Betweenness on ties

NETWORK ANALYSIS IN THE TIDYVERSE

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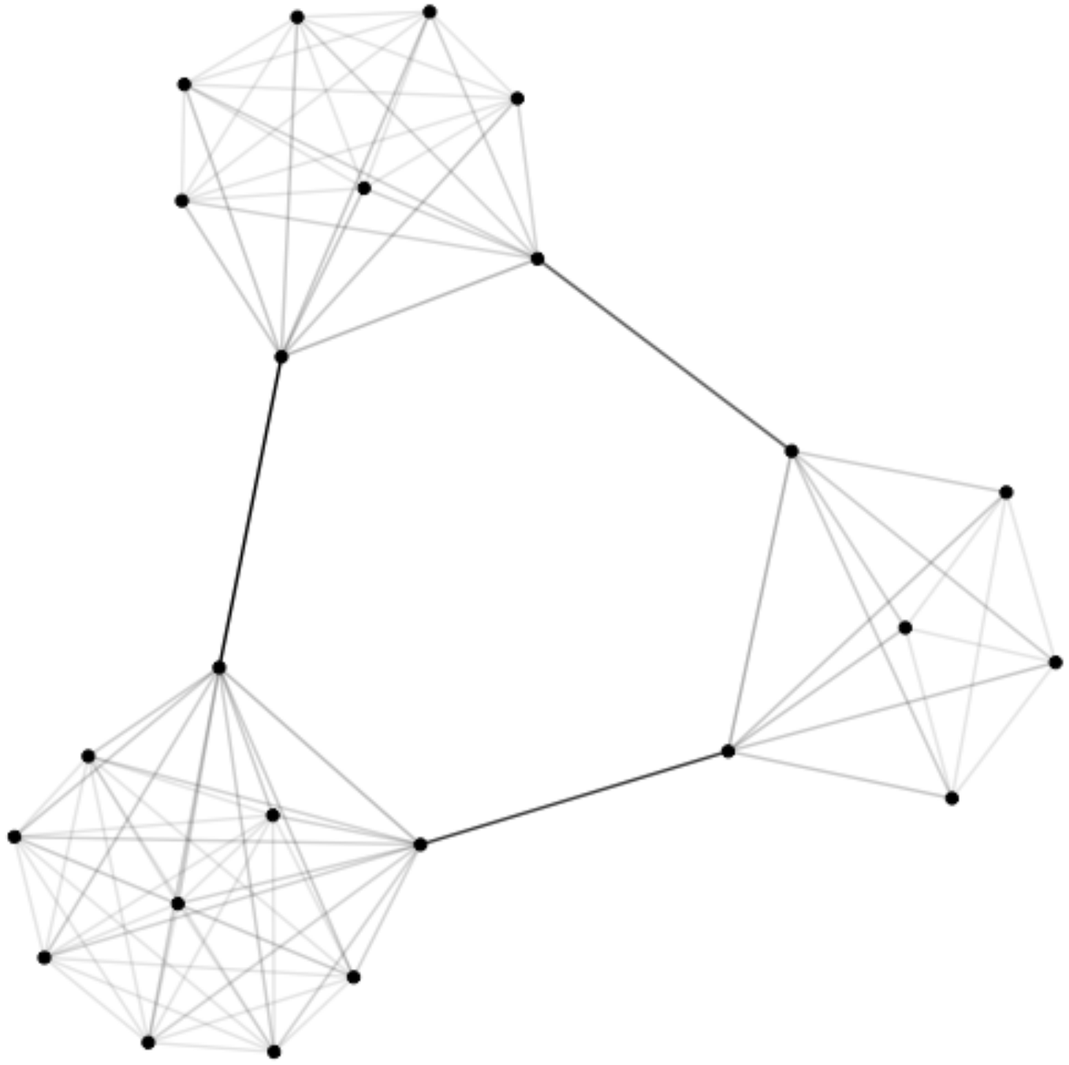
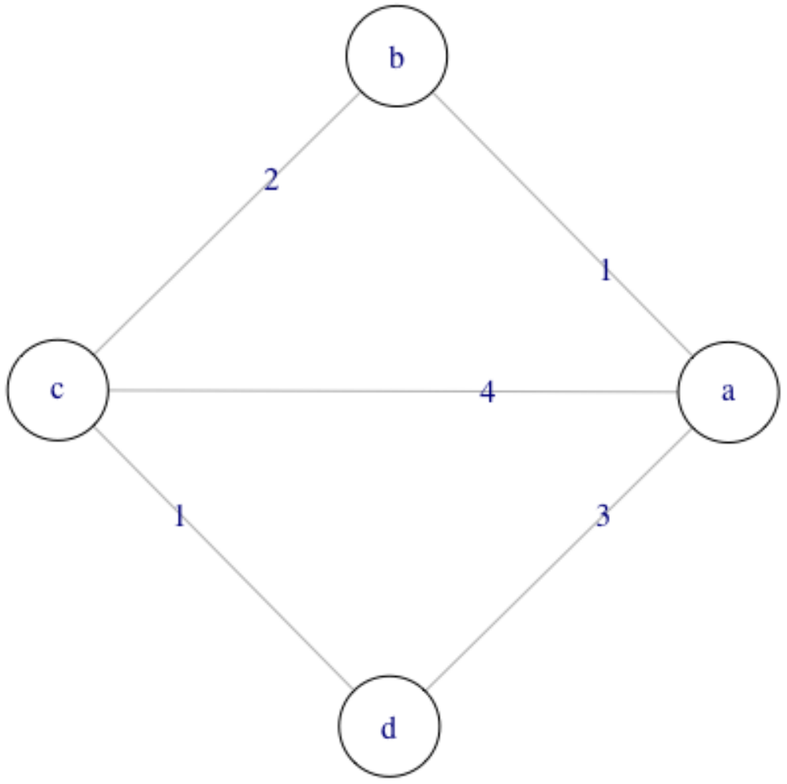
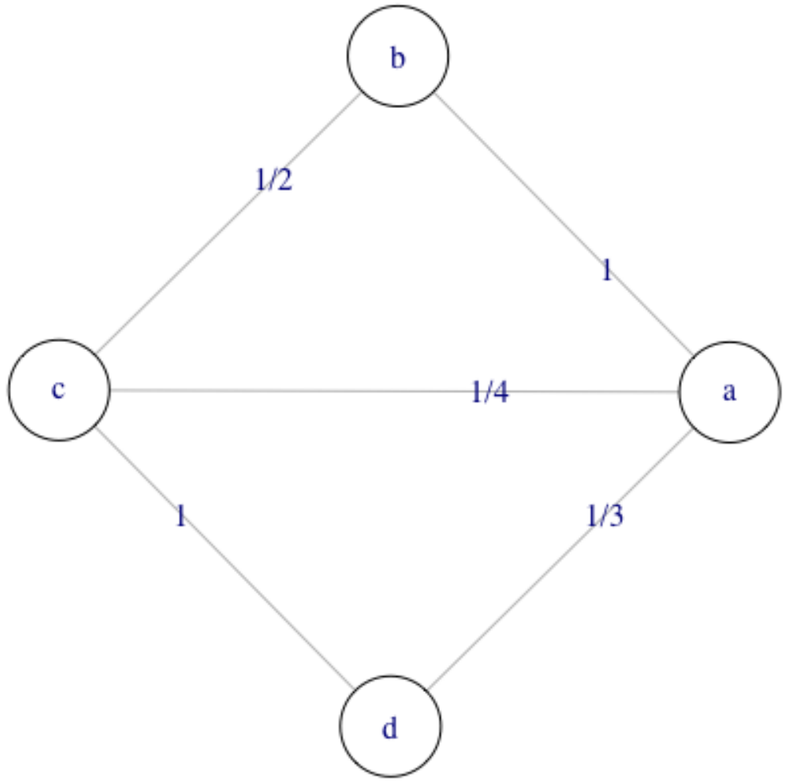


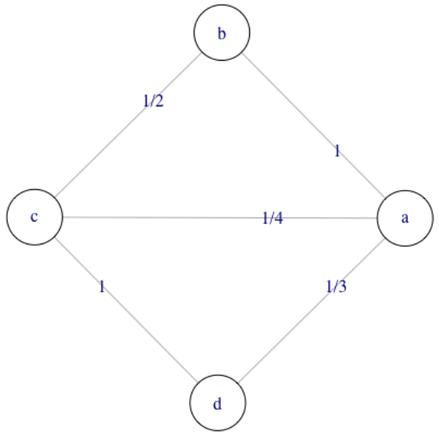
Weighted betweenness





Computing betweenness

```
# compute distance weights for ties
dist_weight = 1 / E(g)$weight
# compute weighted betweenness on ties
edge_betweenness(g, weights = dist_weight)
```



Let's start practicing with tie betweenness!

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Visualizing centrality measures

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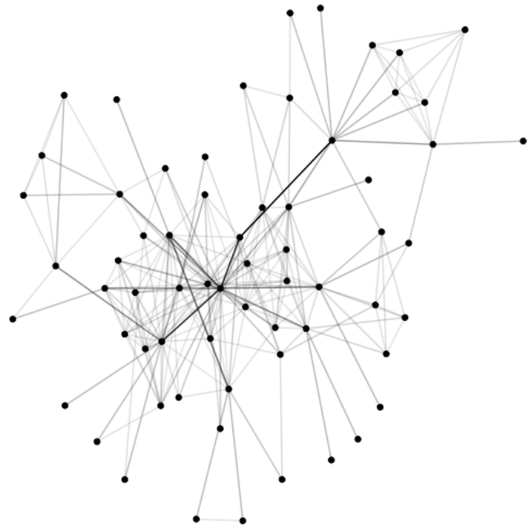
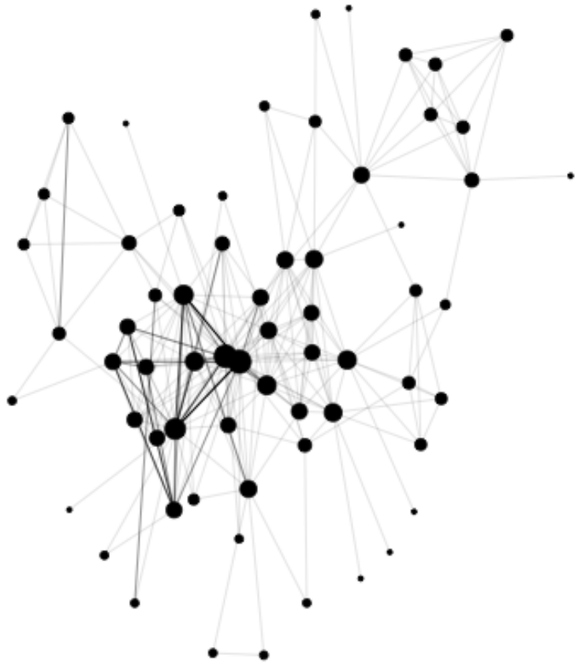
Visualizing betweenness

```
# visualize the network with tie transparency proportional to betweenness
ggraph(g, layout = "with_kk") +
       geom_edge_link(aes(alpha = betweenness)) +
       geom_node_point()
```



Visualizing weight and degree

```
# visualize tie weight and node degree
ggraph(g, layout = "with_kk") +
  geom_edge_link(aes(alpha = weight)) +
  geom_node_point(aes(size = degree))
```



Let's practice!

NETWORK ANALYSIS IN THE TIDYVERSE

The strength of weak ties

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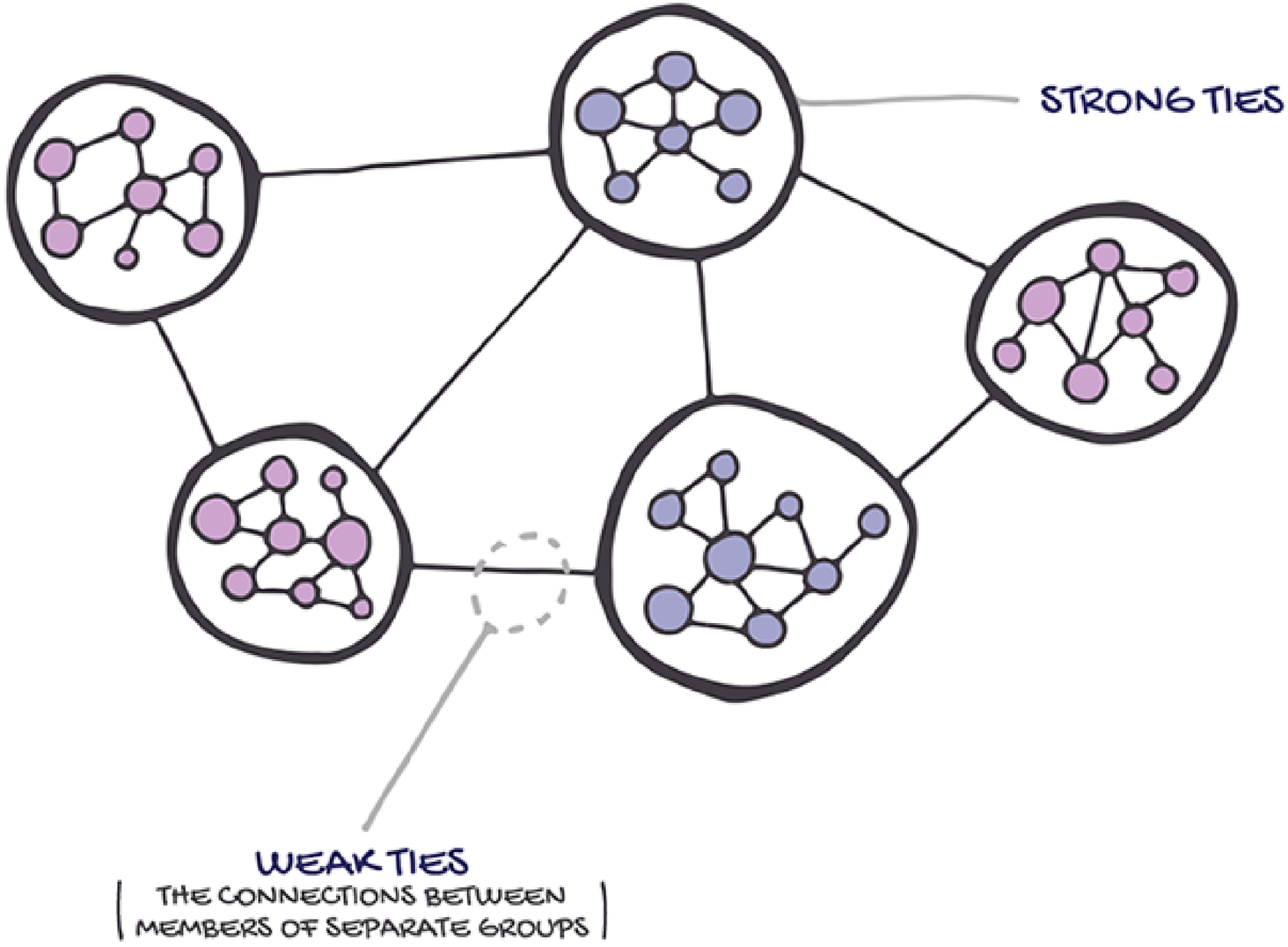
STRONG TIES
WEAK TIES
THE CONNECTIONS BETWEEN MEMBERS OF SEPARATE GROUPS

Weak ties

- **Weak ties** are relationships between members of different communities. They lead to a diversity of ideas

Strong ties

- **Strong ties** are relationships between people who live, work, or play together. They lead to similar and stagnant ideas

In its weakness lies its strength

- Unlike conventional armed groups, which are often hierarchical and centralized
  - Large terrorist networks use **dispersed forms of organization**
- Balances covertness with broader operational support
- Easier to reconstruct without dependencies on strong relationships

Finding weak ties

```
# find number and percentage of weak ties
ties %>%
   group_by(weight) %>%
   summarise(n = n(), p = n / nrow(ties)) %>%
   arrange(-n)
```

```
# A tibble: 4 x 3
  weight     n       p
   <int> <int>   <dbl>
1      1   214 0.881
2      2    21 0.0864
3      3     6 0.0247
4      4     2 0.00823
```

Let's find weak and strong ties in our network!

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