

Going Farther Together: The Impact of Social Capital on Sustained Participation in Open Source



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Maintain, or suffer



[https://w3techs.com/technologies/
history_overview/web_server](https://w3techs.com/technologies/history_overview/web_server)

(Greenstein and Nagel, 2016)

Open-source experience boosts resumes

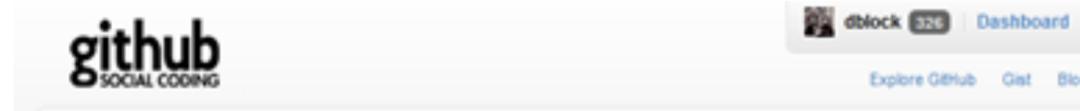
Employers (and job seekers) use open-source experience to make inferences (or form impressions) about a candidate's technical skills.

(Marlow et al., 2013)

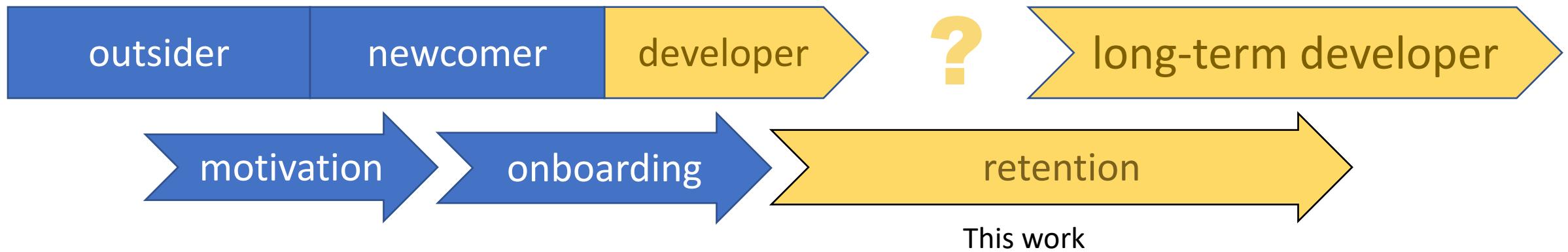
Github is Your New Resume

➔ [github](#) | [git](#) | [organizations](#) | [people](#)

<https://code.dblock.org/2011/07/14/github-is-your-new-resume.html>



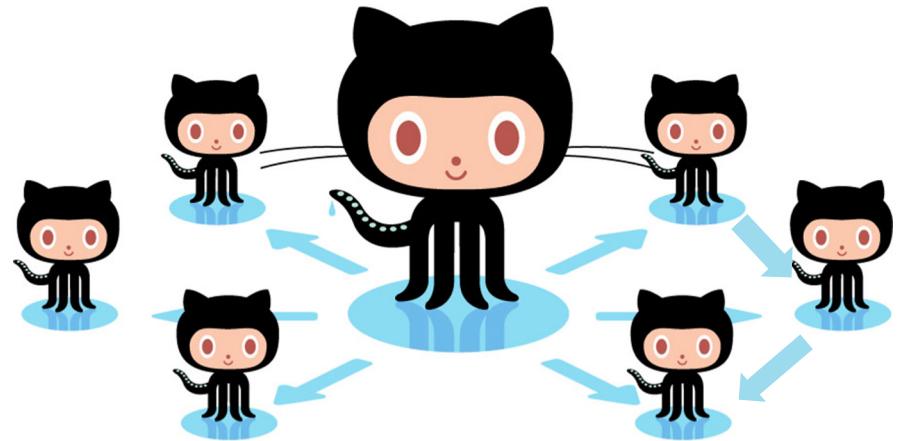
Knowledge gap



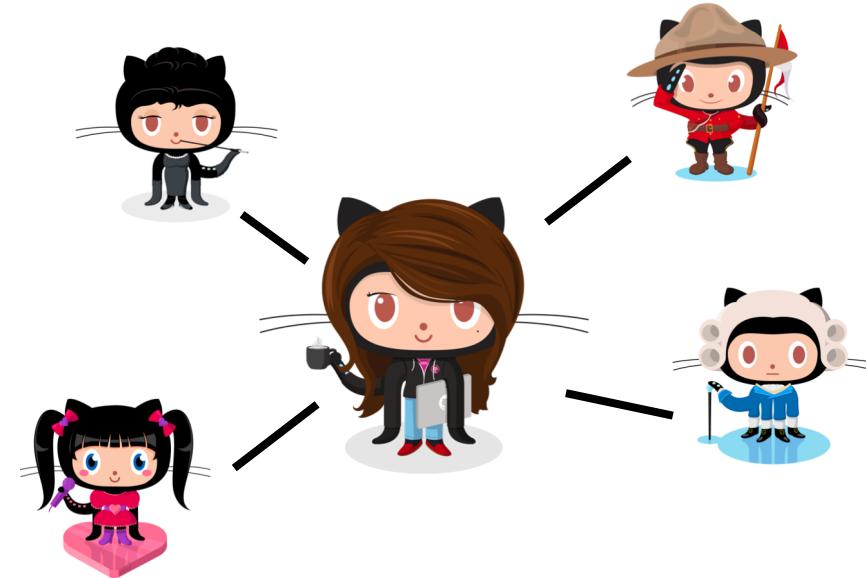
RESULT HIGHLIGHTS: Social capital explains sustained participation



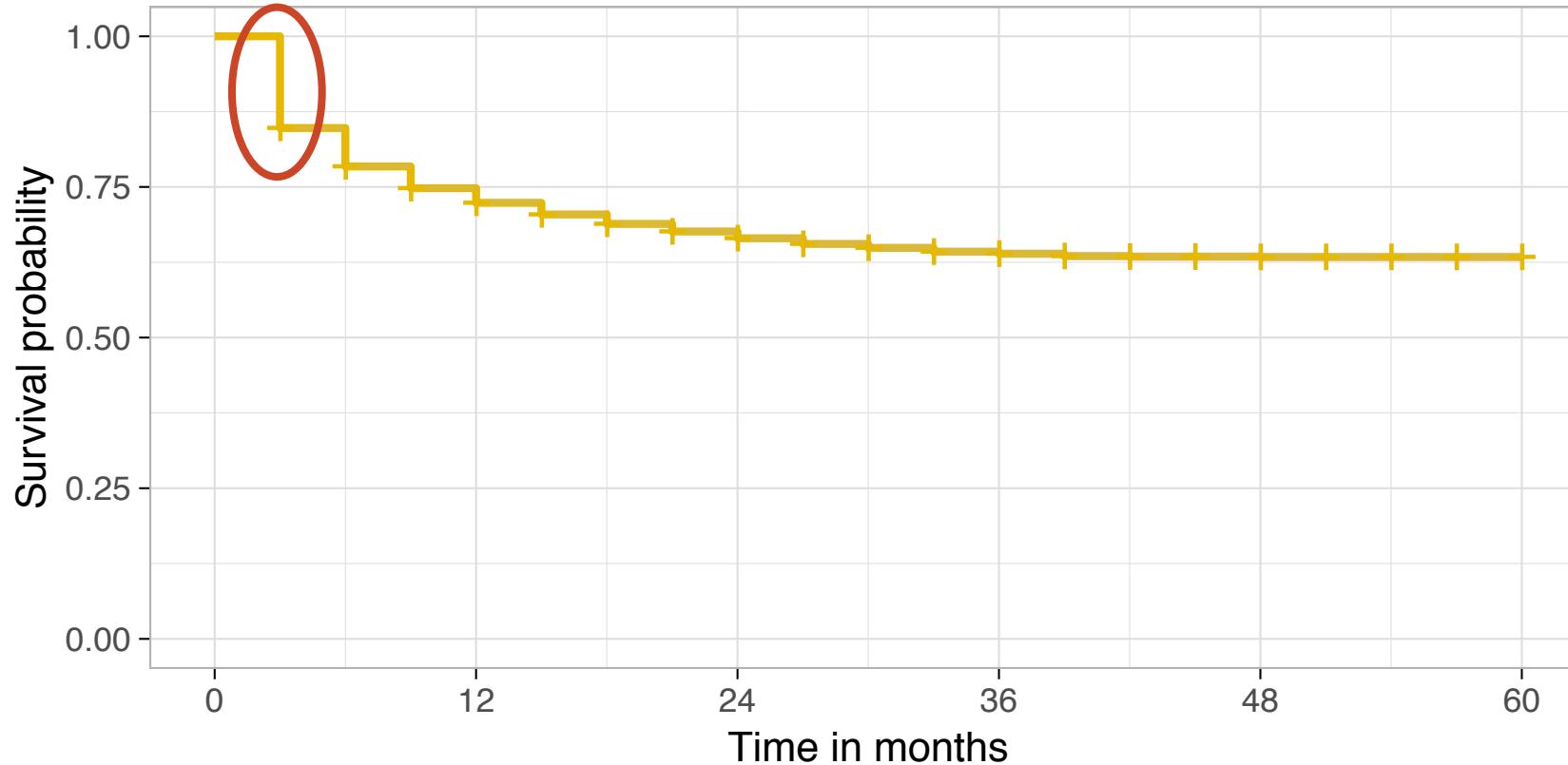
Higher social capital



Being part of teams with more diverse information, especially for women

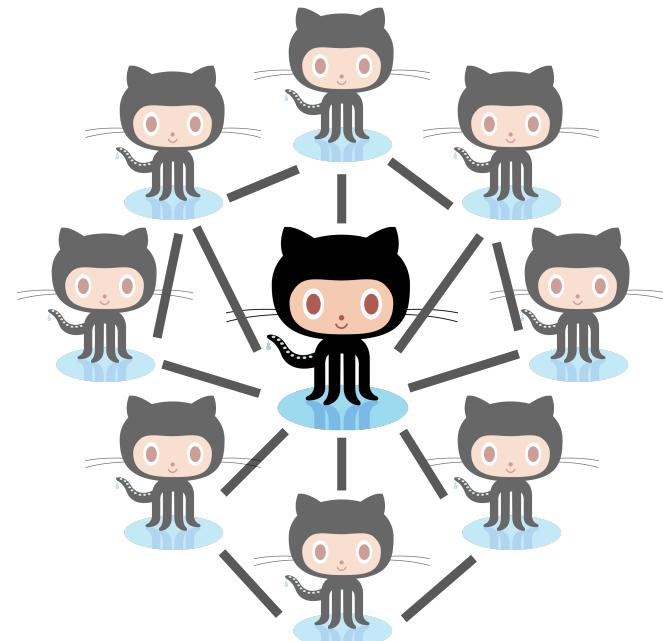


~40% of GitHub contributors disengage



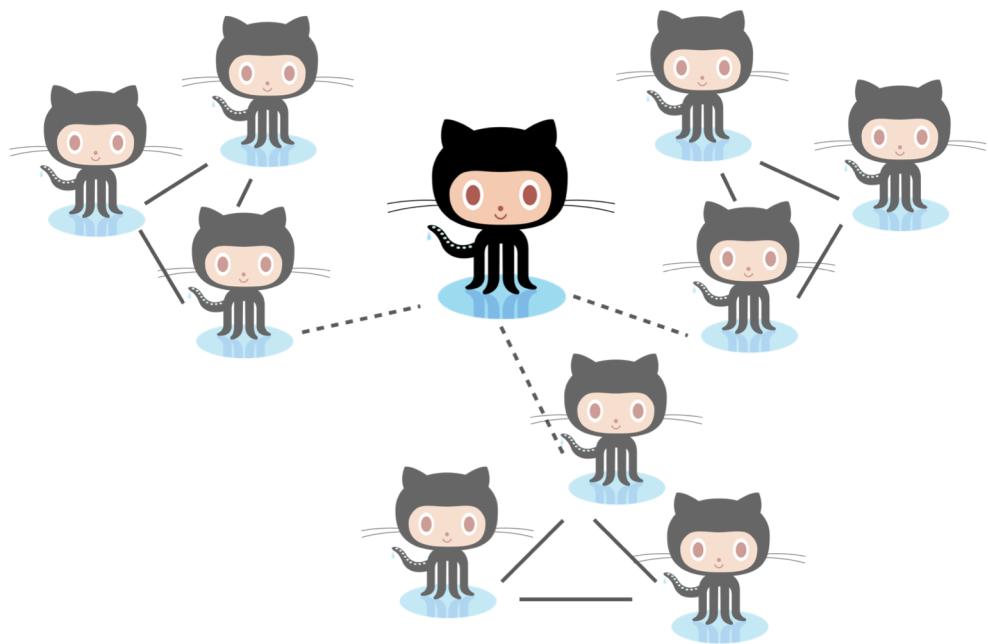
Social capital theory for sustainable participation

Bonding social capital:
benefiting from strongly connected network



Willingness to continue
(Coleman, 1990)

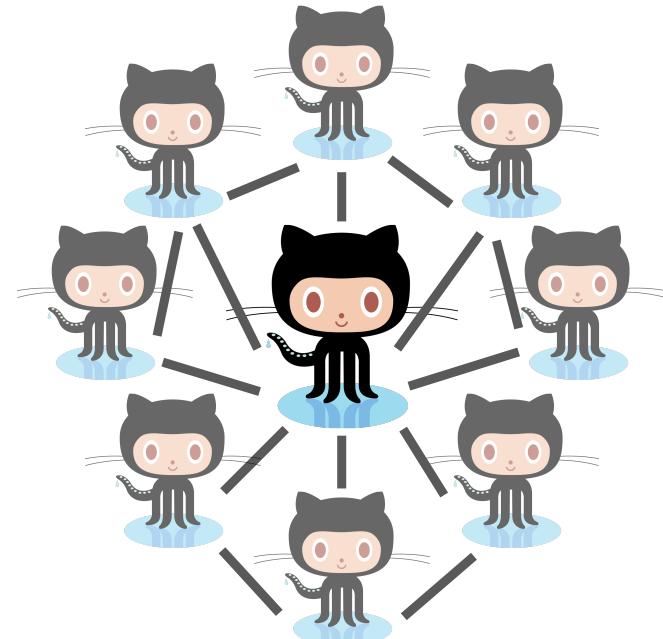
Bridging social capital:
benefiting from network with diverse info



Opportunity to continue
(Burt, 1998, 2001)

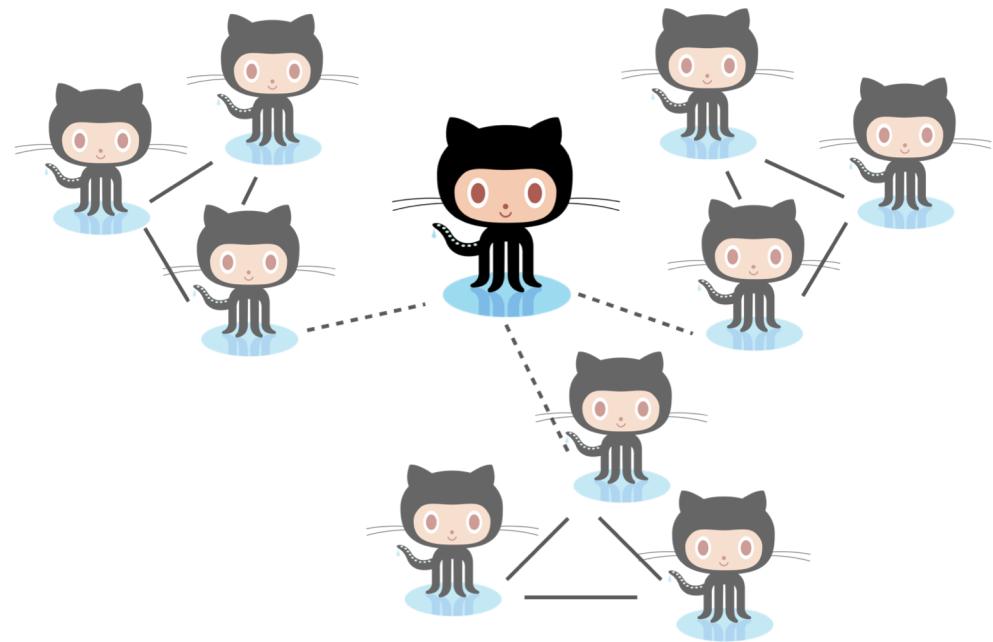
H1: more social capital ~ more prolonged engagement

Bonding social capital:
benefiting from strongly connected network



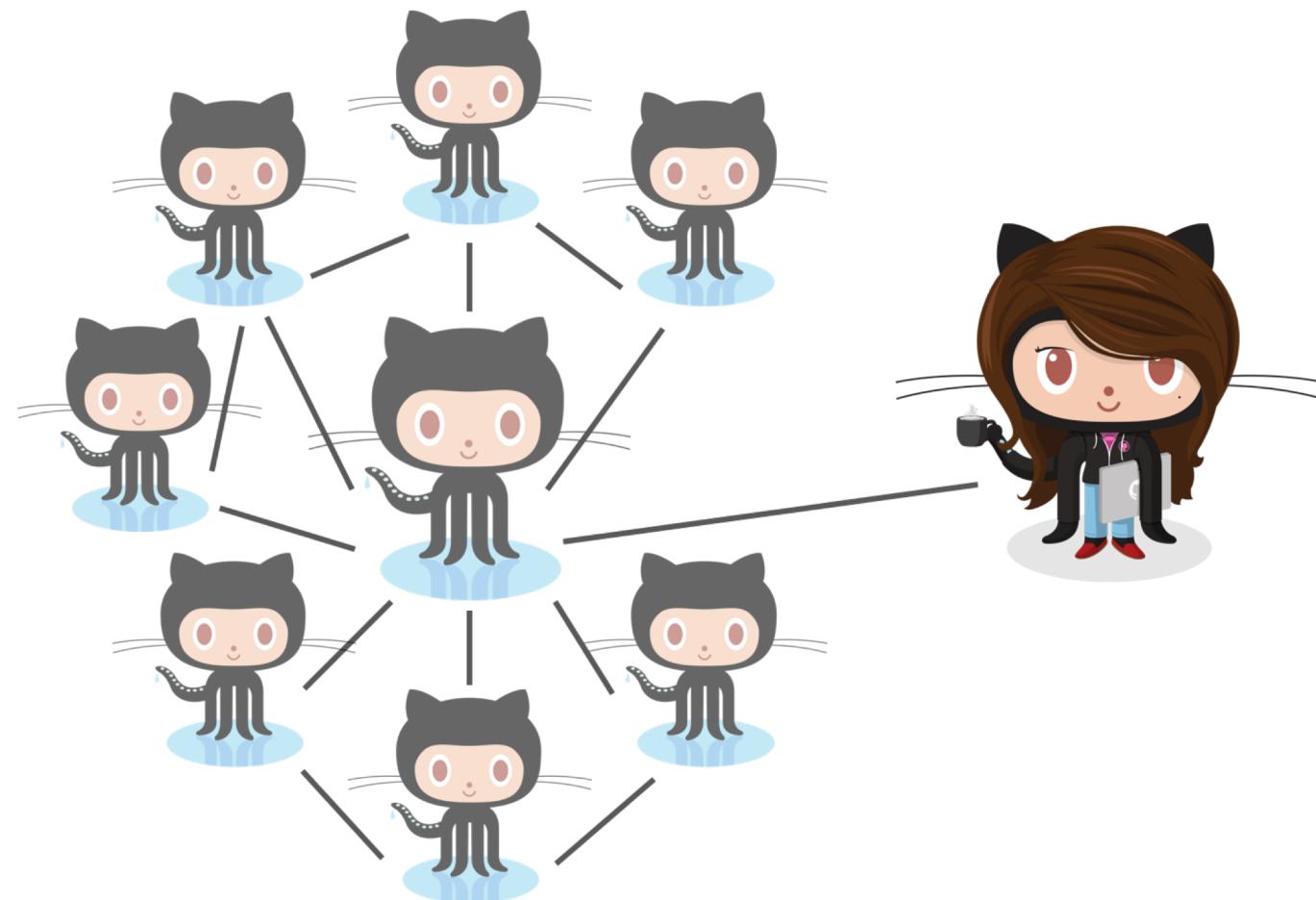
Willingness to continue
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Bridging social capital:
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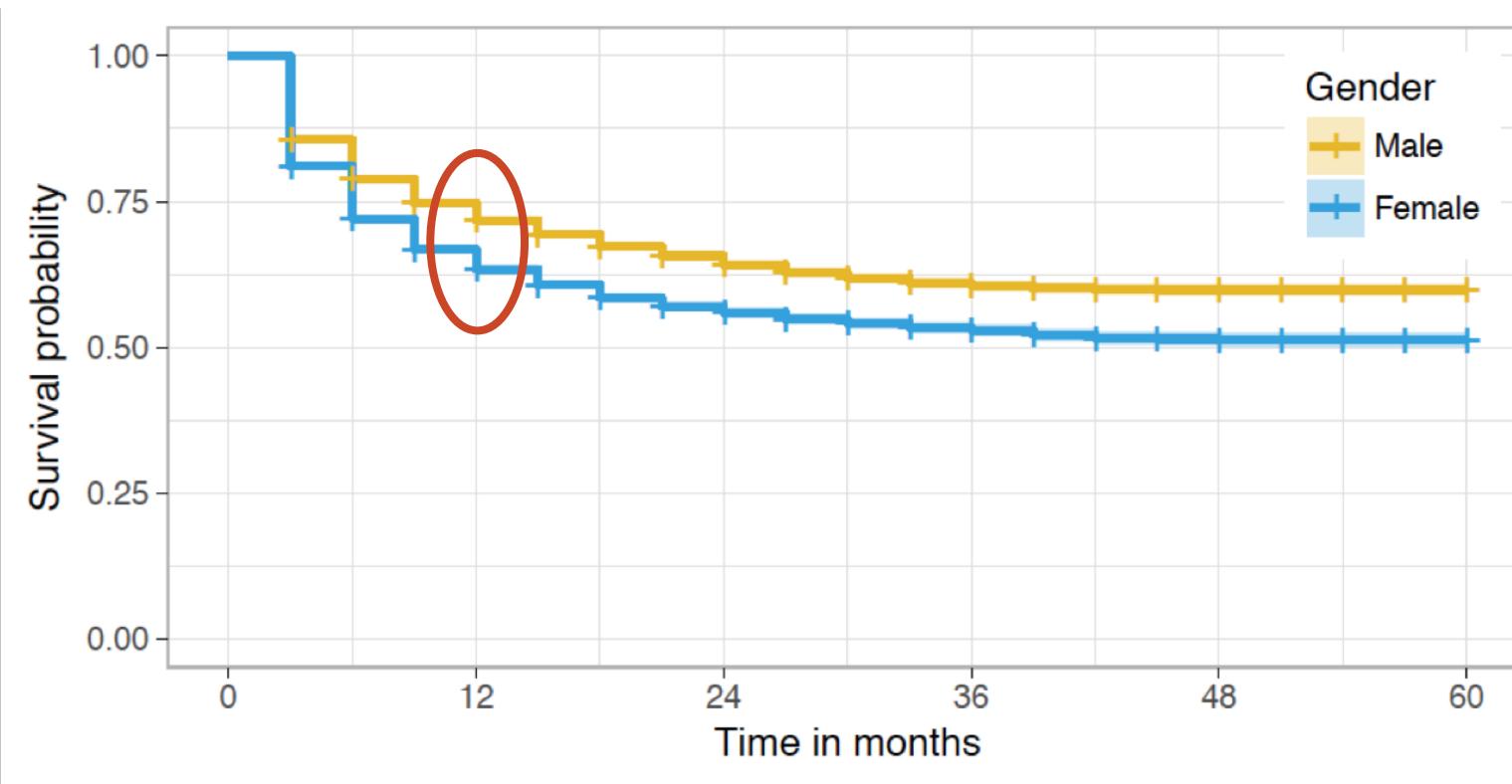
Opportunity to continue
(Burt, 1998, 2001)

Cohesive networks might foster discrimination / exclusion



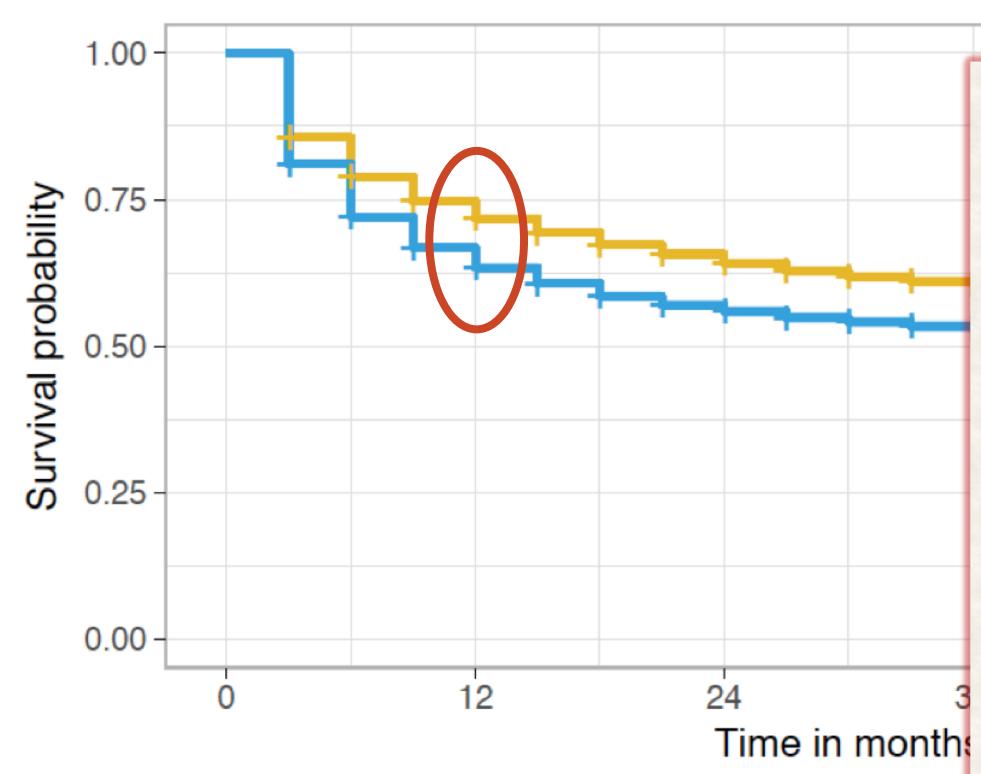
On GitHub, women disengage earlier than men

After one year ca. 70% of men are still active but only ca. 60% of women



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Why do contributors disengage?

- Developer survey in our paper:
 - Work-related (e.g., new job)
 - Personal* (e.g., different hobby)

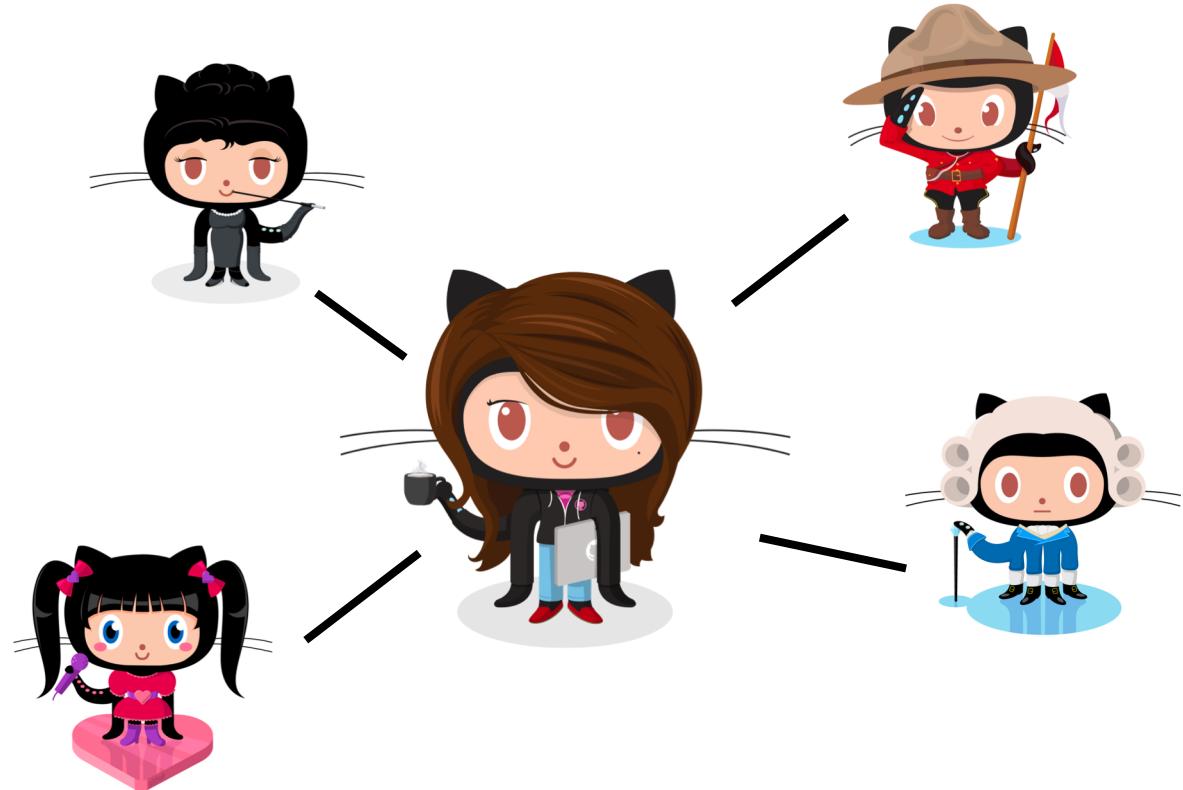
**women cite more often than men*

See also:

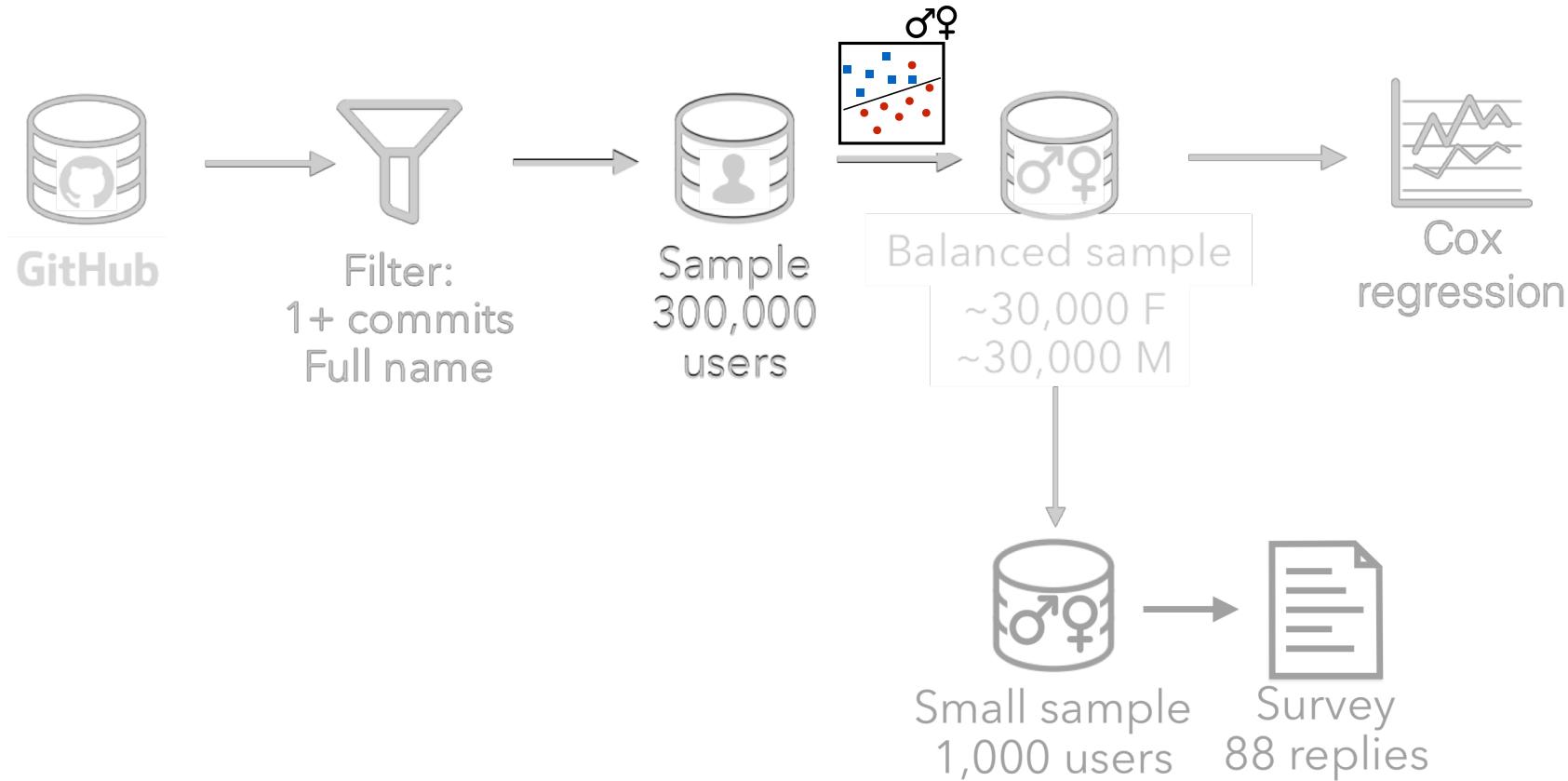
- Miller et al, OSS 2019
- Iaffaldano et al, SoHeal 2019

H2: Teams with more diverse information ~ more prolonged engagement, esp. for women

Information diversity should reduce the risk of demographic-based echo chambers.



Large-scale mixed-methods study



Inferring gender from names

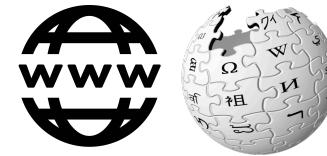
<https://github.com/tue-mdse/genderComputer>



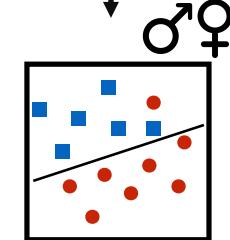
<https://www.namsor.com>



name features, e.g., the last two characters



Public name lists & celebrity names,
including 3,000 East Asian names

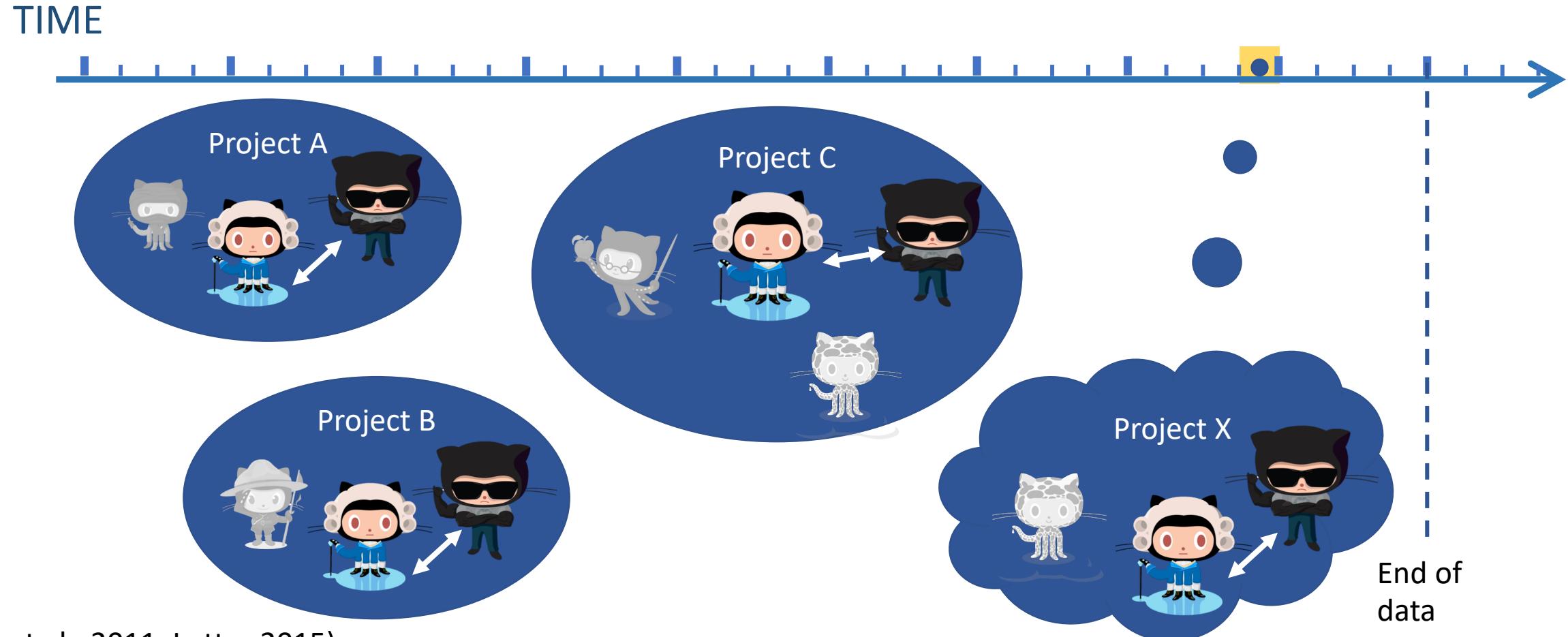


Naive Bayes
classifier



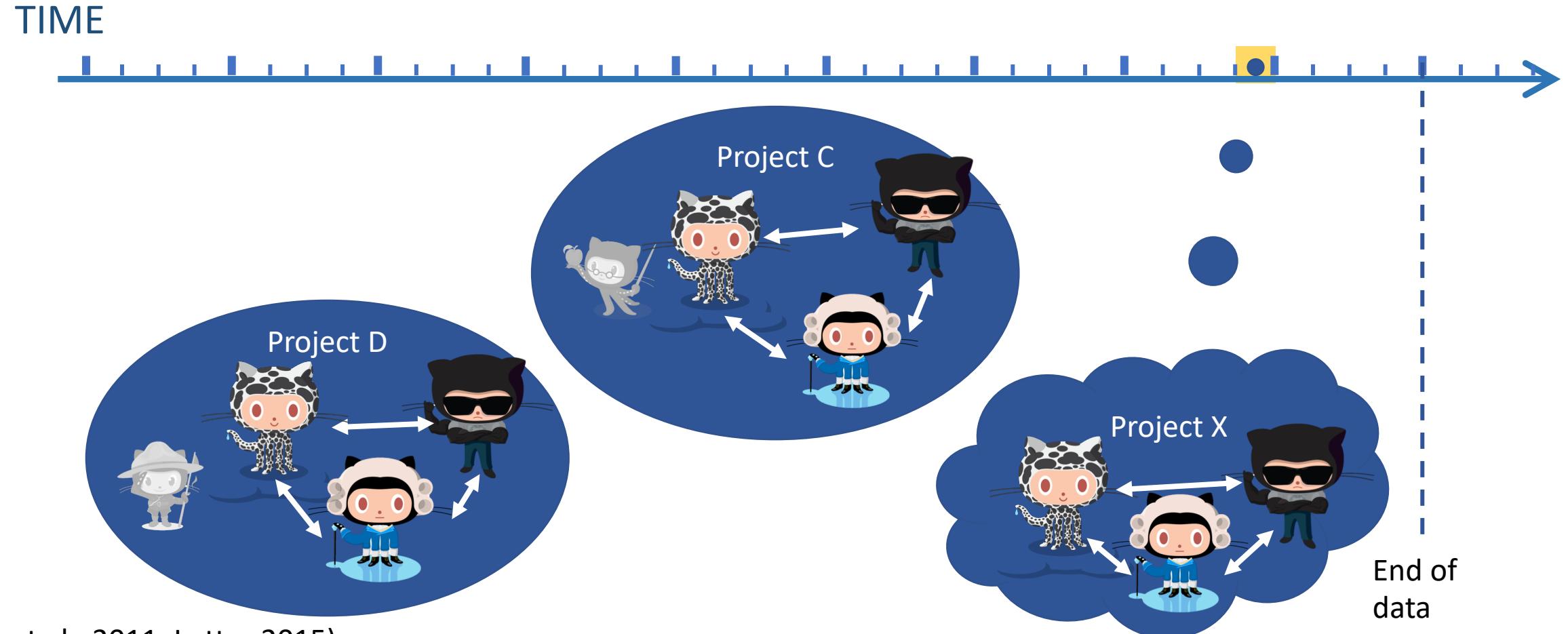
Binary gender
prediction

Bonding social capital – Team Familiarity



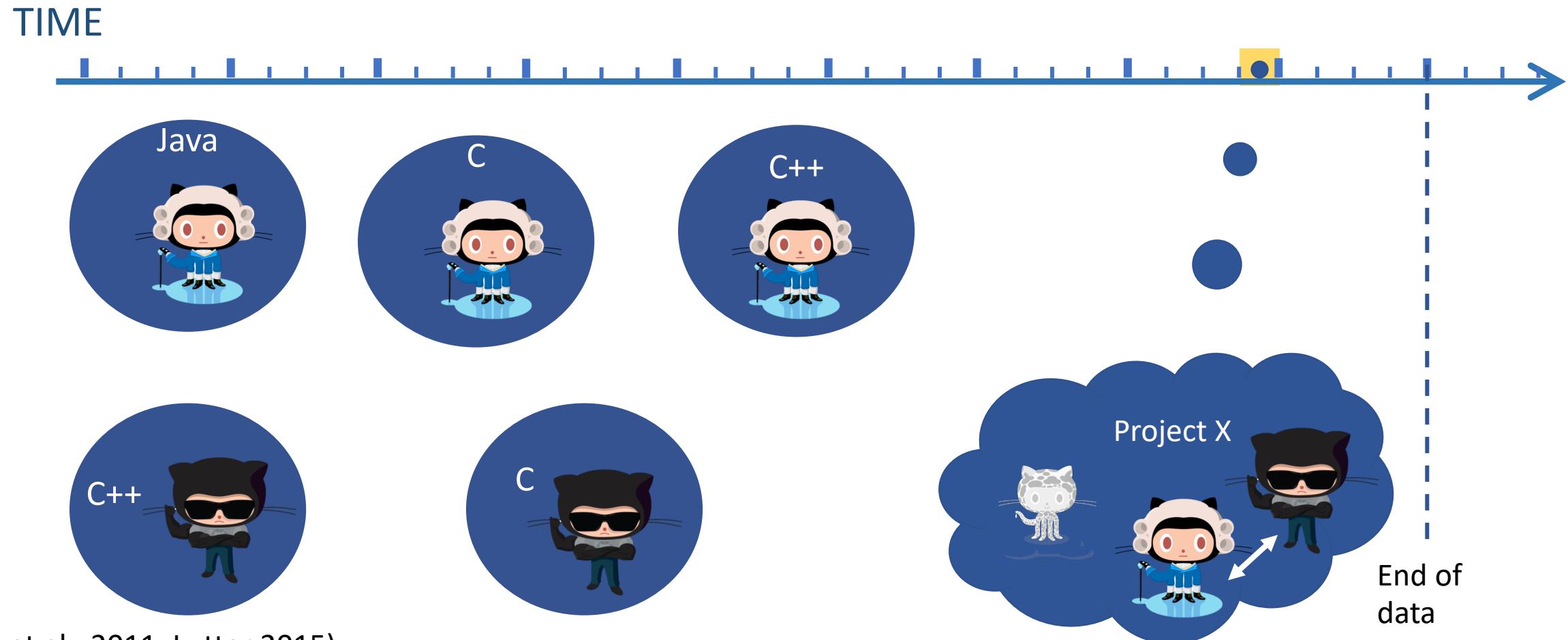
(de Vaan et al., 2011, Lutter 2015)

Bonding social capital – Recurring Cohesion



(de Vaan et al., 2011, Lutter 2015)

Bridging social capital – Language Diversity

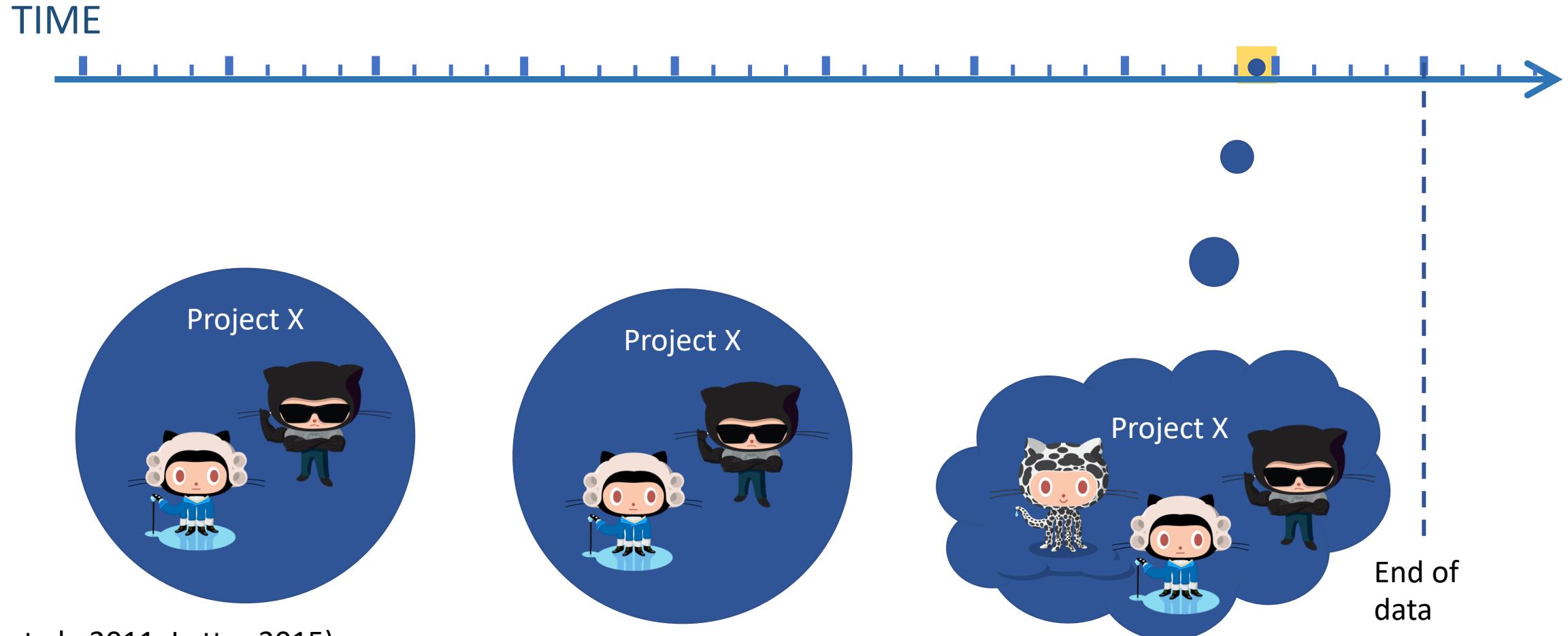


(de Vaan et al., 2011, Lutter 2015)

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Bridging social capital – Share of Newcomers



(de Vaan et al., 2011, Lutter 2015)

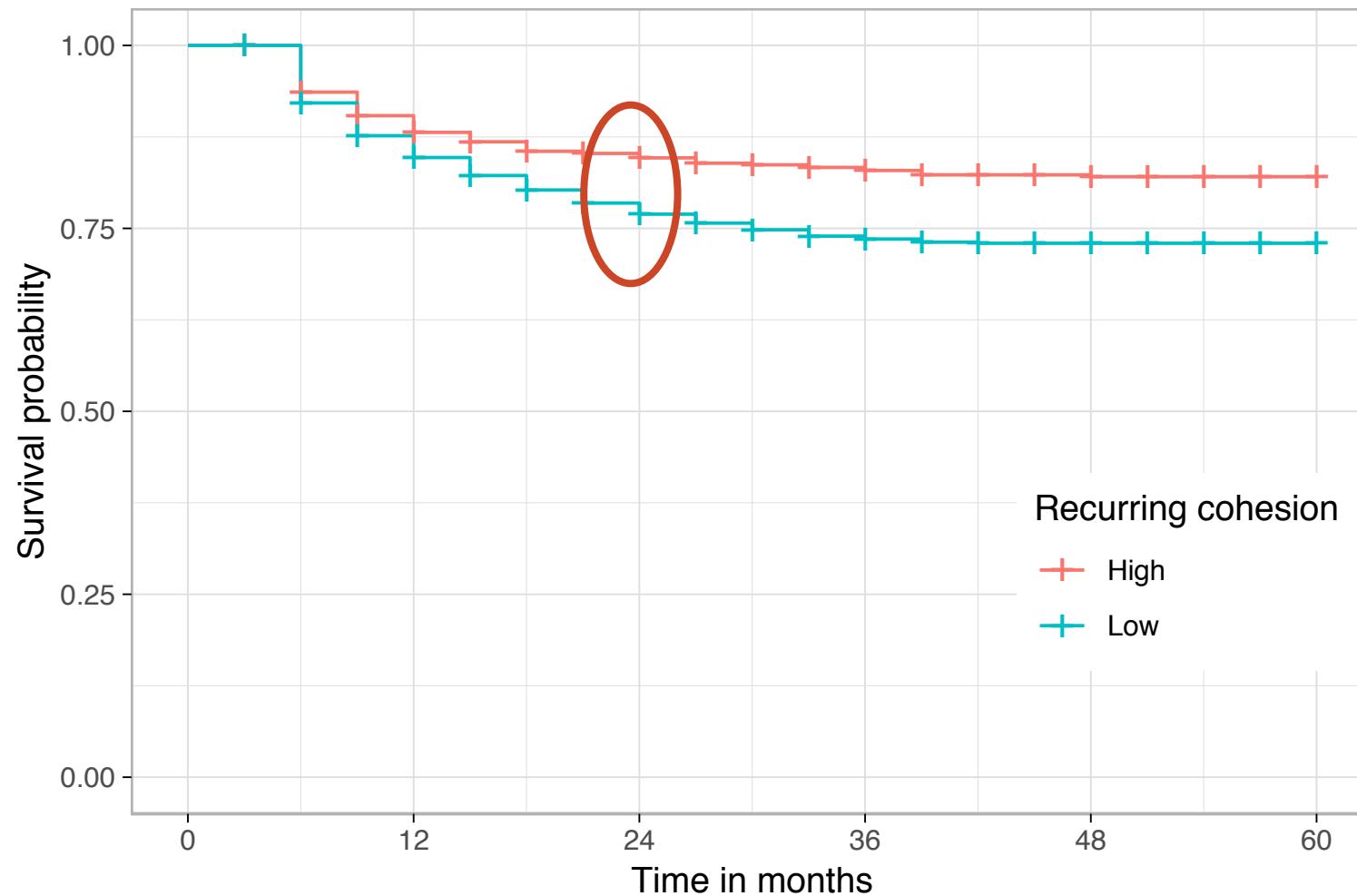
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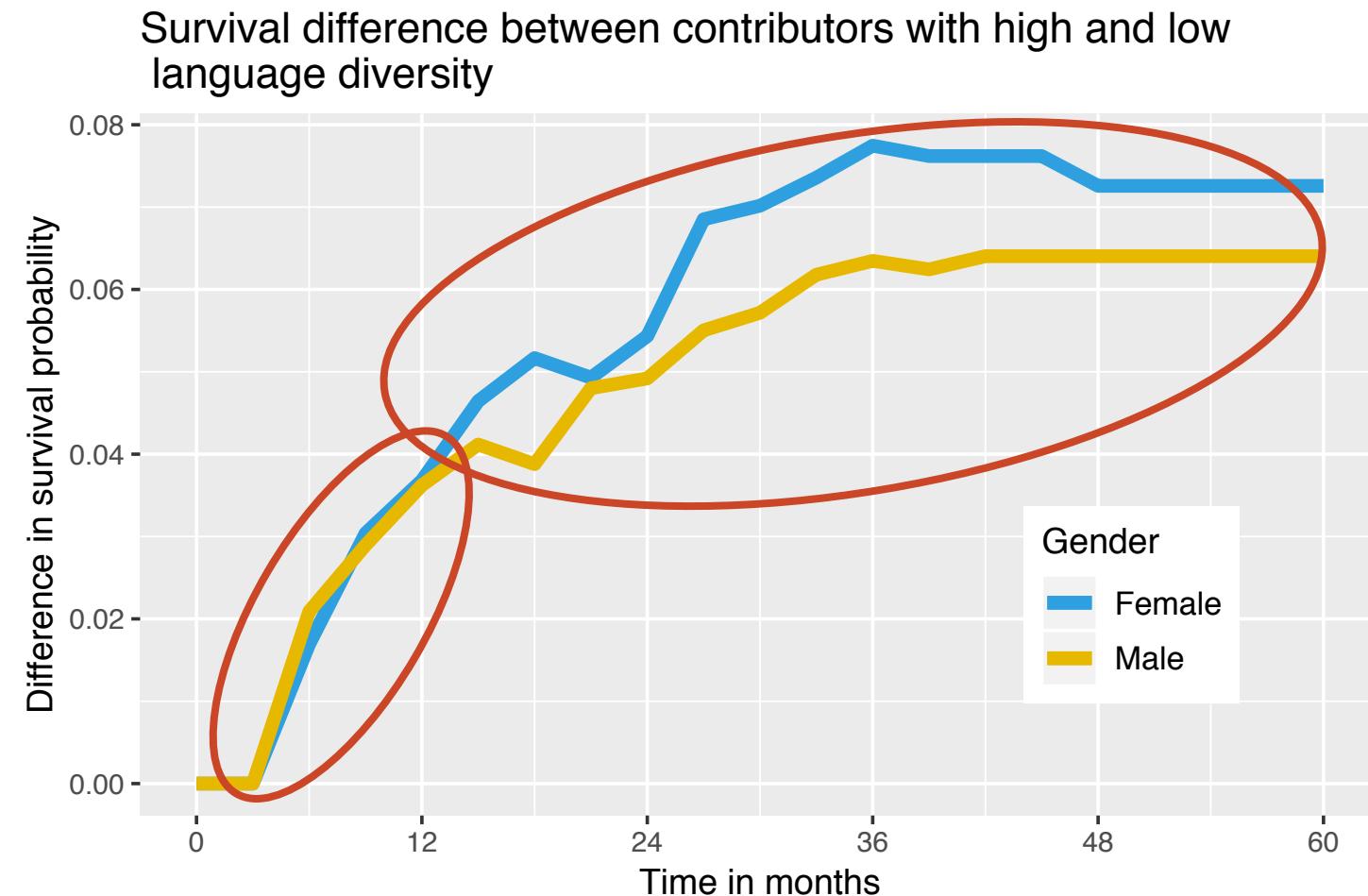
COX regression model

Contributor	Time	Active	Social capital	Control variables
	2008 Jan – Mar	True	Team familiarity Recurring cohesion Language diversity Share of newcomers	Project size Project owner
	2008 Jan – Mar	True	Team familiarity Recurring cohesion Language diversity Share of newcomers	Project size Project owner
	2009 Apr – Jun	False	Team familiarity Recurring cohesion Language diversity Share of newcomers	Project Size Not project owner

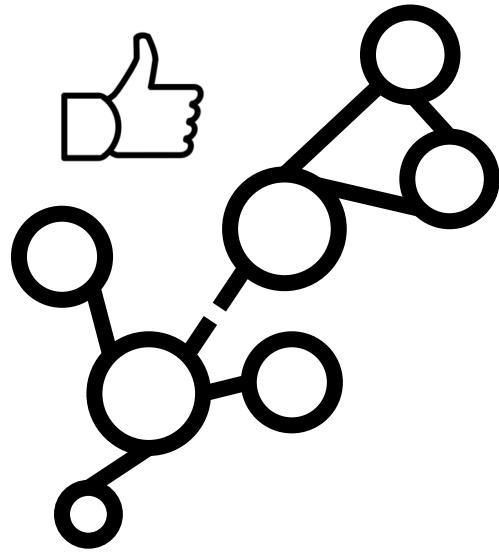
H1: more social capital ~ more prolonged engagement



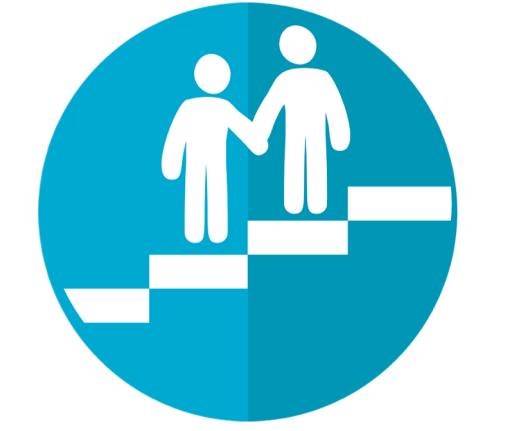
H2: Language diversity interacts with gender



What next?



Recommend projects that
can help build social capital



mentorship 10 mentors

Offer mentorship

community culture We welcome help

community culture We are friendly =)

community culture <3

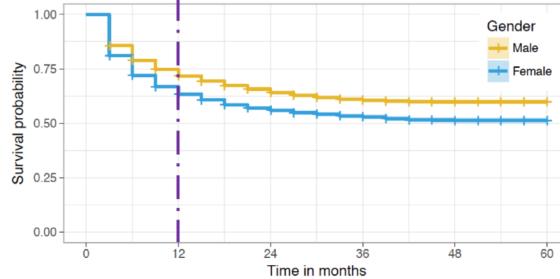
% of newcomers 30%

Use badges to show a
community's culture

Social capital explains prolonged engagement

On GitHub, women disengage earlier than men

- After one year ca. 70% of men are still contributing to GitHub projects but only ca. 60% of women

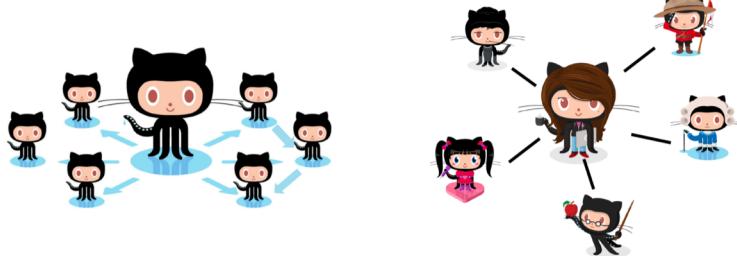


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Social capital explains sustained participation

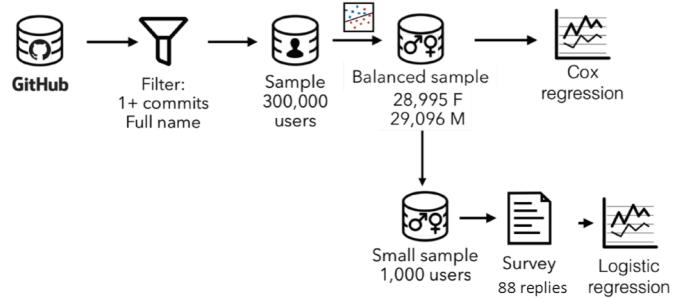


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Large-scale mixed-methods study

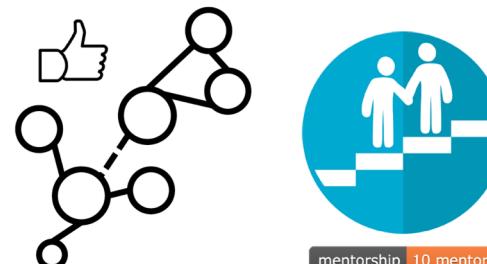


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What can we do?



- community culture We welcome help
- community culture We are friendly =>
- community culture <3
- % of newcomers 30%

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Acknowledgements:



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Code and data:

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