

A network approach to understanding access and exchange of GRFA: Implications for policy

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Key Findings

Network strategies

- **Close ties:** Reliance on close ties (frequent communication and long relationship) to reduce transaction costs of material exchange.
- **Regional ties:** Scientists who collaborate within the same region perceive lower barriers to access and are more likely to exchange.
- **IL ties:** Scientists appear to have a preference to exchange materials with IL members & greater collaboration within the IL leads to reduction in admin time.

Institutional and Individual factors

- **Regulations:** Regulatory pressures increase admin time which could hinder access or willingness to exchange material.
- **Organizations:** Scientists with greater autonomy perceive lower barriers to access & are more likely to obtain material.

A Network Approach

A **network** approach considers relationships among actors to understand GRFA exchange and access.

EXAMPLE: Individuals with diverse, large networks (i.e. connected with several individuals across sectors and countries) might have greater access to GRFA than individuals in small, homogeneous networks (i.e. few relationships with individuals in the same region). O vice versa!

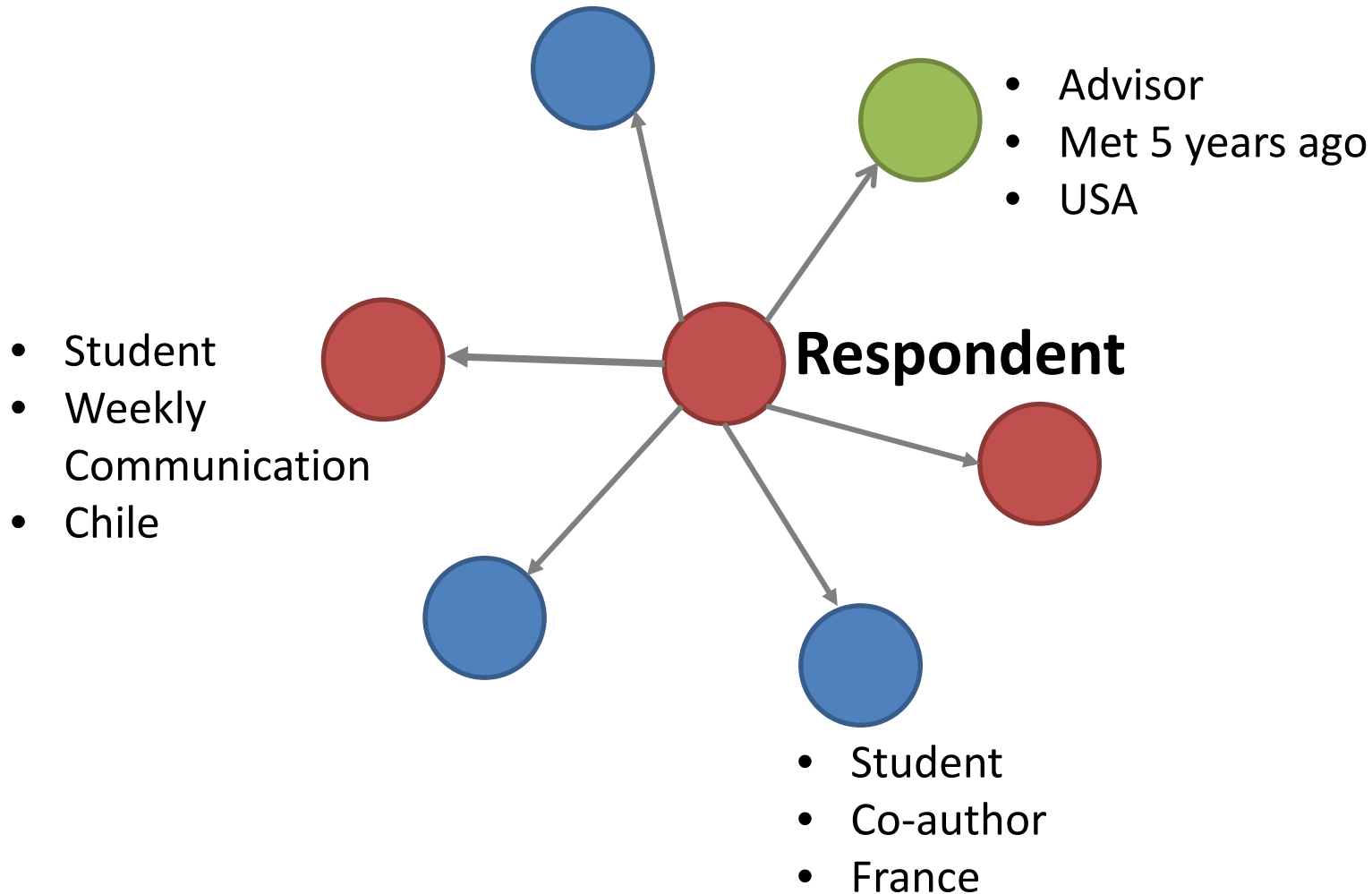
A network approach teases out the effect of different networks on GRFA **access and exchange**.

Network methodology

Data collected through survey:

1. We asked each respondent to indicate (1) other IL members with whom they communicate and (2) non-IL members with whom they collaborate.
2. For each respondent, we were able to identify key relationships inside and outside the IL.
3. For each of the named individuals, we asked respondents to provide further information, such as who they are (a friend, an advisor, a student...), how long they have known each other, how frequently they communicate, whether they exchange material and so on.

Example of Network Data



Quantitative model 1

**Cost and Barriers
to Access:**

- 1. Perceived
Barriers**
- 2. Administrative
Time**

=

Institutional factors (e.g. Regulatory Pressures, ABS)

+

Network factors (e.g. close ties, size)

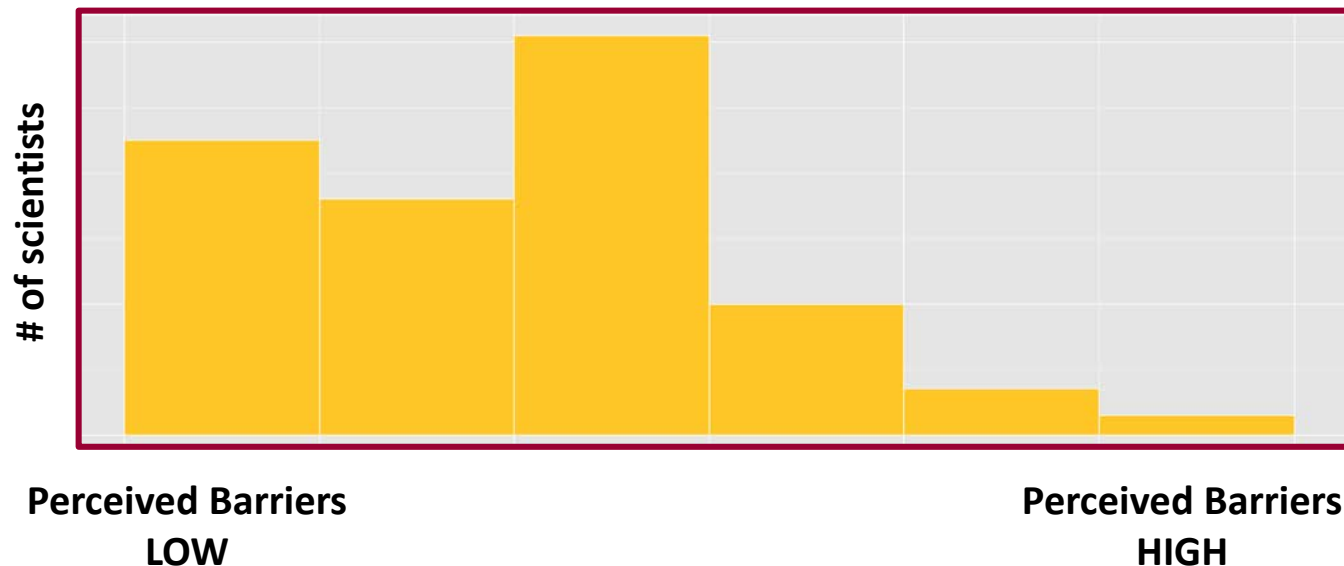
+

Individual factors (e.g. sector, location, tenure)

DV 1 Measurement: Perceived barriers

For each country they consider important sources of GRFA, respondents were asked to rate from 1 to 4, :

- **Likelihood of obtaining** genetic materials (reversed)
- **Likelihood of delays** in obtaining genetic materials
- **Likelihood of stoppages** in obtaining genetic materials



Average scale across the three items. Reliability / Cronbach alpha: 0.7

Perceived barriers: Main Results

Scientists perceive **greater barriers** to access GRFA when:

- they obtain material from **diverse regions**

- they work with **animal genetic resources**

- they have **closer collaborators** (i.e., are in more frequent contact)

- they receive **more support** to deal with regulations

Scientists perceive **lower barriers** to access GRFA when:

- their organization grants them **greater autonomy** to negotiate exchange

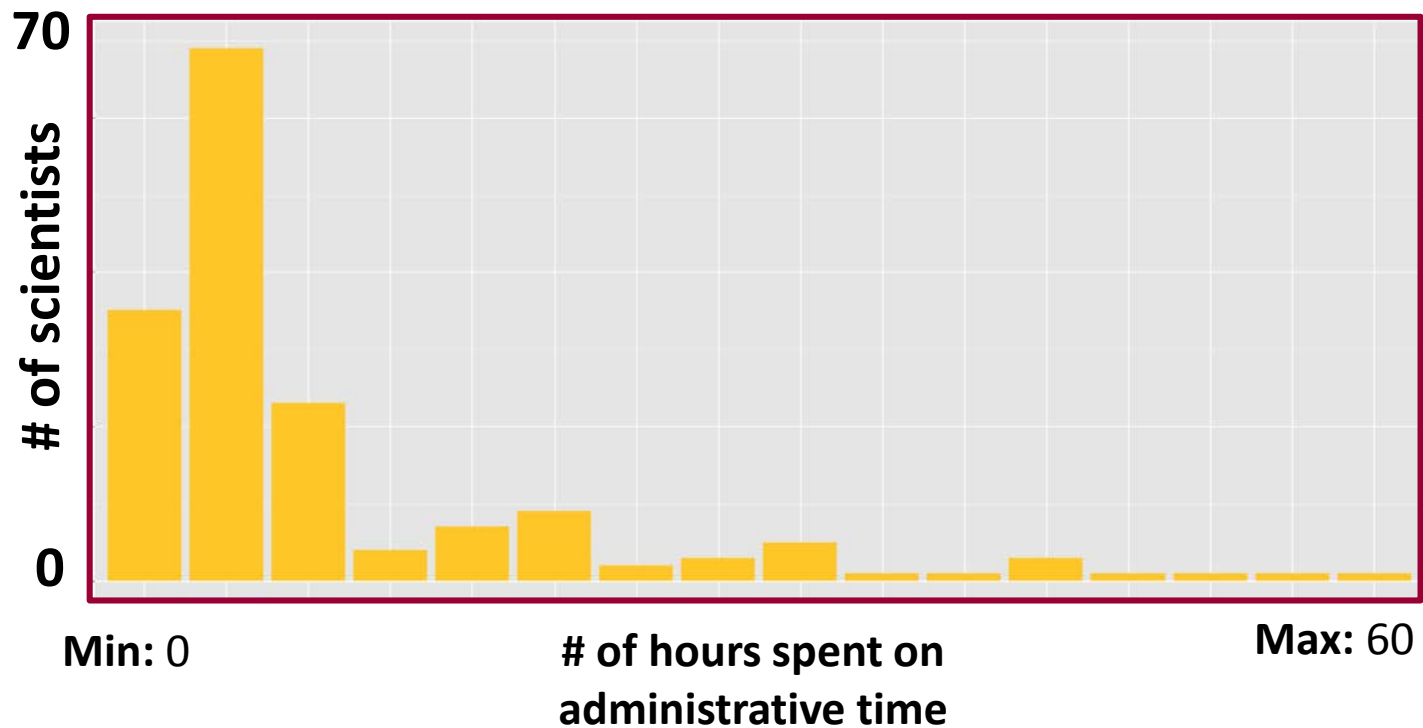
- they work in the **US**

- they are **junior scientists**

Regulatory pressure did not explain differences in barriers to access.

DV 2 Measurement: Admin Time

Number of hours spent per week on administrative activities by each respondent (from 0 to)



Admin Time: Main Results

Scientists report **higher admin time** when:

- they report **higher regulatory pressures** (i.e. greater frequency of compliance with ABS)

- they experience **greater restrictions on use and required returns**

- they have a **greater proportion of ties outside of their IL**

Scientists report **lower admin time** when:

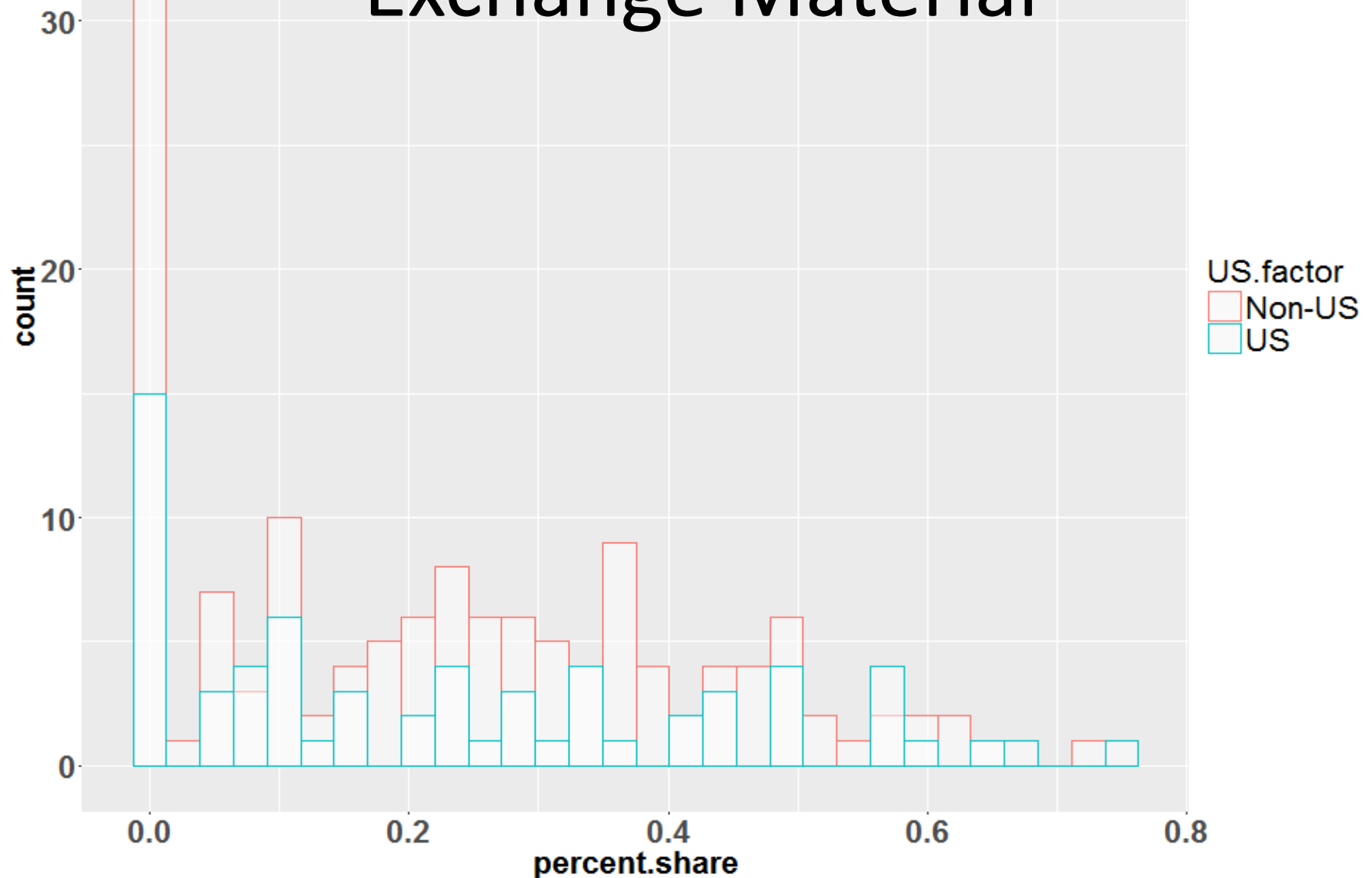
- they work in the **US**

Variation in admin time was not predicted by the **type of institution the scientist collaborated with.**

Quantitative model 2

$$\begin{array}{l} \text{Likelihood of} \\ \text{Receiving} \\ \text{Material from a} \\ \text{Collaborator} \end{array} = \begin{array}{l} \text{Institutional factors (e.g. regulatory} \\ \text{pressures and ABS)} \\ + \\ \text{Network variables/ Collaborator} \\ \text{attributes (e.g. location, organization,} \\ \text{support...)} \\ + \\ \text{Network variables/Relationship} \\ \text{characteristics (e.g. Length of} \\ \text{relationship, frequency of} \\ \text{communication, same country...)} \\ + \\ \text{Individual factors (e.g. gender, age,} \\ \text{location, position, field...)} \end{array}$$

Percent of Collaborators who Exchange Material



Main Results

Scientists are **more likely** to receive material from collaborators when:

- Collaborators provide **support to deal with regulations**

- Collaborators **work in public organizations**

- Collaborators were **former students**.

- Collaborators work in their **same IL**.

- Close** collaborators (communicate more often, known longer)

- Collaborators in their **same region**

Scientists are **less likely** to receive material from collaborators when:

- Collaborators work **outside of the US**

- Collaborators in their **same country**

- Collaborators when they **both work in a public or private organization**

Individual and Institutional factors explain very little variation.

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