We model your utility from restaurant j as:

$$U_{ij} = u_{ij} + \epsilon_{ij} \tag{1}$$

where:

We model your utility from restaurant j as:

$$U_{ij} = u_{ij} + \epsilon_{ij} \tag{1}$$

where:

- u_{ij} captures **observable factors**: price, distance, cuisine type, Yelp rating

We model your utility from restaurant j as:

$$U_{ij} = u_{ij} + \epsilon_{ij} \tag{1}$$

where:

- u_{ij} captures **observable factors**: price, distance, cuisine type, Yelp rating
- ϵ_{ij} captures **unobservable factors**: mood, cravings, things we can't measure

We model your utility from restaurant j as:

$$U_{ij} = u_{ij} + \epsilon_{ij} \tag{1}$$

where:

- u_{ij} captures **observable factors**: price, distance, cuisine type, Yelp rating
- ϵ_{ij} captures **unobservable factors**: mood, cravings, things we can't measure
- Perhaps $u_{\text{Thai}} = -2 \times \textit{price} + 3 \times \textit{Yelp\_rating} - 0.5 \times \textit{travel\_time}$

We model your utility from restaurant j as:

$$U_{ij} = u_{ij} + \epsilon_{ij} \tag{1}$$

where:

- u_{ij} captures **observable factors**: price, distance, cuisine type, Yelp rating
- ϵ_{ij} captures **unobservable factors**: mood, cravings, things we can't measure
- Perhaps $u_{\text{Thai}} = -2 \times \textit{price} + 3 \times \textit{Yelp\_rating} - 0.5 \times \textit{travel\_time}$
- But ϵ_{Thai} might be positive tonight because you're craving spice

You choose restaurant j if and only if:

$$U_{ij} > U_{ik} \text{ for all } k \neq j \tag{2}$$

(3)

You choose restaurant j if and only if:

$$U_{ij} > U_{ik} \text{ for all } k \neq j \tag{2}$$

$$\Updownarrow$$

$$u_{ij} + \epsilon_{ij} > u_{ik} + \epsilon_{ik} \text{ for all } k \neq j \tag{3}$$

You choose restaurant j if and only if:

$$U_{ij} > U_{ik} \text{ for all } k \neq j \tag{2}$$

$$\Updownarrow$$

$$u_{ij} + \epsilon_{ij} > u_{ik} + \epsilon_{ik} \text{ for all } k \neq j \tag{3}$$

Since we (data analysts) can't observe your ϵ's, we have to think probabilistically:

$$P_{ij} = \Pr(U_{ij} > U_{ik} \text{ for all } k \neq j) \tag{4}$$

You choose restaurant j if and only if:

$$U_{ij} > U_{ik} \text{ for all } k \neq j \tag{2}$$

$$\Updownarrow$$

$$u_{ij} + \epsilon_{ij} > u_{ik} + \epsilon_{ik} \text{ for all } k \neq j \tag{3}$$

Since we (data analysts) can't observe your ϵ's, we have to think probabilistically:

$$P_{ij} = \Pr(U_{ij} > U_{ik} \text{ for all } k \neq j) \tag{4}$$

How many times out of 100 would someone choose Thai given identical observables?

Three key properties of choice sets:

- **Finite**: You can't choose from an infinite number of restaurants (i.e., "discrete")
- **Mutually exclusive**: You can eat at only one restaurant tonight
- **Exhaustive**: These are the complete set of realistic options