

# A/B тестирование

## Занятие 1

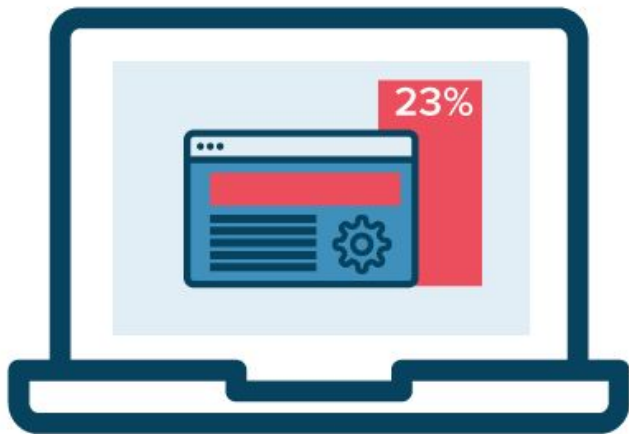
Мурашкин Вячеслав  
mvjacheslav@gmail.com

# Содержание

- Методология проведения A/B тестов
- Выбор метрики
- Дизайн эксперимента
- Проверка гипотез

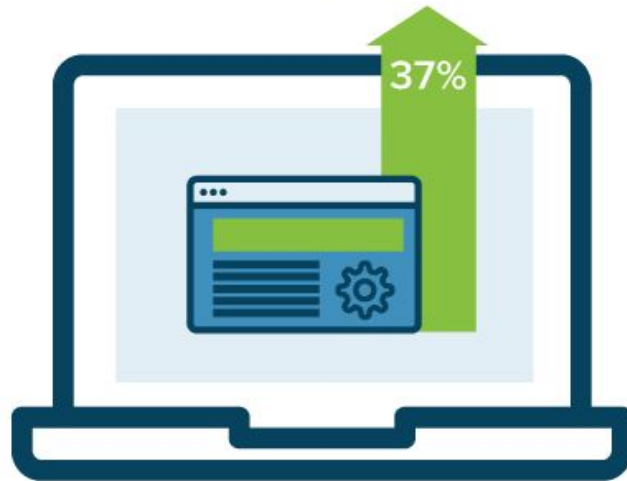
# A/B тестирование

A



CONTROL

B



VARIATION

# A/B тестирование

- Метод маркетингового исследования
- Набор пользователей разбивается на контрольную и тестовую группы
- В тестовой группе вносится некоторое изменение
- Эффект от изменений оценивается сравнением целевых метрик в группах

# Примеры A/B тестов: интерфейсы



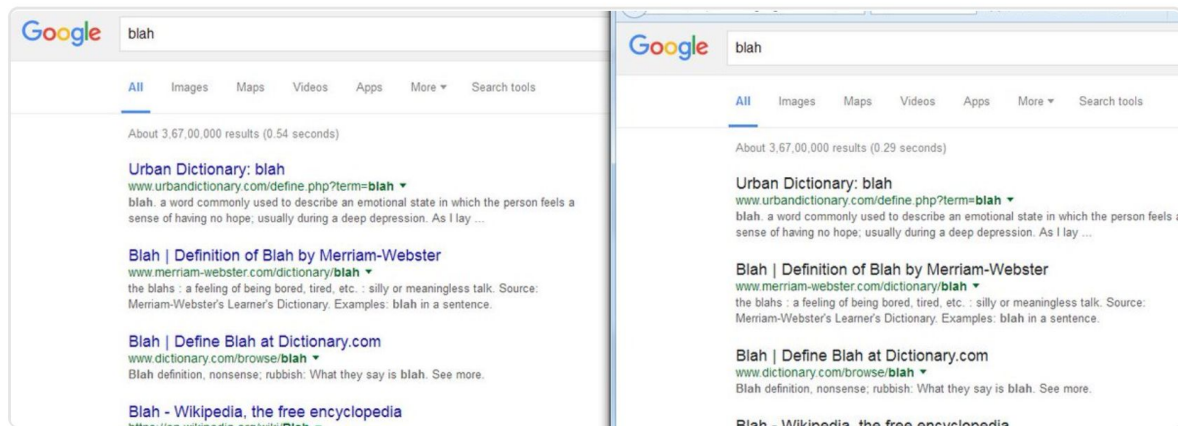
**Tripad**

@\_Tripad

Follow



Google doing some A/B Testing with black links ? #UX #Webdesign



6:37 AM - 7 May 2016

# Примеры А/В тестов: интерфейсы

About 389,000 results (0.61 seconds)

**Hannibal - Wikipedia, the free encyclopedia**  
<https://en.wikipedia.org/wiki/Hannibal> ▼  
Hannibal (247 – between 183 and 181 BC), in full Hannibal Barca, was a Punic military commander from Carthage, generally considered one of the greatest military commanders in history. His father Hamilcar Barca was the leading Carthaginian commander during the First Punic War.  
Hannibal (disambiguation) · Hannibal (TV series) · Scipio Africanus · Punic

**Hannibal - Warrior, General - Biography.com**  
[www.biography.com/people/hannibal-9327767](http://www.biography.com/people/hannibal-9327767) ▼  
Hannibal Barca was born in Carthage (present-day Tunisia) in approximately 247 B.C. He was the son of Carthaginian general Hamilcar Barca (Barca meaning "thunderbolt"). After Carthage's defeat by the Romans in the First Punic War in 241 B.C., Hamilcar devoted himself to improving both his and Carthage's fortunes.

**Hannibal Barca - Livius**  
[www.livius.org](http://www.livius.org) · Articles · Person ▼  
18 Aug 2015 - The Carthaginian general Hannibal (247-182 BCE) was one of the greatest military leaders in history. His most famous campaign took place ...

**Hannibal - Ancient History Encyclopedia**  
[www.ancienthistoryencyclopedia.com](http://www.ancienthistoryencyclopedia.com) ▼

**darker**

Hannibal, fully Hannibal Barca, was a Punic military commander from Carthage, generally considered one of the greatest military commanders in history. His father Hamilcar Barca was the leading Carthaginian commander during the First Punic War. Wikipedia

**Born:** 247 BC, Carthage  
**Died:** Gebze, Turkey  
**Parents:** Hamilcar Barca  
**Allegiance:** Ancient Carthage  
**Battles and wars:** Siege of Saguntum, Battle of Ticinus, more

Hannibal Barca

Images Videos Books Shopping Maps Search tools

About 389,000 results (0.45 seconds)

**Hannibal - Wikipedia, the free encyclopedia**  
<https://en.wikipedia.org/wiki/Hannibal> ▼  
Hannibal (247 – between 183 and 181 BC), in full Hannibal Barca, was a Punic military commander from Carthage, generally considered one of the greatest military commanders in history. His father Hamilcar Barca was the leading Carthaginian commander during the First Punic War.  
Hannibal (disambiguation) · Hannibal (TV series) · Scipio Africanus · Punic

**Hannibal - Warrior, General - Biography.com**  
[www.biography.com/people/hannibal-9327767](http://www.biography.com/people/hannibal-9327767) ▼  
Hannibal Barca was born in Carthage (present-day Tunisia) in approximately 247 B.C. He was the son of Carthaginian general Hamilcar Barca (Barca meaning "thunderbolt"). After Carthage's defeat by the Romans in the First Punic War in 241 B.C., Hamilcar devoted himself to improving both his and Carthage's fortunes.

**Hannibal Barca - Livius**  
[www.livius.org](http://www.livius.org) · Articles · Person ▼  
18 Aug 2015 - The Carthaginian general Hannibal (247-182 BCE) was one of the greatest military leaders in history. His most famous campaign took place ...

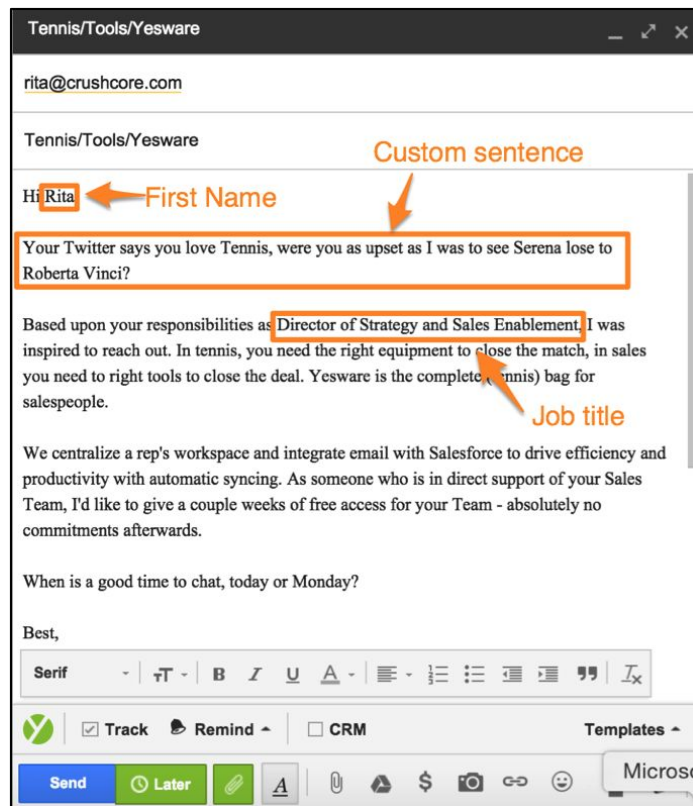
**Hannibal - Ancient History Encyclopedia**  
[www.ancienthistoryencyclopedia.com](http://www.ancienthistoryencyclopedia.com) ▼

**lighter**

Hannibal, fully Hannibal Barca, was a Punic military commander from Carthage, generally considered one of the greatest military commanders in history. His father Hamilcar Barca was the leading Carthaginian commander during the First Punic War. Wikipedia

**Born:** 247 BC, Carthage  
**Died:** Gebze, Turkey  
**Parents:** Hamilcar Barca  
**Allegiance:** Ancient Carthage  
**Battles and wars:** Siege of Saguntum, Battle of Ticinus, more

# Примеры A/B тестов: email



# Примеры А/В тестов: реклама

**Infusionsoft**   
about a week ago 

Boost email marketing and improve lead scoring with our automated solution. Save up to 40% off your first 6 months. Offer expires May 15, experience our live demo today.






**Personalized, automated marketing.**  
125,000+ Users. "It's a game-changer in my business!"

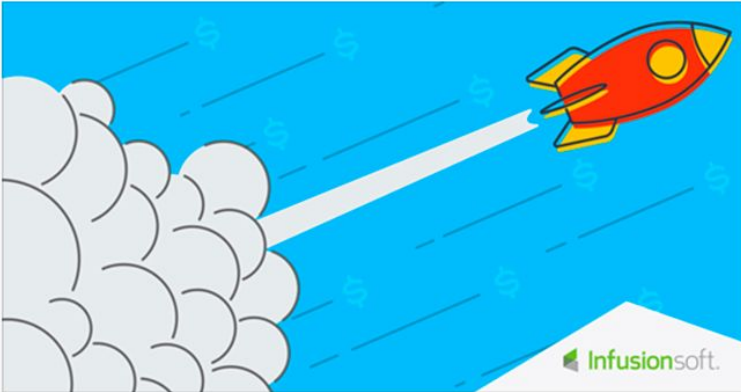
[WWW.INFUSIONSOFT.COM](http://WWW.INFUSIONSOFT.COM)

[Request Time](#)

 Like  Comment  Share

**Infusionsoft**   
about a month ago 




Discover the business marketing tool helping 125,000 users achieve small business success.



**Do what you love. Automate the rest.**  
"It's a game-changer in my business!"

[WWW.INFUSIONSOFT.COM](http://WWW.INFUSIONSOFT.COM)

[Learn More](#)

 197  8  47



# Примеры А/В тестов - алгоритмы

## Frequently Bought Together



+



+



Price for all three: **\$28.11**

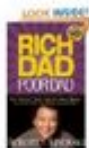
[Add all three to Cart](#)

[Add all three to Wish List](#)

[Show availability and shipping details](#)

- ☒ **This item:** Think and Grow Rich by Napoleon Hill Paperback **\$11.52**
- ☒ How to Win Friends & Influence People by Dale Carnegie Paperback **\$8.40**
- ☒ The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change by Stephen R. Covey Paperback

## Customers Who Bought This Item Also Bought



Rich Dad Poor Dad: What The Rich Teach Their ...  
› Robert T. Kiyosaki  
★★★★☆ (2,825)  
Mass Market Paperback  
**\$7.19**

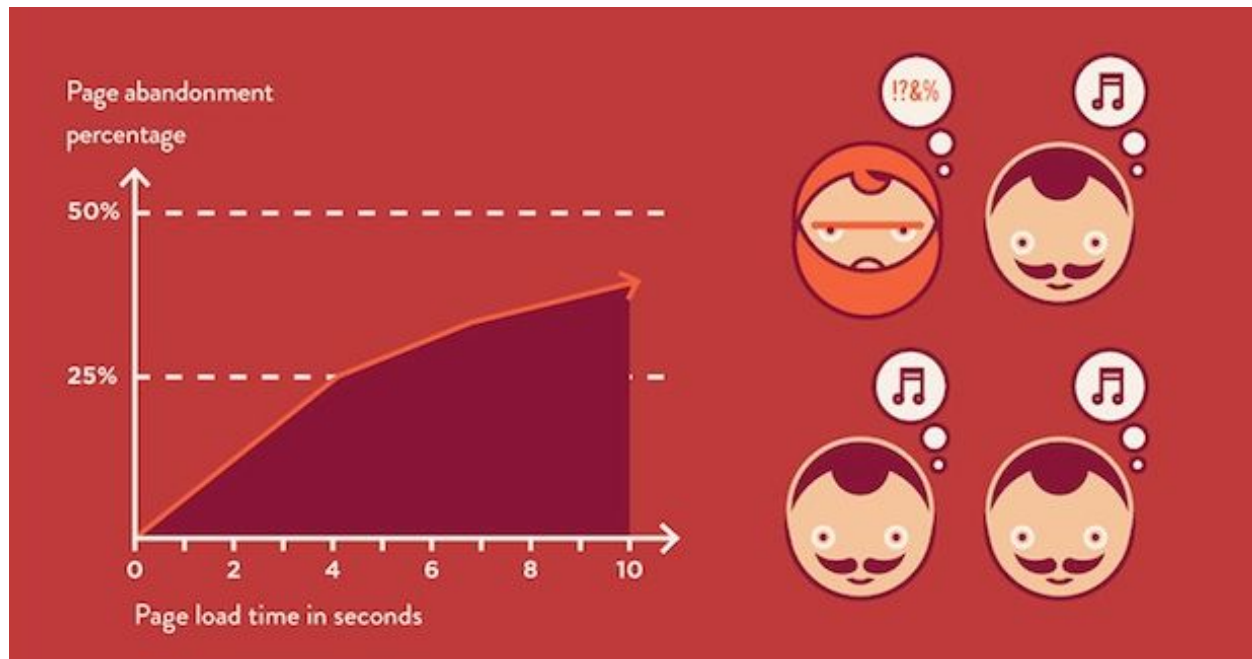


The Richest Man in Babylon: George S. ....  
› George S. Clason  
★★★★☆ (824)  
Paperback  
**\$6.99**



The Law of Success In Sixteen Lessons by ...  
› Napoleon Hill  
★★★★☆ (125)  
Paperback  
**\$9.99**

# Примеры A/B тестов - время загрузки страницы



[How One Second Could Cost Amazon \\$1.6 Billion In Sales](#)

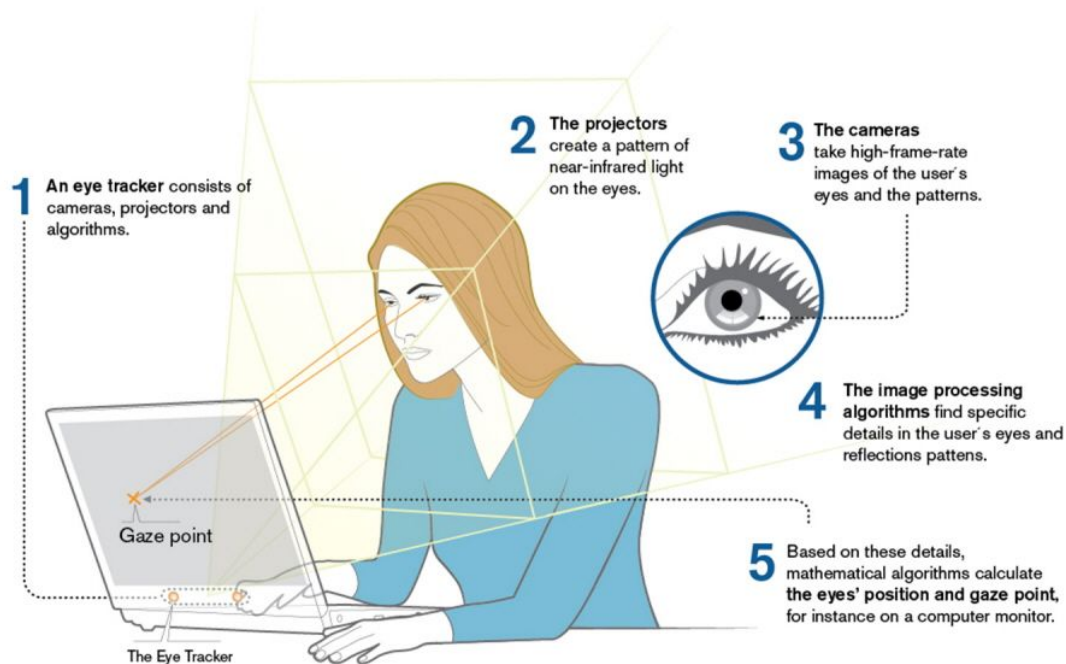
# A/B тесты проводить дорого

- Для проведения теста нужна инфраструктура
  - разбиение пользователей на группы
  - сбор и хранение необходимых данных
- Результат нельзя получить мгновенно
  - необходимо время для накопления достаточного объема данных
- В некоторых случаях можно отказаться от проведения A/B теста
  - если изменение будет в любом случае внесено

# Альтернативы A/B тестам

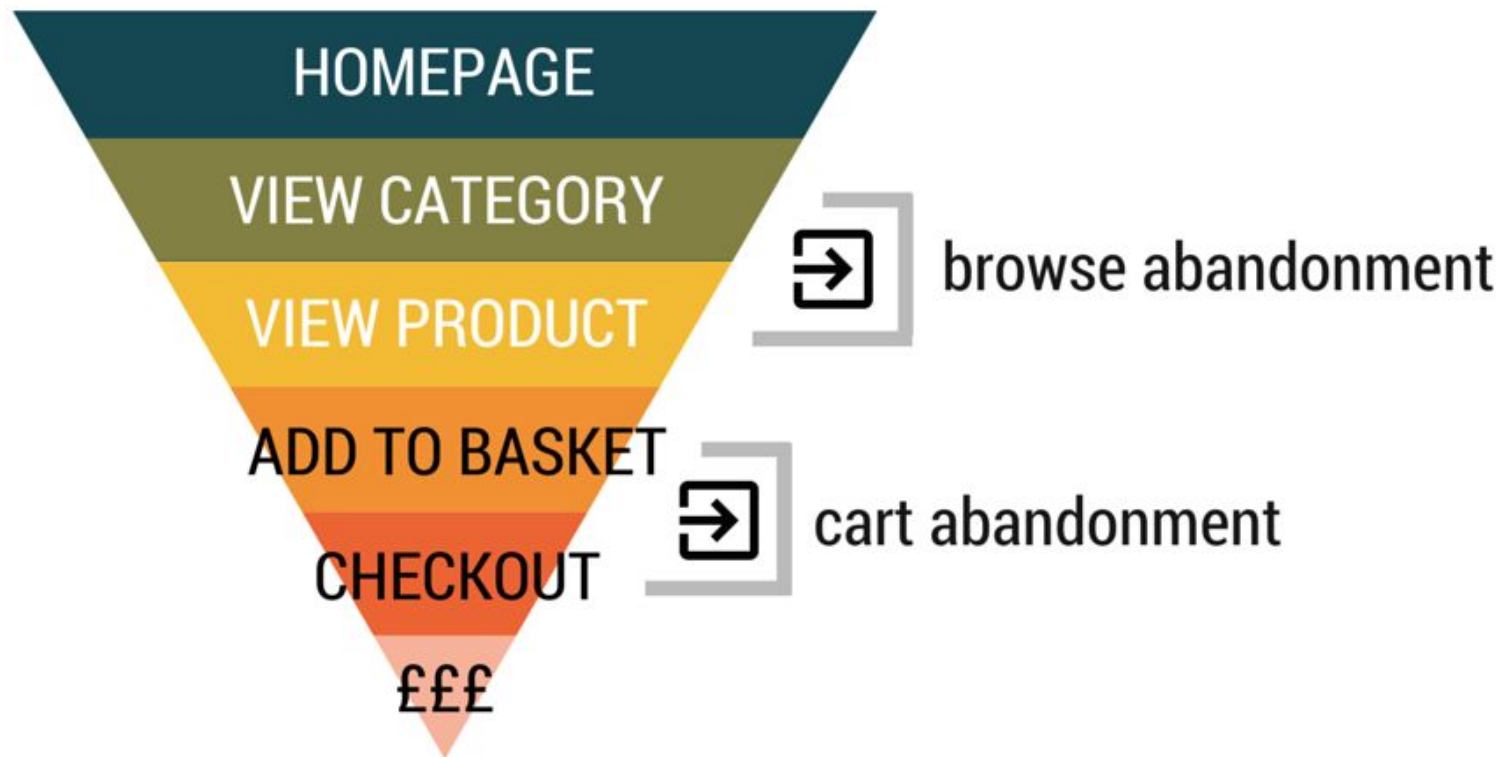
- Qualitative analysis (качественный анализ)
- UX исследования, фокус группы
- Eye tracking
- Опросы

# Альтернативы A/B тестам: Eye Tracking



Методология

# Методология: воронка интернет-магазина



# Методология: воронка интернет-магазина

	<b>CLICKS</b>	<b>USERS</b>
<b>VIEW PRODUCT</b>	10000	100
<b>ADD TO BASKET</b>	100	10
<b>CHECKOUT</b>	50	8



# Методология: воронка интернет-магазина

	<b>CLICKS</b>	<b>USERS</b>
<b>VIEW PRODUCT</b>	10000	100
<b>ADD TO BASKET</b>	100 (1%)	10 (10%)
<b>CHECKOUT</b>	50 (20%)	8 (80%)

# Методология: метрики

- Метрика выбирается исходя из бизнес-задачи
- При выборе метрики важно учитывать:
  - *чувствительность*
  - *стабильность*
  - *сложность вычисления*

# Методология: метрики

- Метрика выбирается исходя из бизнес-задачи
- При выборе метрики важно учитывать:
  - *чувствительность*
  - *стабильность*
  - *сложность вычисления*
- Для оценки качества метрики проводят A/A тесты

# Дизайн эксперимента

# Дизайн эксперимента

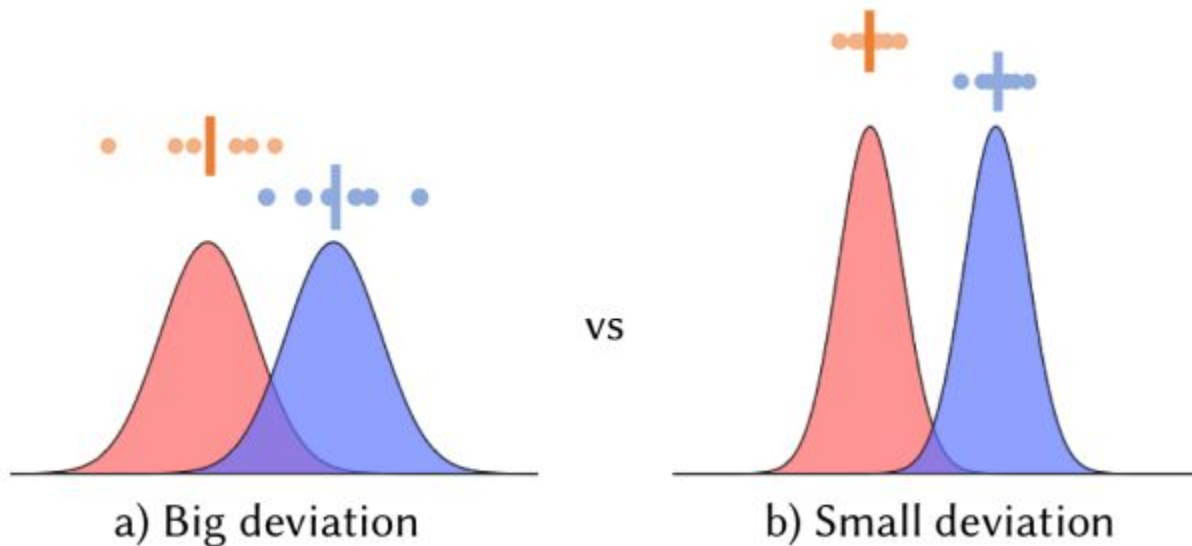
- Зафиксировать цели и метрики эксперимента
- Исключить внешние факторы
- Оценить необходимый объем выборки и время проведения эксперимента

Оценка эффекта и проверка гипотез

# Оценка эффекта

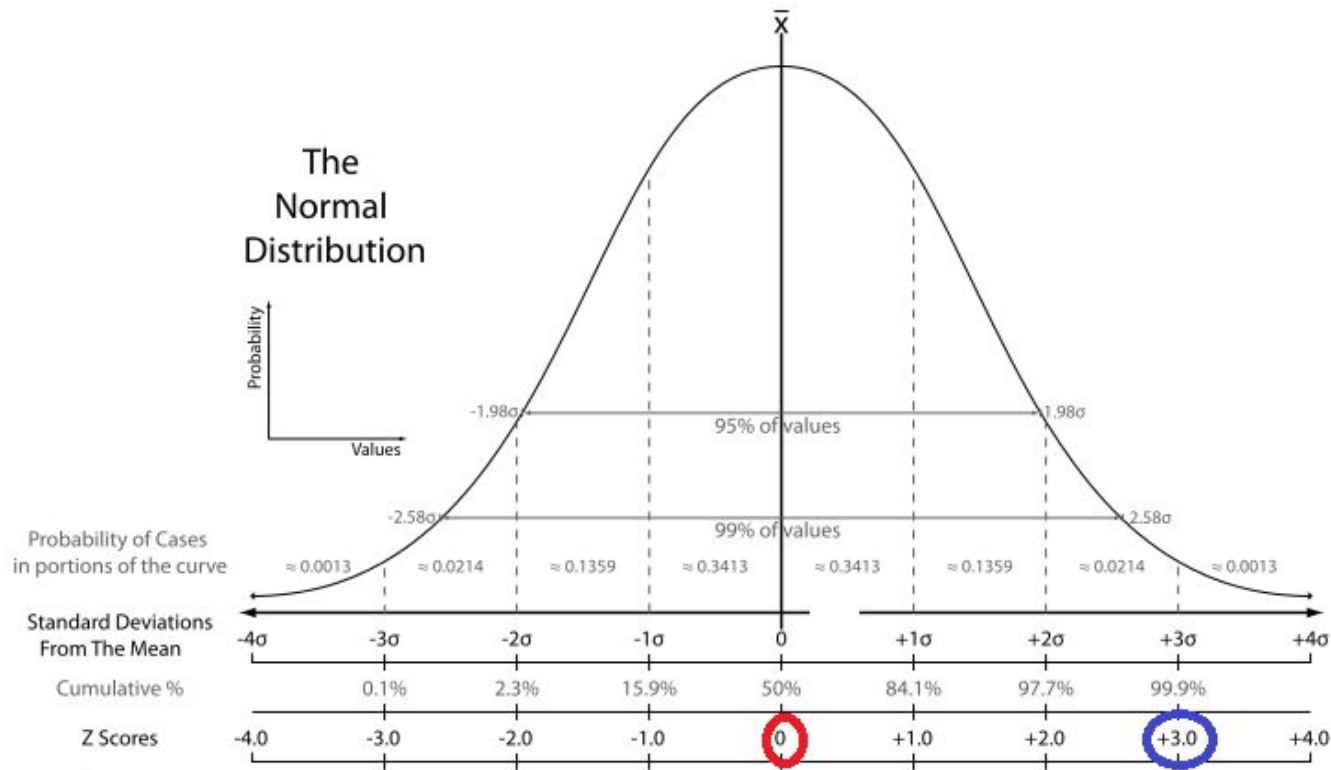
	<b>A</b>	<b>B</b>
<b>Conversion Rate</b>	5%	8%

# Оценка эффекта: разница случайна?

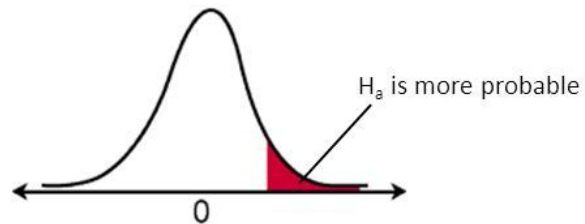




# Доверительный интервал, z-score

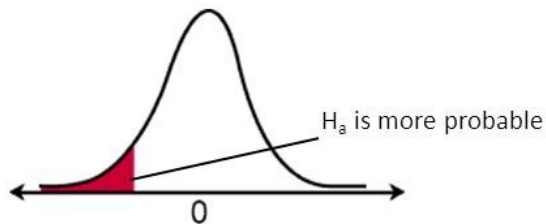


# Проверка гипотез



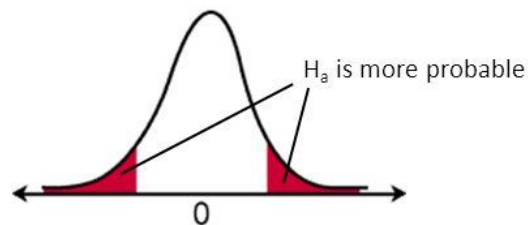
Right-tail test

$$H_a: \mu > \text{value}$$



Left-tail test

$$H_a: \mu < \text{value}$$



Two-tail test

$$H_a: \mu \neq \text{value}$$

# Полезные материалы

- [The Ultimate Guide To A/B Testing](#)
- [Udacity: Online Experiment Design and Analysis](#)
- [Statistics for Online Experiments](#)
- [How To Increase Site Performance Through A/B Split Testing](#)