

Flood risk mitigation and indicators of social cohesion in the Western Balkans

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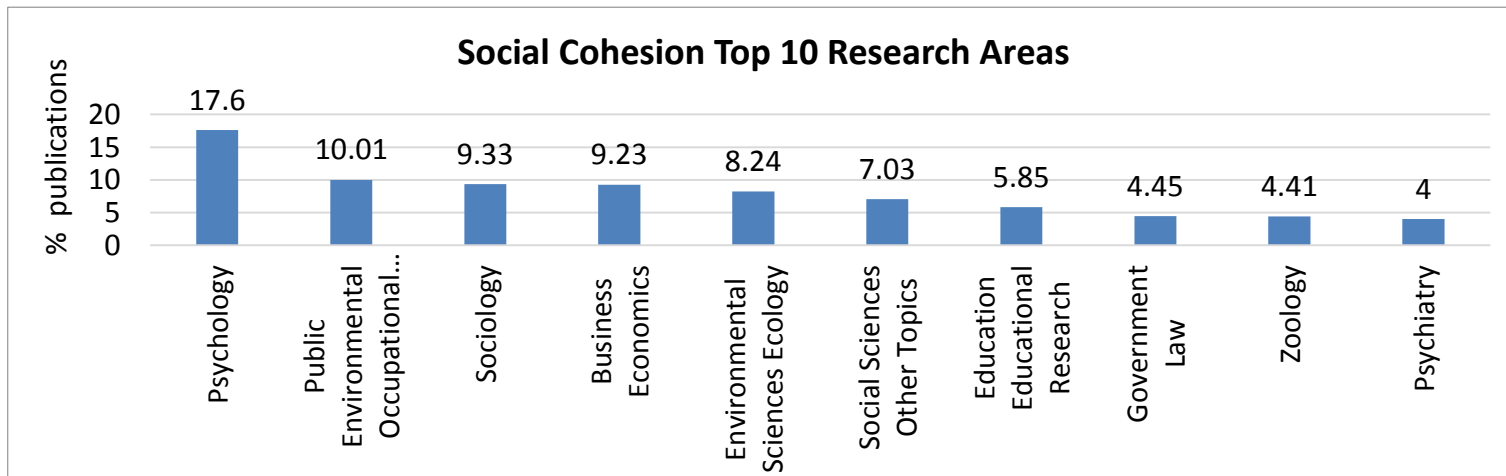
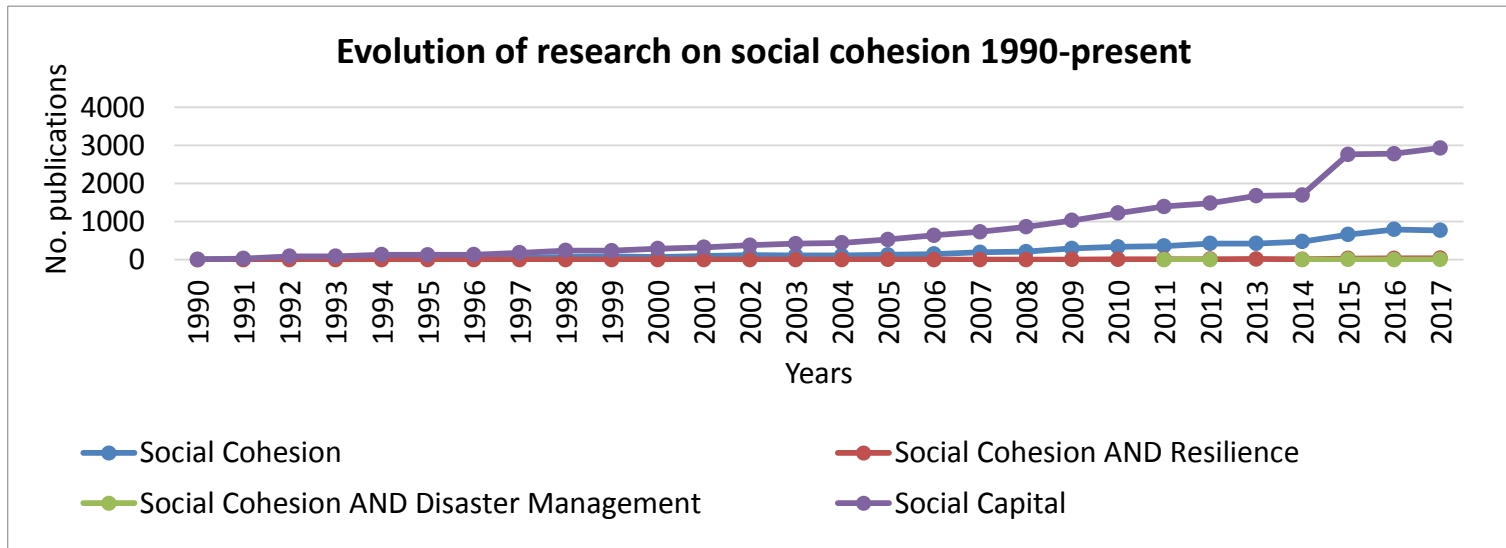
Context of research

- EU Erasmus + project Knowledge for Resilient Society (K-FORCE)
- Increased occurrence and severity of floods in South Eastern Europe as a result of climate change
- Need for more empirical evidence for the link between social cohesion and disaster reconstruction



Source: UNDP

Evolution and scope of research on social cohesion



Source: Web of Science

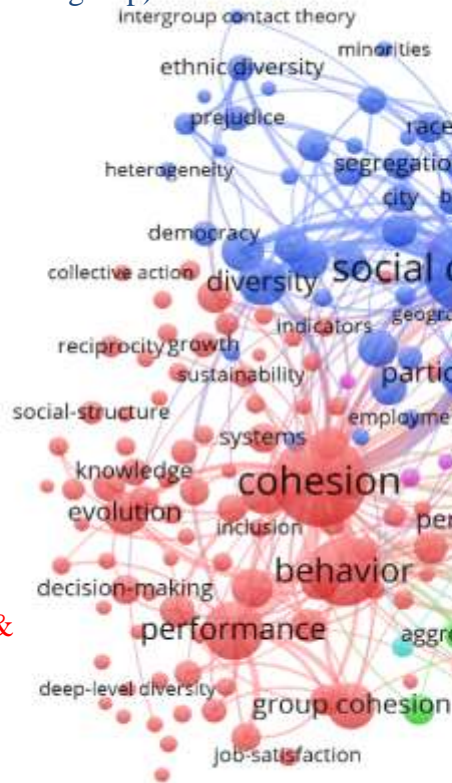
Keyword cluster analysis of social cohesion

Collective perspective

Individual - institutions

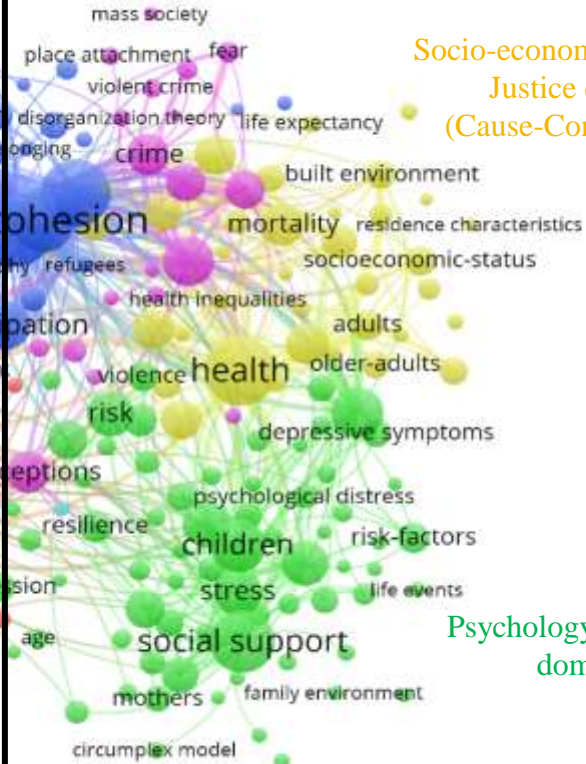
Conflict and Violence domain
(threat from outside the group)

Social Sciences &
Policy domain



Conflict and Violence domain
(threat from within the group)

Socio-economic, Equity &
Justice domain
(Cause-Consequence)



Psychology & Health
domain

Individual perspective
Individual - individual

6000+ records
Source: Web of Science

Selected variables

Flood Exposure Variables
POSTt 1 if t ≥ 2015 (the occurrence of the major flood event in 2014) otherwise, = 0
Influ by Flood2014 if the country is influenced by the major flood event in 2014, it will be 1 for t ≥ 2014; otherwise, = 0
POSTt x Influ by Flood2014 interaction between the above two variables

(EM-dat The International Disaster Database)

Social Cohesion Variables	Pos (+)/Neg (-)	Perceived (P)/Observed (O)
Trust in fellow citizens (World Values Survey)	+	P
Trust in institutions (World Bank – Governance Effectiveness Score)	+	P
Voting - Parliamentary/presidential elections (International Institute for Democracy and Electoral Assistance)	+	O
Helping a stranger (World Giving Index)	+	P
Donating money (World Giving Index)	+	P
Volunteering time (World Giving Index)	+	P
Rule of Law (World Bank Development Indicators)	+/-	P/O
Corruption (Transparency International/World Bank Development Indicators)	+/-	P/O
Crime (World Bank homicide p/100,000 people)	-	O

Control Variables
HDI score (UNDP)
Gini score (World Bank)

Regression model

$$Y_{ct} = \alpha + \beta_1 \text{POST}_t + \beta_2 \text{Influ by Flood 2014}_c + \beta_3 \text{POST}_t \times \text{Flood 2014}_c + \gamma X_{ct} + \varepsilon_{ct}$$

Adapted from Calo-Blanco A, Kovářík J, Mengel F, Romero JG. (2017)

y_{ct} - indicator of social cohesion in a country c at a given time t

β_1 - shows the average increase/decrease in the indicator between the period before and after the 2014 event for the unaffected *countries*

β_2 - difference between affected and unaffected *countries* before the 2014 event

β_3 - average difference in the evolution of the indicator between affected and unaffected *countries* from before the event to after the event

γX_{ct} - vector of control variables

α - region fixed effect, which can be arbitrarily correlated with the control vector X

P-value (significance) : **LOWER** than 0.05 = **good fit**

R-squared (variation) : **HIGH** R-square = **high correlation**

Preliminary Results (Serbia)

Social Cohesion Variables		Pos (+)/Neg (-)	Perceived (P)/Observed (O)	R-squared value	P-value	
<i>Trust & social relations</i>	Trust in fellow citizens	+	P	0.996	2.03e-09	
	Trust in institutions (Governance effectiveness)	+	P	0.912	0.0002	
	Voting	Parliamentary	+	O	0.78	0.0354
		Presidential	+	O	0.542	0.139
<i>Altruism</i>	Helping a stranger	+	P	0.981	0.0066	
	Donating money	+	P	0.846	0.137	
	Volunteering time	+	P	0.718	0.311	
<i>Compliance</i>	Rule of Law	+/-	P/O	0.895	0.0005	
	Corruption	+/-	P/O	0.438	0.274	
	Crime	-	O	0.777	0.102	

R-squared (variation) : HIGH R-square = high correlation

P-value (significance) : LOWER than 0.05 = good fit

Preliminary Conclusions & Future actions

- A pattern of social cohesion positively correlating with disaster recovery is at this stage of the analysis **not visible at the regional level**
- Variables that show the best fit:
Trust; Governance effectiveness; Helping a stranger; and Rule of Law
- A more detailed analysis is in progress, incl. a number of additional social cohesion and control variables
- A follow-up study, using the same social cohesion indicators in relation to **seismic hazards**
- **2018-2019 Educational workshops** with K-FORCE participants from the Western Balkans (conceptualizing and measuring social cohesion for natural hazards)

Acknowledgements & Contact Information

- [EU Erasmus + K-FORCE project](#)
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