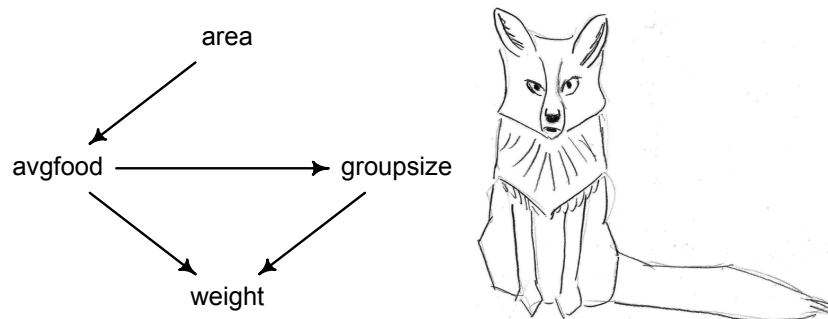


STATISTICAL RETHINKING WINTER 2020/2021
HOMEWORK, WEEK 3

All three problems below are based on the same data. The data in data (foxes) are 116 foxes from 30 different urban groups in England. These foxes are like street gangs. Group size varies from 2 to 8 individuals. Each group maintains its own (almost exclusive) urban territory. Some territories are larger than others. The area variable encodes this information. Some territories also have more avgfood than others. We want to model the weight of each fox. For the problems below, assume this DAG:



1. Use a model to infer the total causal influence of area on weight. Would increasing the area available to each fox make it heavier (healthier)? You might want to standardize the variables. Regardless, use prior predictive simulation to show that your model's prior predictions stay within the possible outcome range.
2. Now infer the causal impact of adding food (avgfood) to a territory. Would this make foxes heavier? Which covariates do you need to adjust for to estimate the total causal influence of food?
3. Now infer the causal impact of group size. Which covariates do you need to adjust for? Looking at the posterior distribution of the resulting model, what do you think explains these data? That is, can you explain the estimates for all three problems? How do they make sense together?