

1) For the Separated case, we choose the variables to be

a: BMI

c: Vegetables

y: Hyperlipidemia

Such that, $P(\text{BMI} \mid \text{Vegetables}, \text{Hyperlipidemia}) = P(\text{BMI} \mid \text{Hyperlipidemia})$

Truth table:

$P(\text{BMI} = \sim 18.5 \mid \text{Vegetables}, \text{Hyperlipidemia})$

	Yes	No
<400g/d	0.20	0.49
400–500g/d	0.20	0.49
>500g/d	0.20	0.49

Truth tables show same pattern for other BMI values (i.e., BMI = ~ 24.0 , ~ 28.0 , < 18.5)

Therefore, we see it is Separated as wanted

However, this variable assignment is not Sufficient, as BMI is clearly dependent over Hyperlipidemia given Vegetables

2)

For the Sufficient case, we choose the variables to be:

a = BMI

c = Hyperlipidemia

y = Vegetables

Clearly the same reasoning above still applies. I.e., A is independent of Y given C. Given this fact, we can conclude that this variable assignment is Sufficient and not Separated.

As a conclusion, we have shown that it is not possible to enforce Separation and Sufficient at the same time.