University of Amsterdam

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NEWS FLOWS

European Research Council

Mapping Dark Platforms: Modelling Information Flows on Telegram

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Telegram

Private: end-to-end encrypted messaging.

Public: *chats* (many-to-many) and *channels* (few-to-many).

A home for the **deplatformed**: permissively governed, low-moderated space.

Relatively free of **algorithmic interference**.

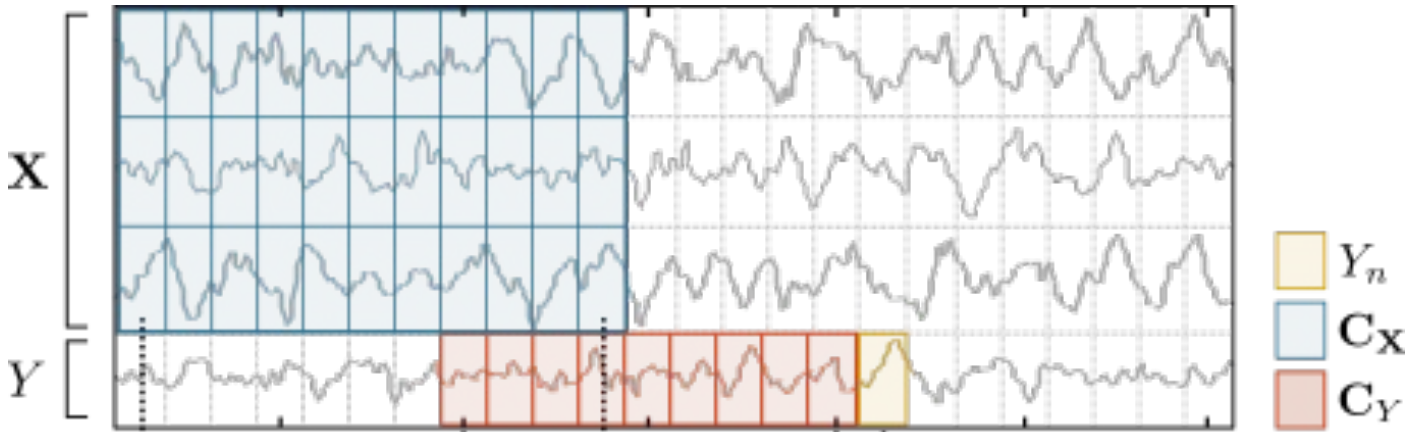
Information about network structure is very limited!

What we have: full messaging text-streams of chats/channels.

What we lack: relational data describing user, chat/channel associations.

from agents to flows -

Multivariate Transfer Entropy (mTE) -



IDTxl package for Python: P. Wollstadt, J. T. Lizier, R. Vicente, C. Finn, M. Martinez-Zarzuela, P. Mediano, L. Novelli, M. Wibral (2018). *IDTxl: The Information Dynamics Toolkit xl: a Python package for the efficient analysis of multivariate information dynamics in networks.* Journal of Open Source Software, 4(34), 1081. https://doi.org/10.21105/joss.01081.

mTE applied -
‘Network Toxicity’

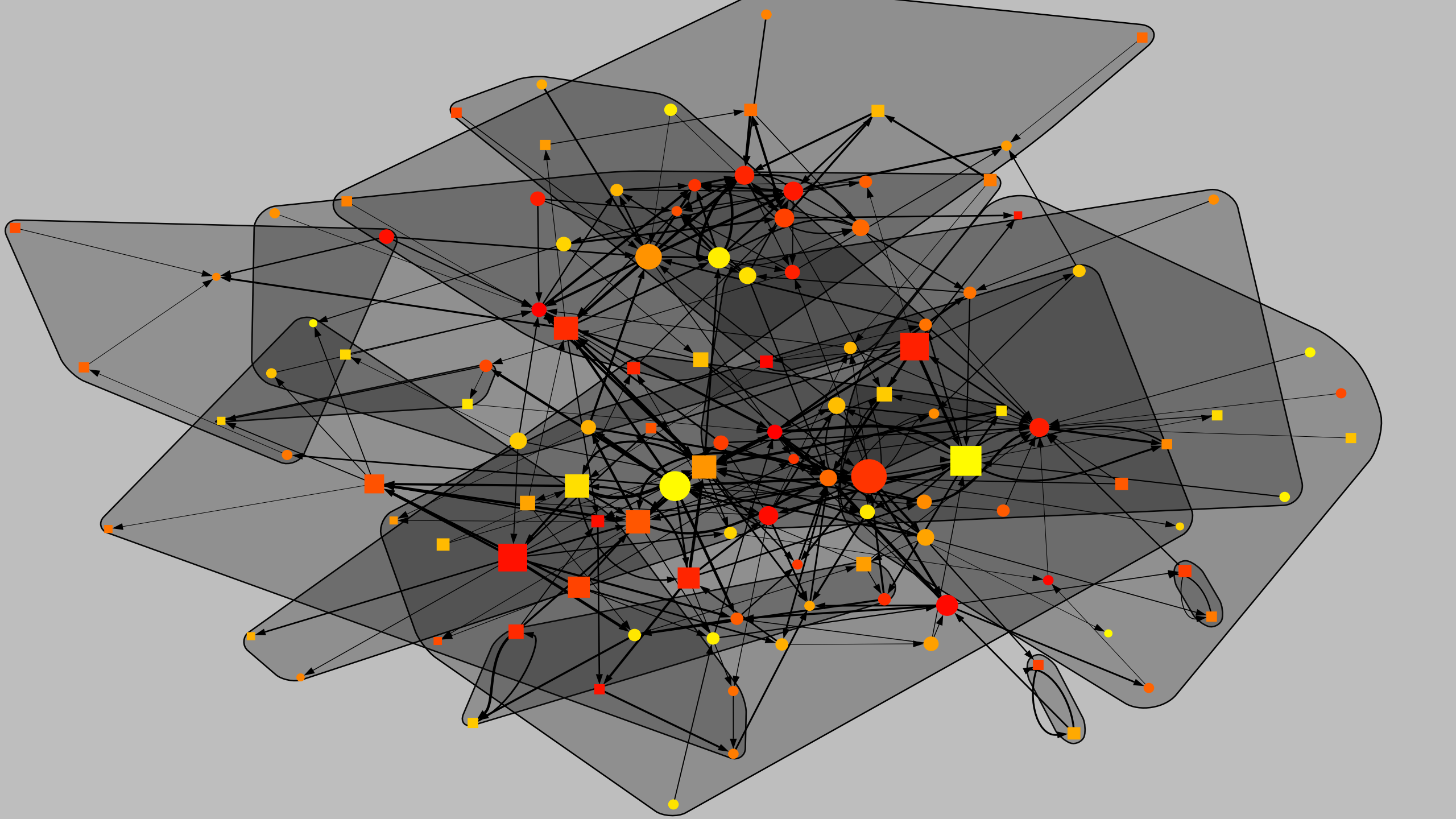
- **Aim**: to infer an *effective network* that describes the flows of toxicity between chats/channels on Telegram.

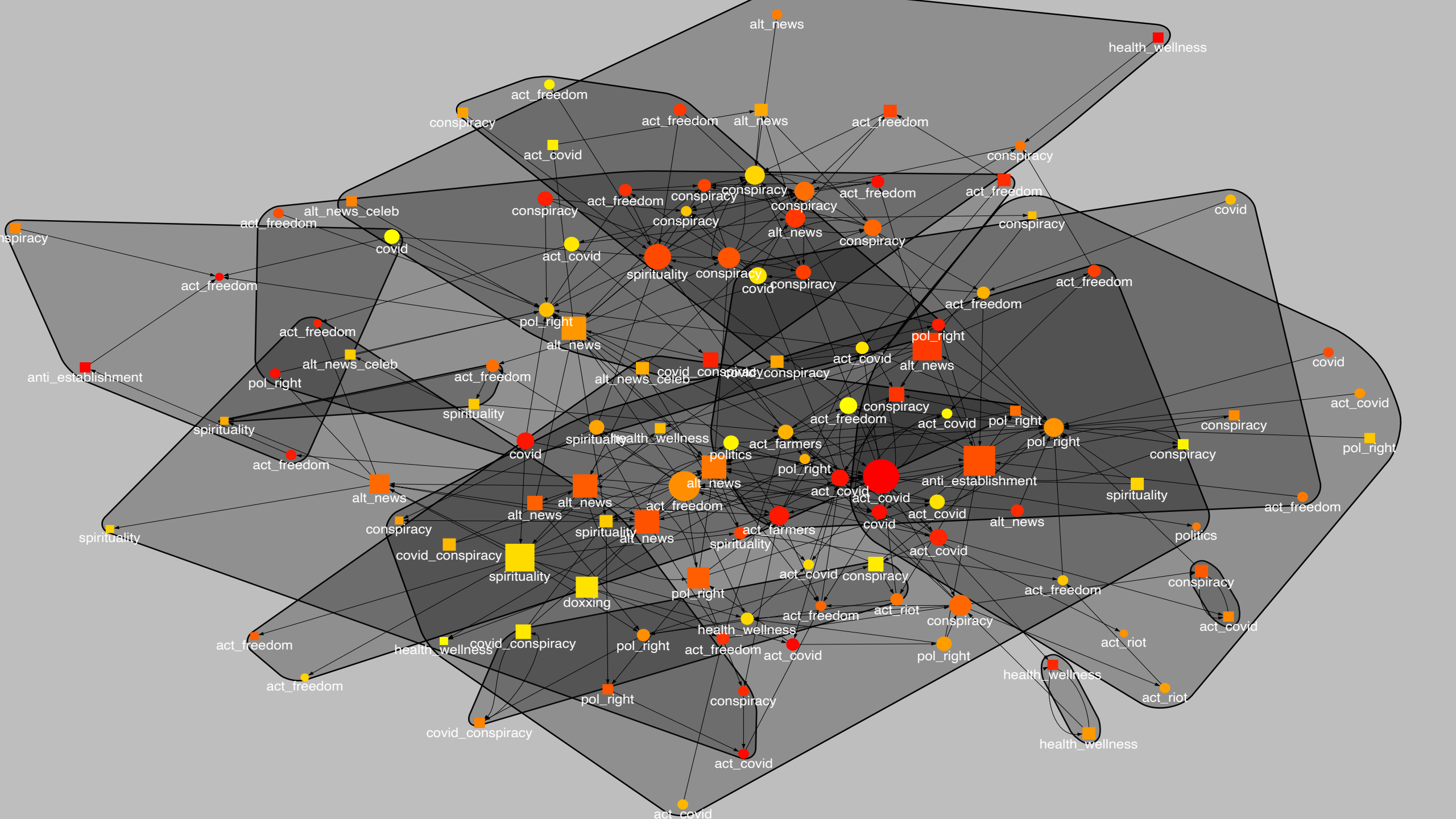
- **Toxicity**: *hateful, hurtful or marginalizing language that makes a person want to leave a conversation*.

> A growing threat to individuals & platforms.
> Telegram users are particularly at-risk.
> Existing approaches would struggle here.

Method -

1. **Data**: 6m snapshot (1M messages) of Dutch ‘Telegramsphere’ ---- *Jan ‘21 to Jun ’21.*
2. **Classification***:* messages → *toxicity scores* with the *Perspective API (Google).*
3. **Resampling**: 5-minute windows; average of scores; 24-hour leeway.
4. **Estimation:** linear estimator using **IDTxl,** 30-minute maximum lag.
5. **Aggregation:** *n for each i,j / max(n) for any i,j = ‘toxicity transfer’.*
6. **Pruning:** disparity filter: 3% of edges retained (p=0.05).

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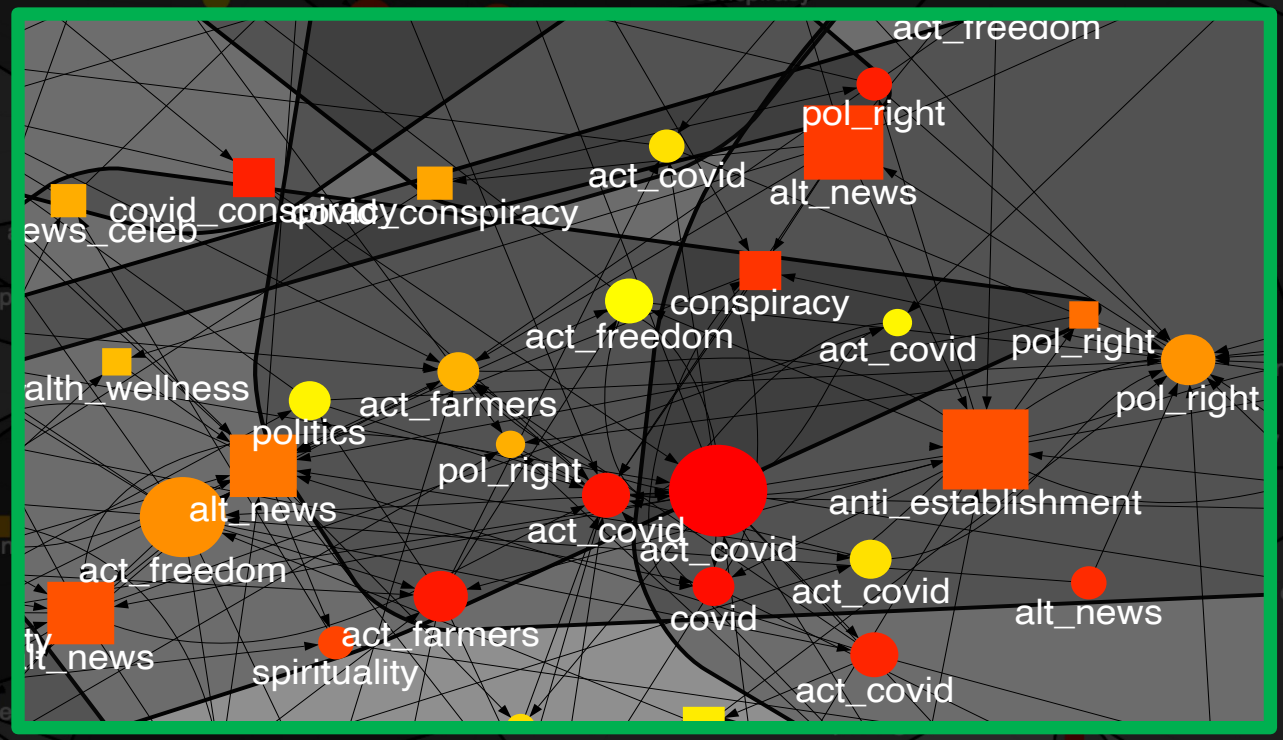
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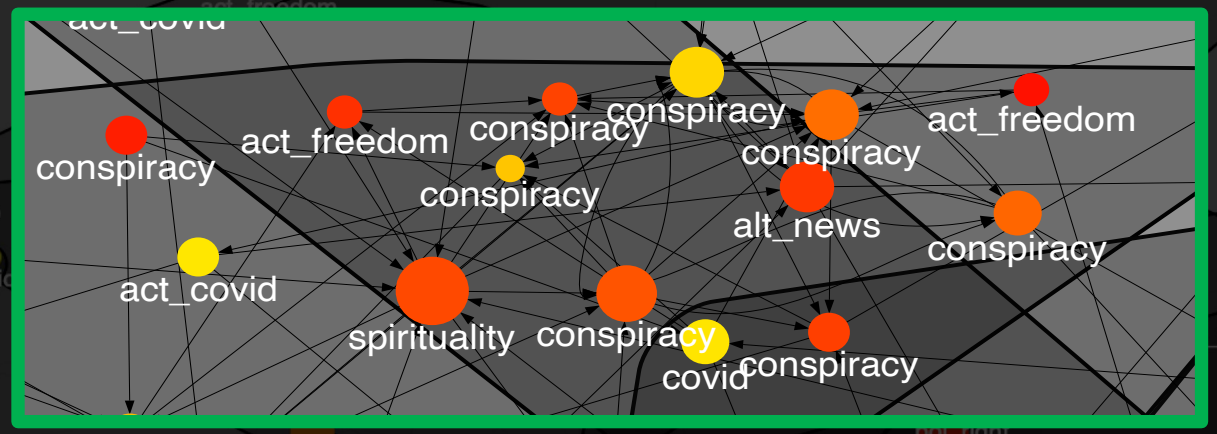
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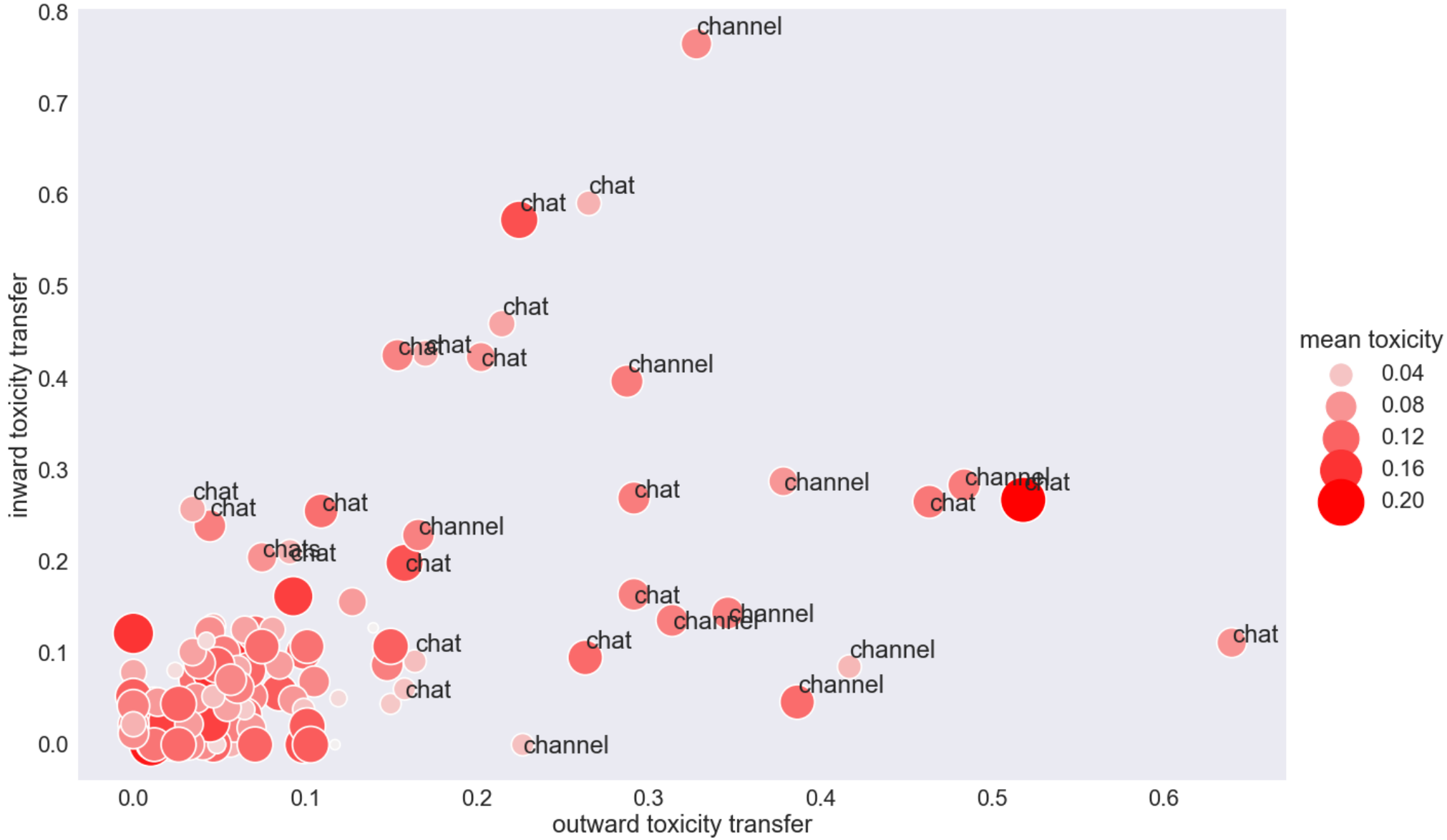
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mean toxicity
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0.20

Concluding Remarks -

- A '***model-free***' approach to understand the **dynamic consequences of toxicity.**
  + non-linear estimators (more complex relationships)
  + different timescales (beyond 30 minutes)
  + validation methods ('unpacking')

- **mTE framework** for **information flows & influence** more broadly.
  + different representations (e.g. word embeddings)
  + beyond Telegram..

Thank you very much!

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