Final Project Dagitty Rough Draft

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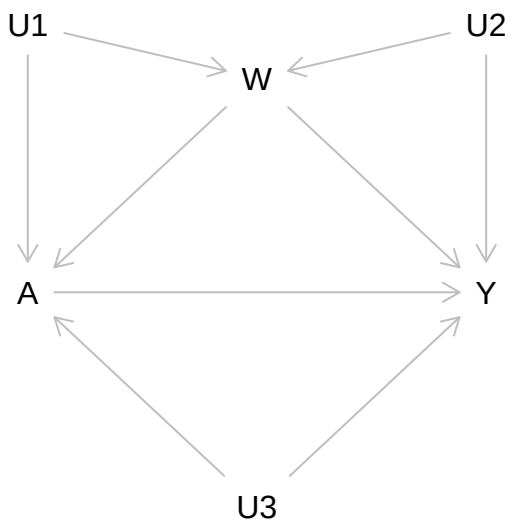
Causal Relationship between Salary and Whether a Person Leaves the Job or Not

Exposure variable A is salary. Outcome variable Y is whether the person left the job or not. Baseline covarates W includes the following:

- work accident
- promotion
- last evaluation
- satisfaction
- department
- number of projects
- average monthly hours
- time spent at the company

```
library(dagitty)

salary <- dagitty("dag {
A <- U1 -> W <- U2 -> Y
A <- W -> Y
A <- U3 -> Y
A -> Y
}")
coordinates(salary) <- list(x=c(A=1,U3=2,Y=3,U1=1,U2=3,W=2),
                            y=c(A=0,U3=1,Y=0,U1=-1.25,U2=-1.25,W=-1))
exposures(salary) <- "A"
outcomes(salary) <- "Y"
plot(salary)
```



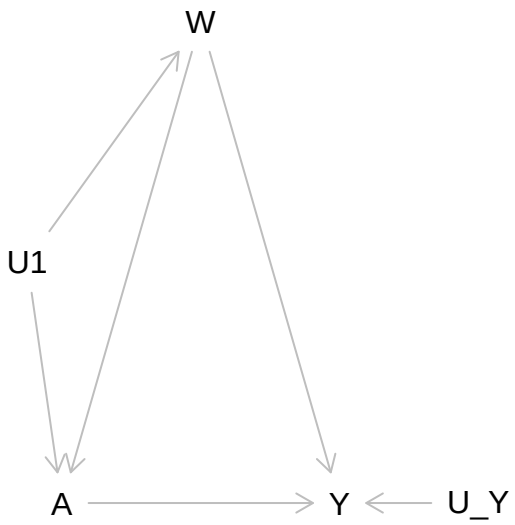
```
adjustmentSets(salary, effect = "direct")
```

```
##  { U2, U3, W }
##  { U1, U3, W }
```

To be able to identify the effect of salary on whether a person leaves the job or not, we make the following independence assumptions and condition on W:

$U_A \perp U_Y, U_W \perp U_Y$

```
salary_adjusted <- dagitty("dag {
A <- U1 -> W
A <- W -> Y
A -> Y
U_Y -> Y
}")
coordinates(salary_adjusted) <- list(x=c(A=1,Y=3,U1=0.75,W=2, U_Y = 4),
                                     y=c(A=0,Y=0,U1=-0.25,W=-0.5, U_Y = 0))
plot(salary_adjusted)
```

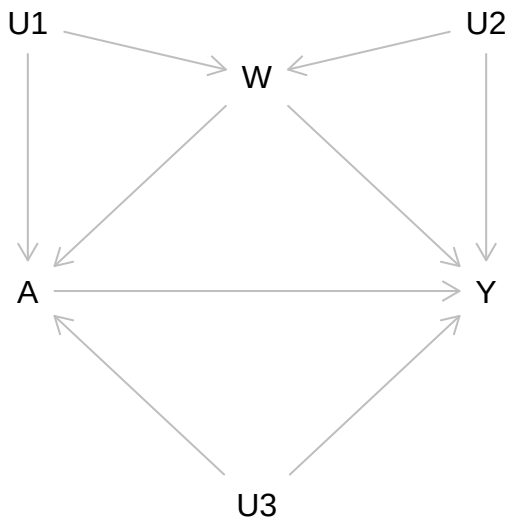


Causal Relationship between Average Monthly Hours and Whether a Person Leaves the Job or Not

Exposure variable A is average monthly hours a person works. Outcome variable Y is whether the person left the job or not. Baseline covarates W includes the following:

- work accident
- promotion
- last evaluation
- satisfaction
- department
- number of projects
- time spent at the company
- salary

```
average_monthly_hours <- dagitty("dag {
A <- U1 -> W <- U2 -> Y
A <- W -> Y
A <- U3 -> Y
A -> Y
}")
coordinates(average_monthly_hours) <- list(x=c(A=1,U3=2,Y=3,U1=1,U2=3,W=2),
                            y=c(A=0,U3=1,Y=0,U1=-1.25,U2=-1.25,W=-1))
exposures(average_monthly_hours) <- "A"
outcomes(average_monthly_hours) <- "Y"
plot(average_monthly_hours)
```



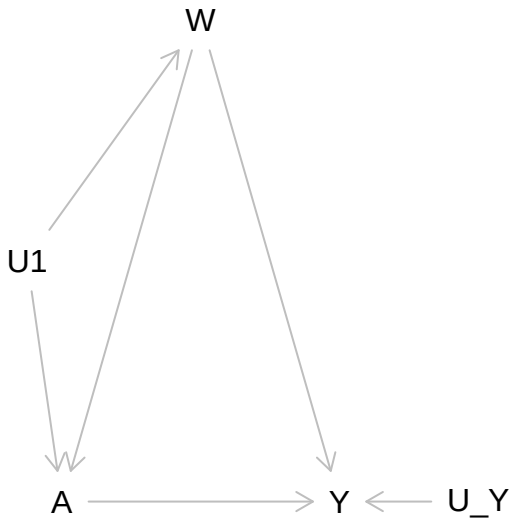

```
adjustmentSets(average_monthly_hours, effect = "direct")
```

```
##  { U2, U3, W }
##  { U1, U3, W }
```

To be able to identify the effect of average monthly hours a person works on whether a person leaves the job or not, we make the following independence assumptions and condition on W:

$U_A \perp U_Y, U_W \perp U_Y$

```
average_monthly_hours_adjusted <- dagitty("dag {
A <- U1 -> W
A <- W -> Y
A -> Y
U_Y -> Y
}")
coordinates(average_monthly_hours_adjusted) <- list(x=c(A=1,Y=3,U1=0.75,W=2, U_Y = 4),
                                    y=c(A=0,Y=0,U1=-0.25,W=-0.5, U_Y = 0))
plot(average_monthly_hours_adjusted)
```

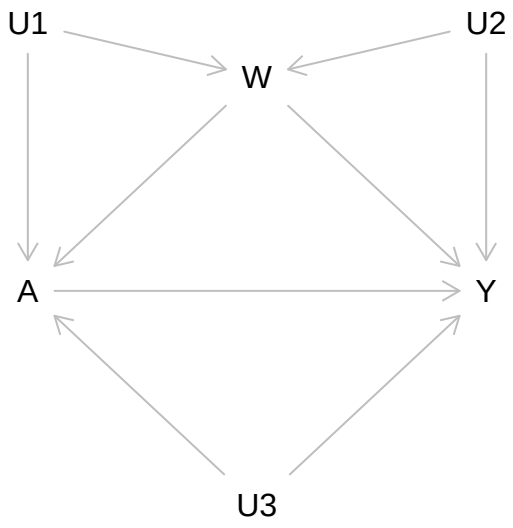


Causal Relationship between Job Satisfaction Level and Whether a Person Leaves the Job or Not

Exposure variable A is job satisfaction level. Outcome variable Y is whether the person left the job or not. Baseline covarates W includes the following:

- work accident
- promotion
- last evaluation
- salary
- department
- number of projects
- average monthly hours
- time spent at the company

```
satisfaction_level <- dagitty("dag {
A <- U1 -> W <- U2 -> Y
A <- W -> Y
A <- U3 -> Y
A -> Y
}")
coordinates(satisfaction_level) <- list(x=c(A=1,U3=2,Y=3,U1=1,U2=3,W=2),
                            y=c(A=0,U3=1,Y=0,U1=-1.25,U2=-1.25,W=-1))
exposures(satisfaction_level) <- "A"
outcomes(satisfaction_level) <- "Y"
plot(satisfaction_level)
```



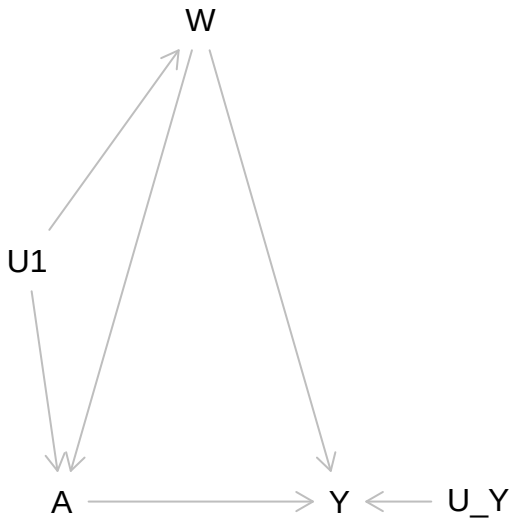

```
adjustmentSets(satisfaction_level, effect = "direct")
```

```
##  { U2, U3, W }
##  { U1, U3, W }
```

To be able to identify the effect of job satisfaction level on whether a person leaves the job or not, we make the following independence assumptions and condition on W:

$U_A \perp U_Y, U_W \perp U_Y$

```
satisfaction_level_adjusted <- dagitty("dag {
A <- U1 -> W
A <- W -> Y
A -> Y
U_Y -> Y
}")
coordinates(satisfaction_level_adjusted) <- list(x=c(A=1,Y=3,U1=0.75,W=2, U_Y = 4),
                                    y=c(A=0,Y=0,U1=-0.25,W=-0.5, U_Y = 0))
plot(satisfaction_level_adjusted)
```

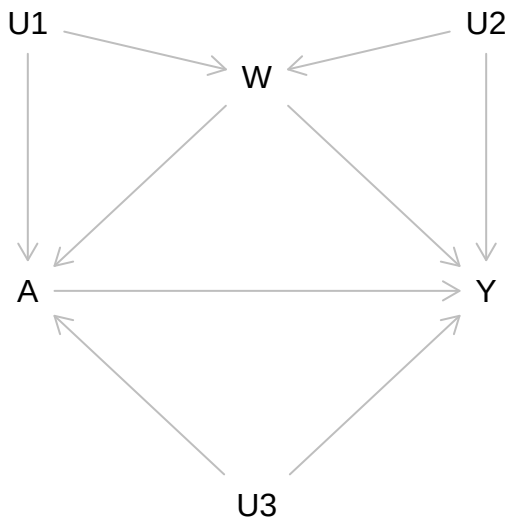


Causal Relationship between Performance Evaluation and Whether a Person Leaves the Job or Not

Exposure variable A is the last performance evaluation the person received at the job. Outcome variable Y is whether the person left the job or not. Baseline covarates W includes the following:

- work accident
- promotion
- salary
- satisfaction
- department
- number of projects
- average monthly hours
- time spent at the company

```
last_evaluation <- dagitty("dag {
A <- U1 -> W <- U2 -> Y
A <- W -> Y
A <- U3 -> Y
A -> Y
}")
coordinates(last_evaluation) <- list(x=c(A=1,U3=2,Y=3,U1=1,U2=3,W=2),
                             y=c(A=0,U3=1,Y=0,U1=-1.25,U2=-1.25,W=-1))
exposures(last_evaluation) <- "A"
outcomes(last_evaluation) <- "Y"
plot(last_evaluation)
```




```
adjustmentSets(last_evaluation, effect = "direct")
```

```
##  { U2, U3, W }
##  { U1, U3, W }
```

To be able to identify the effect of last evaluation on whether a person leaves the job or not, we make the following independence assumptions and condition on W:

$U_A \perp U_Y, U_W \perp U_Y$

```
last_evaluation_adjusted <- dagitty("dag {
A <- U1 -> W
A <- W -> Y
A -> Y
U_Y -> Y
}")
coordinates(last_evaluation_adjusted) <- list(x=c(A=1,Y=3,U1=0.75,W=2, U_Y = 4),
                                      y=c(A=0,Y=0,U1=-0.25,W=-0.5, U_Y = 0))
plot(last_evaluation_adjusted)
```