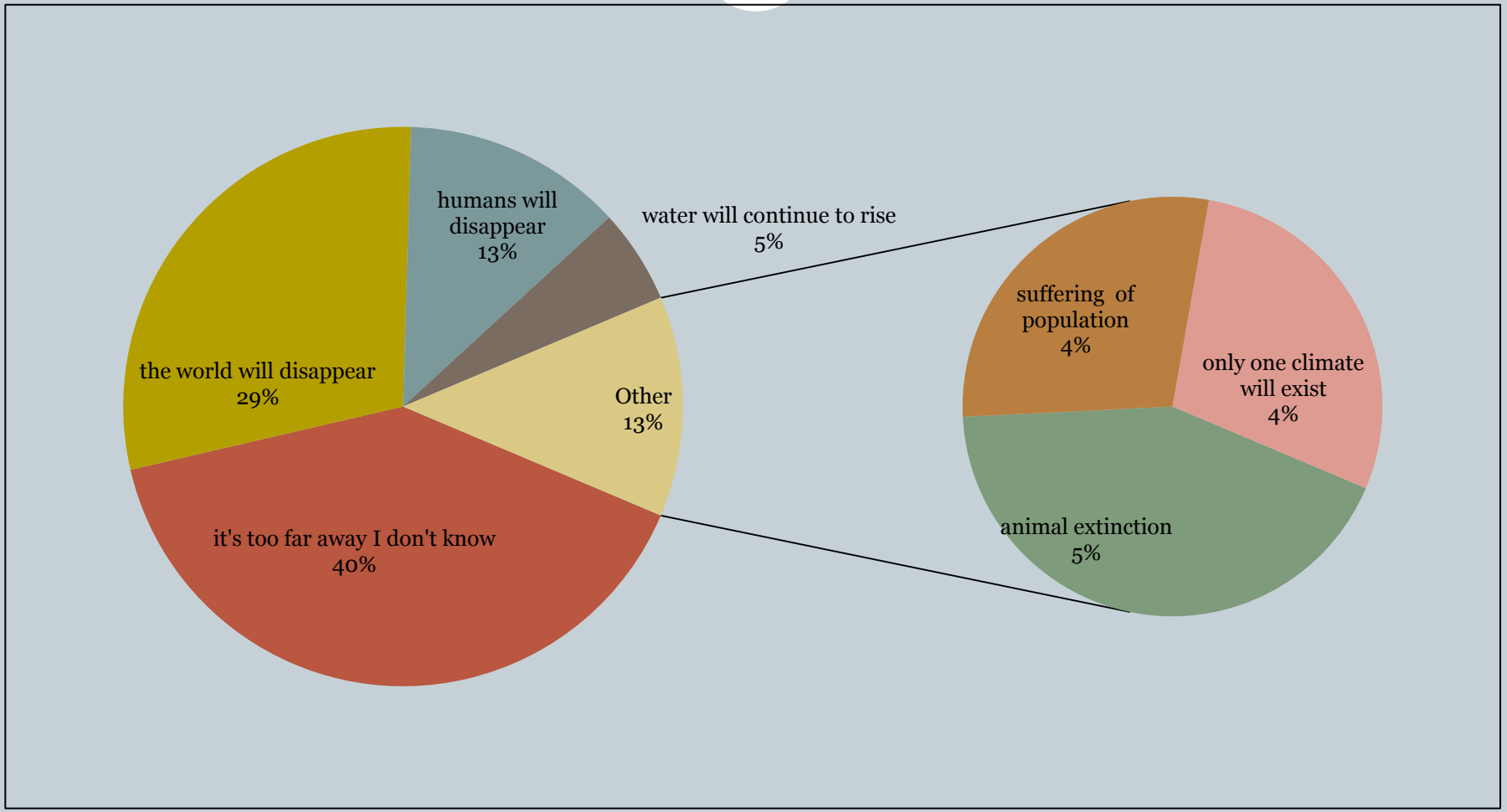


- 19% of the subjects question climate change

  Simplified view with isolated elements in terms of quantity (+, -): order can return
  Climate disruption 19% + / -
  Atmosphere: Temperature (32%) +
  Ice melting -
  Rising water +

  Pollution + / -

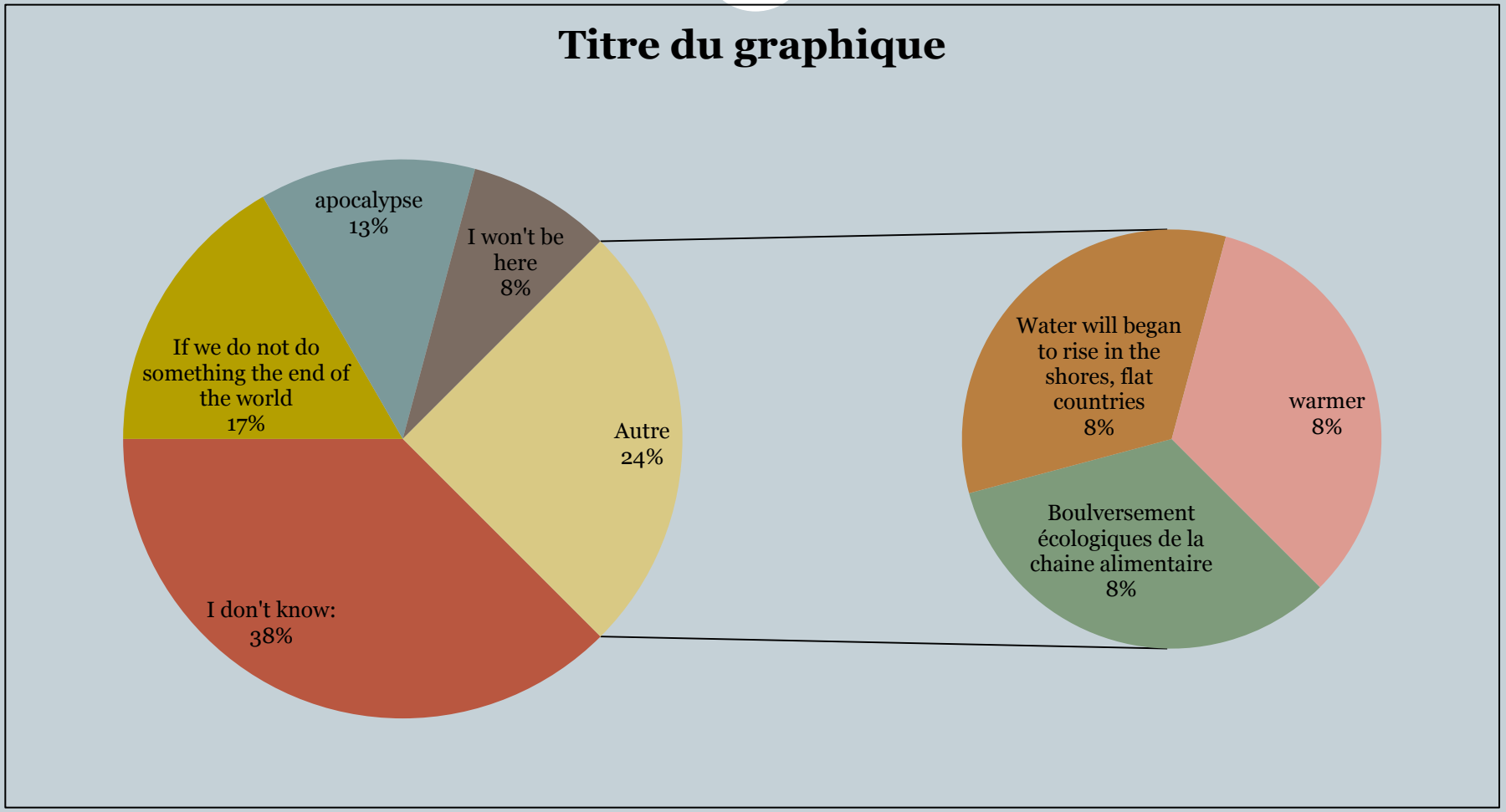
Prediction 100 years in New Caledonia



- As we expected, prediction of climate change in 100 years was a very difficult task; 40% of our participants said they could not predict changes on such a long-term basis.
- Those participants who made the attempt increased their pessimistic views of the world.
- We could not identify any optimistic previsions as we had expected in their responses.
- The data present an apocalyptic picture of the future in which water levels have continued to rise, but a slow rate; ice melting was not actually mentioned.
- People projected extinction of life on earth, or, in the best-case scenario, a future population subjected to more suffering, within a desolate world with one dominant climate.
- Without adopting hasty interpretations, it seems to us that the projection of a uniform global climate symbolizes the disappearance of the diversity of life in the world.

- From a holistic vantage point, the global destruction of a single force could be formed.

Prediction of climate change in a hundred years in Parisian subjects



- 44% of the subjects can not answer or do not believe in the reality of climate change
- 30% of the subjects believe the situation can be catastrophic
- However they have no arguments

Conclusion

Our preliminary research suggest that most individuals in the Parisian region dispose a very low level of conceptualization of climate and climate change and very poor understanding of the mechanisms of this complex phenomena.

We consider that cognitive adaptation to global warming, is primordial to all collective efforts of adaptation.

We think that if culture can't permit the development of complex individual cognitive models on global worming humans can't adapt to important and rapid environmental changes.

Pertinent understanding is necessary and can permit the elaboration of pertinent strategies of problem solving at a local level.

These local solutions, by an additional way, can help the global cognitive adaptation to climate changes.