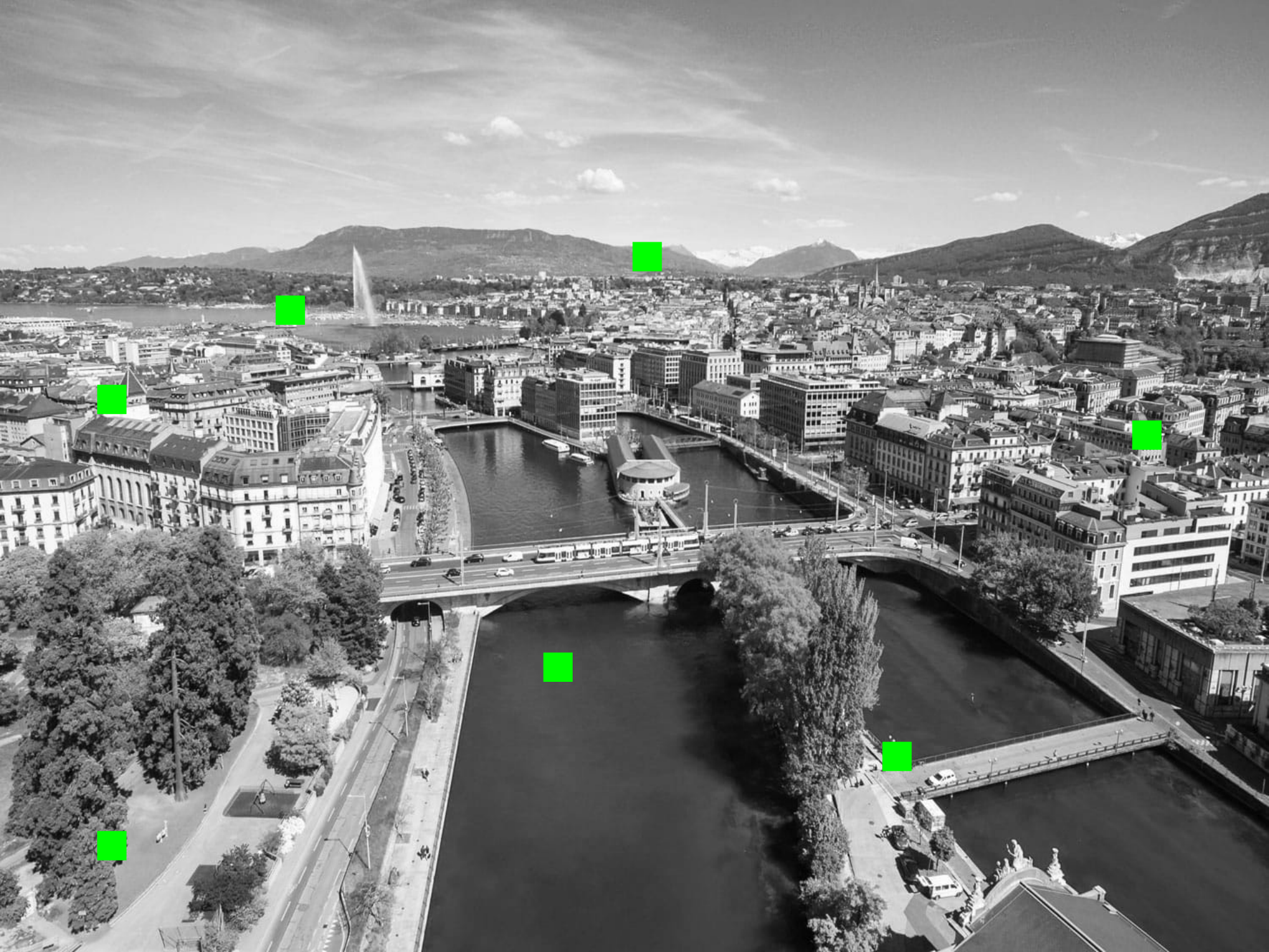

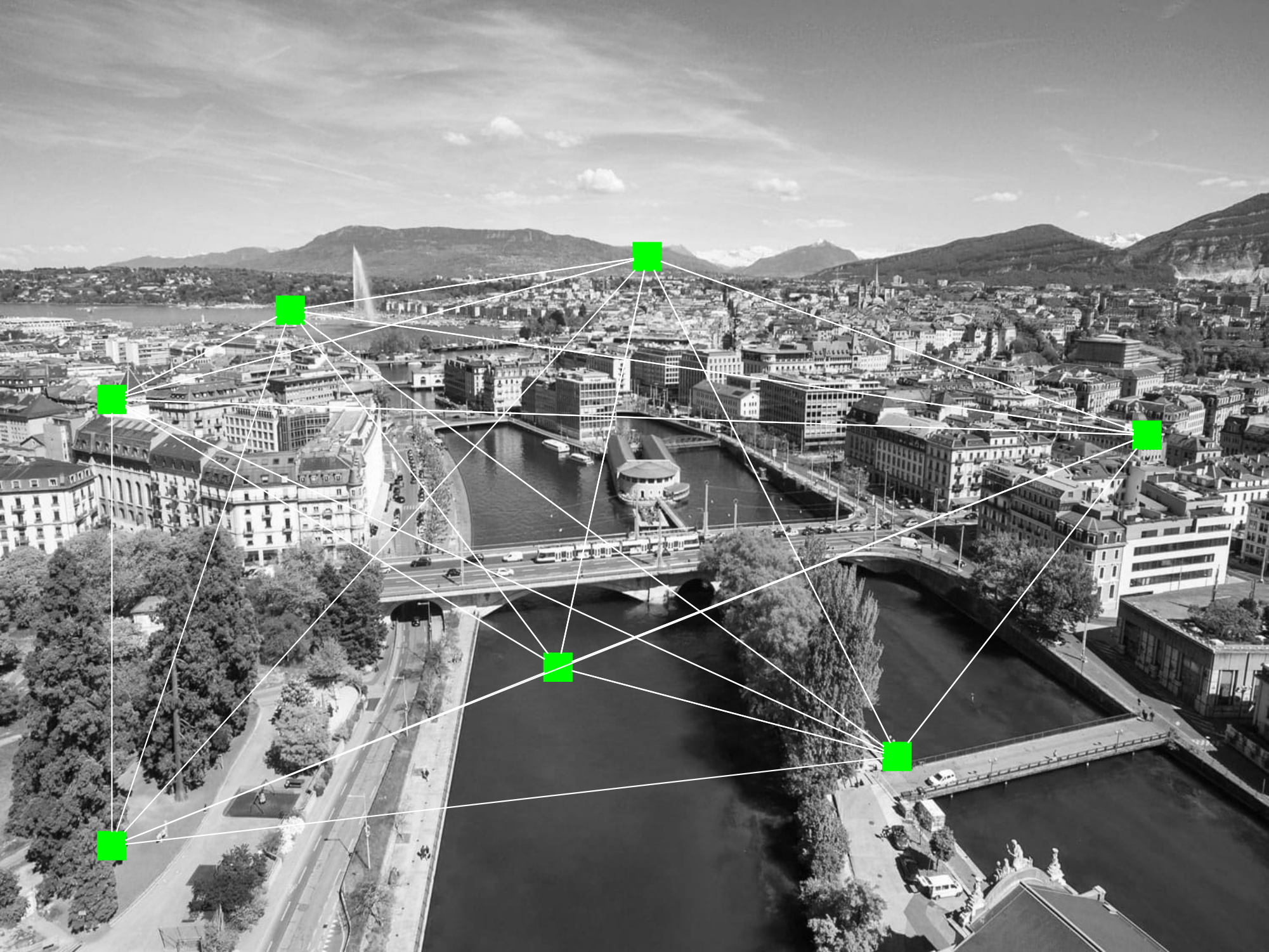

Framing environmental transitions.

How policy actors perceive social-ecological interdependencies?

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Grenoble Ecole de Management
G-EAU, Montpellier, 19 mai 2023

Considering perceptions for transition

System thinking & interdependencies

- social-ecological systems, co-evolution (Kallis and Norgaard, 2010; Ostrom, 2009)
- institutional complementarities (Amable, 2016; Aoki, 2011; Bolognesi and Nahrath, 2020)

Policy process and organization

- integration VS specialization (Ingold et al., 2019; Morrison, 2017; Trein et al., 2021)
- coalitions and collaboration (Kim et al., 2022; Weible and Sabatier, 2009)
- agenda setting (Frondel et al., 2017; Mathias et al., 2020)

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The Hows & Whys of interdependencies perception

1 Nature 2 Determinants 3 Policy

3 sets of hypotheses

Limited perceptions of interdependencies & variations (H1)

1 scope | 2 intensity | 3 polarization

3 sets of hypotheses

Limited perceptions of interdependencies & variations (H1)

1 scope 2 intensity 3 polarization

Drivers of perception (H2)

1 knowledge in env. disciplines (≠) scope & intensity
2 level of education (+) on scope, (-) on polarization
3 sensitive to environment (+) on scope
4 age (-) on scope & intensity
5 environmental uses (+) on scope & intensity

3 sets of hypotheses

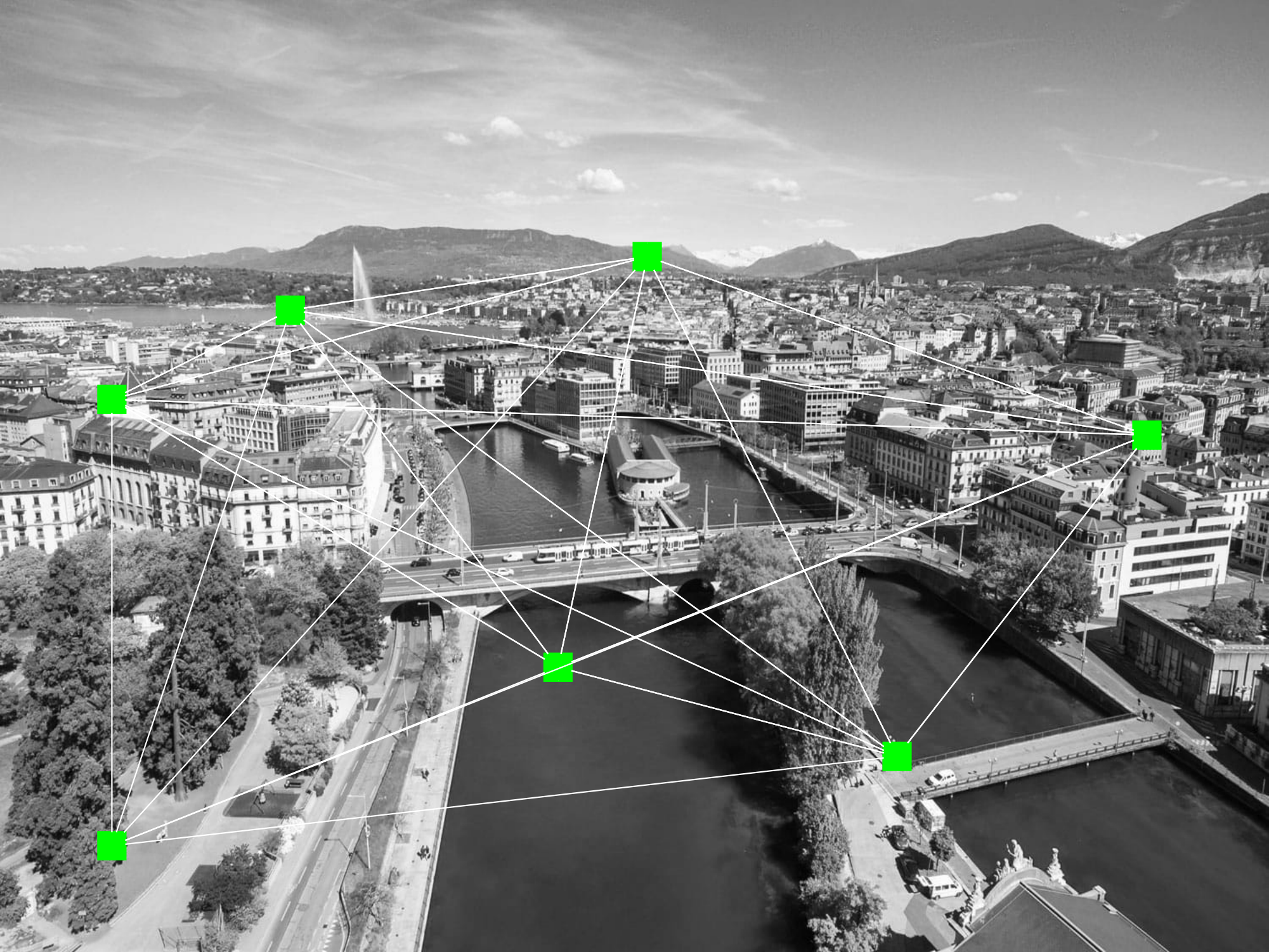
Limited perceptions of interdependencies & variations (H1)

Drivers of perception (H2)

Perception intensity # policy preferences (H3)

1 (+) wider participation, if env. use (i.e., asso, citizens...)
2 (+) state intervention
3 (+) precautionary principle, if env. uses
4 (+) stringent instruments

Data & Methods



19 water uses

1/Habitat	2/ Biodiversity	3/ Hydrological cycle
4/Sediments	6/ Industrial	7/ Drinking water
8/Irrigation	9/ Discharge	10/ Refreshment
11/Leisure	12/ Bathing	13/ Fishing
14/Drainage	14/ Hydroelectricity	15/ Commercial navigation
16/ Nautism	17/Hydrothermal power	18/Fire
19/ Protection against water-related damages		

Data & case

Case

- Water Geneva state
- 19 Water uses
- 342 relations

Survey on interdependencies perceptions

- ask impact of x-use on y-use (Likert scale)
- sent to 265 key stakeholders (70)
- use 74 respondents
- N= 25,270 relations

Data & case

Case

- Water Geneva state
- 19 Water uses
- 342 relations

3 dimensions

- Perception= p(resp.)
- Intensity= mean resp.
- Polarization= sd resp.

Survey on interdependencies perceptions

- ask impact of x-use on y-use (Likert scale)
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Explanatory variables

- H2: disciplinary expertise, education, age, freq to water, affiliation
- H3: Policy pref for participation, instruments

Empirical strategy

Limited perceptions of interdependencies (H1)

descriptive statistics

Empirical strategy

Limited perceptions of interdependencies (H1)

descriptive statistics

Drivers (H2)

→ outcomes: prob, intensity, polarization

$$Perception_{i,j,r} = \alpha + \beta_1.expertise_r + \beta_2.individuals_r + \beta_3.uses_{i,j} + controls_{i,j,r} + \varepsilon \quad (1)$$

Empirical strategy

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descriptive statistics

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Perception # policy (H3)

→ outcomes: participation & instruments

$$\begin{aligned} Pref_{i,j,r} = \alpha &+ \beta_1.intensity_{i,j,r} + \beta_2.env_i + \beta_3.env_i \times intensity_{i,j,r} \\ &+ \beta_4.env_j + \beta_5.env_j \times intensity_{i,j,r} + \beta_6.env_i \times env_j \\ &+ \beta_7.env_i \times env_j \times intensity_{i,j,r} + controls_{i,j,r} + \epsilon \end{aligned} \quad (2)$$

Controls

actors groups, survey structure, SD clustered at actors level

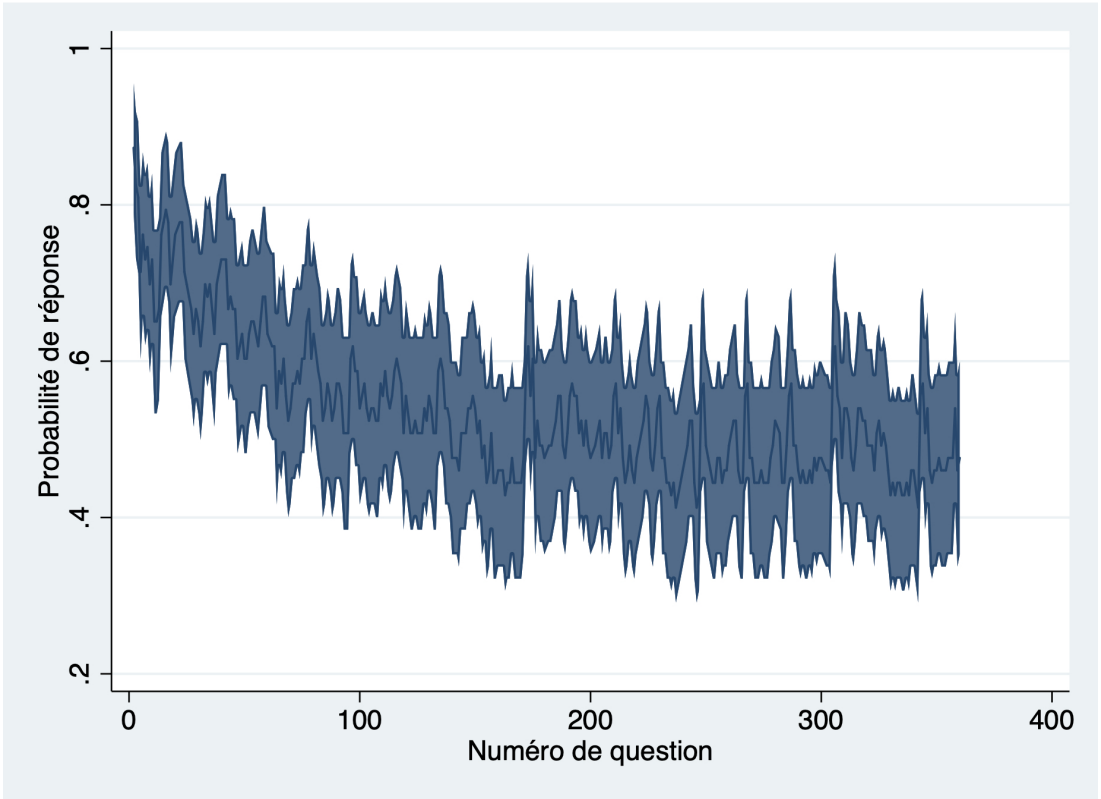
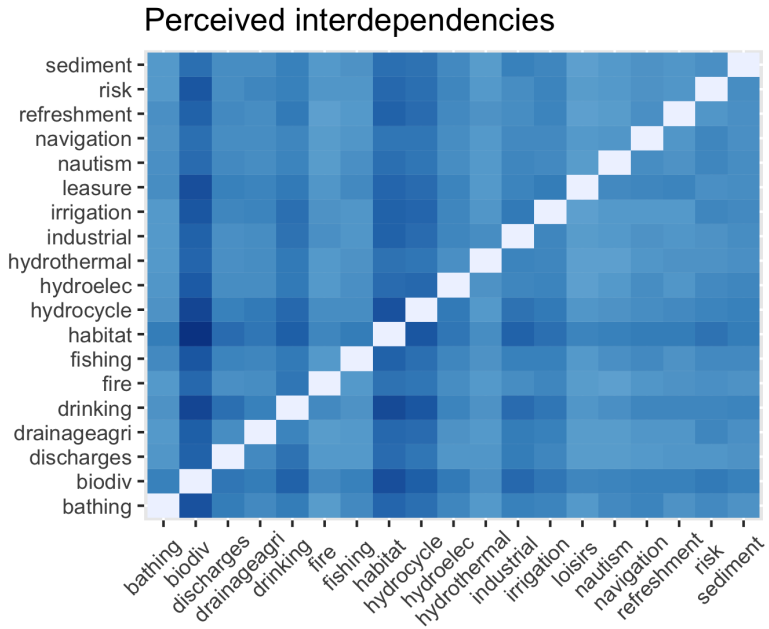
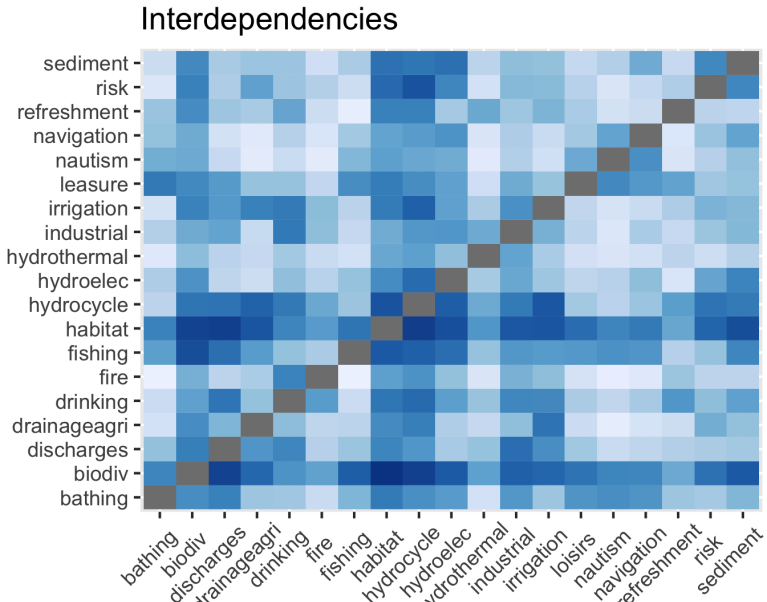


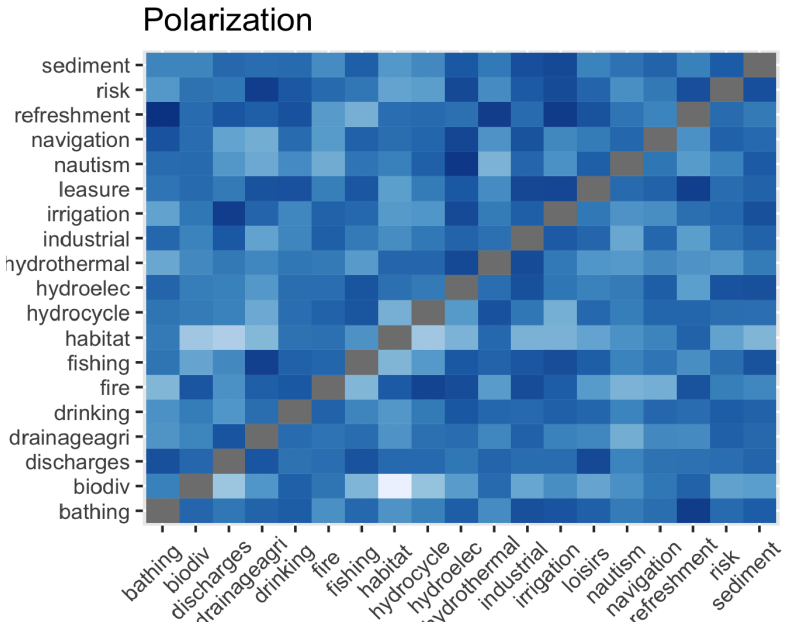
Figure 1: Survey structure and response rate

Results

Variations of perceptions (H.1)







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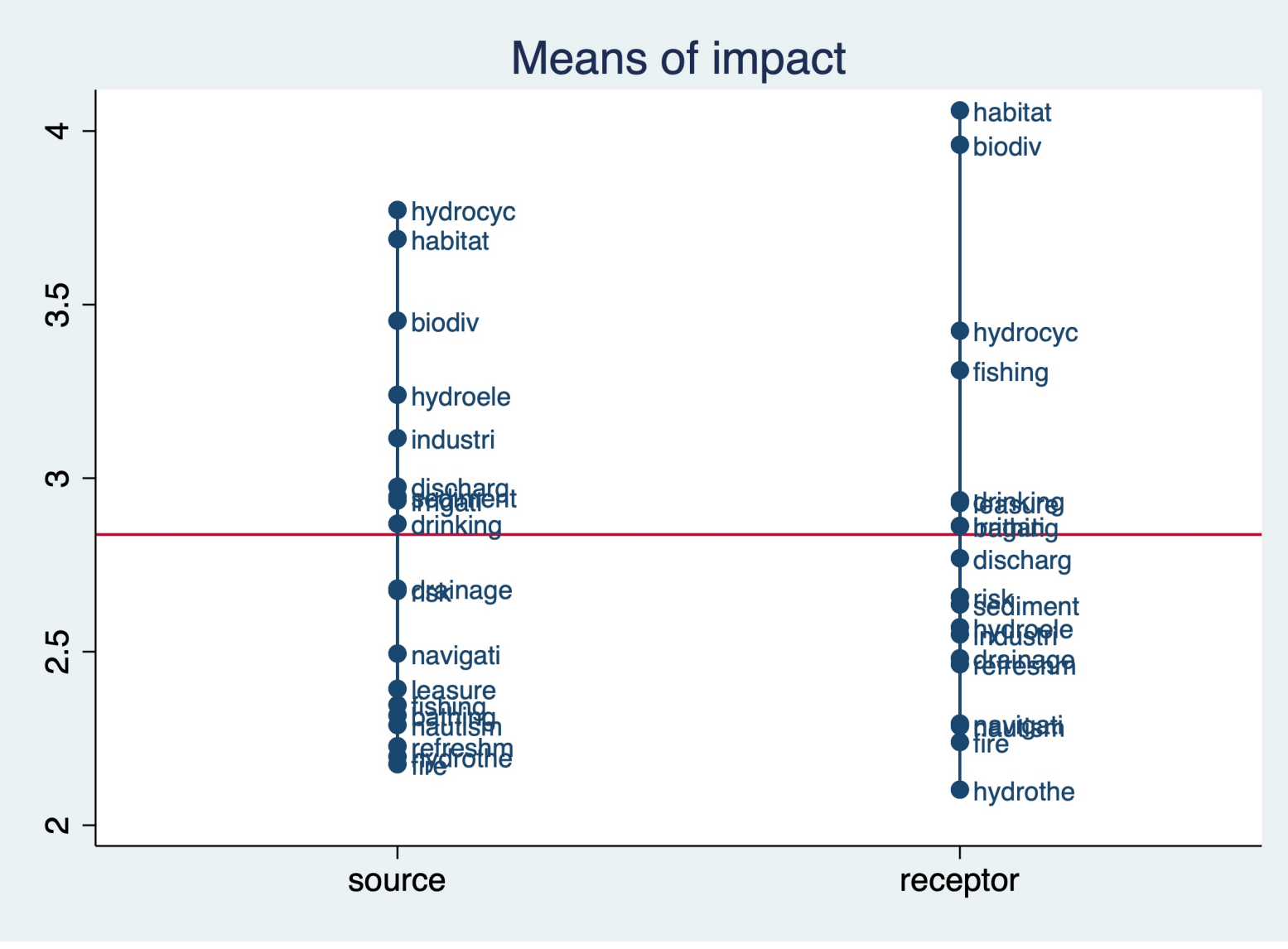

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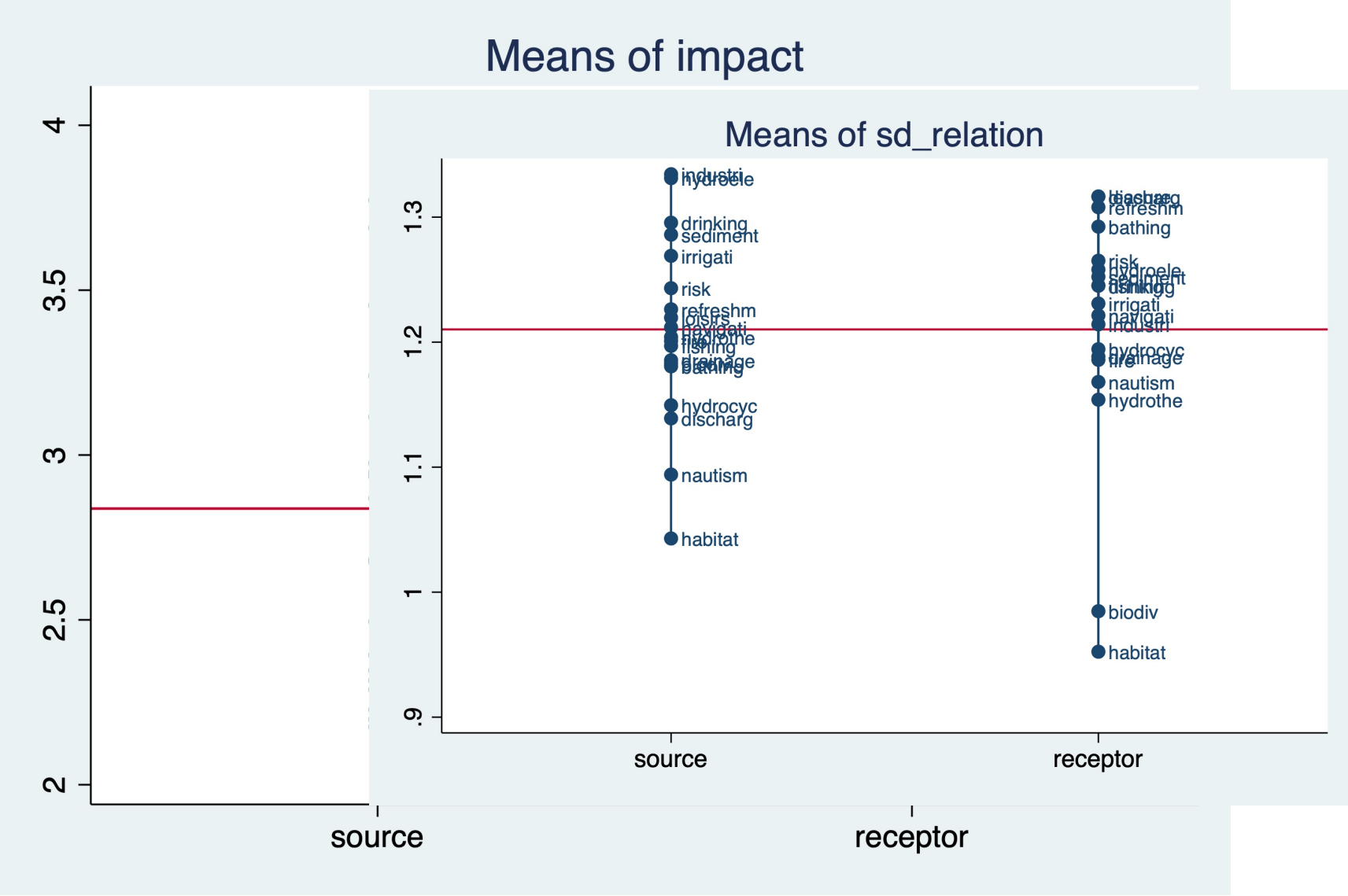

Determinants of perceptions (H.2)

	Perception	Intensity	Polarization
Expertise			
social	0.0932**	-0.0144	-0.00553
environment	-0.0405	0.0292*	0.0249
Individuals			
age	0.00533	-0.00451	-0.00483
education	0.344**	-0.209*	-0.208*
Frequency water	0.807***	-0.118	-0.117
Affiliation (base = other)			
Political	0.932	1.212**	1.174**
Professional	0.171	1.063***	0.974***
Environmental uses			
receptor	0.216***	1.304***	0.0633
source	0.413***	0.766***	-0.00564
Observations	21 660	11 163	11 163
Pseudo R2	0.166		
R-squared		0.265	0.092

Controls: groups, survey structure, SE clustered at respondent level
*** p<0.01, ** p<0.05, * p<0.1

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Perception and participation preferences (H.3)

	(1) Mun.	(2) Rgl	(3) Ntl	(4) PPP	(5) Private	(6) Asso	(7) Citiz
intensity	-0.02	-0.04	0	0.02	0.08	0.08	-0.01
Environment							
recept	-0.34	0.35*	-0.29	0.07	-0.09	-0.16	-0.49**
recept ×int	0.11	-0.05	0.09	-0.01	-0	0.03	0.14**
source	-0.13	0.33	-0.35*	0.04	0.06	-0.31*	-0.48**
source ×int	0.05	-0.03	0.13**	0.01	-0.04	0.13**	0.17***
recept × so	-0.06	-1.26**	-0	-0.2	0.1	-0.45	-0.55
recept × so ×int	-0.02	0.25*	-0.06	0.04	0	0.07	0.06
N	10875	10551	10551	10367	10387	10471	10482
R^2	0.26	0.47	0.19	0.23	0.33	0.3	0.32

Controls determinants (H2), groups, survey structure, SE clustered at respondent level
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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Perception and policy instruments preferences (H.3)

	(1) subs	(2) tax	(3) mkt	(4) info_use	(5) info_res	(6) ban	(7) precaution
intensity	-0.01	-0.05	0.06	0.1	0.13*	0.06	-0.06
Environment							
recept	-0.08	-0.08	-0.33	-0.32	-0.47*	-0.27	-0.28
recept × int	0.03	0.09	0.07	0.03	0.06	0.08	0.12*
source	0.16	0.03	-0.27	-0.21	-0.29	-0.43*	-0.29*
source × int	0.02	0.03	0.04	0.03	0.05	0.12**	0.14**
recept × so	-0.71	-0.02	0.49	-0.93*	-1.26*	0.04	-1.05**
recept × so × int	0.15	-0.03	-0.15	0.2	0.27*	-0.03	0.2*
N	10470	10470	10153	10530	10530	10477	10530
R^2	0.24	0.22	0.16	0.25	0.24	0.27	0.20

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Variations & significance of interdependencies perceptions

- by uses & dimensions
- ex: intensity ↻ env & polarization ↻ infrastructure

Determinants vary across dimensions

- usual suspects OK
- knowledge & sensitivity to env.

Perceptions associate w/ pol. preferences

- interesting results
- surprise: information
- identification strat.

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