A Small-scale Analysis of Health Service Stakeholder Networks: Insights from Social Media

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Agenda

1. What are we doing?
2. Why are we doing it?
3. How are we doing it?
4. Data collection and method
5. Node meta-information assessment
6. Pairwise network analysis
7. Networks
8. Key outcomes
9. Future research
10. Questions

What are we doing?

- Highlighting the importance of stakeholder networks in the context of mental health not-for-profit services
- Data from the social media brand pages of three organisations from the U.S., U.K., and Australia
- Assess the differences in the way each of these organisations manages stakeholder networks
- Highlight important nodes and structural properties of the networks

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Why are we doing it?

To help organisations:

- Understand the structural properties of their immediate network to help with social media marketing development
- Understand how similar / partner / competing organisations structure their social media networks
- Evaluate how embedded campaign partners are within their broader network
- Identify opportunities for future campaigns focused on building awareness / lobbying / seeking donations
  - Both within their present network, and based on the activities of other organisations

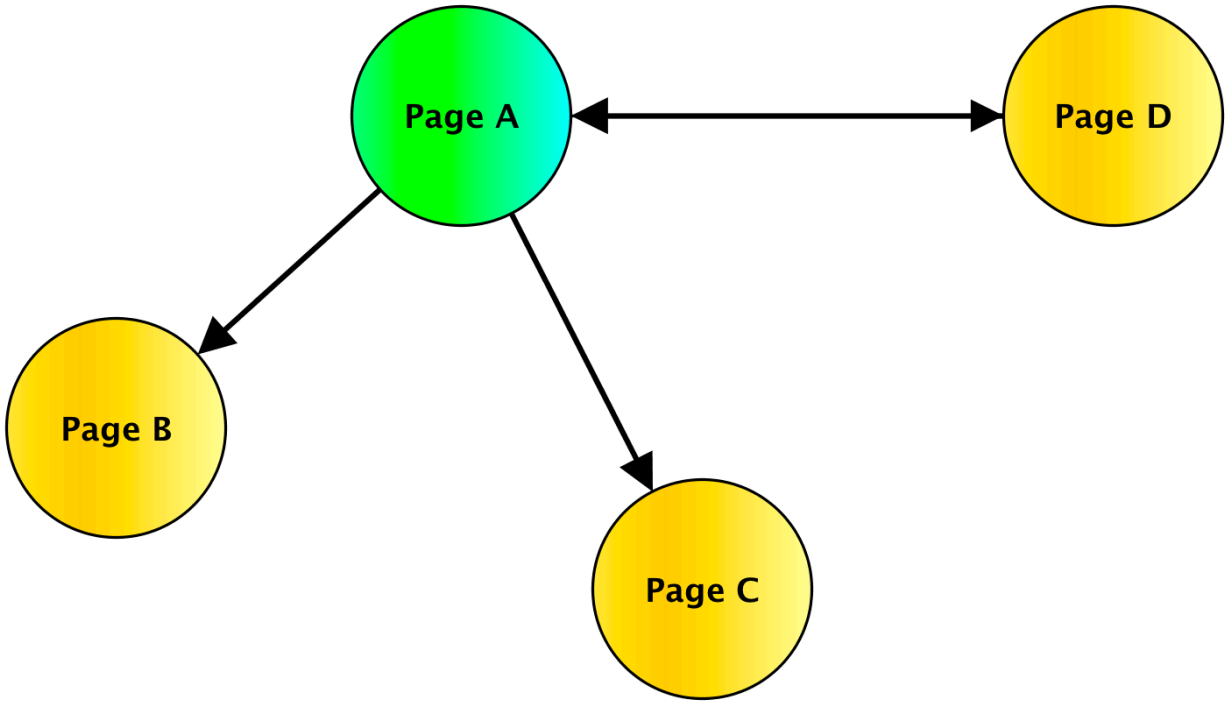
Stakeholders in this Context

- Other charities
- Other not-for-profit organisations
- Celebrities
- Politicians
- Companies

Why are we doing it?

- Mental health disorders have been recognized as a high-priority issue by governments around the world [1]
- Facebook now has 1.59 billion MAUs (1.44 billion on mobile), and is widely used by organizations of all types to connect with consumers [2]
- Not-for-profit sector = cost-effectiveness is key, and relevant and strong stakeholder relationships are critical!

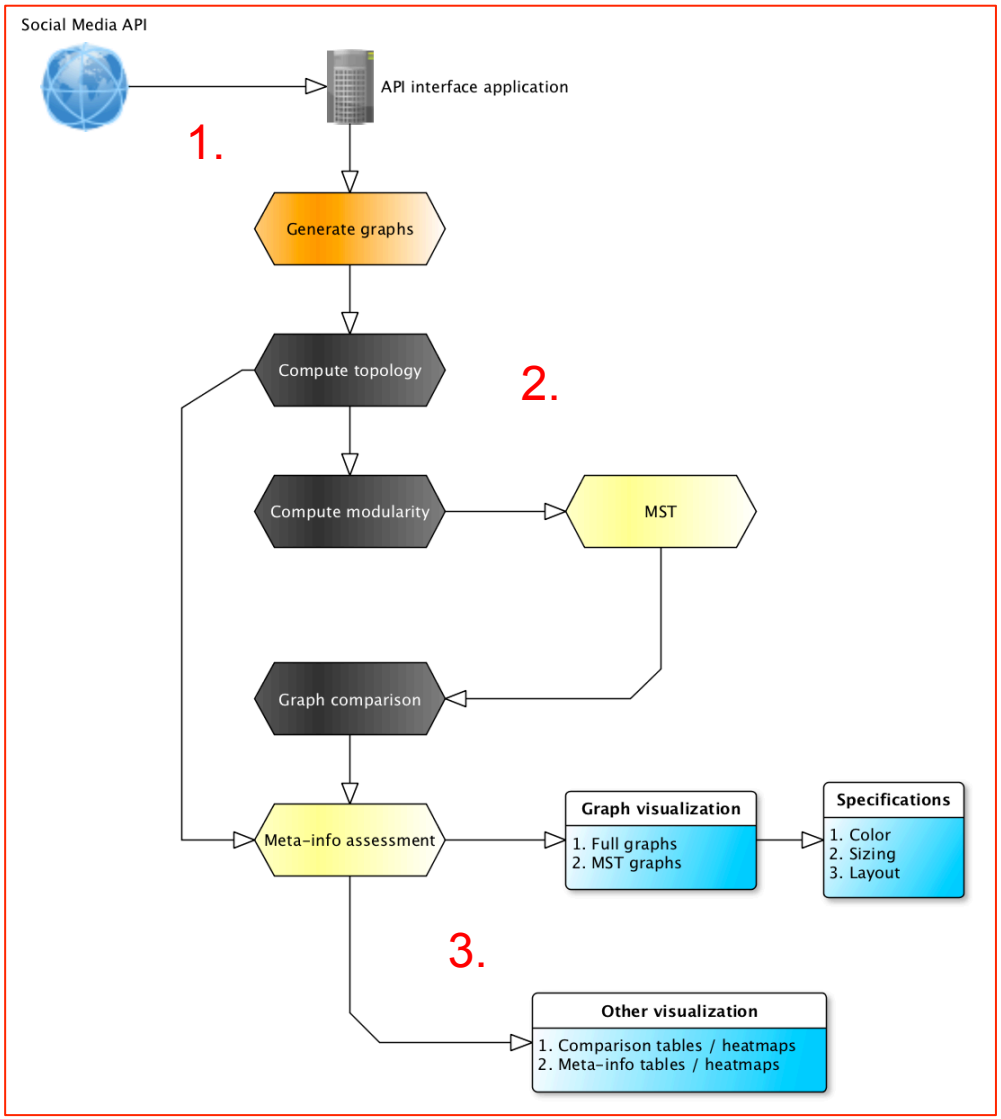
How are we doing it?



Organisations / Seed Nodes

- Mental Health America
- Beyond Blue (Australia)
- Mind (UK)

Data Collection and Method



Three main stages:

1. Data collection and graph generation
2. Basic analysis
3. Assessment and visualization

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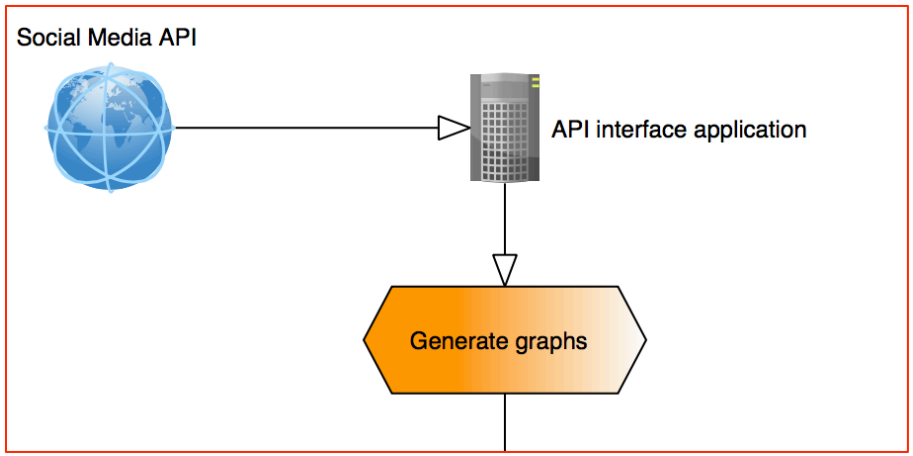
1. Data Collection and Graph Generation



- Existing API application for data collection (*Netvizz* [3])
- Generated graphs in *Gephi* [4]

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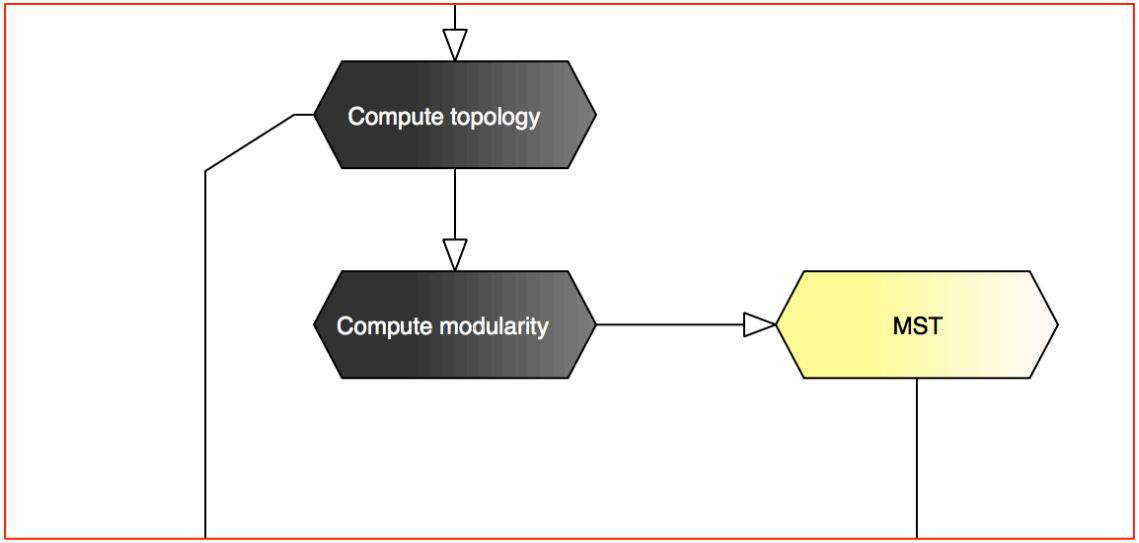
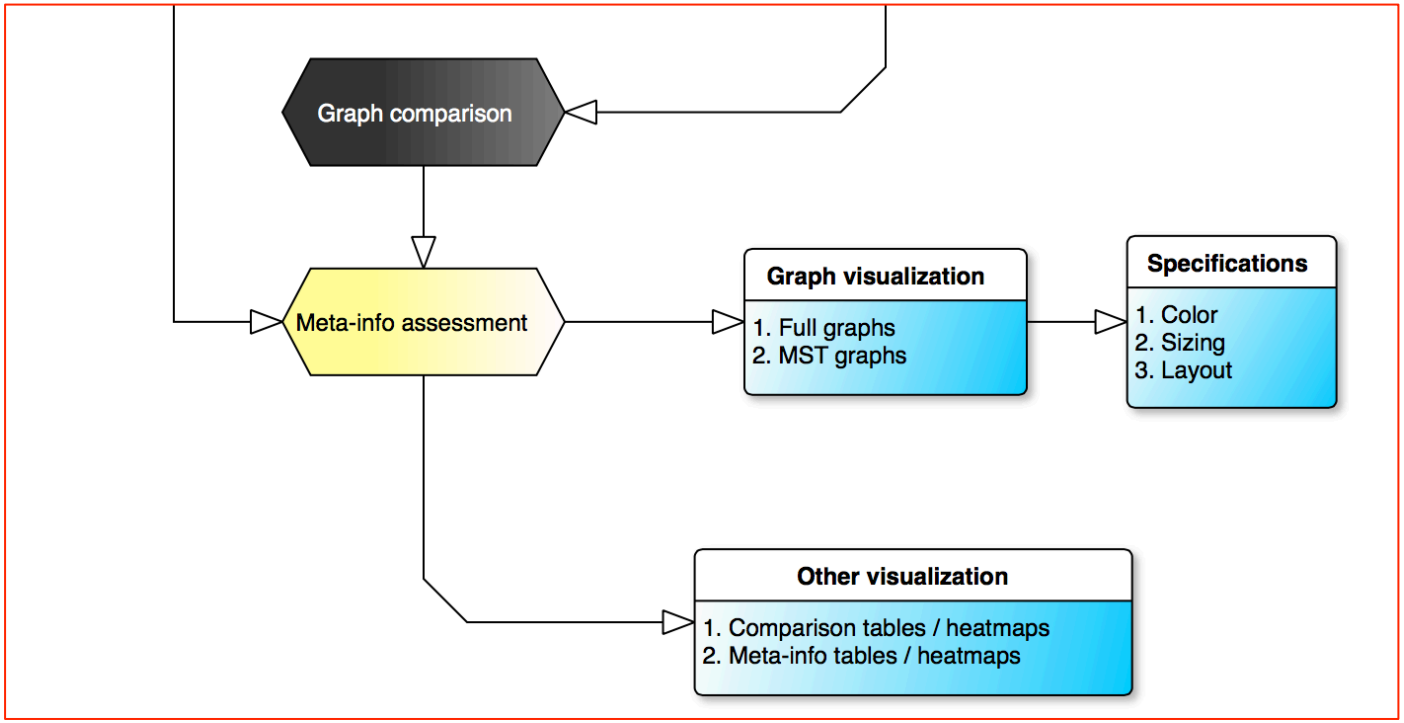
2. Basic Analysis



- Degree centrality (plus in-degree and out-degree)
- Eigenvector centrality
- Community detection using modularity
- Minimum-spanning trees
- All in *Gephi* [4]

3. Assessment and Visualisation



- Comparison in *GraphCrunch 2* [5]
- Visualisation in *Gephi* [4]

Topology

In-degree / Out-degree

- In-bound / out-bound connections in a directed graph

Degree centrality

- Number of connections

Weighted centrality

- Weighted connections
- We use Eigenvector centrality

Community detection

- We use modularity [6]

Node Meta-information Assessment

Mental Health America

ID	Likes	indeg	outdeg	deg	EVC
Demi Lovat...	36207485	8	0	8	0.15
Facebook f...	9366222	9	1	10	0.14
Health.com	3106893	5	0	5	0.08
Wounded Wa...	2832079	20	0	20	0.27
To Write L...	1395696	35	3	38	0.50
Non-Profit...	993451	26	1	27	0.28
philosophy	572738	2	0	2	0.07
HealthCare...	469318	13	2	15	0.19
It Gets Be...	379183	17	2	19	0.22
Born This...	324871	11	0	11	0.17
Momastery	324203	5	0	5	0.07
Pura Vida...	321607	2	0	2	0.08
The Trevor...	304034	33	6	39	0.45
American P...	292985	26	3	29	0.28
National S...	206228	55	18	73	0.81
Time to Ch...	191797	20	3	23	0.26
Brain & Be...	179422	16	54	70	0.19
National I...	172502	72	21	93	0.89
NAMI	168556	71	1	72	0.81
Love is Lo...	156013	16	7	23	0.31
American F...	148994	57	4	61	0.82
HealthyPla...	123018	23	7	30	0.30
StoryCorps	119062	4	0	4	0.08
Mental Hea...	106278	27	1	28	0.32
Mental Hea...	95636	102	215	317	1.00

Mind

ID	Likes	indeg	outdeg	deg	EVC
Zoella	2108334	2	0	2	0.10
Macmillan...	553807	15	1	16	0.37
ODEON Cine...	472942	1	1	2	0.09
The Nation...	287986	7	1	8	0.16
Secret Cin...	252126	1	1	2	0.09
Time to Ch...	191797	37	13	50	0.73
Mind	175839	55	100	155	1.00
Alzheimer...	169092	13	2	15	0.38
38 Degrees	156212	11	0	11	0.27
Pieta Hous...	155097	5	3	8	0.13
Rethink Me...	146636	33	14	47	0.70
The Woodla...	127948	5	6	11	0.14
Mental Hea...	106278	26	8	34	0.57
Eden Proje...	85465	4	1	5	0.12
NHS Choice...	74380	4	31	35	0.15
Royal Coll...	47936	8	10	18	0.20
Nursing Ti...	43702	4	2	6	0.15
Scope	40369	10	15	25	0.27
Samaritans...	37389	16	4	20	0.38
MS Society...	37342	14	8	22	0.38
Woodland T...	37156	5	2	7	0.13
NHS	31821	4	0	4	0.13
Parkinson...	31224	13	10	23	0.37
Carers UK	28368	17	12	29	0.54
Mencap	25975	16	5	21	0.44

Beyond Blue

ID	Likes	indeg	outdeg	deg	EVC
Norton	1279676	1	2	3	0.05
Foxtel	855854	4	2	6	0.06
triple j	834439	18	0	18	0.24
Chet Faker	657819	1	0	1	0.05
The Random...	642020	3	0	3	0.06
beyondblue...	373463	133	261	394	1.00
Daniel Mor...	318062	8	0	8	0.10
R U OK Day	278912	72	16	88	0.79
Hawthorn F...	258903	6	2	8	0.06
Julia Gill...	248751	11	4	15	0.08
Canterbury...	247311	4	4	8	0.06
The Anxiet...	227100	22	46	68	0.27
Lindt Aust...	226624	3	2	5	0.05
Channel Te...	219837	11	1	12	0.11
Optus	212652	5	3	8	0.06
Sydney Swa...	211458	7	0	7	0.07
NEON Run	198064	4	3	7	0.05
Laura Dund...	195039	2	0	2	0.05
Time to Ch...	191797	12	0	12	0.20
Telstra	176189	10	6	16	0.09
Sydney FC	131644	3	0	3	0.07
Student Ed...	127749	7	8	15	0.12
Australian...	118591	35	2	37	0.36
Waratahs	117527	2	1	3	0.05
Bupa Austr...	108782	13	7	20	0.15

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Pairwise Network Analysis

Network 1	Network 2	Degdist Pearson	Degdist Spearman	Path diff %
MHA_Full	Mind_Full	0.79	0.87	0.01
Mind_Full	Beyond_Blue_Full	0.78	0.82	0.02
MHA_Full	Beyond_Blue_Full	0.75	0.79	0.01
MHA_MST	Beyond_Blue_MST	1	0.58	0.17
Mind_MST	Beyond_Blue_MST	0.99	0.74	0.03
MHA_MST	Mind_MST	0.99	0.7	0.19

*Extended report in the paper

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Full Networks

Node size

- Eigenvector centrality

Node colour

- Modularity class

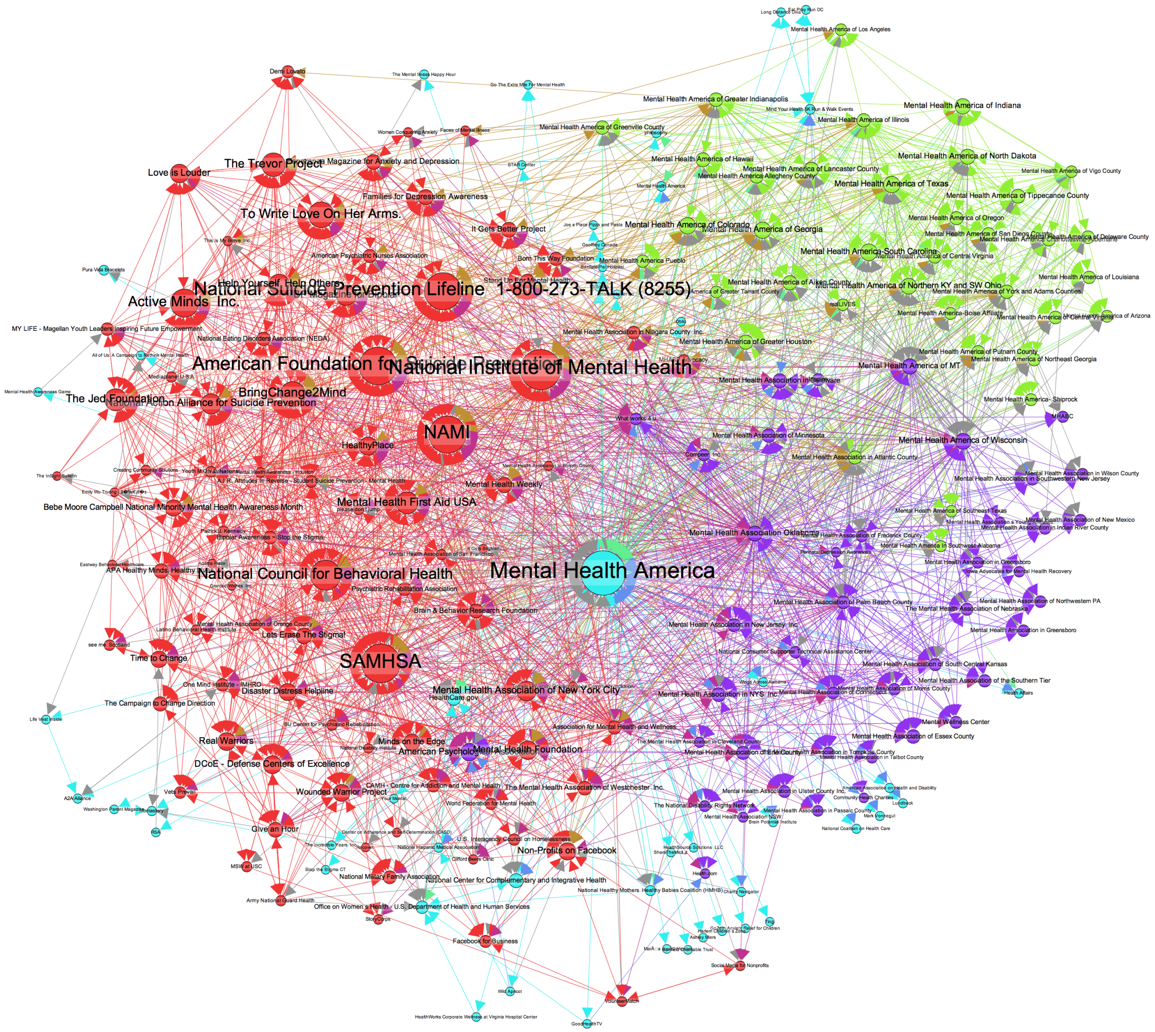
Edge colour

- Mixed

Edge directionality

- Arrows indicate direction of “like”

Mental Health America



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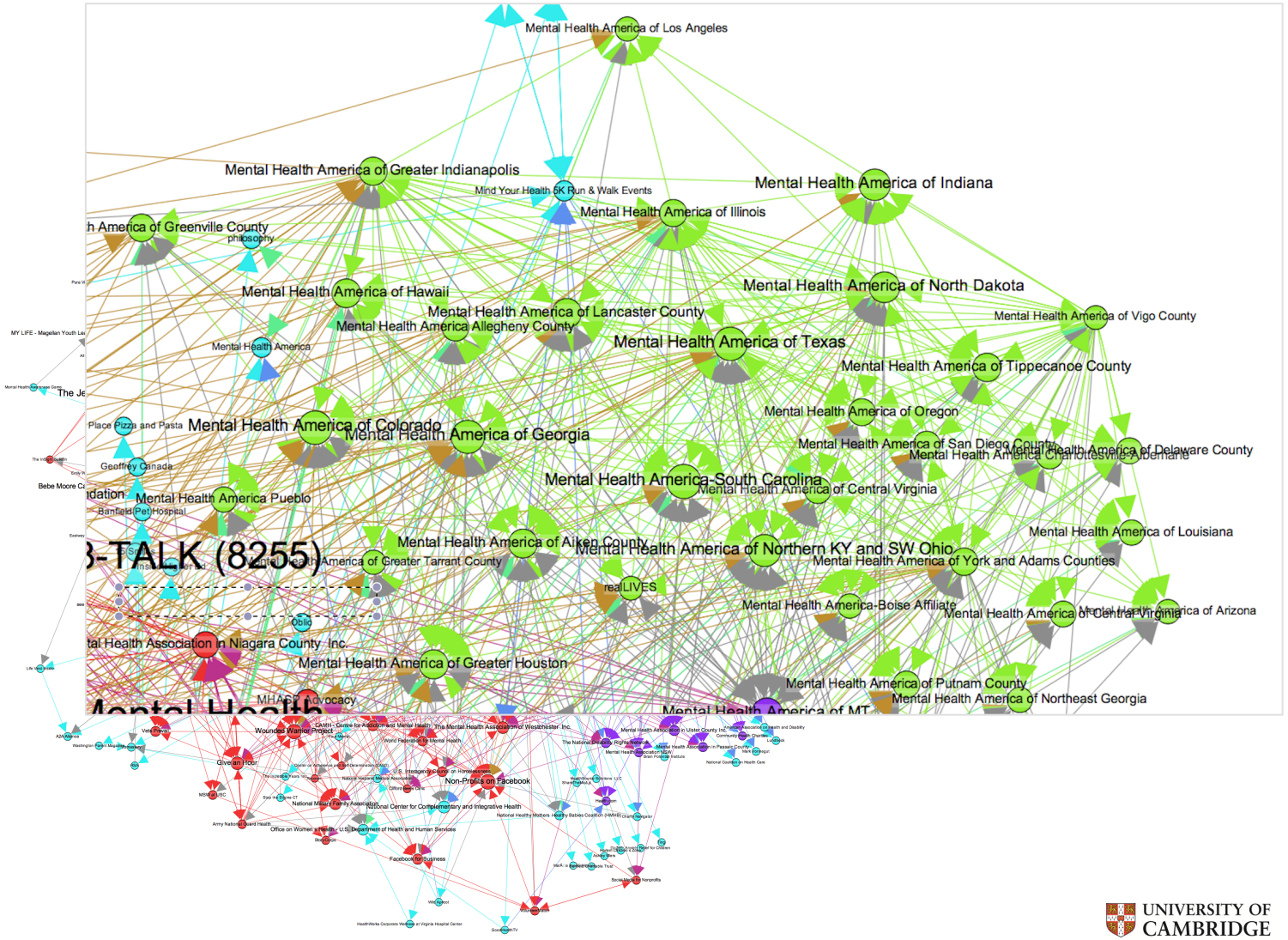
Mental Health America



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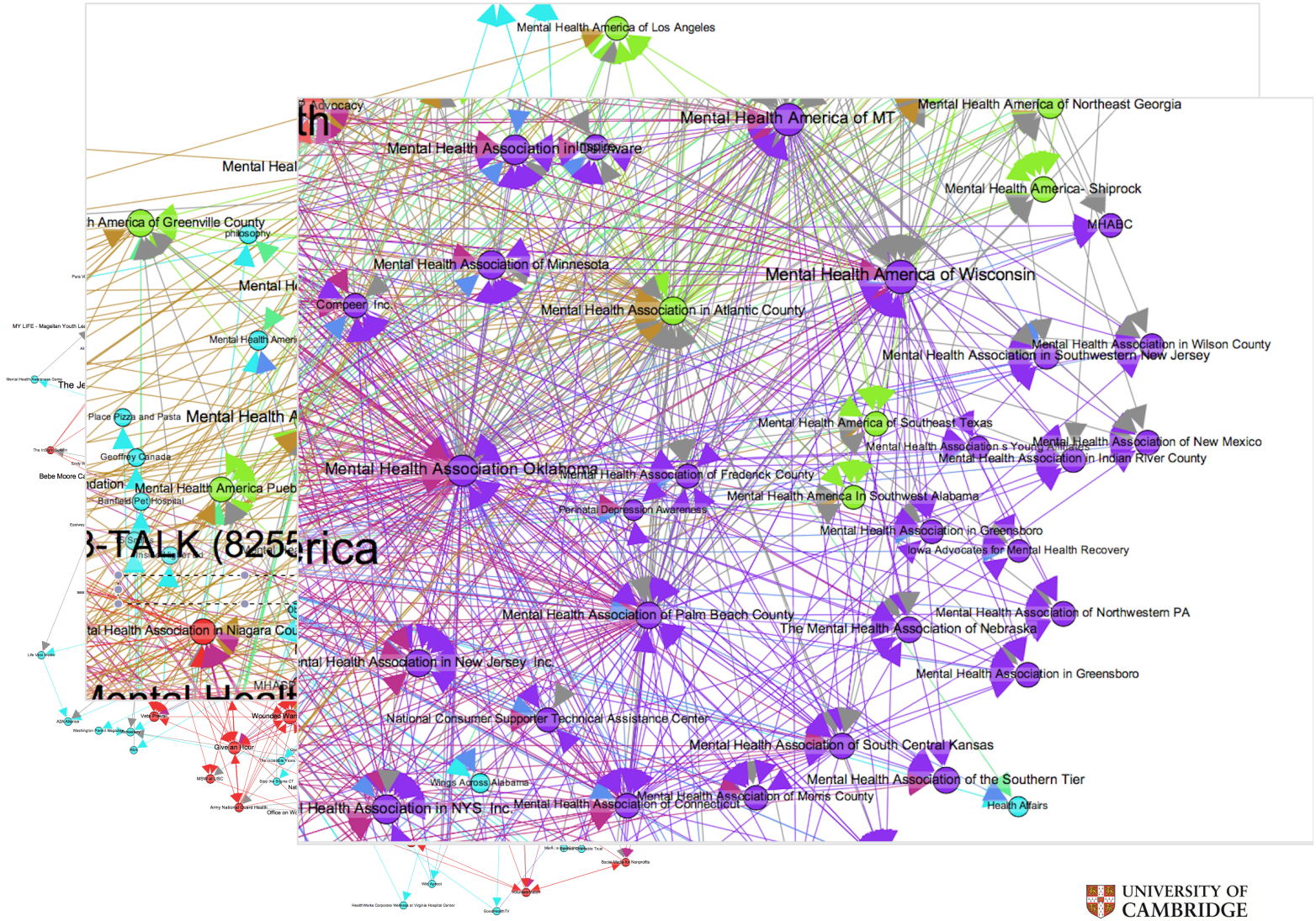
Mental Health America



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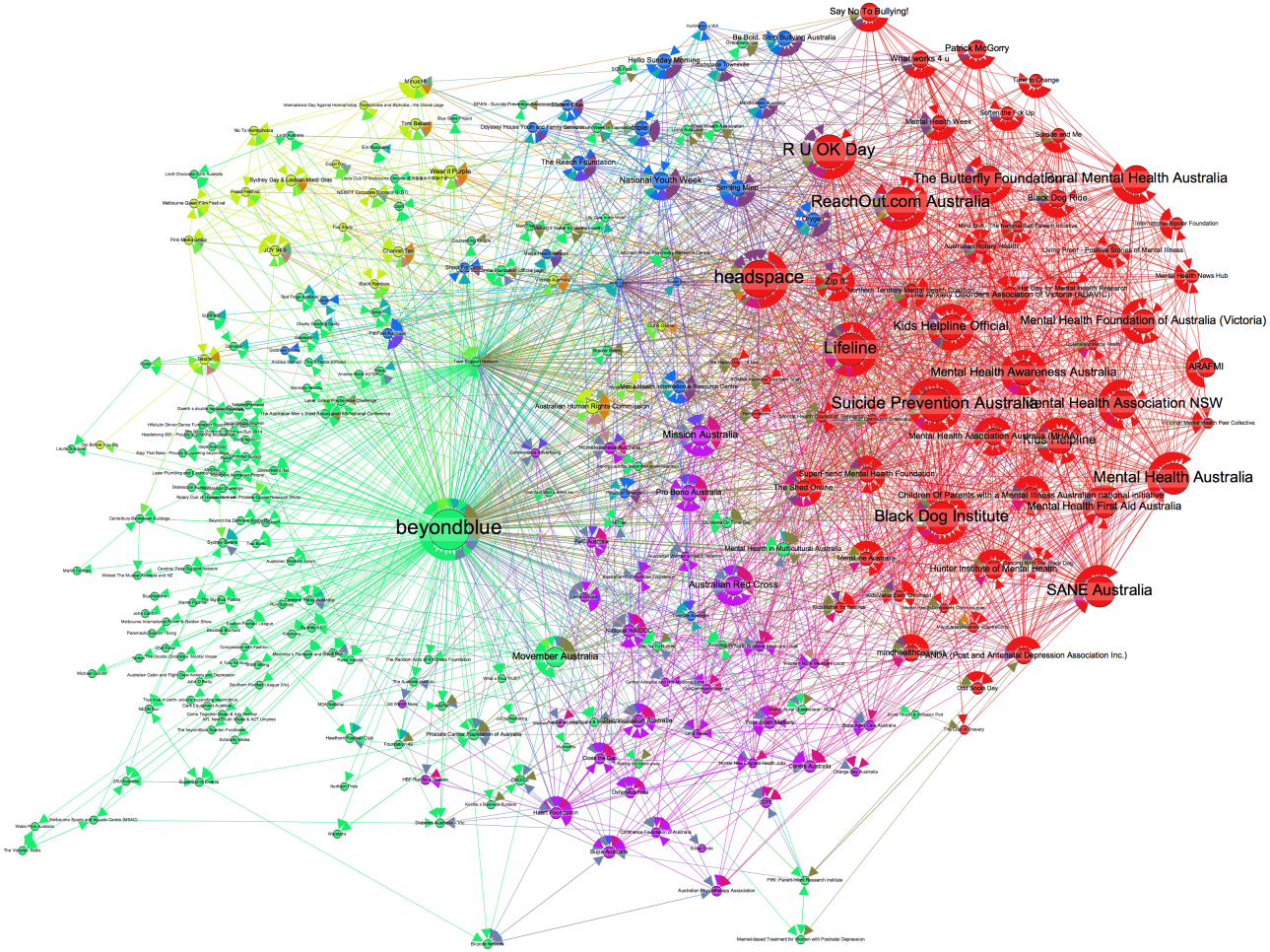
Beyond Blue (Australia)



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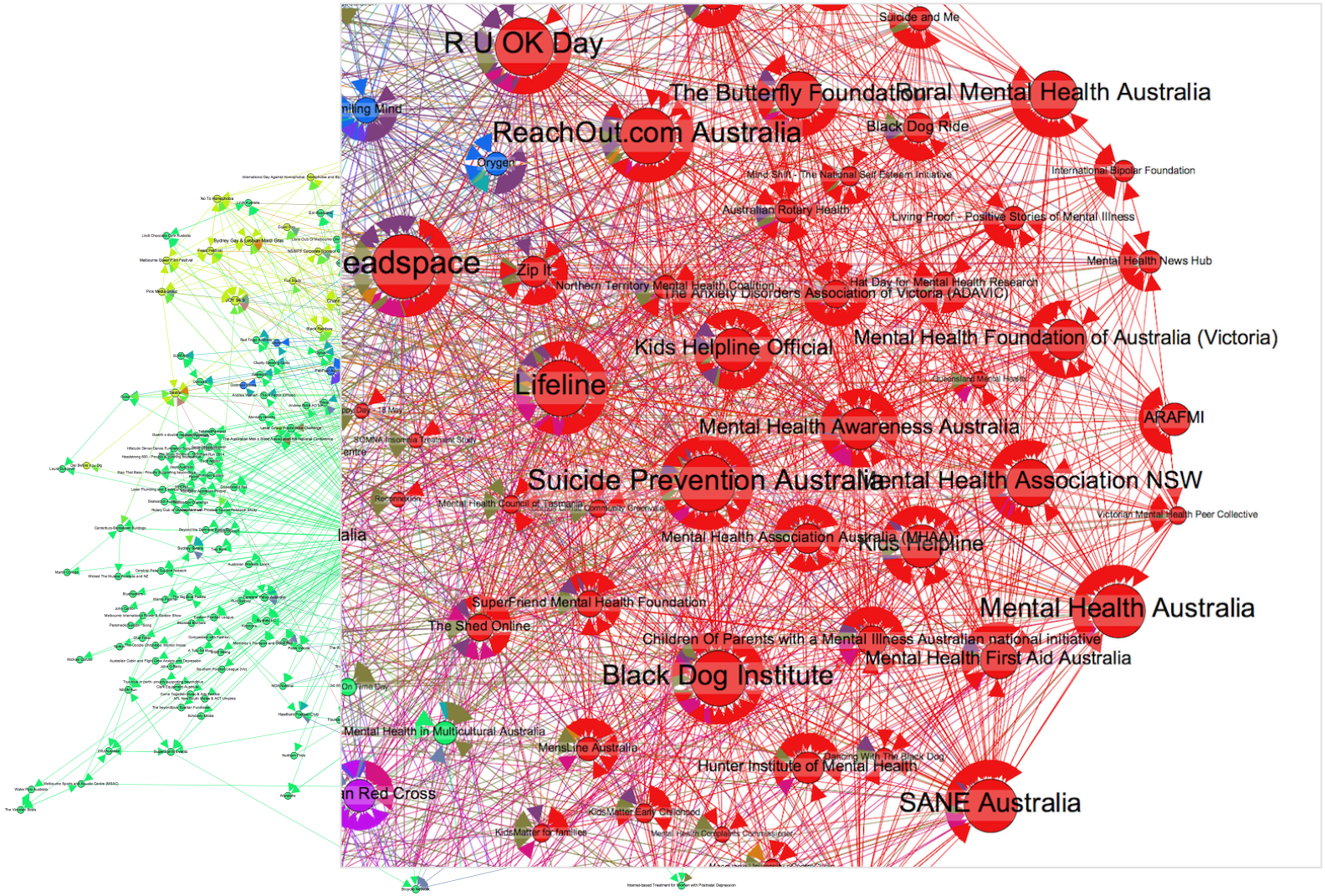

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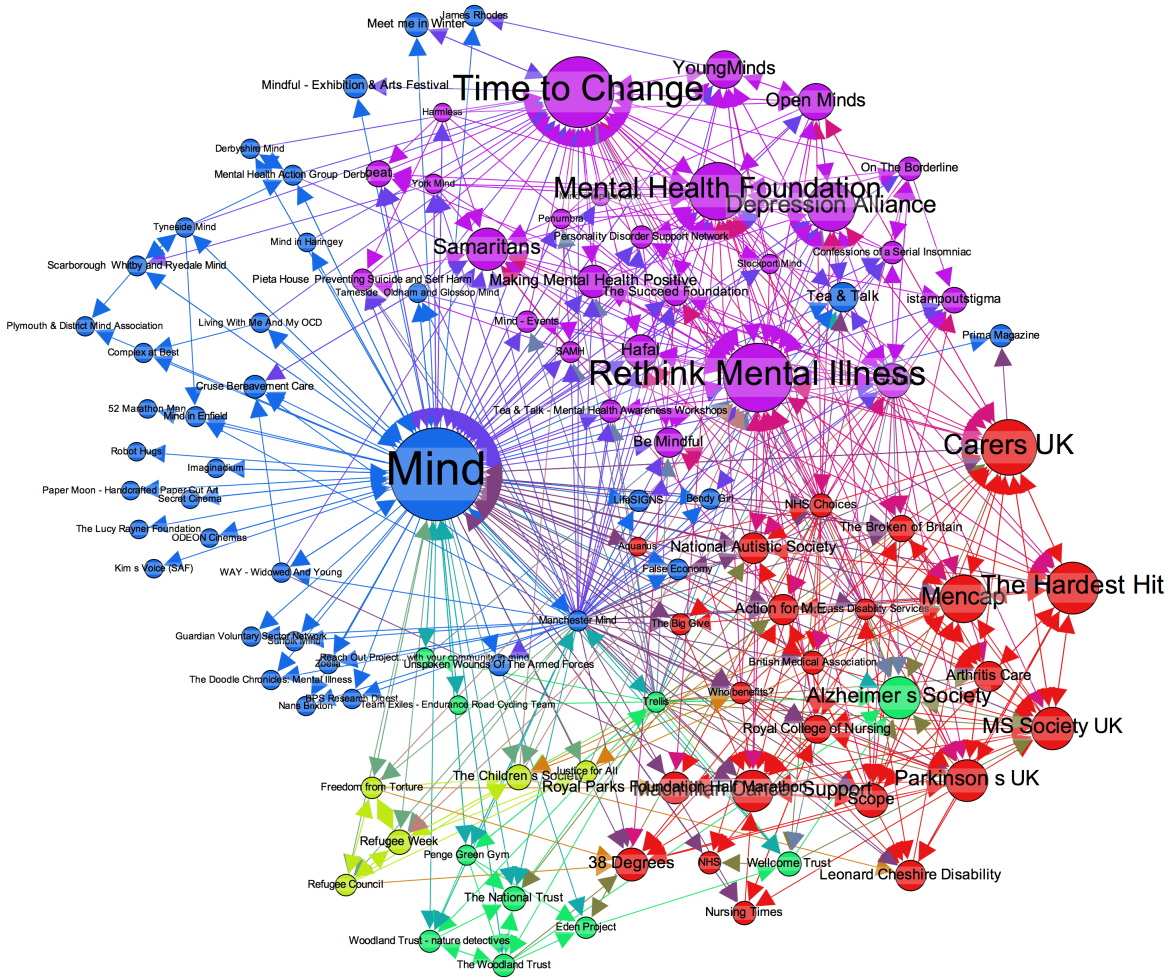
Mind (UK)



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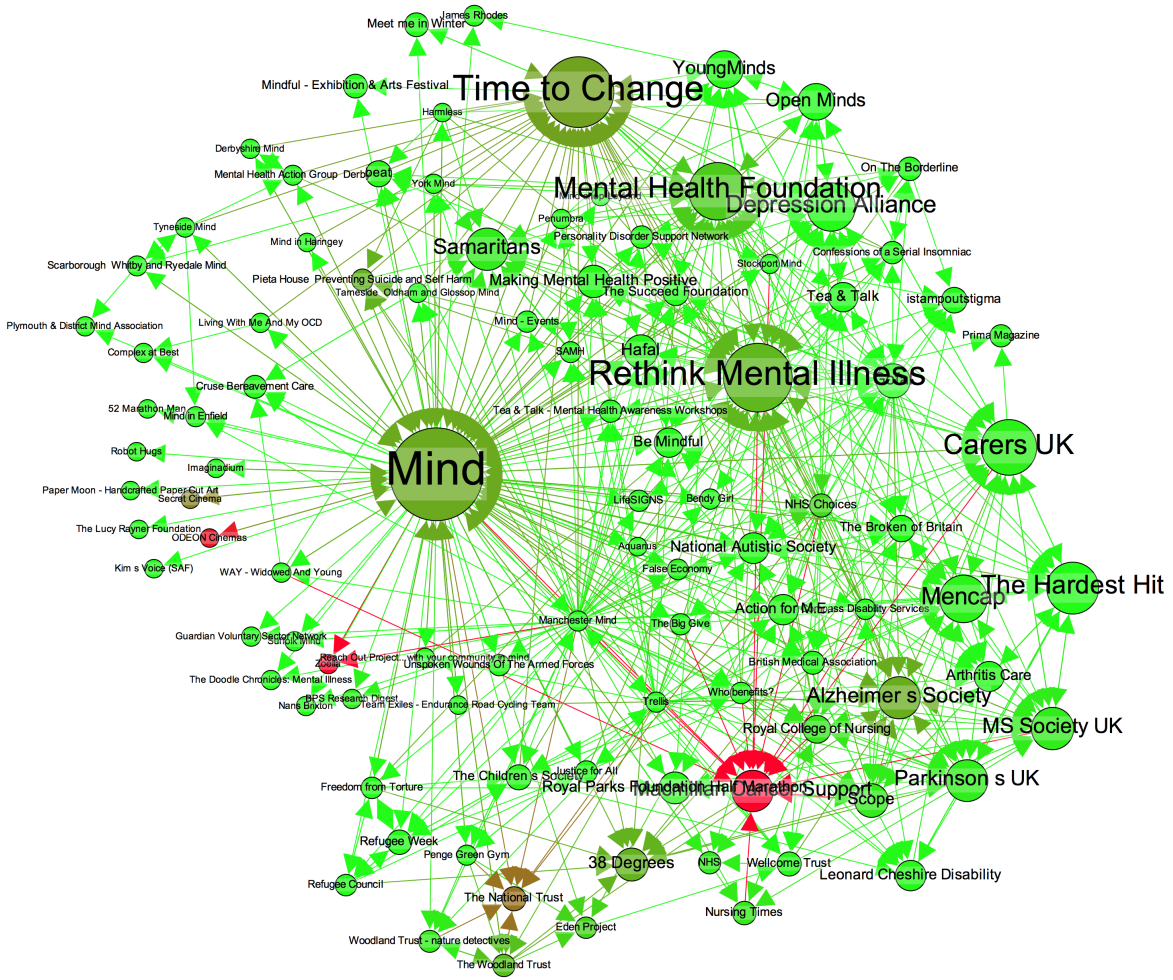

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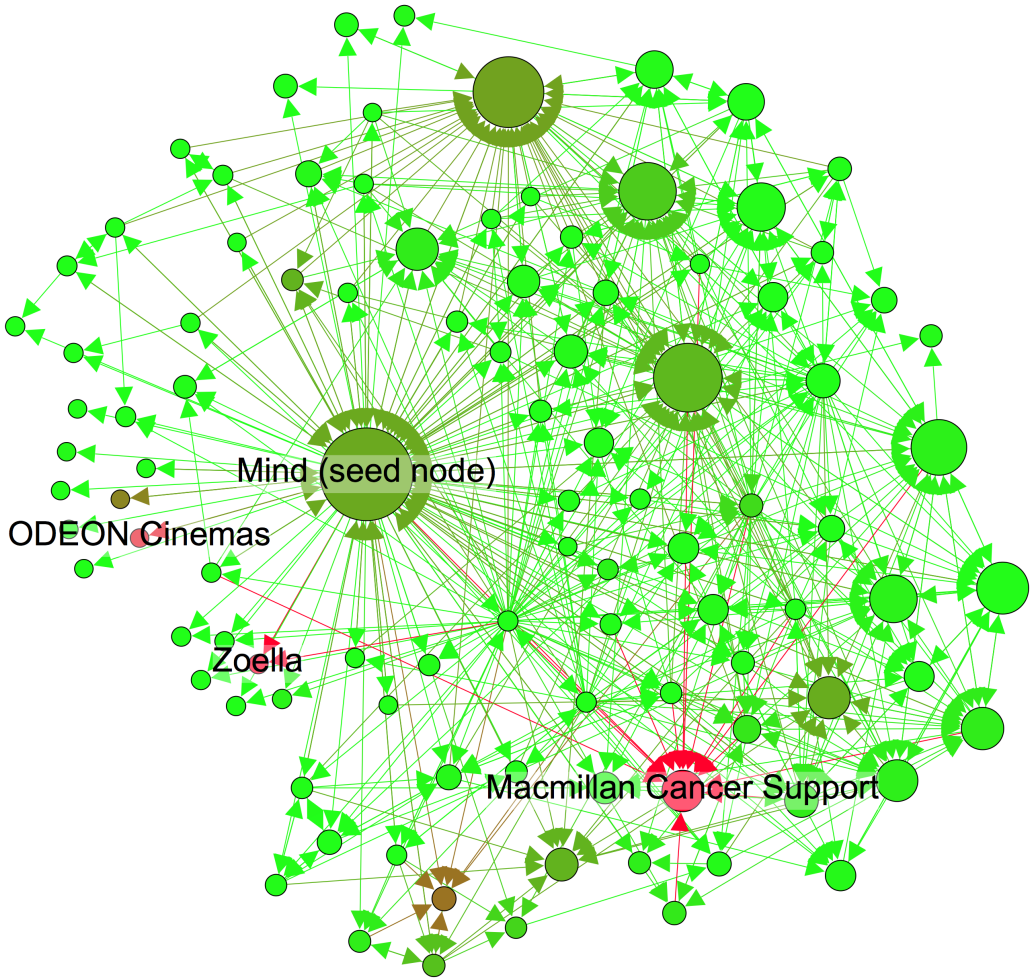
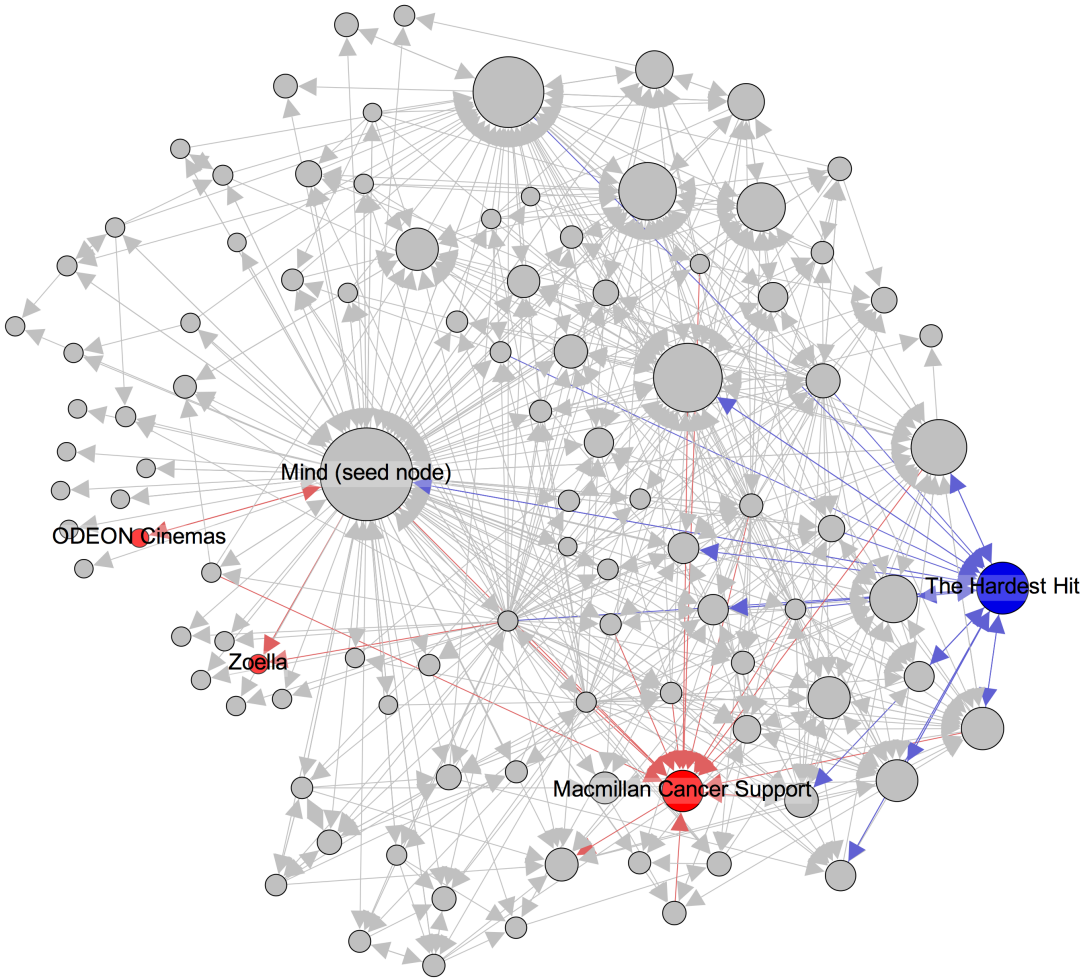
Mind (UK)


Mind (seed node)
ODEON Cinemas
Zoella
Macmillan Cancer Support

Mind (UK)


Mind (seed node)
ODEON Cinemas
Zoella
Macmillan Cancer Support
The Hardest Hit

MST Networks

Node size

- Degree centrality

Node colour

- Degree centrality

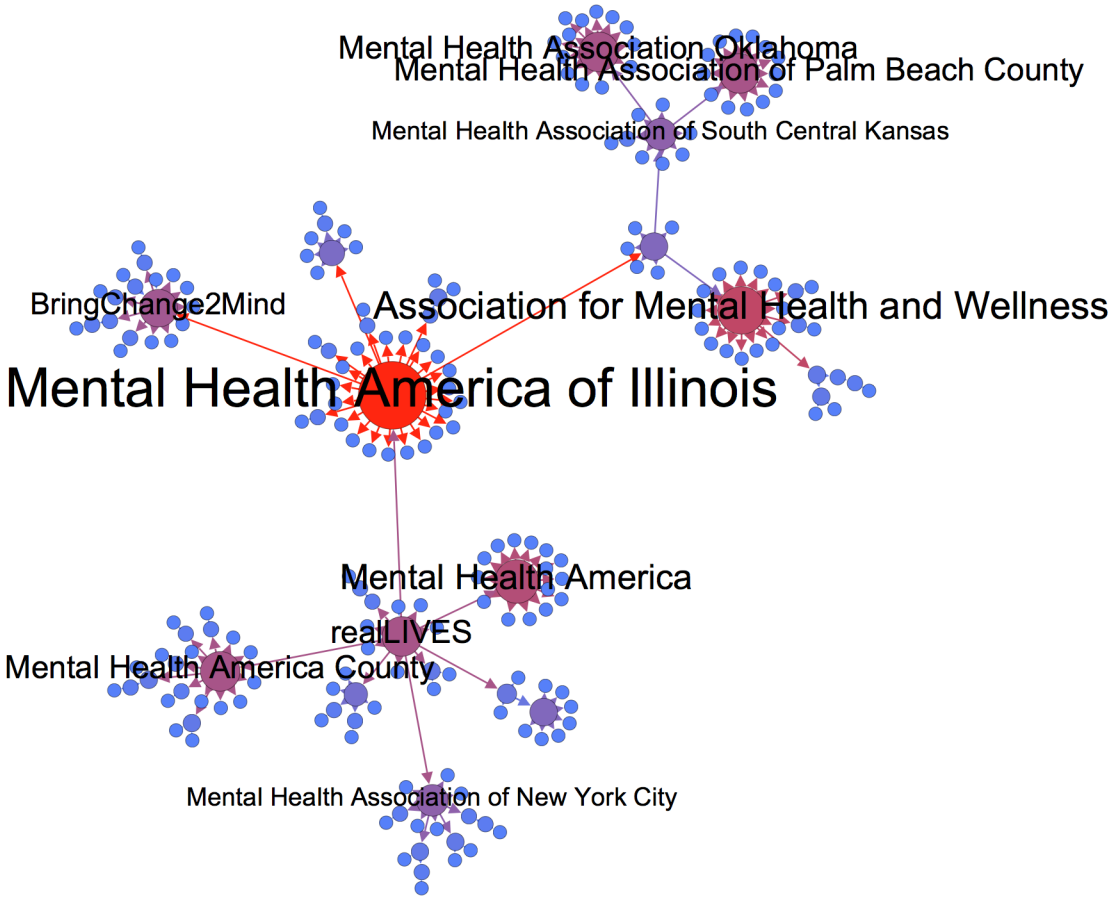
Edge colour

- Mixed

Edge directionality

- Arrows indicate direction of “like”

Mental Health America – Minimum Spanning Tree



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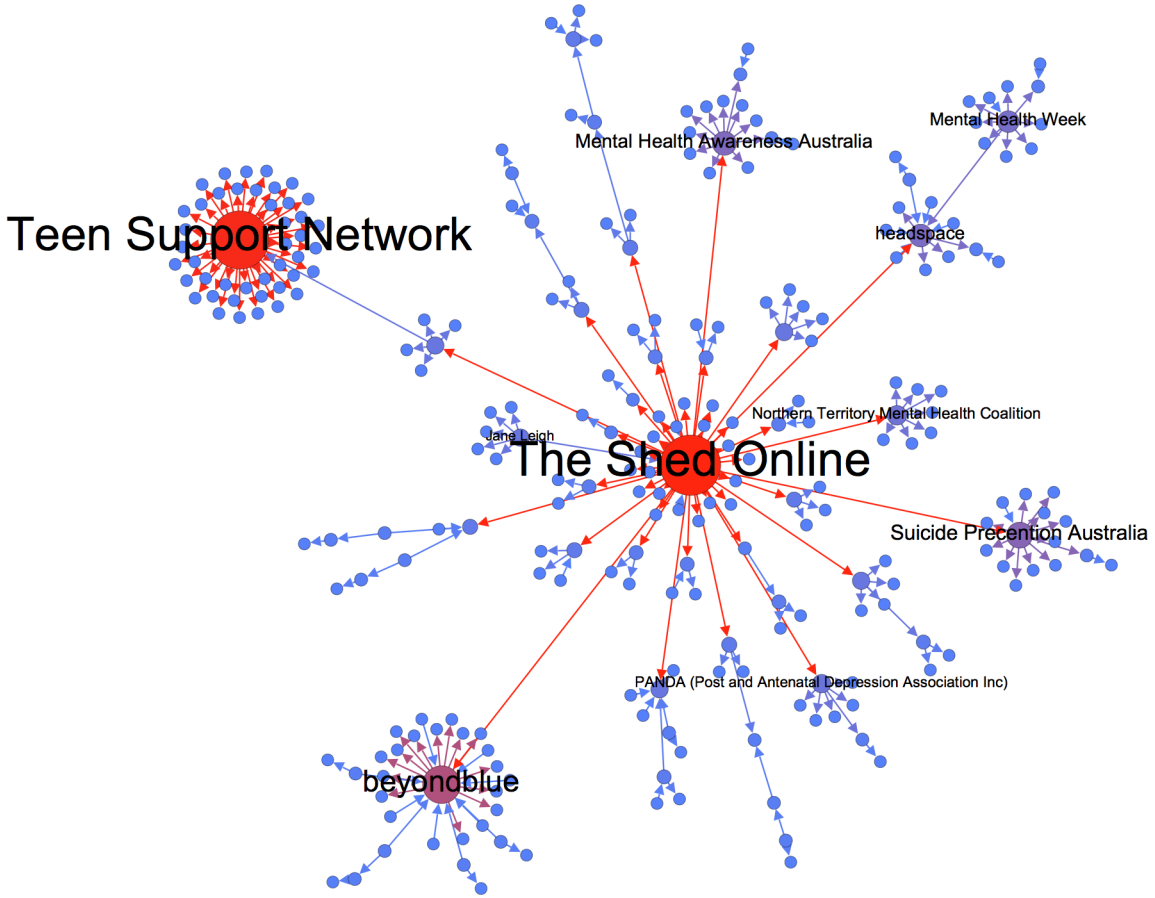
Beyond Blue (Australia) – Minimum Spanning Tree



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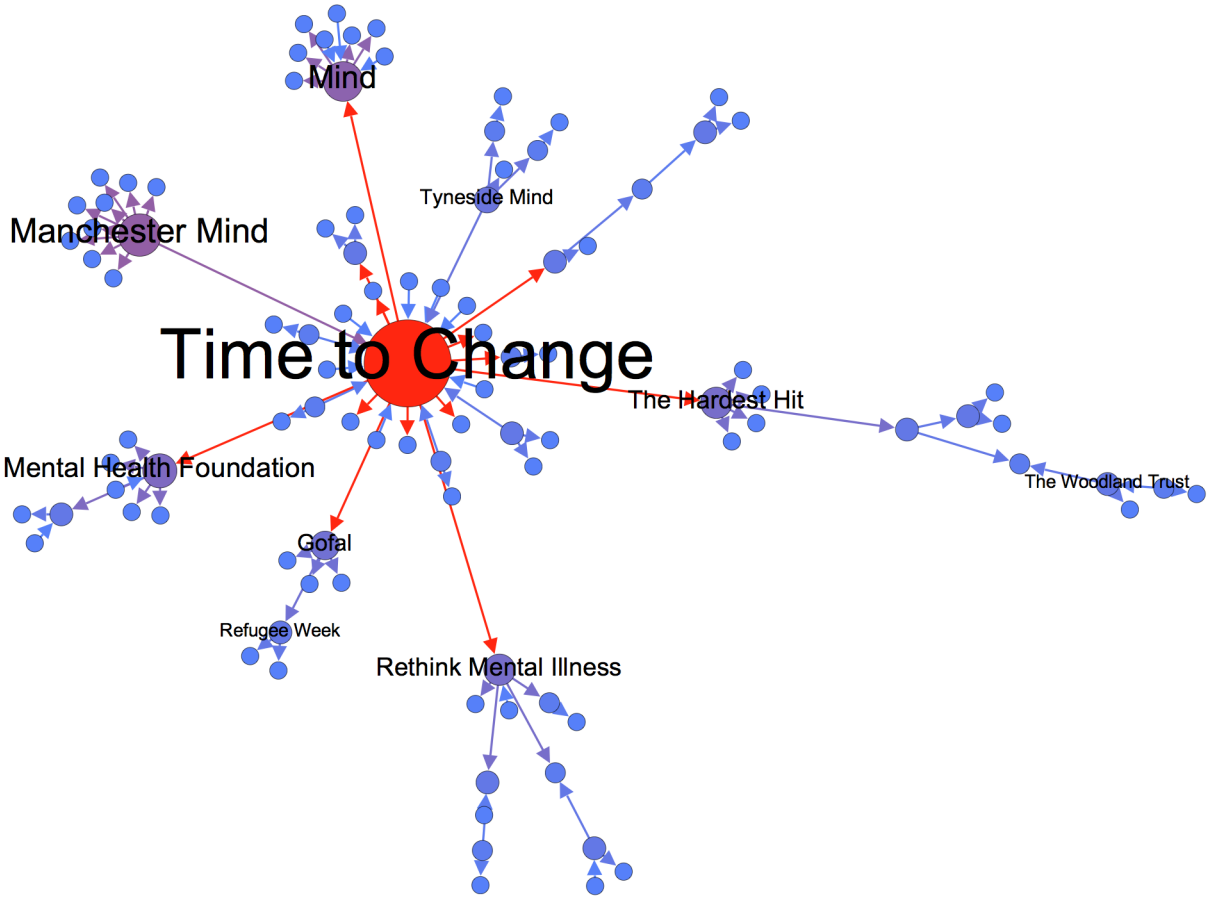
Mind (UK) – Minimum Spanning Tree



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Key Outcomes

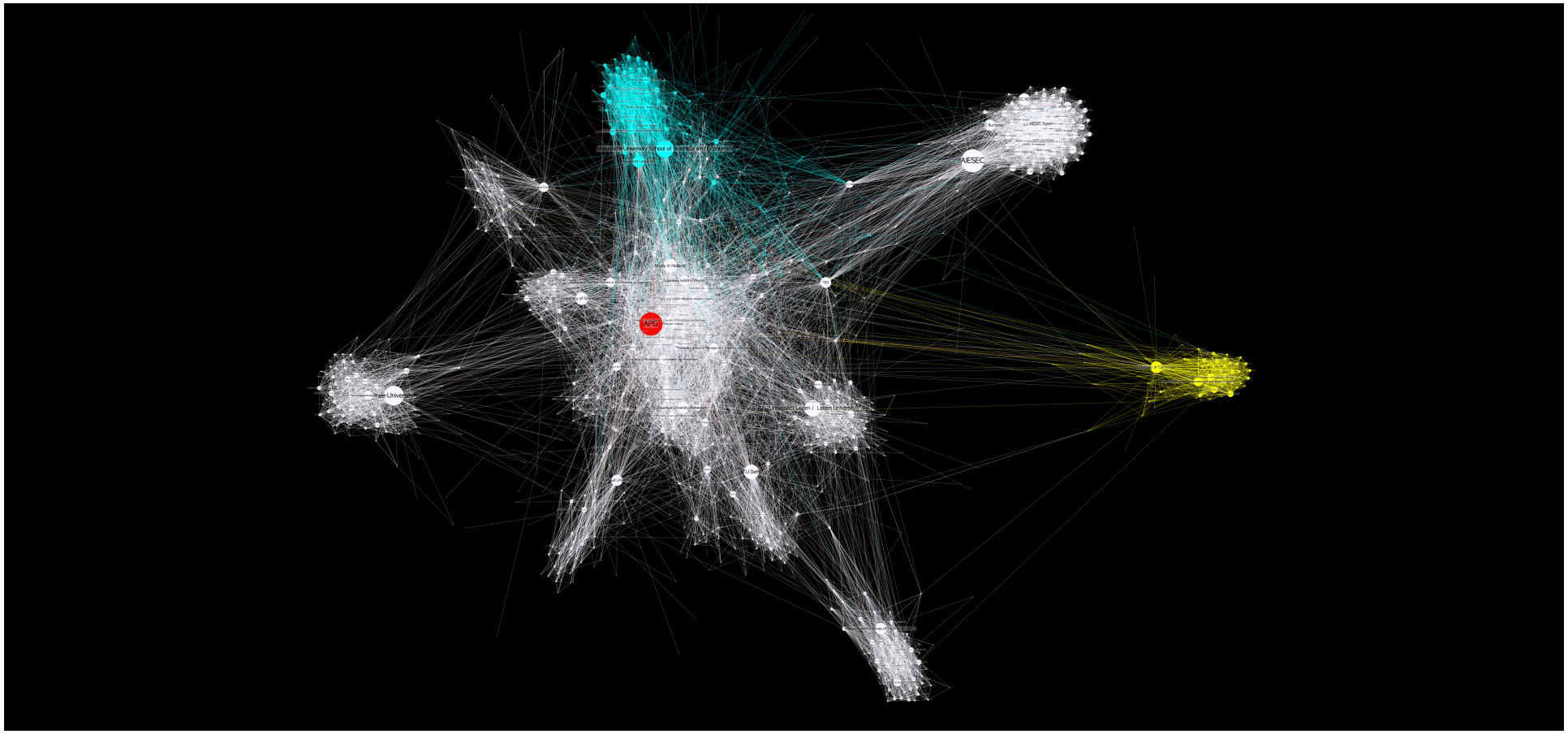
- Easy and cost-effective to implement on an ad-hoc or ongoing basis
- Identifying how other organisations structure their social networks as proxies for how they manage their campaigns / stakeholder relationships
- Identifying where organisations can / should encourage stakeholders and campaign partners to more deeply embed within networks (e.g. quick comparisons of external audience size relative to network centrality)
- Identifying hubs and fast lines of communication through the network

Future Research

Possible avenues:

1. Extended networks (extra degrees of connections, multi-seeding)
2. For-profit context (B2C and B2B)
3. Other platforms / multiple platforms
4. Dashboard tools (see [7] for an extended discussion)
5. Embed other metrics in the network (e.g. “Talking about this” on FB)
6. Other network data sources (e.g. build stakeholder networks from survey sources, company records)

Future Research: Extended Networks



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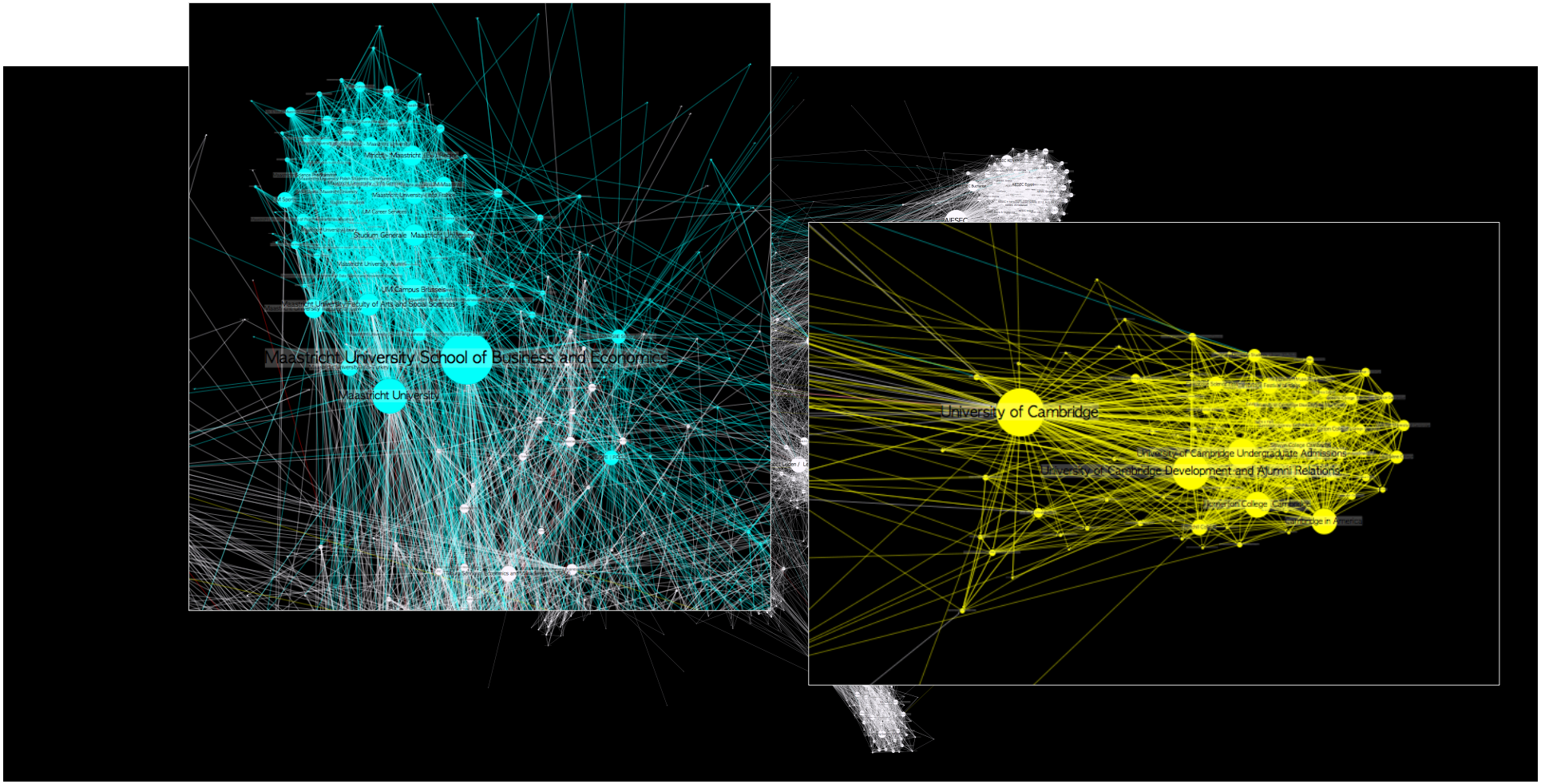
Future Research: Extended Networks



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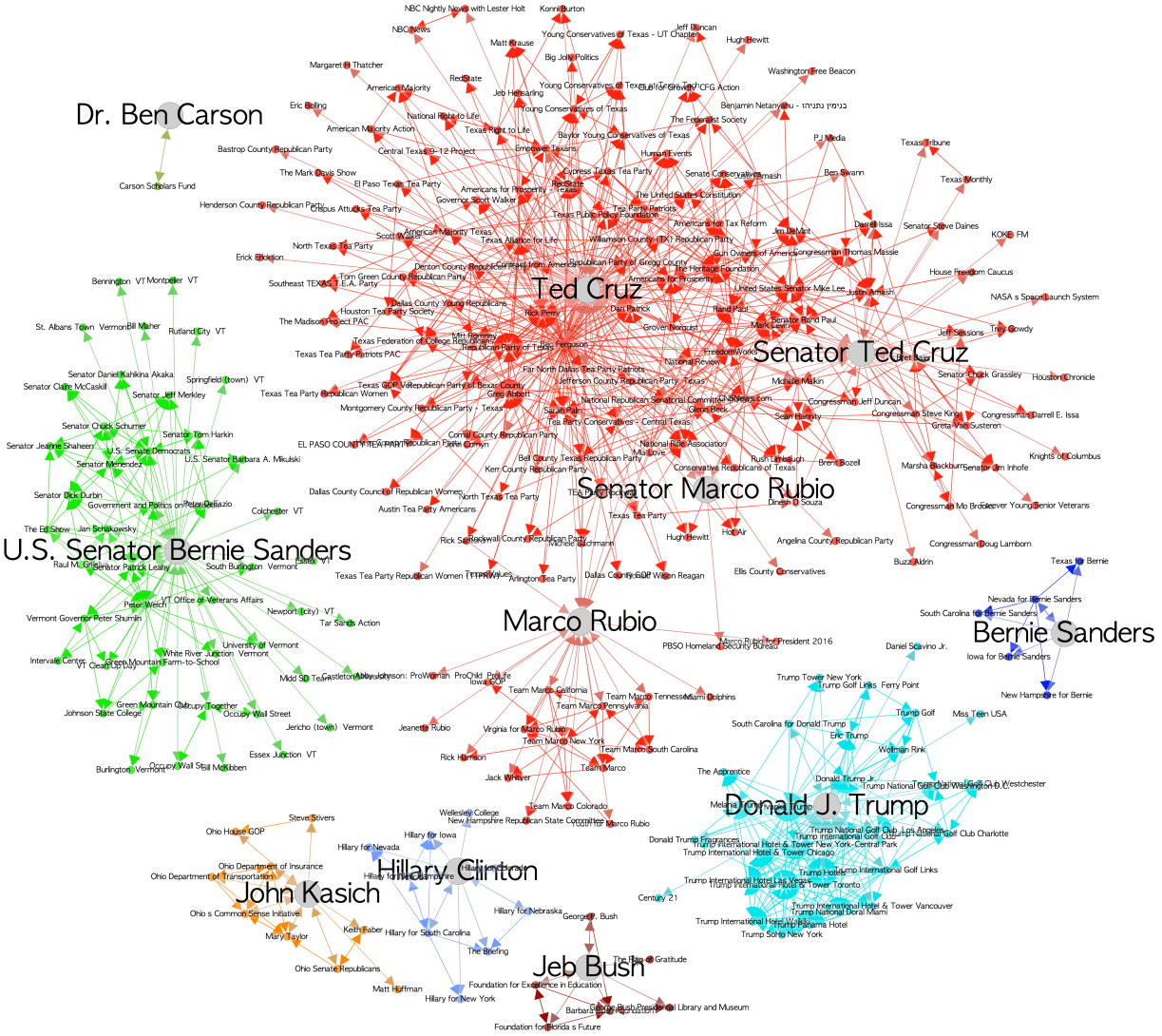
Future Research: Extended Networks



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Thank you

Questions

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