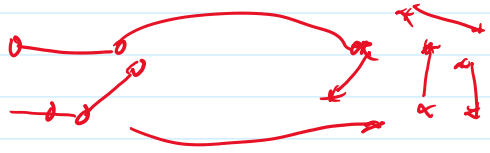
Homophily - Assortative Mixing.

11 April 2023 08:51



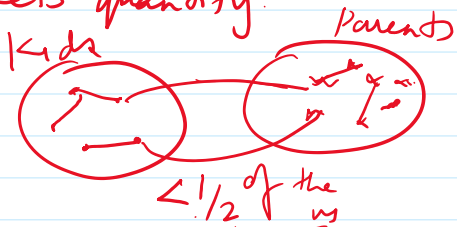
What is the prob. that kids interact w' kids.

k — k →
{k — p, p — k} 1/2
p — p →

Tossing a coin twice
H H → 1/4
{H T → 1/4, T H → 1/4} 1/2
T T → 1/4

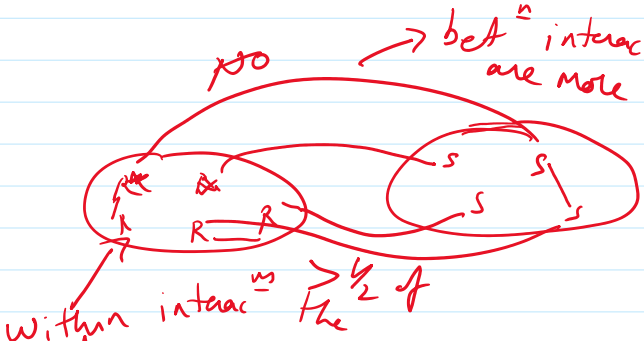
Homophily

Let's quantify.

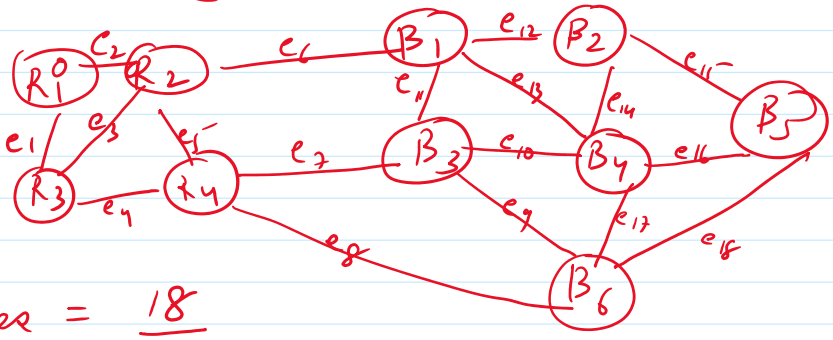


< 1/2 of the interacⁿ

Homophily
Assortative Mixing



Heterophily
Not Homophily
Less Homophily



Total edges = 18

Expected edges bet^n R & S ⇒ 9

Actual edges = 3.

$\frac{Ac}{Expected} \Rightarrow \frac{3}{9} = 1/3$

$1 - \frac{Ac}{Exp} = 1 - 1/3 \Rightarrow$ Value ↑, Assortative → Homophily ↑

Not homophily → Disassortative

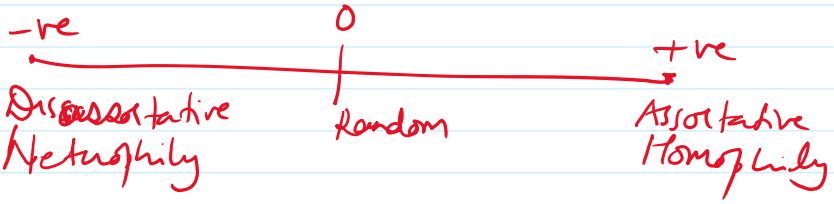
$1 - \frac{Ac}{Ex=Ac} = 0 \Rightarrow$ Random

$1 - \frac{Ac}{Ex = Ac} = 0 \Rightarrow$ Random

↘ Disassortative

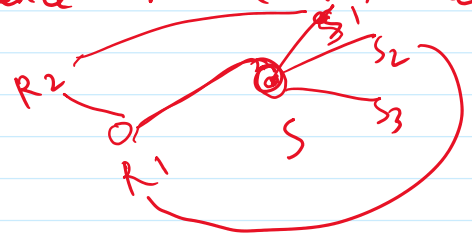
When Ac > Exp

$1 - \frac{Ac}{Ex}$ is -ve → Non-Homophily
Heterophily / Disassortative



→ Similar nodes interact

→ Influence Nodes influence other nodes



Link predic^n.

→ Categorical attributes
race, hair, city

age? → Numerical
Salary? → Numerical

$$r = \frac{\sum e_{ii} - \sum_i a_i^2}{1 - \sum_i a_i^2}$$

e_{ii} = frac^n of edges bet^n nodes w' same attr^o

a_i = frac^n of edges having at least one end w' attr^o

	S_1	S_2	S_3	S_4	a_i
S_1	0.3	0.05	0.1	0.05	0.5
S_2	0.05	0.05	0	0.1	0.1
S_3	0.1	0	0.2	0	0.3
S_4	0.05	0	0	0.05	0.1
a_i	0.5	0.1	0.3	0.1	1

frac^n of edges bet^n S2 & S4 students

frac^n of edges bet^n S1 & S4 students

→ actual →

$$r = (0.3 + 0.05 + 0.2 + 0.5) - (0.5^2 + 0.1^2 + 0.3^2 + 0.1^2)$$

$$\gamma = \frac{(0.3 + 0.05 + 0.2 + 0.5) - (0.5^2 + 0.1^2 + 0.3^2 + 0.1^2)}{1 - (0.5^2 + 0.1^2 + 0.3^2 + 0.1^2)}$$

exp.

$1 - \frac{Ac}{Exp}$ =

Homophily / Assortative index value of the n/w. in the context of Sem attribute