

# Hypothesis Testing

Psychology 3256

# Introduction

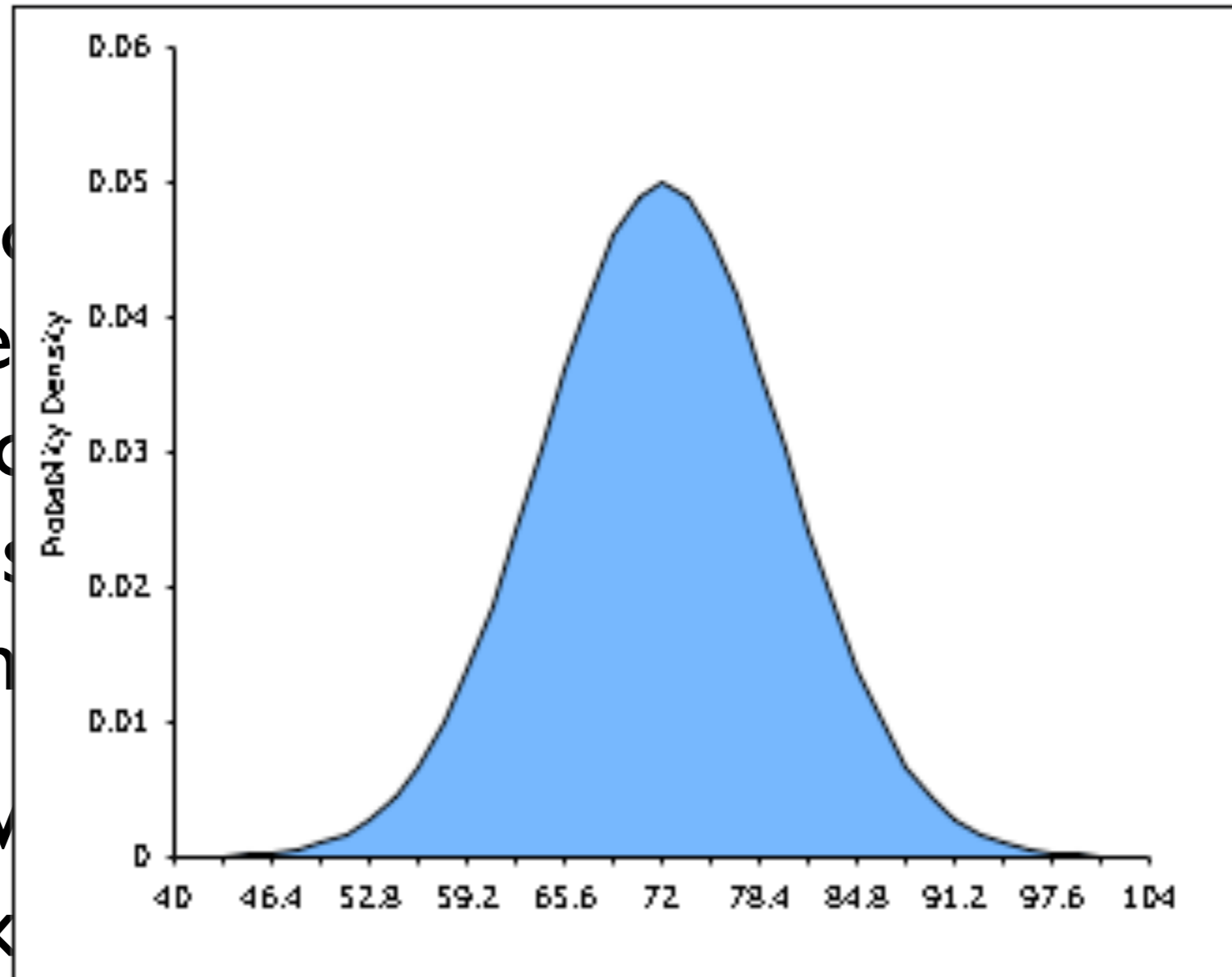
- There are three things we need to say that we have a causal relationship
- Temporal precedence
- Elimination of alternative explanations
- Covariation
- the first two can be easily dealt with through design

# Some made up data

	Group 1	Group 2
	57	72
	66	62
	60	64
	73	79
	75	81
Mean	66.2	71.6
sd	7.85	8.56

# Question...

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# We just made a decision

- If the chance is relatively small, usually less than five percent, we say it is unlikely our difference happened by chance alone and we therefore have a statistically significant effect
- Without significance we have no covariation of  $x$  and  $y$  and therefore no causation

# We set up two, mutually exclusive hypotheses

- $H_0$  the null hypothesis
- $H_a$  the alternative hypothesis

# Errors in Hypothesis Testing

	• $H_0$ True	• $H_a$ True
Do Not Reject $H_0$	Correct Decision	Type II Error
Reject $H_0$	Type I Error	Correct Decision

# We have some control

- We set the probability of a type I error, usually at .05
- This is called  $\alpha$
- The probability of a type II error depends on  $n$ ,  $\sigma$  and  $\alpha$  (this is called  $\beta$ )
- $1-\beta$  is a correct rejection or Power



# What should we set $\alpha$ at?

- Well, .05 of course...
- Just because of Fisher
- we might want to be more flexible
- e.g.  $p < .0504$  “Do not discuss non significant results!”