CSE 440:
Introduction to HCI

08: Models and Human Performance

April 18, 2024

Jesse J. Martinez | Avery Mack | Simona Liao

Course Reminders

Assignment 2d: Due Today @ 3pm

- Bring to Section tomorrow!

Assignment 2e: Due Monday @ 3pm

- EXP available: “Modeling the User”

Looking Ahead:

- Initial Design Proposal “3x4” (2f) due Wk5 Wed (4/24)
- Revised Design Proposals (2f_rev) due Wk5 Thurs (4/25)
- Selected Design Review “1x2” (2g) due Wk6 Mon (4/29)

Overview

- Wrap-up: Task Analysis
  - Finishing Task Analysis Questions
  - Personas & Scenarios
- Modeling Human Performance
  - Visual Perception
  - Model Human Processor
  - Fitts's Law
  - Gestalt Principles

Wrap-Up: Task Analysis

Objectives

Given design research data, be able to analyze that data in terms of people and their tasks.

Describe personas, their purpose, how and why we emphasize design research data in their creation.

Define and describe relationships between tasks, personas, and scenarios.

Question 6

What is the relationship between people & data?

- Personal data
  - Always accessed at same machine?
  - Do people move between machines?
- Common data
  - Used concurrently?
  - Passed sequentially between customers?
- Remote access required?
- Access to data restricted?
- Does this relationship change over time?

Patient-provider curation example, Fitbit example

Question 7

What other tools does a person have?

More than just compatibility

How customer works with collection of tools

- Automating lab data collection example:
- how is data collected now?
- by what instruments and manual procedures?
- how is the information analyzed?
- are the results transcribed for records or publication?
- what media/forms are used and how are they handled?

Enhanced Field Biologist Notebooks, Navigating by Sextant

Question 8

How do people communicate with each other?

Who communicates with whom?

About what?

Follow lines of the organization? Against it?

Old Email Adoption Example, Contrasted to Current Expectations

Question 9

How often are the tasks performed?

Frequent use likely remember more details

Infrequent use may need more help

- Even for simple operations
- Make these tasks possible to accomplish

Which function is performed

- Most frequently?
- By which people?
- Optimizing for these will improve perception of performance
- Careful about initial use scenario

Question 10

What are the time constraints on the tasks?

What functions will people be in a hurry for?

Which can wait?

Is there a timing relationship between tasks?

Target example, versus Pregnancy in Web Search

Question 11

What happens when things go wrong?

How do people deal with

- task-related errors?
- practical difficulties?
- catastrophes?

Is there a backup strategy?

What are the consequences?

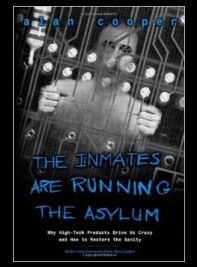
Combine with Other Methods

Personas

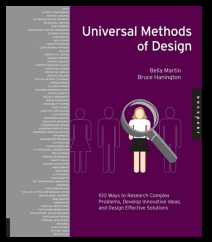
Concept Mapping

Competitive Analysis

"If you want to create a product that satisfies a broad audience …, logic will tell you to make it as broad in its functionality as possible to accommodate the most people. Logic is Wrong."



Method 63



Personas

Archetypal character meant to represent a group of people in a role who share common goals, attitudes, and behaviors when interacting with a particular product or service

"This is what I need in order to do my job."

NAME: Vivica Parker

AGE: 32

OCCUPATION: Journalist

PROFILE:
Born in Washington, DC
Lives and works in New York City (far from family)
Lives by herself in a small apartment
Has a driver's license
Calls parents and older brother on weekends
Works for an online art magazine and is currently in charge of writing a blog about graffiti. In order to do that she needs to do the following tasks:

- **Walk/drive around the city**
- **Take pictures**
- **Talk with artists and keep record of that info (place, time, people)**
- **Work day/night**
- **Share the collected information with editor and magazine's readers**

To do her job, usually carries notebooks, camera and cell phone to keep in touch with her editor.

INTERESTS:
Amateur theater actress since she was 23
Travel and merge in different cultures
Architecture

ACTIVITIES:
Did research on ancient Egyptian architecture
Member of the Art Society of NY

TECH EXPERIENCE:
Basic knowledge about operating systems
Uses the Internet frequently either for personal or business purposes

TECH ATTITUDE:
Always open to new technology, but she feels annoyed with complex applications and discards them very often
Tends to feel numb using the latest high-tech gadgets and needs time to get used to them

GOALS & SITUATED BLOGGING NEED:
Needs to keep track of her location and time when she (a) finds and photographs graffiti and street art for her blog and (b) conducts audio interviews of artists and enthusiasts
Needs to have a quick way of keeping track of content gathered from separate locations in order to post articles before editorial deadlines

Personas

Purpose

Empathy: characters to engage and relate to

Focus: can focus on specific people and needs,
versus always attempting to design for everybody

Communication: conveys range of data,
can help make assumptions more explicit

Multiple Types

Primary, Secondary, Supplemental,

Customer, Served, Negative

Personas

Goals

Life Goals: personal aspirations

e.g., to retire before the age of 50

Experience Goals: how to feel with a product

e.g., to be competent while using the product

End Goals: tangible outcomes with a design

e.g., to be updated about finances over last month

Personas

Roles

- Personas do not necessarily equal roles
  - e.g., parent, doctor, programmer, actor
- People can have multiple roles
- People in a role can have different needs and goals
  - e.g., new programmer vs. experienced programmer
  - e.g., parent of 1 vs. parent of 8
  - e.g., oncologist vs. podiatrist

Personas

Critical to avoid using stereotypes as personas

> "The whole point in creating personas is
> to get past our personal opinions and presuppositions."
> Goodwin, 2002

Not a substitute for design research, but a tool for summarizing and conveying that research

- Collect design research data
- Segment people
- Create personas for segments

Personas

Parxat Practical

Primary Motivation to acquire phone:
I got my mobile phone to make calls when I am away from work or home

Associated motivations:
I got a good price on my phone and mobile phones are cheaper than landlines

Personal Profile

"Mobile phones are part of your communications its like eyes and ears"

For Parxat, mobile phones have provided a key way to stay in contact with work, family and friends.

He owns and manages a small computer game club with eight computers. His club does not yet have internet or a landline; however, he would like to add the internet and more computers when he can afford them.

Currently, Parxat maintains all of the computers but knows he may need help with some computer problems in the future. Other club owners that he has known have had to shut down after two to three years because the equipment has broken down and the owners cannot get the old equipment fixed or afford new. Right now he is not sure who he would ask for help if one of his computers needed maintenance that he could not perform himself.

Parxat has always relied heavily on a system of personal recommendations when looking for professional services. He feels that one should *"trust the advice of friends because they are to be trusted."*

Parxat's Goals for MoSoSo Directory

- Would seek recommendations for professional help such as plumbers and computer maintenance
- Would like to create a public recommendation for his computer club
- Groups he would join or create
  - Family
  - Clients from his computer club
  - Friends through work

Key Significant Differences

- **Uses the phone for work calls**
- **Bought his mobile phone (not a gift)**
- **Tech savvy compared to other groups**

Personal Information

Age: 43 years
Profession: Owns and manages computer game club with eight computers
Lives: In the capital city of Bishkek
Home Life: Lives with his wife and two sons
Russian: Can speak and read fluently
Primary Home Language: Kyrgyz
Primary Work Language: Russian
Schooling: He has a degree in economics focused on finance and credit from Kyrgyzstan Slavonic University
Income: 5200 soms a month (approx $140.00)

Technical Information

Internet Use: Yes, at least occasionally
- **Length of use**: 36 months
- **Use how often:** 1-2 days a week
- **Where use:** Most often at a friend's internet cafe

Computer User: Yes
- **How often:** Several times a day at work

Cable or Satellite TV: Yes
Home Landline: Yes

Mobile Phone Use

Length of use: 28 months
How acquired: Bought his phone new
Use how often: Usually a few times a day
For: 60% personal calls, 40% work calls
SMS: Yes: 70% voice, 30% text
Feelings and concerns:
- Concerned that mobile phone activity is monitored
- Would miss his phone very much if he did not have it (rated 4 on a scale of 1-4)
- Feels mobile phone access is too expensive

Primary persona: represents 55% of survey respondents who own mobile phones 1

Shirin Social

Primary Motivation to acquire phone:
I like people to reach me at all times

Associated motivations:
My friends all have mobile phones

Personal Profile

"We just talk to our friends....things like did you hear that this or that happened - in our communication rumors are the official news, and gossip works"

For Shirin, keeping in contact with friends is the most important thing about mobile phones.

She is a full time student (junior) at American University of Central Asia (AUCA), studying business administration. She also works part time as a bartender in a cafe .

Shirin is part of an unregistered student association at school that organizes cultural and historical meetings at a local cafe. She also enjoys arranging parties for her friends.

She is interested in social networking applications on the internet, but has found it boring, stating" *the first time is interesting then you get bored because you already know everybody."*

Shirin's Goals for MoSoSo Directory

- Would use the service most to create groups of friends
- Would like to broadcast messages to particular groups or to tell people where there will be social gatherings
- Would like to retrieve messages from other members of a group
- Groups she would join or create
  - Family
  - Friends from work and school
  - Associations through her unregistered student organization

Key Significant Differences

- **Uses the phone to primarily to call friends**
- **Least likely to feel mobile access is too expensive**
- **Somewhat tech savvy**

Personal Information

Age: 20 years
Profession: Student and works part time as a bartender in a local cafe
Lives: In the capital city of Bishkek
Home Life: Lives with her dad and an older brother. She also has around 30 cousins in towns.
Russian: Can speak and read fluently
Primary Home Language: Kyrgyz
Primary Work Language: Kyrgyz
Schooling: She is a full time student (junior) at the American University of Central Asia studying business administration
Income: 2000 soms a month (approx $55.00)

Technical Information

Internet Use: Yes, at least occasionally
- **Length of use**: 33 months
- **Use how often:** About once a week
- **Where use:** Most often at an internet cafe

Computer User : Yes
- **How often:** A few times a week at school

Cable or Satellite TV: Yes
Home Landline: Yes

Mobile Phone Use

Length of use: 25 months
How acquired: Was given the phone by a cousin
Use how often: Several times a day
For: 80% personal calls, 20% work calls
SMS: Yes: 65% voice, 35% text
Feelings and concerns:
- The least likely of any group to feel that mobile phones are too expensive
- Feels that mobile phones are important to her future career

Primary persona: represents 32% of survey respondents who own mobile phones 2

Roza Replacement

Primary Motivation to acquire phone:
I have no home phone

Associated motivations:
It takes too long to get a home phone

Personal Profile

"There are only so many services provided, but not enough for middle class people... it would be nice if there was the one server that gave the information about everything that was needed for marshukas (buses) and other things."

For Roza, who does not have a landline at home, a mobile phone is a very important device that allows her to stay in contact with her friends and family; however, she would like to see more affordable mobile phone services for "middle class" people like her.

There is only one landline in a community building in her village that closes at 5 PM every day.

While Roza herself is not tech savvy; she does not use the internet or computers. However, she recognizes the importance of technology for her daughters, and would like to have a computer at home while they are in school.

Roza and her husband rely on their friends and family to find specialist to complete services they need. Recently, she needed to find a mechanic and used her social network, stating *"...it's better to find someone through your friends."*

Roza's Goals for MoSoSo Directory

- Would be more likely to seek a recommendation for services than to make one
- Would want to access the service without using text
- Would like to find recommendations for professional services from other members of a group
- Groups she would join
  - Family
  - Neighbors
  - May look in the public area for professional services

Key Significant Differences

- **Least likely to use the phone for work**
- **Lives in a rural area**
- **Not tech savvy**

Personal Information

Age: 35 years
Profession: Housewife - her husband is a driver for an agricultural corporation (for 23 years)
Lives: In Ceragulak, a rural village
Home Life: Lives with her husband, son and two daughters
Russian: Can speak and read Russian
Primary Home Language: Kyrgyz
Primary (Husband's)Work Language: Kyrgyz
Schooling: Completed secondary school
Income: (Husband's income) 4200 soms a month (approx $110.00)

Technical Information

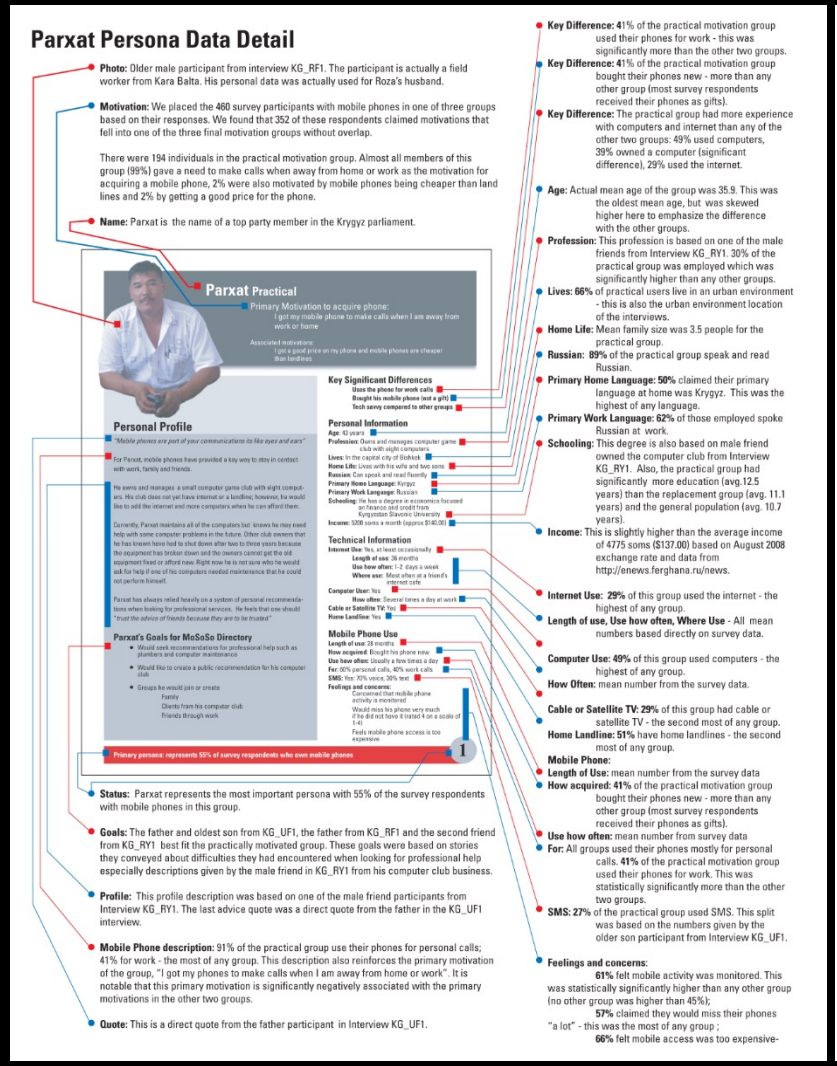
Internet Use?: No
Computer User? : No, but she would like to get a computer for her two daughters who are still in school
Cable or Satellite TV: No
Home Landline: No

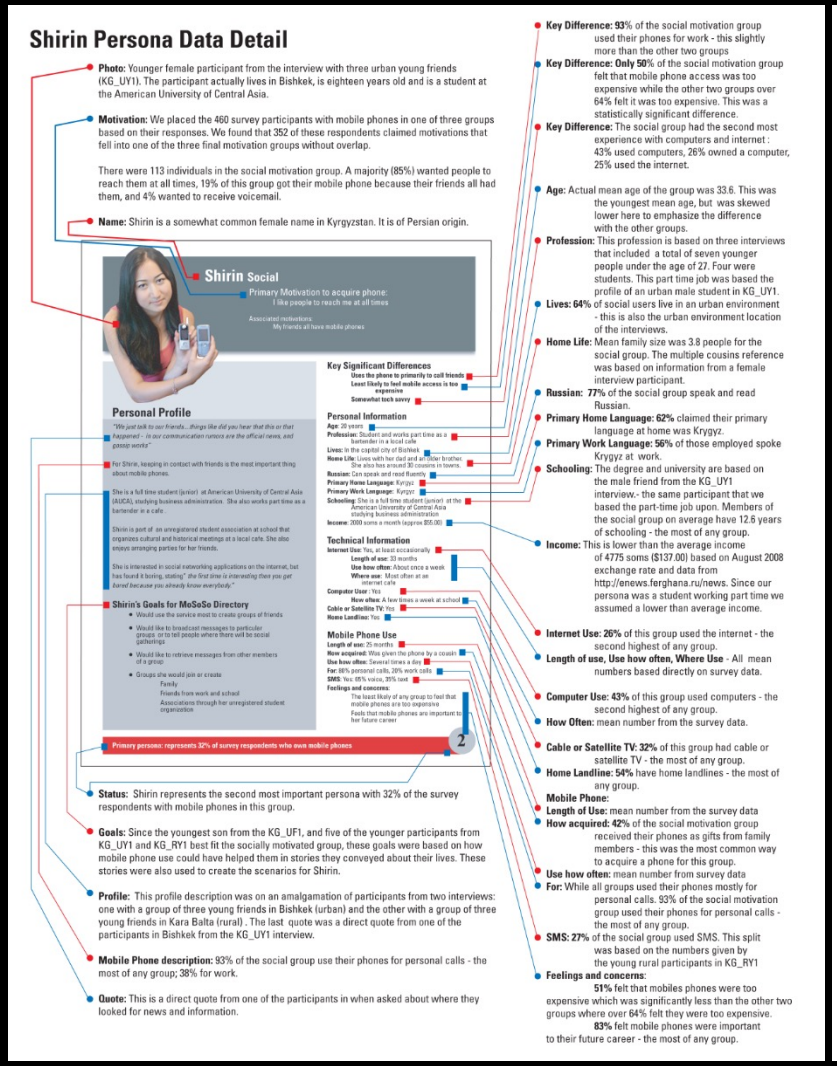
Mobile Phone Use

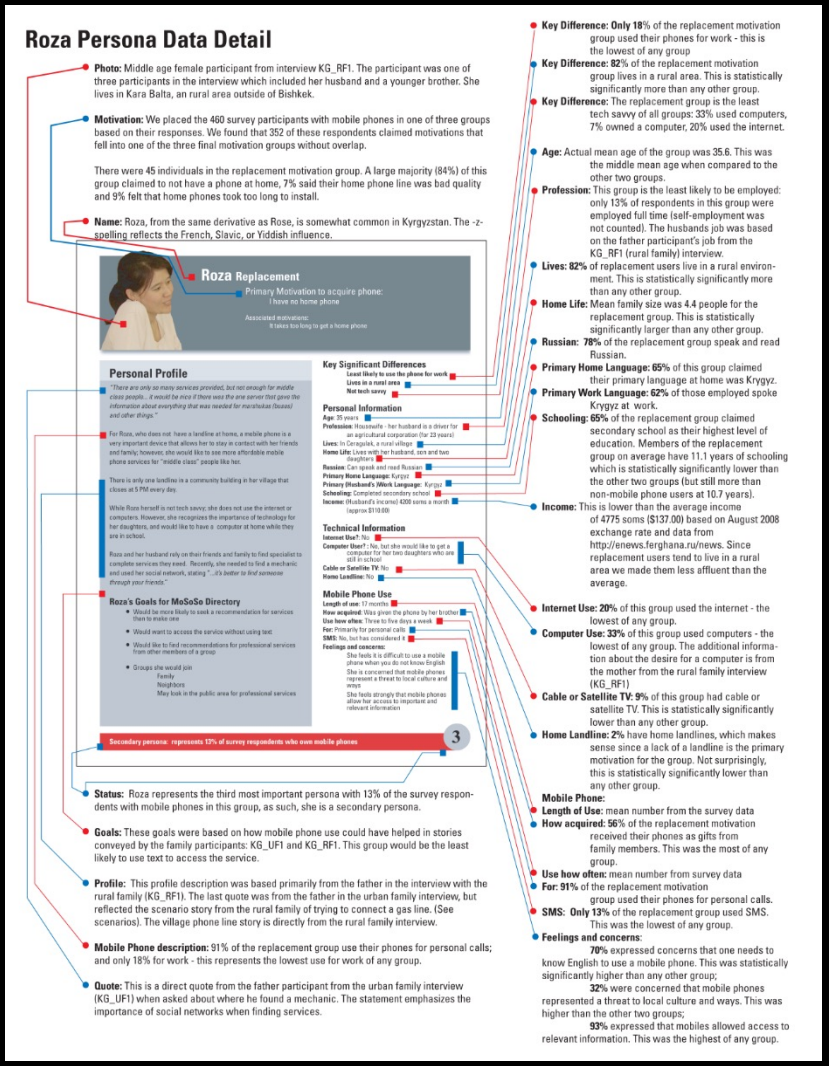
Length of use: 17 months
How acquired: Was given the phone by her brother
Use how often: Three to five days a week
For: Primarily for personal calls
SMS: No, but has considered it
Feelings and concerns:
- She feels it is difficult to use a mobile phone when you do not know English
- She is concerned that mobile phones represent a threat to local culture and ways
- She feels strongly that mobile phones allow her access to important and relevant information

Secondary persona: represents 13% of survey respondents who own mobile phones 3

Personas

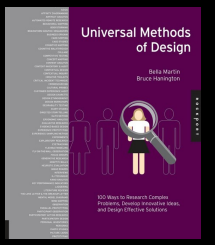

Parxat Persona Data Detail
Photo: Older male participant from interview KG_RF1. The participant is actually a field worker from Kara Balta. His personal data was actually used for Roza's husband.
Motivation: We placed the 460 survey participants with mobile phones in one of three groups based on their responses. We found that 352 of these respondents claimed motivations that fell into one of the three final motivation groups without overlap.
There were 194 individuals in the practical motivation group. Almost all members of this group (99%) gave a need to make calls when away from home or work as the motivation for acquiring a mobile phone, 2% were also motivated by mobile phones being cheaper than land lines and 2% by getting a good price for the phone.
Name: Parxat is the name of a top party member in the Krygyz parliament.
Parxat Practical
Primary Motivation to acquire phone:
I got my mobile phone to make calls when I am away from work or home
Associated motivations:
I get a good price on my phone and mobile phones are cheaper than landlines
Personal Profile
"Mobile phones are part of your communications its like eyes and ears"
For Parxat, mobile phones have provided a key way to stay in contact with work, family and friends.
He owns and manages a small computer game club with eight computers. His club does not yet have internet or a landline; however, he would like to add the internet and more computers when he can afford them.
Currently, Parxat maintains all of the computers but knows he may need help with some computer problems in the future. Other club owners that he has known have had to shut down after two to three years because the equipment has broken down and the owners cannot get the old equipment fixed or afford new. Right now he is not sure who he would ask for help if one of his computers needed maintenance that he could not perform himself.
Parxat has always relied heavily on a system of personal recommendations when looking for professional services. He feels that one should "trust the advice of friends because they are to be trusted."
Parxat's Goals for MoSoSo Directory
Would seek recommendations for professional help such as plumbers and computer maintenance
Would like to create a public recommendation for his computer club
Groups he would join or create
Family
Clients from his computer club
Friends through work
Key Significant Differences
Uses the phone for work calls
Bought his mobile phone (not a gift)
Tech savvy compared to other groups
Personal Information
Age: 40 years
Profession: Owns and manages computer game club with eight computers
Lives: In the capital city of Bishkek
Home Life: Lives with his wife and two sons
Russian: Can speak and read fluently
Primary Home Language: Kyrgyz
Primary Work Language: Russian
Schooling: He has a degree in economics focused on finance and credit from Kyrgyzstan Slavonic University
Income: 5200 soms a month (approx $140.00)
Technical Information
Internet Use: Yes, at least occasionally
Length of use: 36 months
Use how often: 1-2 days a week
Where use: Most often at a friend's internet cafe
Computer User: Yes
How often: Several times a day at work
Cable or Satellite TV: Yes
Home Landline: Yes
Mobile Phone Use
Length of use: 28 months
How acquired: Bought his phone new
Use how often: Usually a few times a day
For: 90% personal calls, 40% work calls
SMS: few 70% voice, 30% text
Feelings and concerns:
Concerned that mobile phone activity is monitored
Would miss his phone very much if he did not have it (rated 4 on a scale of 1-4)
Feels mobile phone access is too expensive
Primary persona: represents 55% of survey respondents who own mobile phones
1
Status: Parxat represents the most important persona with 55% of the survey respondents with mobile phones in this group.
Goals: The father and oldest son from KG_UF1, the father from KG_RF1 and the second friend from KG_RY1 best fit the practically motivated group. These goals were based on stories they conveyed about difficulties they had encountered when looking for professional help especially descriptions given by the male friend in KG_RY1 from his computer club business.
Profile: This profile description was based on one of the male friend participants from Interview KG_RY1. The last advice quote was a direct quote from the father in the KG_UF1 interview.
Mobile Phone description: 91% of the practical group use their phones for personal calls; 41% for work - the most of any group. This description also reinforces the primary motivation of the group, "I got my phones to make calls when I am away from home or work". It is notable that this primary motivation is significantly negatively associated with the primary motivations in the other two groups.
Quote: This is a direct quote from the father participant in Interview KG_UF1.
Key Difference: 41% of the practical motivation group used their phones for work - this was significantly more than the other two groups.
Key Difference: 41% of the practical motivation group bought their phones new - more than any other group (most survey respondents received their phones as gifts).
Key Difference: The practical group had more experience with computers and internet than any of the other two groups: 49% used computers, 39% owned a computer (significant difference), 29% used the internet.
Age: Actual mean age of the group was 35.9. This was the oldest mean age, but was skewed higher here to emphasize the difference with the other groups.
Profession: This profession is based on one of the male friends from Interview KG_RY1. 30% of the practical group was employed which was significantly higher than any other groups.
Lives: 66% of practical users live in an urban environment - this is also the urban environment location of the interviews.
Home Life: Mean family size was 3.5 people for the practical group.
Russian: 89% of the practical group speak and read Russian.
Primary Home Language: 50% claimed their primary language at home was Krygyz. This was the highest of any language.
Primary Work Language: 62% of those employed spoke Russian at work.
Schooling: This degree is also based on male friend owned the computer club from Interview KG_RY1. Also, the practical group had significantly more education (avg.12.5 years) than the replacement group (avg. 11.1 years) and the general population (avg. 10.7 years).
Income: This is slightly higher than the average income of 4775 soms ($137.00) based on August 2008 exchange rate and data from http://enews.ferghana.ru/news.
Internet Use: 29% of this group used the internet - the highest of any group.
Length of use, Use how often, Where Use - All mean numbers based directly on survey data.
Computer Use: 49% of this group used computers - the highest of any group.
How Often: mean number from the survey data.
Cable or Satellite TV: 29% of this group had cable or satellite TV - the second most of any group.
Home Landline: 51% have home landlines - the second most of any group.
Mobile Phone:
Length of Use: mean number from the survey data
How acquired: 41% of the practical motivation group bought their phones new - more than any other group (most survey respondents received their phones as gifts).
Use how often: mean number from survey data
For: All groups used their phones mostly for personal calls. 41% of the practical motivation group used their phones for work. This was statistically significantly more than the other two groups.
SMS: 27% of the practical group used SMS. This split was based on the numbers given by the older son participant from Interview KG_UF1.
Feelings and concerns:
61% felt mobile activity was monitored. This was statistically significantly higher than any other group (no other group was higher than 45%);
57% claimed they would miss their phones "a lot" - this was the most of any group ;
66% felt mobile access was too expensive-


Shirin Persona Data Detail
Photo: Younger female participant from the interview with three urban young friends (KG_UY1). The participant actually lives in Bishkek, is eighteen years old and is a student at the American University of Central Asia.
Motivation: We placed the 460 survey participants with mobile phones in one of three groups based on their responses. We found that 352 of these respondents claimed motivations that fell into one of the three final motivation groups without overlap.
There were 113 individuals in the social motivation group. A majority (85%) wanted people to reach them at all times, 19% of this group got their mobile phone because their friends all had them, and 4% wanted to receive voicemail.
Name: Shirin is a somewhat common female name in Kyrgyzstan. It is of Persian origin.
Shirin Social
Primary Motivation to acquire phone:
I like people to reach me at all times
Associated motivations:
My friends all have mobile phones
Personal Profile
"We just talk to our friends...things like did you hear that this or that happened - In our communication rumors are the official news, and gossip works"
For Shirin, keeping in contact with friends is the most important thing about mobile phones.
She is a full time student (junior) at American University of Central Asia (AUCA), studying business administration. She also works part-time as a bartender in a cafe.
Shirin is part of an unregistered student association at school that organizes cultural and historical meetings at a local cafe. She also enjoys arranging parties for her friends.
She is interested in social networking applications on the internet, but has found it boring, stating" the first time is interesting then you get bored because you already know everybody."
Shirin's Goals for MoSoSo Directory
Would use the service most to create groups of friends
Would like to broadcast messages to particular groups or to tell people where there will be social gatherings
Would like to retrieve messages from other members of a group
Groups she would join or create
Family
Friends from work and school
Associations through her unregistered student organization
Key Significant Differences
Uses the phone to primarily to call friends
Least likely to feel mobile access is too expensive
Somewhat tech savvy
Personal Information
Age: 29 years
Profession: Student and works part time as a bartender in a local cafe
Lives: In the capital city of Bishkek
Home Life: Lives with her dad and an older brother. She also has around 30 cousins in towns.
Russian: Can speak and read fluently
Primary Home Language: Kyrgyz
Primary Work Language: Kyrgyz
Schooling: She is a full time student (junior) at the American University of Central Asia studying business administration
Income: 2000 soms a month (approx $55.00)
Technical Information
Internet Use: Yes, at least occasionally
Length of use: 33 months
Use how often: About once a week
Where use: Most often at an internet cafe
Computer User: Yes
How often: A few times a week at school
Cable or Satellite TV: Yes
Home Landline: Yes
Mobile Phone Use
Length of use: 25 months
How acquired: Was given the phone by a cousin
Use how often: Several times a day
For: 86% personal calls, 20% work calls
SMS: Yes 85% voice, 35% text
Feelings and concerns:
The least likely of any group to feel that mobile phones are too expensive
Feels that mobile phones are important to her future career
Primary persona: represents 32% of survey respondents who own mobile phones
2
Status: Shirin represents the second most important persona with 32% of the survey respondents with mobile phones in this group.
Goals: Since the youngest son from the KG_UF1, and five of the younger participants from KG_UY1 and KG_RY1 best fit the socially motivated group, these goals were based on how mobile phone use could have helped them in stories they conveyed about their lives. These stories were also used to create the scenarios for Shirin.
Profile: This profile description was on an amalgamation of participants from two interviews: one with a group of three young friends in Bishkek (urban) and the other with a group of three young friends in Kara Balta (rural) . The last quote was a direct quote from one of the participants in Bishkek from the KG_UY1 interview.
Mobile Phone description: 93% of the social group use their phones for personal calls - the most of any group; 38% for work.
Quote: This is a direct quote from one of the participants in when asked about where they looked for news and information.
Key Difference: 93% of the social motivation group used their phones for work - this slightly more than the other two groups
Key Difference: Only 50% of the social motivation group felt that mobile phone access was too expensive while the other two groups over 64% felt it was too expensive. This was a statistically significant difference.
Key Difference: The social group had the second most experience with computers and internet : 43% used computers, 26% owned a computer, 25% used the internet.
Age: Actual mean age of the group was 33.6. This was the youngest mean age, but was skewed lower here to emphasize the difference with the other groups.
Profession: This profession is based on three interviews that included a total of seven younger people under the age of 27. Four were students. This part time job was based the profile of an urban male student in KG_UY1.
Lives: 64% of social users live in an urban environment - this is also the urban environment location of the interviews.
Home Life: Mean family size was 3.8 people for the social group. The multiple cousins reference was based on information from a female interview participant.
Russian: 77% of the social group speak and read Russian.
Primary Home Language: 62% claimed their primary language at home was Krygyz.
Primary Work Language: 56% of those employed spoke Krygyz at work.
Schooling: The degree and university are based on the male friend from the KG_UY1 interview.- the same participant that we based the part-time job upon. Members of the social group on average have 12.6 years of schooling - the most of any group.
Income: This is lower than the average income of 4775 soms ($137.00) based on August 2008 exchange rate and data from http://enews.ferghana.ru/news. Since our persona was a student working part time we assumed a lower than average income.
Internet Use: 26% of this group used the internet - the second highest of any group.
Length of use, Use how often, Where Use - All mean numbers based directly on survey data.
Computer Use: 43% of this group used computers - the second highest of any group.
How Often: mean number from the survey data.
Cable or Satellite TV: 32% of this group had cable or satellite TV - the most of any group.
Home Landline: 54% have home landlines - the most of any group.
Mobile Phone:
Length of Use: mean number from the survey data
How acquired: 42% of the social motivation group received their phones as gifts from family members - this was the most common way to acquire a phone for this group.
Use how often: mean number from survey data
For: While all groups used their phones mostly for personal calls. 93% of the social motivation group used their phones for personal calls - the most of any group.
SMS: 27% of the social group used SMS. This split was based on the numbers given by the young rural participants in KG_RY1
Feelings and concerns:
51% felt that mobiles phones were too expensive which was significantly less than the other two groups where over 64% felt they were too expensive.
83% felt mobile phones were important to their future career - the most of any group.


Roza Persona Data Detail
Photo: Middle age female participant from interview KG_RF1. The participant was one of three participants in the interview which included her husband and a younger brother. She lives in Kara Balta, an rural area outside of Bishkek.
Motivation: We placed the 460 survey participants with mobile phones in one of three groups based on their responses. We found that 352 of these respondents claimed motivations that fell into one of the three final motivation groups without overlap.
There were 45 individuals in the replacement motivation group. A large majority (84%) of this group claimed to not have a phone at home, 7% said their home phone line was bad quality and 9% felt that home phones took too long to install.
Name: Roza, from the same derivative as Rose, is somewhat common in Kyrgyzstan. The -z- spelling reflects the French, Slavic, or Yiddish influence.
Roza Replacement
Primary Motivation to acquire phone:
I have no home phone
Associated motivations:
It takes too long to get a home phone
Personal Profile
"There are only so many sciences provided, but not enough for middle class people...it would be nice if there was the one server that gave the information about everything that was needed for mainstream (busses) and other things."
For Roza, who does not have a landline at home, a mobile phone is a very important device that allows her to stay in contact with her friends and family; however, she would like to see more affordable mobile phone services for "middle class" people like her.
There is only one landline in a community building in her village that closes at 5 PM every day.
While Roza herself is not tech savvy; she does not use the internet or computers. However, she recognizes the importance of technology for her daughters, and would like to have a computer at home while they are in school.
Roza and her husband rely on their friends and family to find specialist to complete services they need. Recently, she needed to find a mechanic and used her social network, stating "...it's better to find someone through your friends."
Reza's Goals for MoSoSo Directory
Would be more likely to seek a recommendation for services then to make one
Would want to access the service without using text
Would like to find recommendations for professional services from other members of a group
Groups she would join
Family
Neighbors
May look in the public area for professional services
Key Significant Differences
Least likely to use the phone for work
Lives in a rural area
Not tech savvy
Personal Information
Age: 35 years
Profession: Housewife - her husband is a driver for an agricultural corporation (for 23 years)
Lives: In Ceragolek, a rural village
Home Life: Lives with her husband, son and two daughters
Russian: Can speak and read Russian
Primary Home Language: Kyrgyz
Primary (Husband's)Work Language: Kyrgyz
Schooling: Competent secondary school
Income: (Husband's Income) 4200 soms a month (approx $119.00)
Technical Information
Internet Use?: No
Computer User?: No, but she would like to get a computer for her two daughters who are still in school
Cable or Satellite TV: No
Home Landline: No
Mobile Phone Use
Length of use: 17 months
How acquired: Was given the phone by her brother
Use how often: Three to five days a week
For: Primarily for personal calls
SMS: No, but has considered it
Feelings and concerns:
She feels it is difficult to use a mobile phone when you do not know English
She is concerned that mobile phones represent a threat to local culture and ways
She feels strongly that mobile phones allow her access to important and relevant information
Secondary persona: represents 13% of survey respondents who own mobile phones
3
Status: Roza represents the third most important persona with 13% of the survey respondents with mobile phones in this group, as such, she is a secondary persona.
Goals: These goals were based on how mobile phone use could have helped in stories conveyed by the family participants: KG_UF1 and KG_RF1. This group would be the least likely to use text to access the service.
Profile: This profile description was based primarily from the father in the interview with the rural family (KG_RF1). The last quote was from the father in the urban family interview, but reflected the scenario story from the rural family of trying to connect a gas line. (See scenarios). The village phone line story is directly from the rural family interview.
Mobile Phone description: 91% of the replacement group use their phones for personal calls; and only 18% for work - this represents the lowest use for work of any group.
Quote: This is a direct quote from the father participant from the urban family interview (KG_UF1) when asked about where he found a mechanic. The statement emphasizes the importance of social networks when finding services.
Key Difference: Only 18% of the replacement motivation group used their phones for work - this is the lowest of any group
Key Difference: 82% of the replacement motivation group lives in a rural area. This is statistically significantly more than any other group.
Key Difference: The replacement group is the least tech savvy of all groups: 33% used computers, 7% owned a computer, 20% used the internet.
Age: Actual mean age of the group was 35.6. This was the middle mean age when compared to the other two groups.
Profession: This group is the least likely to be employed: only 13% of respondents in this group were employed full time (self-employment was not counted). The husbands job was based on the father participant's job from the KG_RF1 (rural family) interview.
Lives: 82% of replacement users live in a rural environment. This is statistically significantly more than any other group.
Home Life: Mean family size was 4.4 people for the replacement group. This is statistically significantly larger than any other group.
Russian: 78% of the replacement group speak and read Russian.
Primary Home Language: 65% of this group claimed their primary language at home was Krygyz.
Primary Work Language: 62% of those employed spoke Krygyz at work.
Schooling: 65% of the replacement group claimed secondary school as their highest level of education. Members of the replacement group on average have 11.1 years of schooling which is statistically significantly lower than the other two groups (but still more than non-mobile phone users at 10.7 years).
Income: This is lower than the average income of 4775 soms ($137.00) based on August 2008 exchange rate and data from http://enews.ferghana.ru/news. Since replacement users tend to live in a rural area we made them less affluent than the average.
Internet Use: 20% of this group used the internet - the lowest of any group.
Computer Use: 33% of this group used computers - the lowest of any group. The additional information about the desire for a computer is from the mother from the rural family interview (KG_RF1)
Cable or Satellite TV: 9% of this group had cable or satellite TV. This is statistically significantly lower than any other group.
Home Landline: 2% have home landlines, which makes sense since a lack of a landline is a primary motivation for the group. Not surprisingly, this is statistically significantly lower than any other group.
Mobile Phone:
Length of Use: mean number from the survey data
How acquired: 56% of the replacement motivation received their phones as gifts from family members. This was the most of any group.
Use how often: mean number from survey data
For: 91% of the replacement motivation group used their phones for personal calls.
SMS: Only 13% of the replacement group used SMS. This was the lowest of any group.
Feelings and concerns:
70% expressed concerns that one needs to know English to use a mobile phone. This was statistically significantly higher than any other group;
32% were concerned that mobile phones represented a threat to local culture and ways. This was higher than the other two groups;
93% expressed that mobiles allowed access to relevant information. This was the highest of any group.

Combine with Other Methods

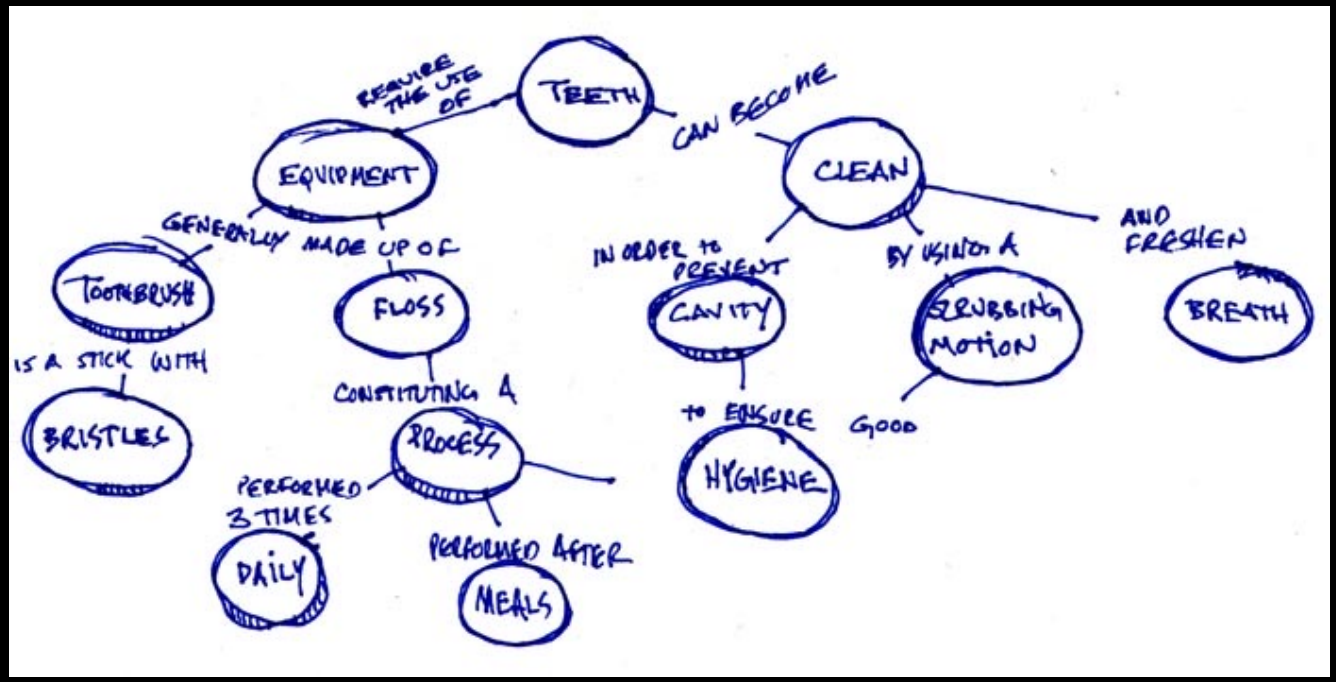
Method 16



Personas

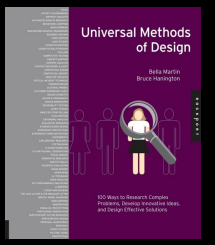
Concept Mapping

Competitive Analysis



Combine with Other Methods

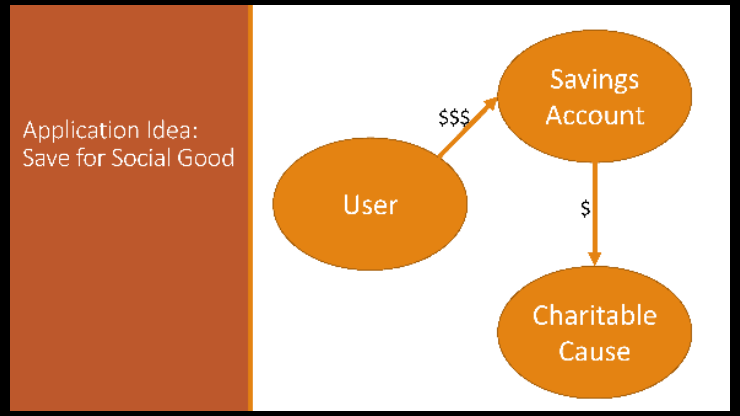
Method 16

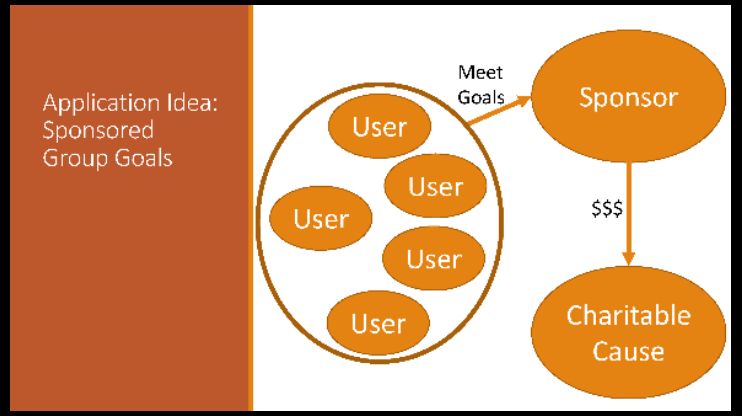


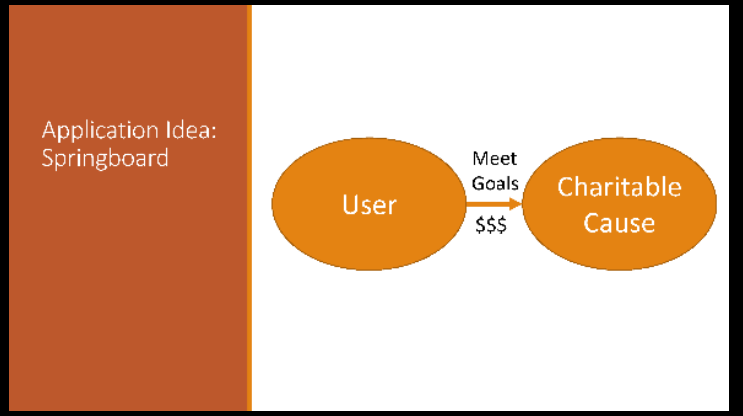
Personas

Concept Mapping

Competitive Analysis

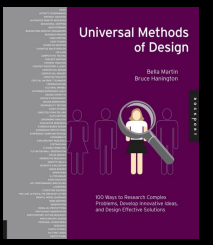






Combine with Other Methods

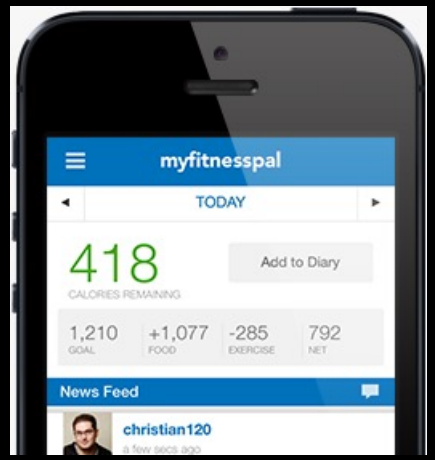
Method 15

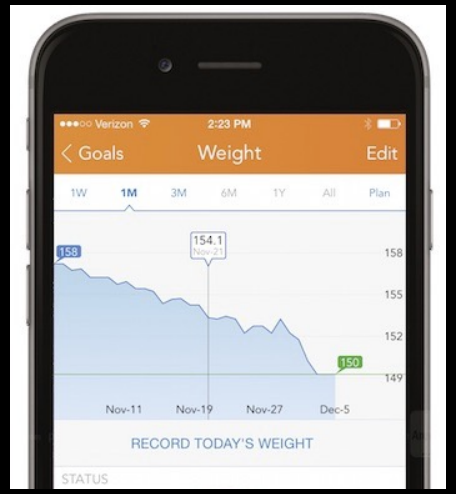


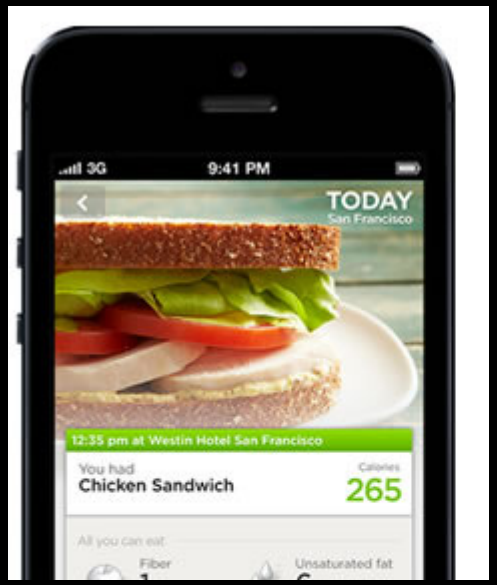
Personas

Concept Mapping

Competitive Analysis







Tasks & Your Projects

Selecting Tasks

Real tasks people have faced or requested
- as supported by your design research
- collect any necessary materials

Should provide reasonable coverage
- compare check list of functions to tasks

Mixture of simple and complex tasks
- easy tasks (common or introductory)
- moderate tasks
- difficult tasks (infrequent or for power use)

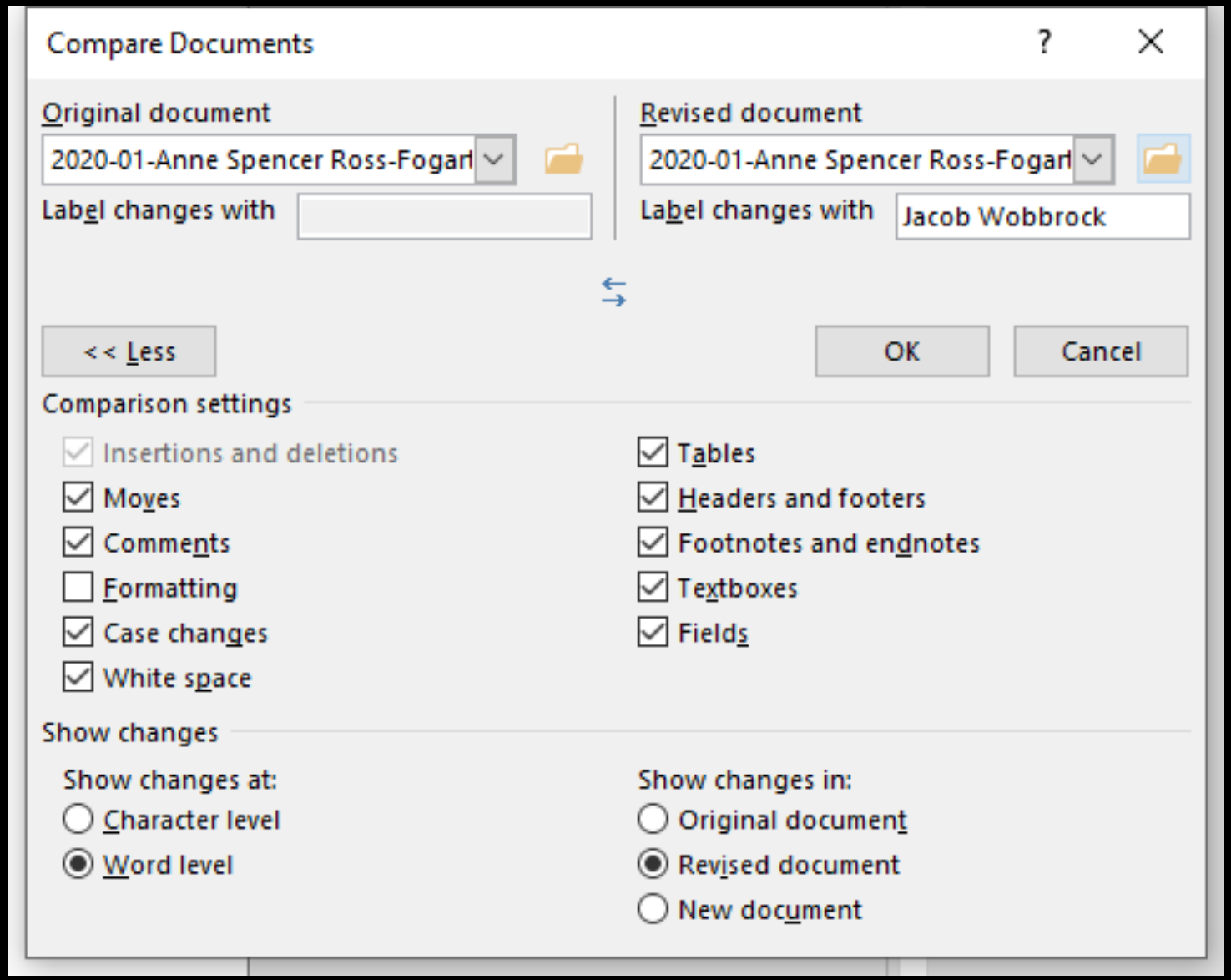
Easy / Moderate / Hard Tasks:
Not Required, Could be Useful

What Should Tasks Look Like?

- Say what person wants to do, but not how
  - allows comparing different design alternatives
- Be specific, stories based in concrete facts
  - say who person is (e.g., using personas or profiles)
    - design can really differ depending on who
    - give ‘names’ (allows referring back with more info later)
    - characteristics of person (e.g., job, expertise)
  - story forces us to fill in description with details
- Sometimes describe a complete “accomplishment”
  - forces us to consider how features work together

filename task example

File Name Example



Task: Park in a New Neighborhood

Peter is going to brunch on a Sunday with his roommates at a **new place he found on Yelp**. He has the address for the place and he is using his phone's GPS for directions, but the restaurant doesn't have a parking lot and he will need to find somewhere to park.

The restaurant is very popular, so the whole party needs to be there promptly at 10am for their reservation. He also doesn't want to have to walk very far from where he parks to the restaurant, because the weather is awful today. He drives a modest mid-sized sedan and is comfortable parking on the street or in a garage, though he would like to not have to pay much for parking since brunch is already going to be so expensive.

Goal: Find somewhere to park

Task: Park in a New Neighborhood

Peter is going to brunch on a Sunday with his roommates at a **new place he found on Yelp**. He has the address for the place and he is using his phone's GPS for directions, but the restaurant doesn't have a parking lot and **he will need to find somewhere to park.**

The restaurant is very popular, so **the whole party needs to be there promptly at 10am** for their reservation. He also doesn't want to have to walk very far from where he parks to the restaurant, because the weather is awful today. He drives a modest mid-sized sedan and is comfortable parking on the street or in a garage, though he would like to not have to pay much for parking since brunch is already going to be so expensive.

Goal: Find somewhere to park

Constraints:

- Does not know the area
- Needs it to be quick

Task: Park in a New Neighborhood

Peter is going to brunch on a Sunday with his roommates at a **new place he found on Yelp**. He has the address for the place and he is using his phone's GPS for directions, but the restaurant doesn't have a parking lot and **he will need to find somewhere to park.**

The restaurant is very popular, so **the whole party needs to be there promptly at 10am** for their reservation. He also **doesn't want to have to walk very far from where he parks to the restaurant**, because the weather is awful today. He drives a modest mid-sized sedan and is comfortable parking on the street or in a garage, though he **would like to not have to pay much for parking** since brunch is already going to be so expensive.

Goal: Find somewhere to park

Constraints:

- Does not know the area
- Needs it to be quick

Preferences:

- Proximity to final destination
- Not expensive

Task: Park in a New Neighborhood

Peter is going to brunch on a Sunday with his roommates at a **new place he found on Yelp**. He has the address for the place and he is **using his phone's GPS for directions**, but the restaurant doesn't have a parking lot and **he will need to find somewhere to park.**

The restaurant is very popular, so **the whole party needs to be there promptly at 10am** for their reservation. He also **doesn't want to have to walk very far from where he parks to the restaurant**, because the weather is awful today. He drives a modest mid-sized sedan and **is comfortable parking on the street or in a garage**, though he **would like to not have to pay much for parking** since brunch is already going to be so expensive.

Goal: Find somewhere to park

Constraints:
- Does not know the area
- Needs it to be quick

Preferences:
- Proximity to final destination
- Not expensive

Things that aren't Constraints:
- Doesn't need special parking
- Fine parking in any type of spot

Additional Context:
- Has Phone & GPS Access

Hierarchical Task Analysis

Steps of the task execution (detailed in a hierarchy)

Hierarchical Task Analysis

Steps of the task execution (detailed in a hierarchy)

Or step back a level and motivate ridesharing

Using Tasks in Design

Rough out an interface design

- discard features that do not support your tasks
  - or add a real task that exercises that feature
- major elements and functions, not too detailed
- hand sketched

Produce scenarios for each task

- what person does and what they see
- step-by-step performance of task
- illustrate using storyboards

Scenarios

Scenarios are design specific, tasks are not

Scenarios force us to

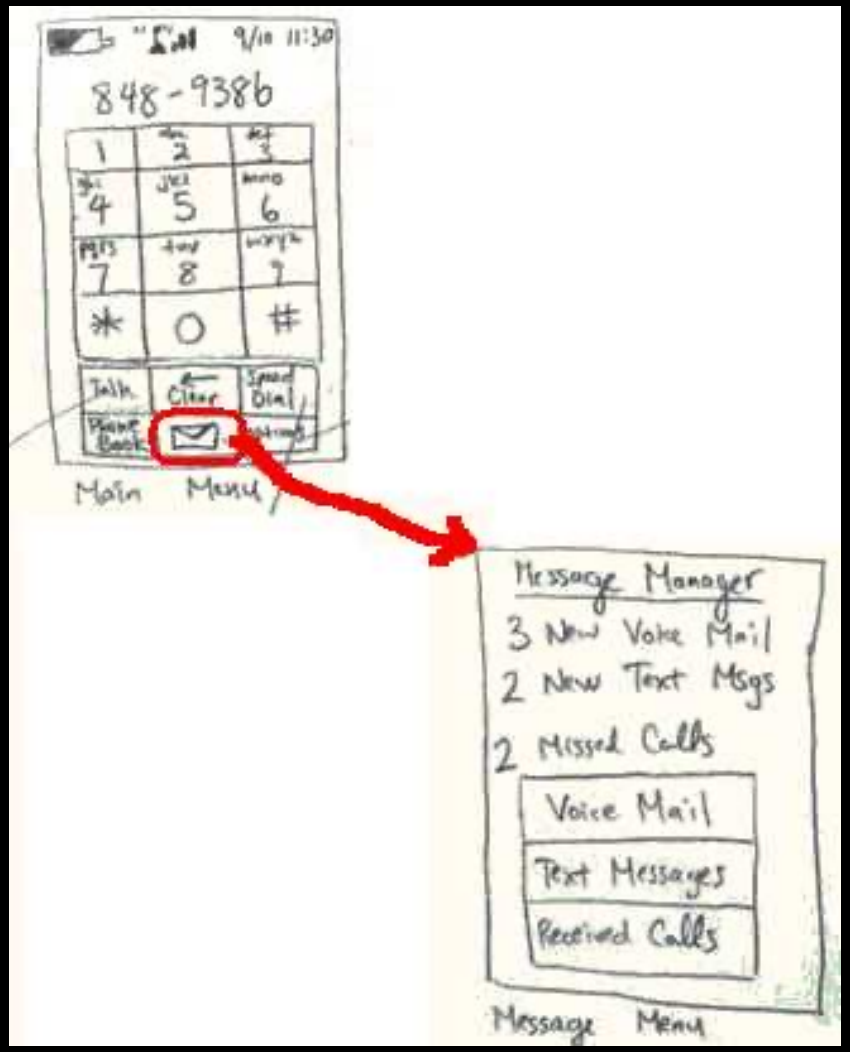
show how things work together

settle arguments with examples

but these are only examples, and may need to look beyond flaws

Show people storyboards

topic for next Tuesday



Tasks, Personas, and Scenarios

Task: a design-agnostic objective

Persona: a fictional person with a backstory

Scenario: narrative that demonstrates a persona completing a task using a particular design

Use Case: in software engineering, describes requirements using one or more scenarios

Tasks in Your Projects

Say what is accomplished, not how

Real tasks that people currently encounter,
or new tasks your design will enable

Reasonable coverage of the interesting aspects
of your problem and your design space

Range of difficulty and complexity

- Park in a New Neighborhood (near the zoo)
- Park in a New Neighborhood (Friday night in Ballard)
- Park in a New Neighborhood (at the airport)

Models & Human Performance

Objectives

Describe an interaction in terms of a model, such as Norman's Execution-Evaluation Cycle or Buxton's 3-State Model

Describe properties of the human perceptual system that impact interaction

Use the Model Human Processor to describe simple human performance phenomena

Describe what Fitts's Law models, how terms in the model impact interaction, how the model can be used in low-level and higher-level interaction design

Describe the Gestalt perspective on human perception

These are Examples of What?

Popsicle-stick bridge

$x = x_0 + v_0t + ½ at^2$

ACT-R

Goffman's Negotiated Approach

Norman's Execution-Evaluation Cycle

Naomi Campbell

These are Examples of What?

Popsicle-stick bridge

$x = x_0 + v_0t + \frac{1}{2} at^2$

ACT-R

Goffman's Negotiated Approach

Norman's Execution-Evaluation Cycle

Naomi Campbell

MODELS!

Models

Models describe phenomena,
isolating components and allowing a closer look

Today is a closer look at modeling humans

- Capture essential pieces
  - Model should have what it needs but no more
    Thus avoid underfitting or overfitting model
- Allow us to measure
  - Collect data, put in model, compare model terms
- Allow us to predict
  - The better the model, the better the predictions

Models of Interaction

Models of interaction allow a closer look

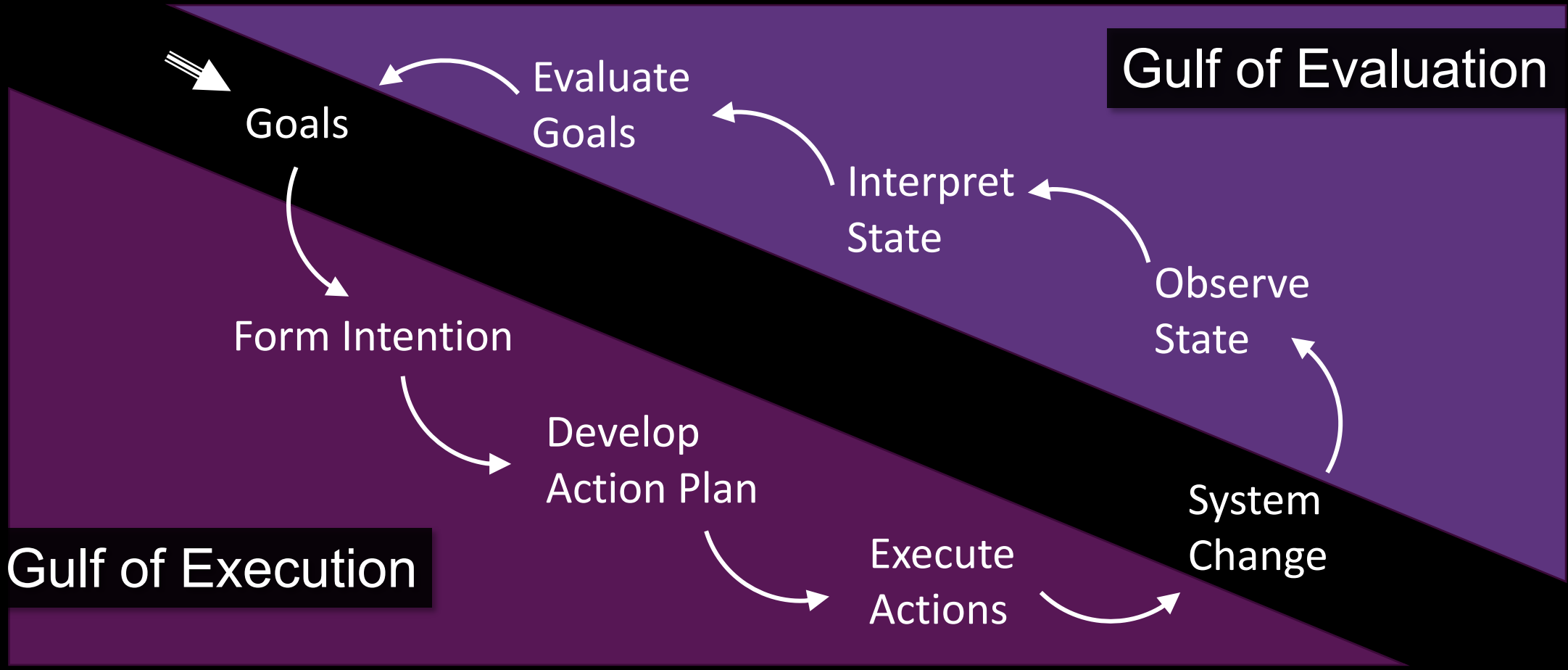
- Define and describe an interaction
- Isolate areas where problems occur
- Design new interaction

Two examples at different scales

- Norman's Execution-Evaluation Cycle
- Buxton's 3-State Model

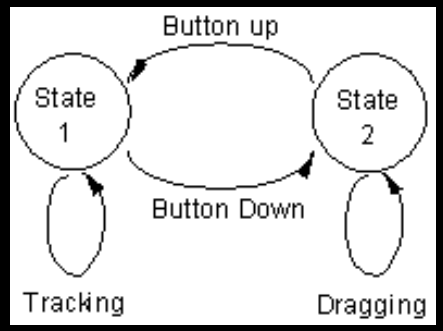
"All models are wrong, but some are useful"
George Box

Norman's Execution-Evaluation Cycle

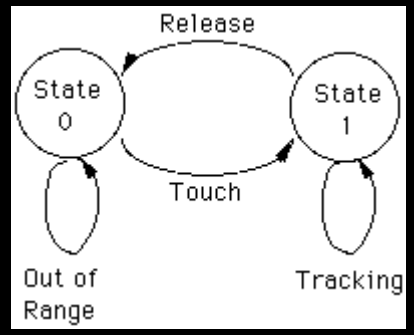


Buxton's 3-State Model

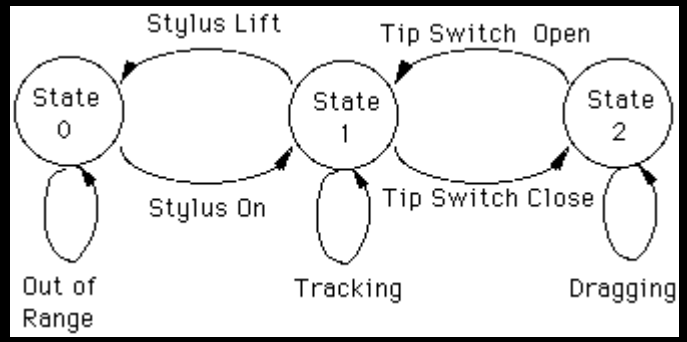
Mouse



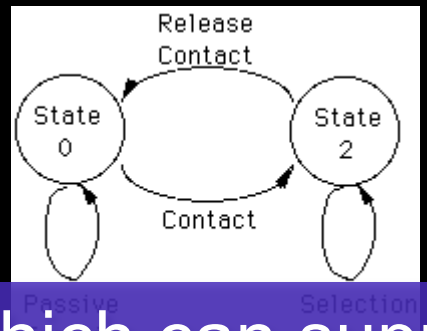
Touchpad



Stylus



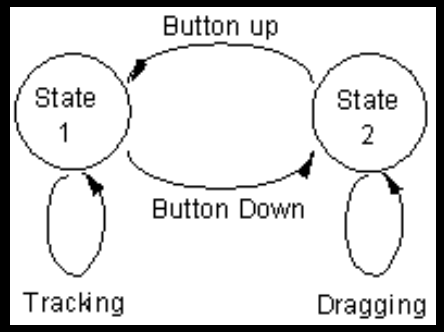
Touch Screen



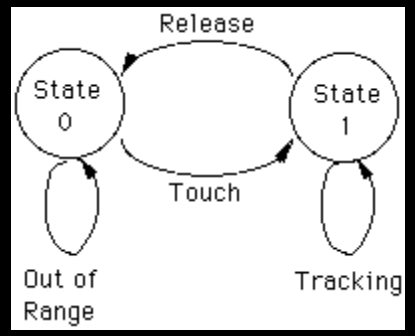
Which can support tooltip previews?

Buxton's 3-State Model

Mouse

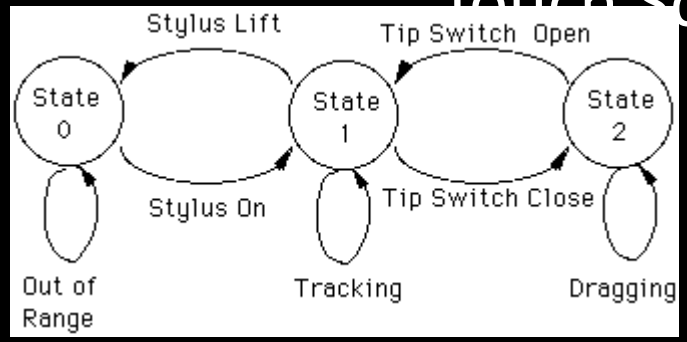


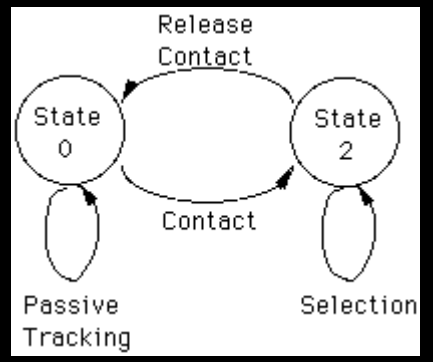
Touchpad



Stylus

Touch Screen





Which can support tooltip previews?

Creating a Model

How would you go about creating a model?

One approach:

- Observe, Collect Data, Find Patterns,
- Draw Analogies, Devise Model,
- Test Fit to Data, Test Predictions, Revise

Fundamentally an inductive process

- From specific observations
  to broader generalization

Models from Different Perspectives

Some example models of human performance

Visual System	Biological Model
Model Human Processor	Higher-Level Model
Fitts's Law	Model by Analogy
Gestalt Principles	Predict Interpretation

Models from Different Perspectives

Some example models of human performance

Visual System

Model Human Processor

Fitts's Law

Gestalt Principles

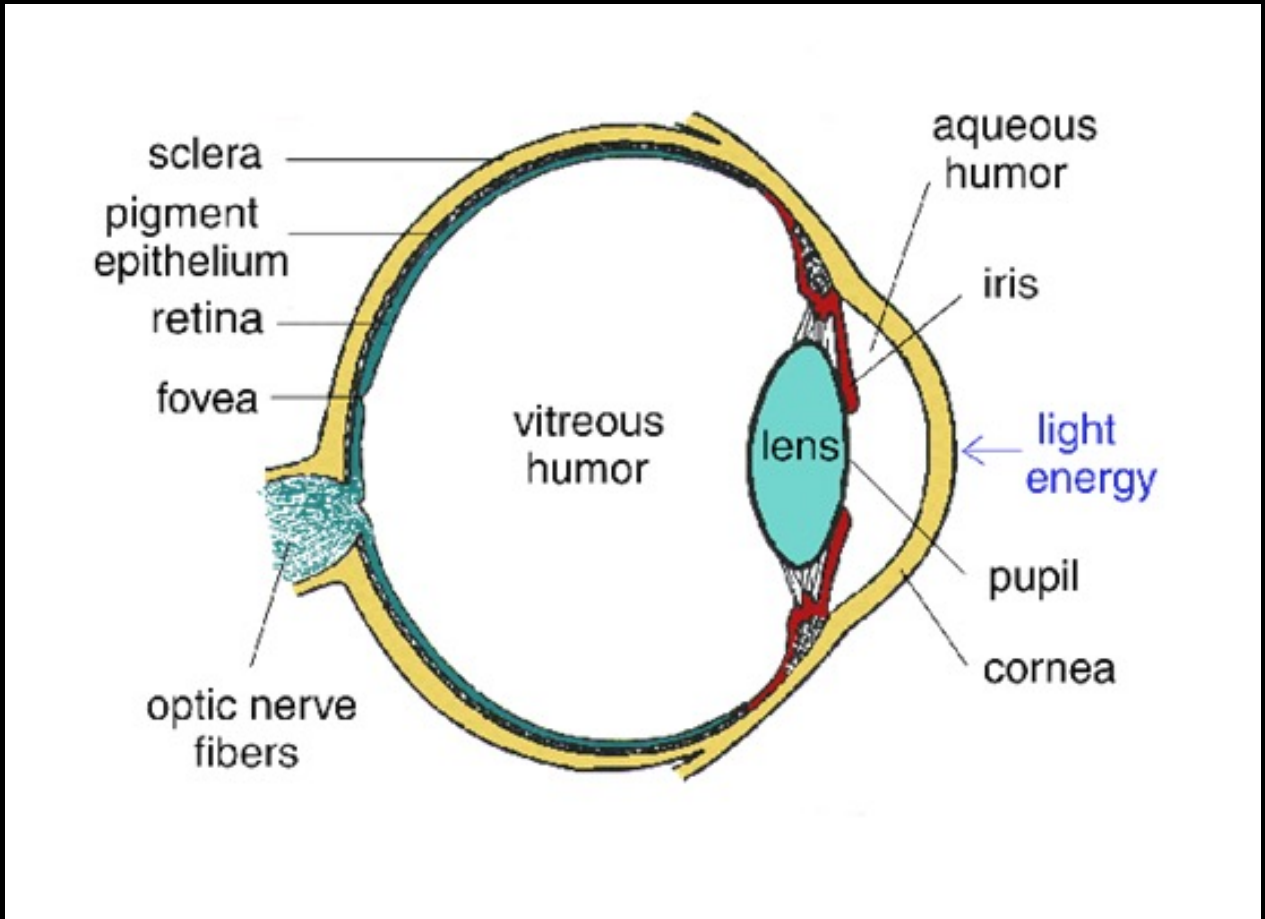
Biological Model

Higher-Level Model

Model by Analogy

Predict Interpretation

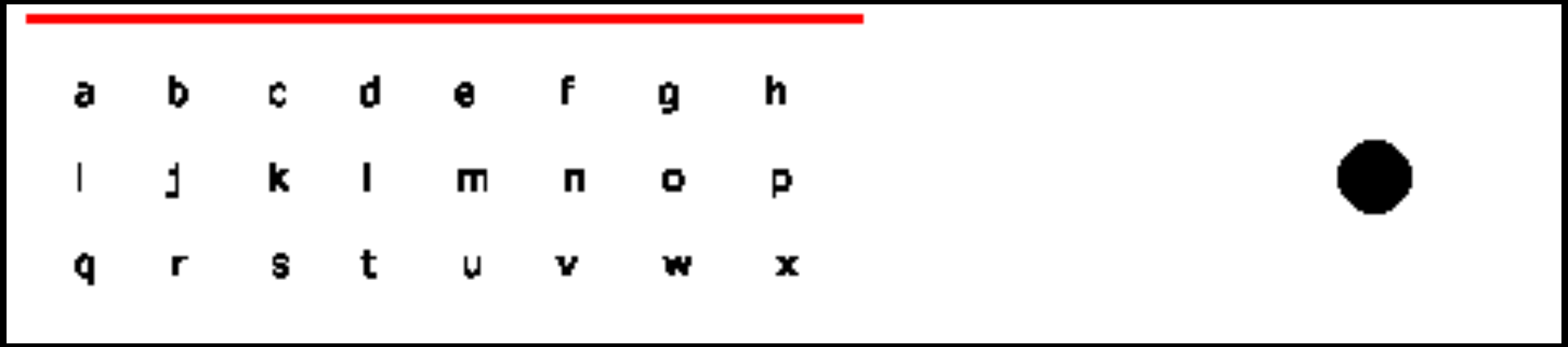
Human Visual System



Light passes through lens, focused on retina

Blind Spot?

Blind Spot

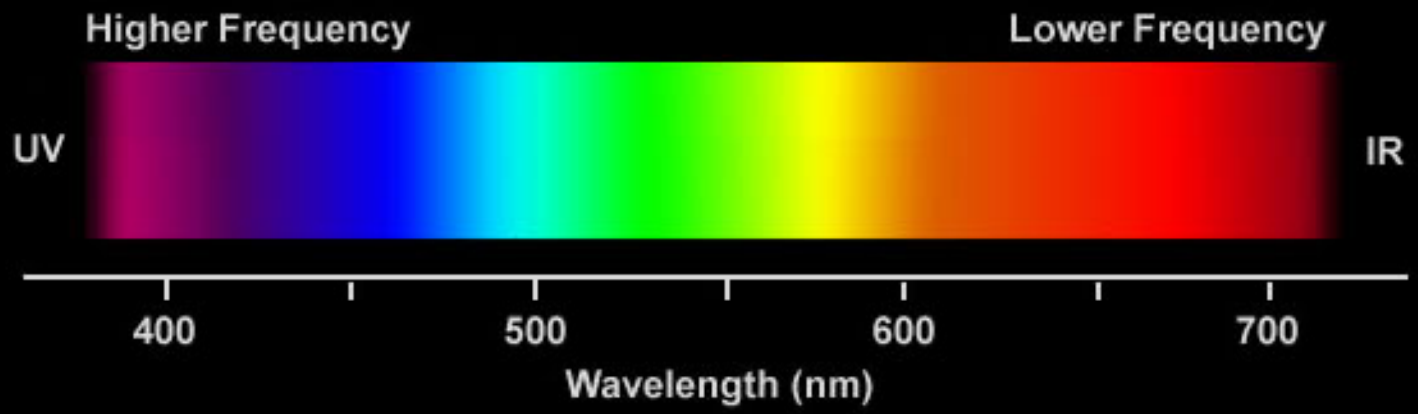


Use right eye, look at letters

Blind Spot

Use left eye, look at cross

Visible Spectrum



Retina

Covered with light-sensitive receptors

- Rods (120 million)
  - Sensitive to broad spectrum of light
  - Sensitive to small amounts of light
  - Cannot discriminate between colors
  - Sense intensity or shades of gray
  - Primarily for night vision & perceiving movement
- Cones (6 million)
  - Used to sense color

Retina

Center of retina has most of the …

Retina

Center of retina has most of the cones

- Allows for high acuity of objects focused at center

Retina

Center of retina has most of the cones

- Allows for high acuity of objects focused at center

Edge of retina is dominated by …

Retina

Center of retina has most of the cones

- Allows for high acuity of objects focused at center

Edge of retina is dominated by rods

- Allows detecting motion of threats in periphery

Retina

Center of retina has most of the cones

- Allows for high acuity of objects focused at center

Edge of retina is dominated by rods

- Allows detecting motion of threats in periphery

What does that mean for you?

Retina

Center of retina has most of the cones

- Allows for high acuity of objects focused at center

Edge of retina is dominated by rods

- Allows detecting motion of threats in periphery

What does that mean for you?

- Peripheral movement is easily distracting

Retina

Center of retina has most of the cones

- Allows for high acuity of objects focused at center

Edge of retina is dominated by rods

- Allows detecting motion of threats in periphery

What does that mean for you?

- Peripheral movement is easily distracting

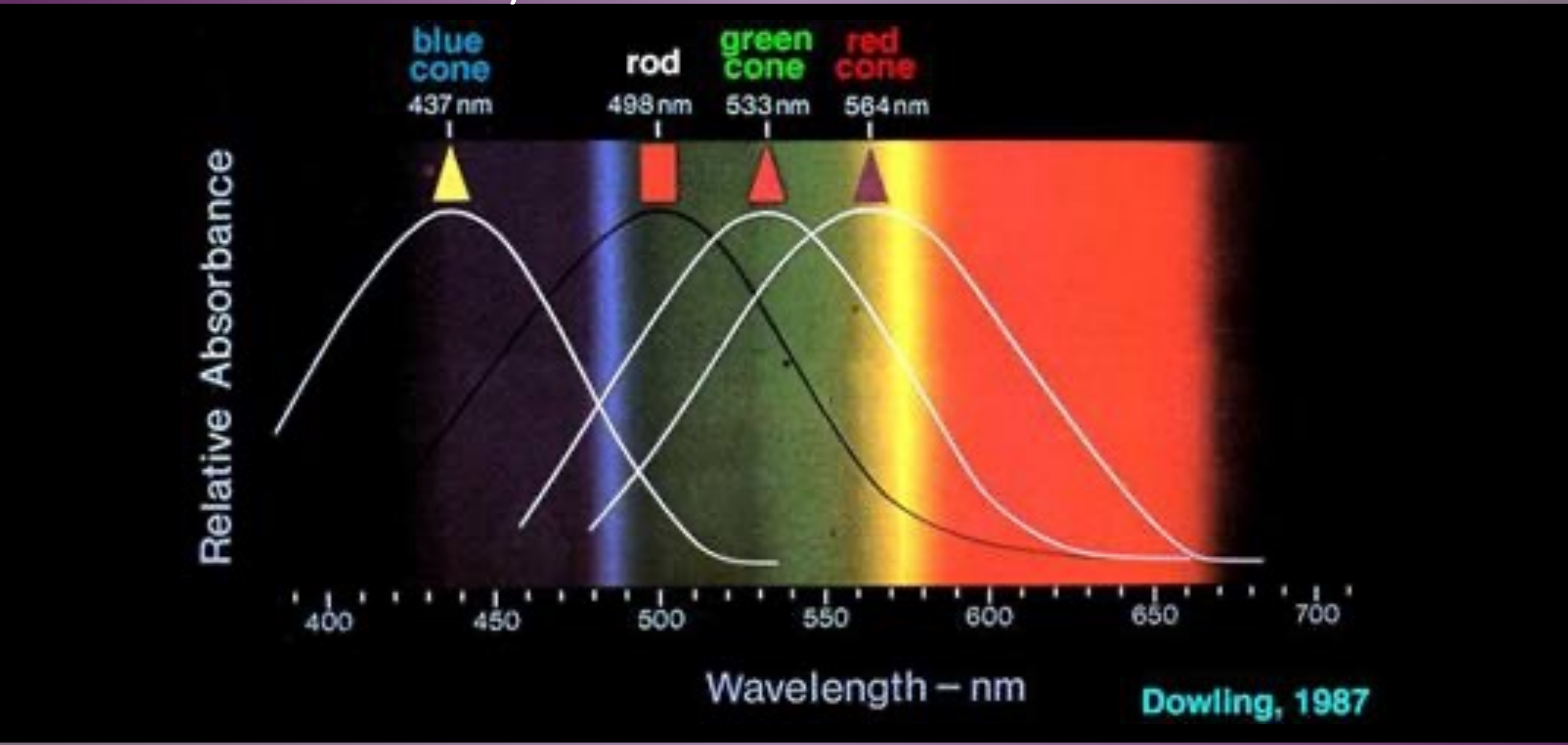
Color Perception via Cones

Photopigments used to sense color

3 types: blue, green, “red” (actually yellow)

- Each sensitive to different band of spectrum
- Ratio of neural activity stimulation for the three types of receptor gives us a continuous perception of color

Color Sensitivity



Distribution of Photopigments

Not distributed evenly

- Mainly reds (64%), Very few blues (4%)
- Insensitivity to short wavelengths (i.e., blue)

No blue cones in retina center

- Fixation on small blue object yields “disappearance”

Lens yellows with age, absorbs short wavelengths

- Sensitivity to blue is reduced even further

Color Sensitivity & Image Detection

Most sensitive to center of spectrum

- To be perceived as the same, blues and reds must be brighter than greens and yellows

Brightness determined mainly by red and green

- Y = 0.3 Red + 0.59 Green + 0.11 Blue

Shapes detected by finding edges

- We use brightness and color difference

Implication

- Blue edges and shapes are hard

Color Sensitivity & Image Detection

Most sensitive to center of spectrum

- To be perceived as the same, blues and reds must be brighter than greens and yellows

Brightness determined mainly by red and green

- Y = 0.3 Red + 0.59 Green + 0.11 Blue

Shapes detected by finding edges

- We use brightness and color difference

Implication

- Blue edges and shapes are hard

Focus

Different wavelengths of light
focused at different distances behind eye's lens

- Constant refocusing causes fatigue

Saturated colors (i.e., pure colors)
require more focusing than desaturated (i.e., pastels)

Focus

Different wavelengths of light
focused at different distances behind eye's lens

- Constant refocusing causes fatigue

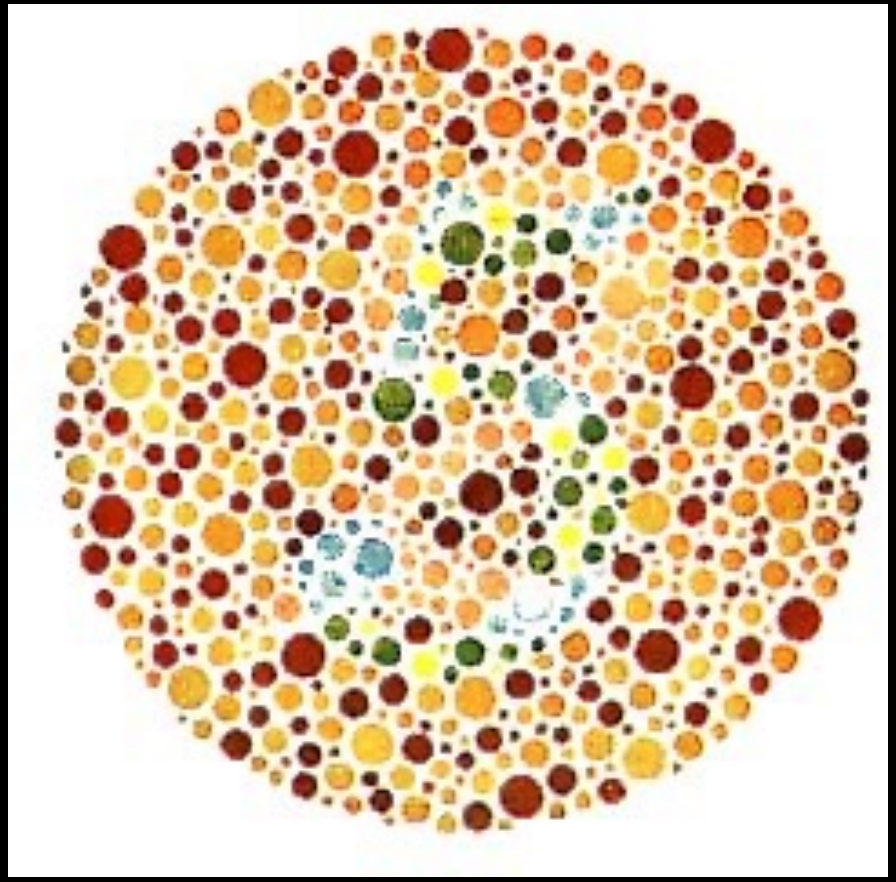
Saturated colors (i.e., pure colors)
require more focusing than desaturated (i.e., pastels)

This hurts, why?

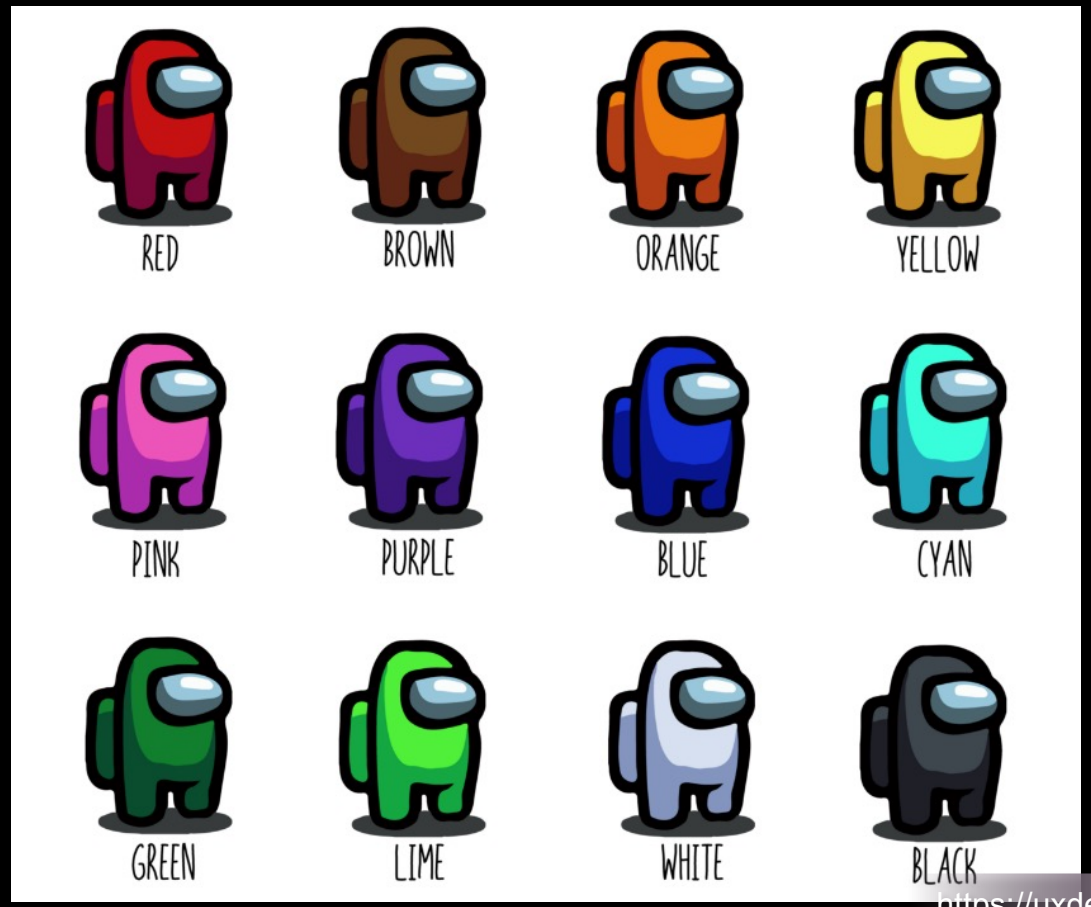
Color Vision Deficiency

- Trouble discriminating colors
  - Affects about 9% of population
- Two main types
  - Different photopigment response most common
    - Reduces capability to discern small color differences
  - Red-Green CVD is best known (“deuteranopia”)
    - Lack of either green or red photopigment,
      cannot discriminate colors dependent on red and green
- Also known as color blindness

Red-Green Deficiency Test

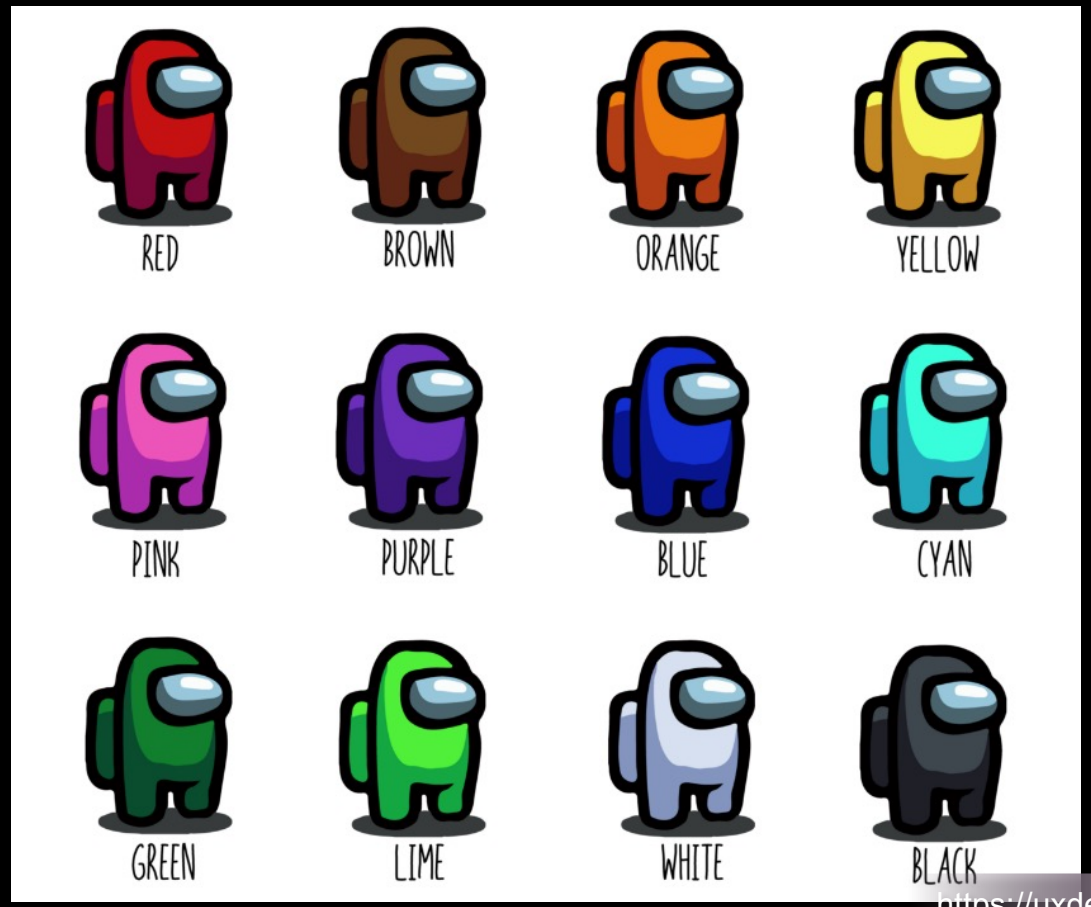


Color-Based Encoding



https://uxdesign.cc/the-importance-of-colorblind-friendly-design-case-study-among-us-dcd042c87b9

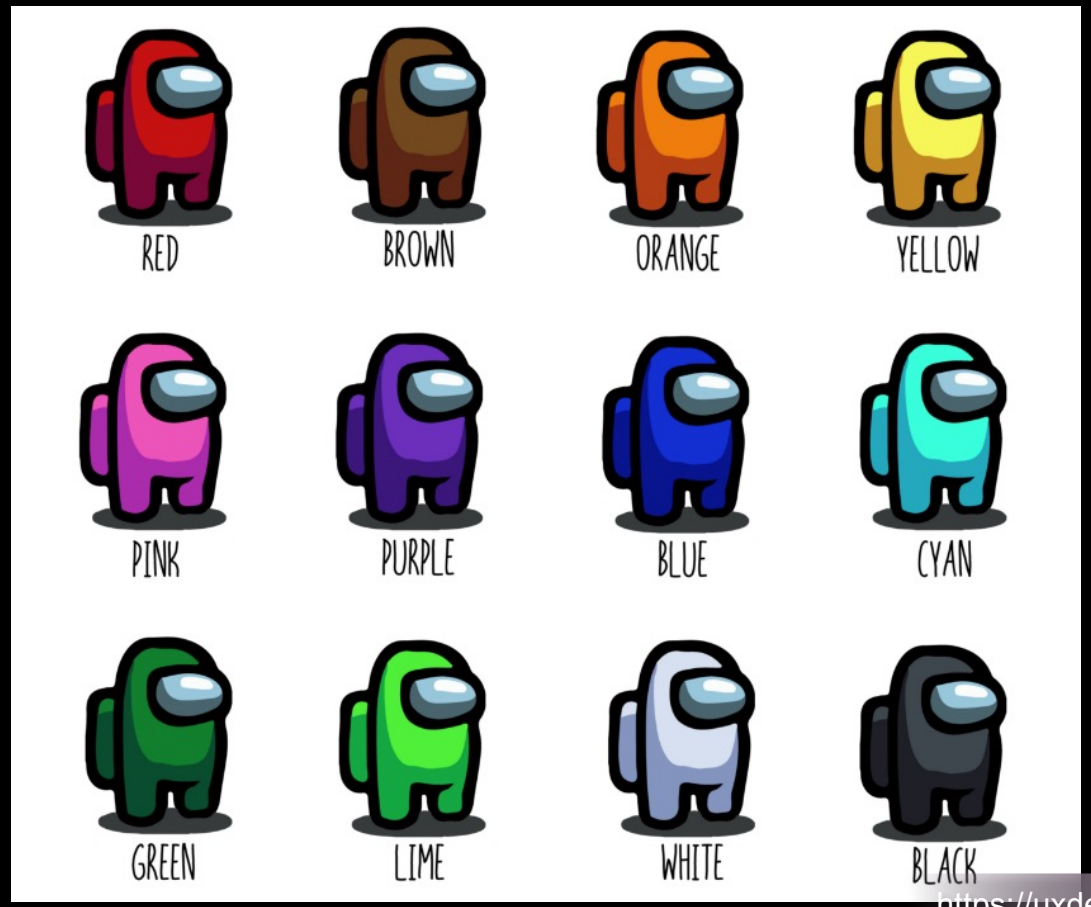
Color-Based Encoding



Protanopia: absence of red cones

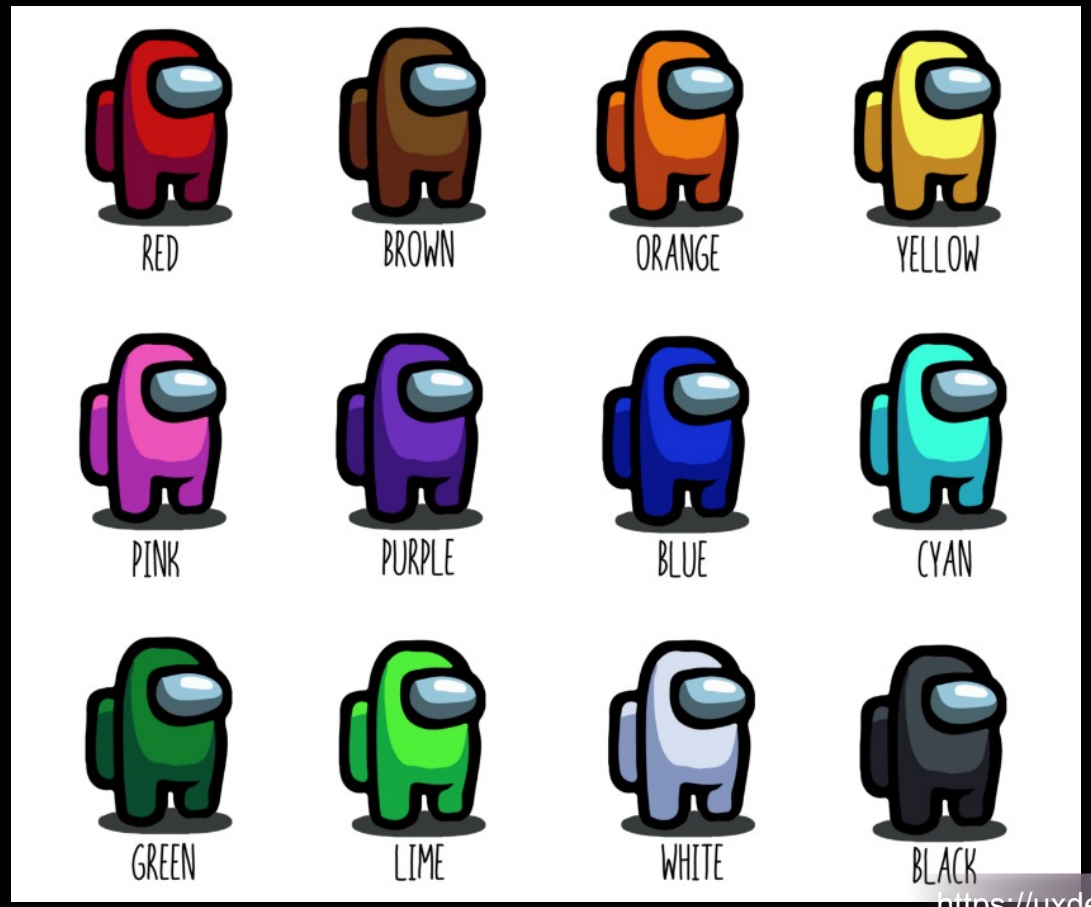
https://uxdesign.cc/the-importance-of-colorblind-friendly-design-case-study-among-us-dcd042c87b9

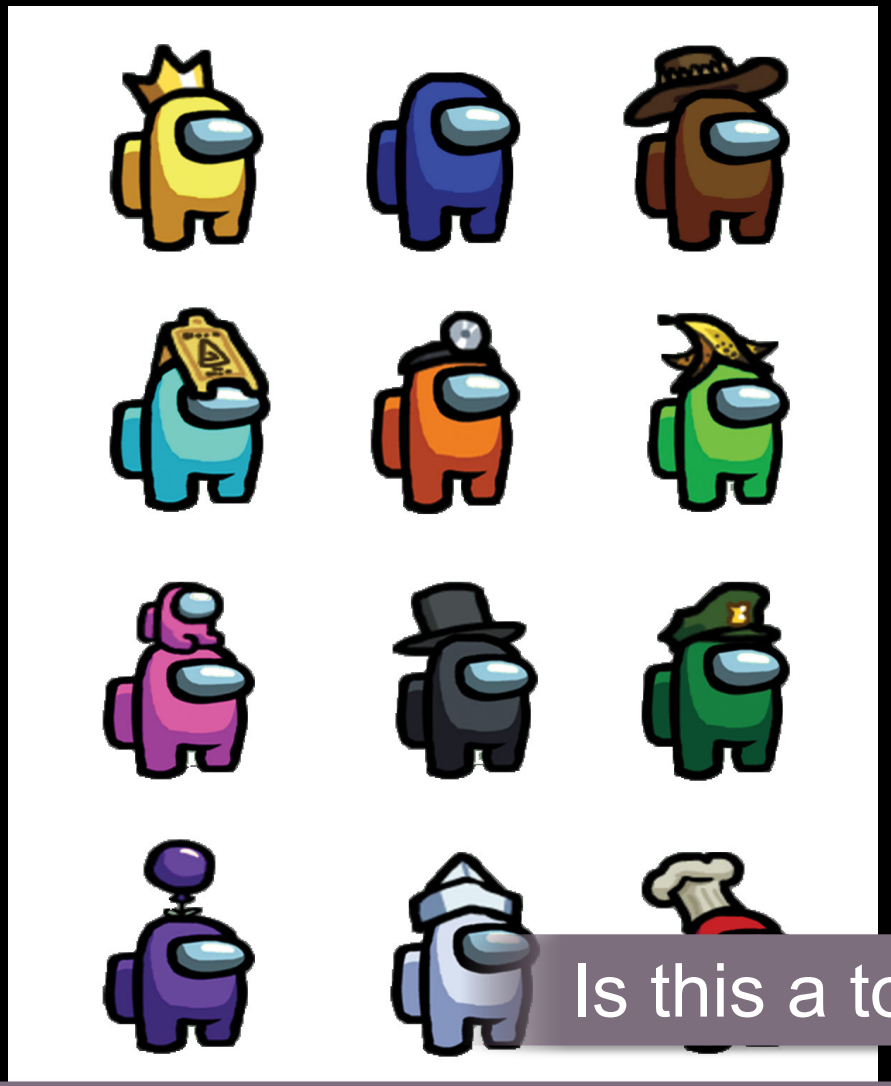
Color-Based Encoding



https://uxdesign.cc/the-importance-of-colorblind-friendly-design-case-study-among-us-dcd042c87b9

Color-Based Encoding





Is this a total fix?

https://uxdesign.cc/the-importance-of-colorblind-friendly-design-case-study-among-us-dcd042c87b9

Dual / Redundant Encoding

Uno

Pandemic

Dual / Redundant Encoding

Uno

Pandemic

ColorADD is an attempt to standardize encodings

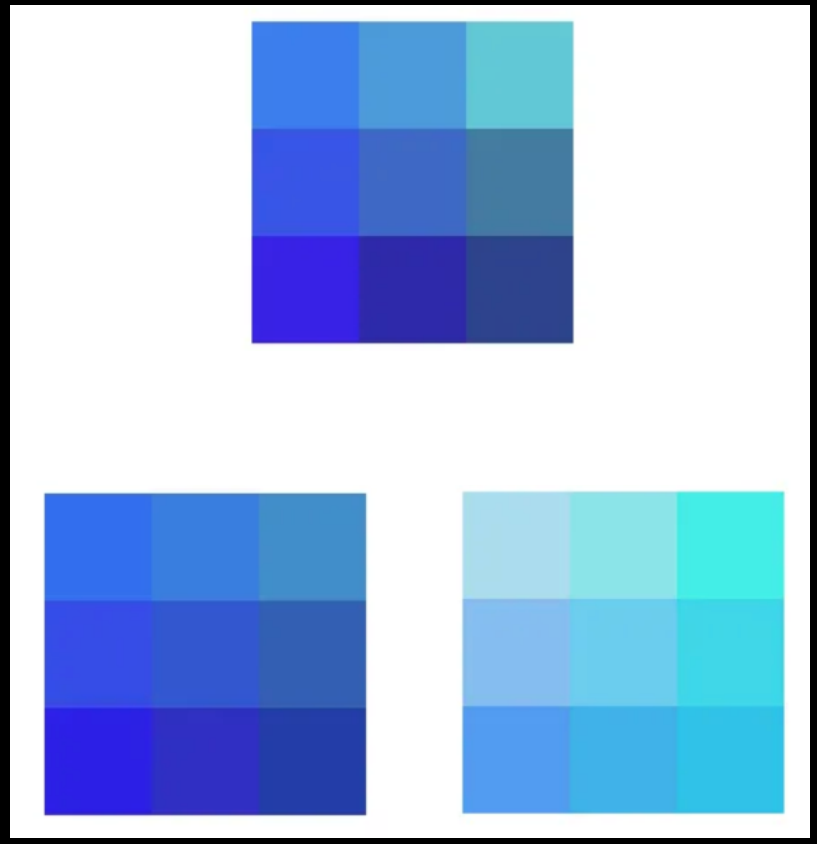
https://www.coloradd.net/

Is *this* a total fix?

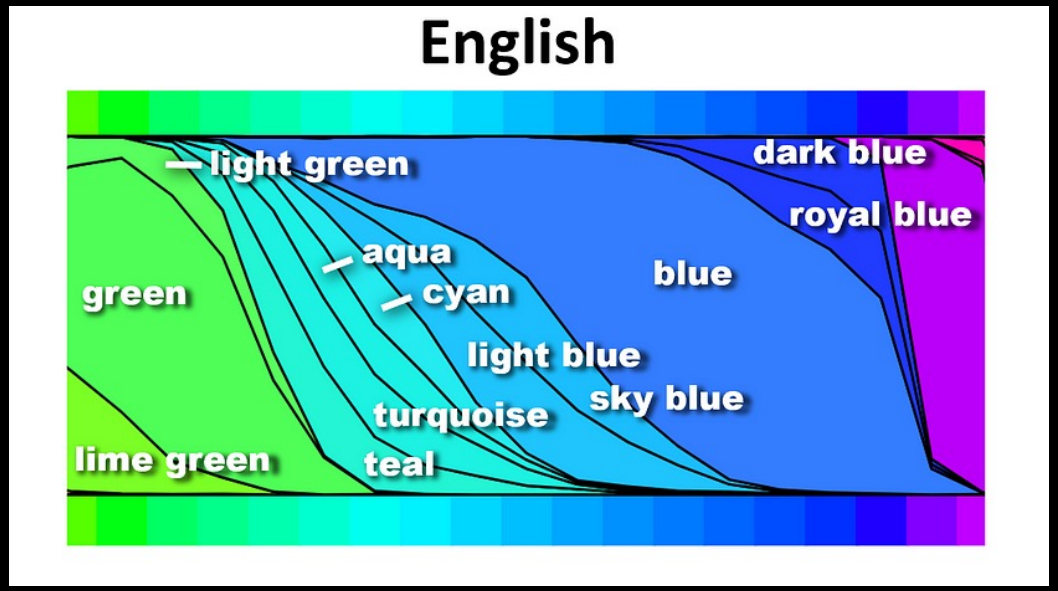
A Grain of Salt:

There's a lot more to color than just vision!

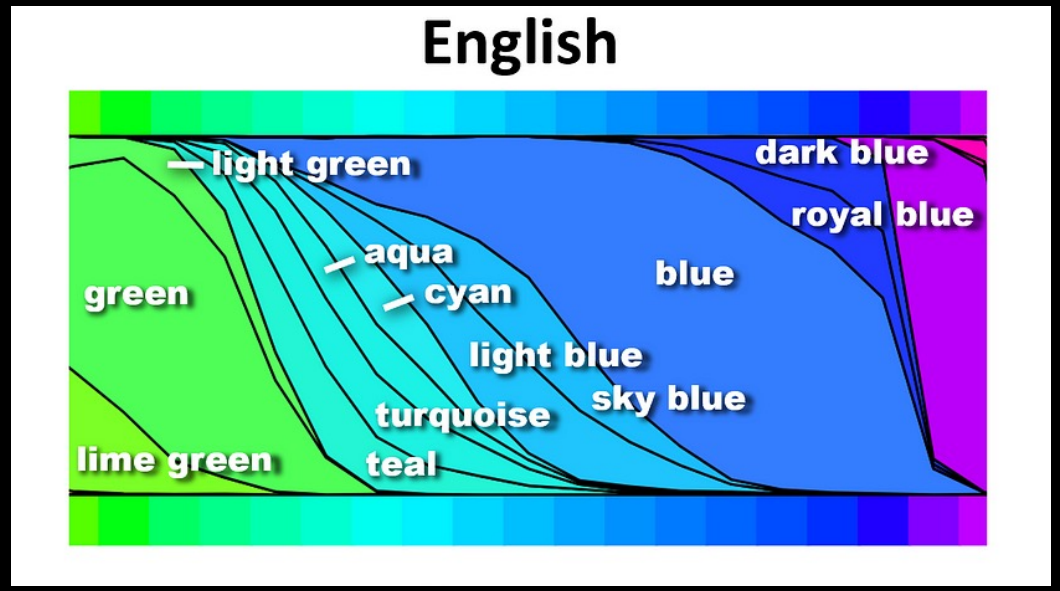
What is this?

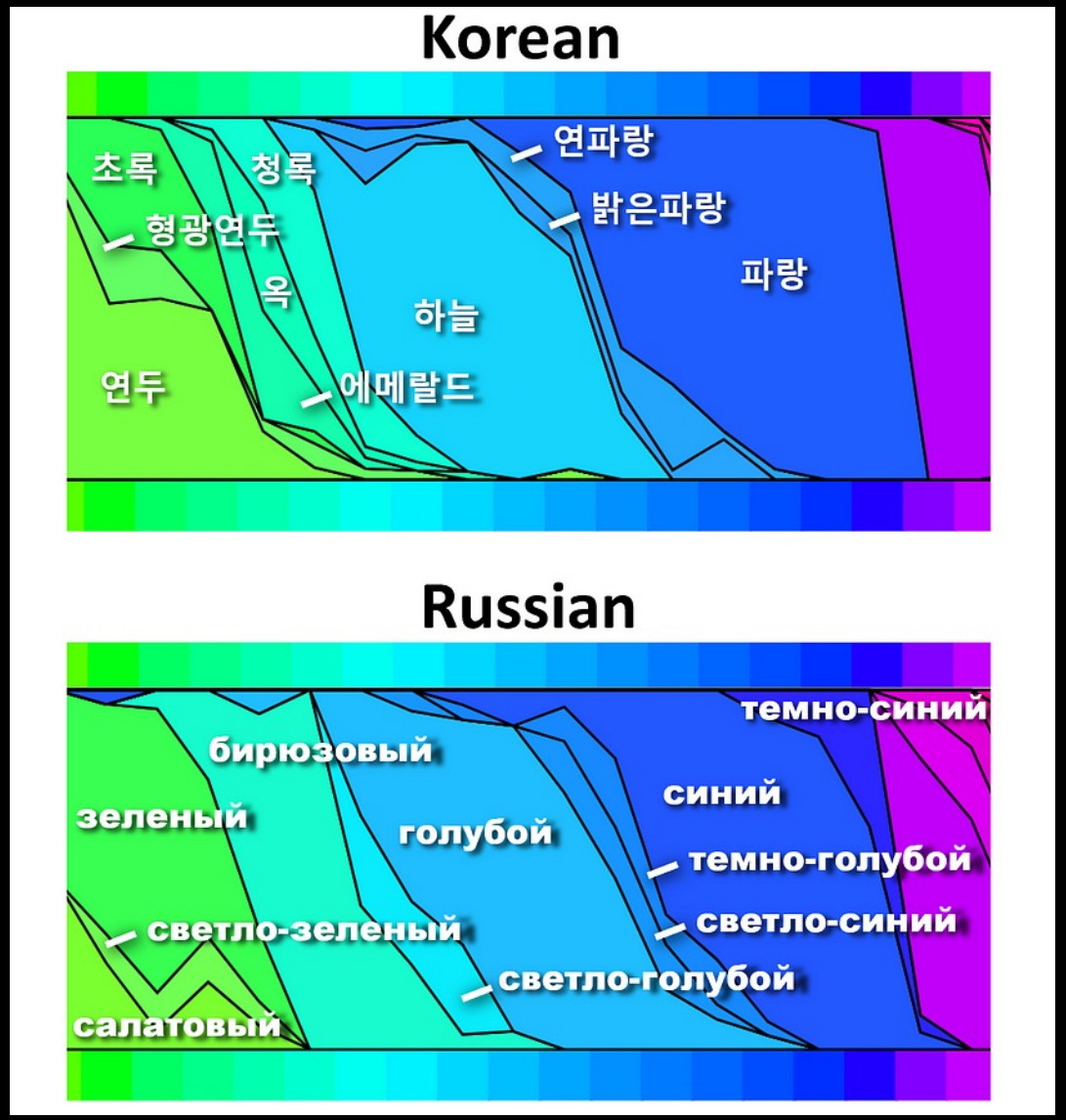


Linguistics X Perception



Linguistics X Perception





Models from Different Perspectives

Some example models of human performance

Visual System

Model Human Processor

Fitts's Law

Gestalt Principles

Biological Model

Higher-Level Model

Model by Analogy

Predict Interpretation

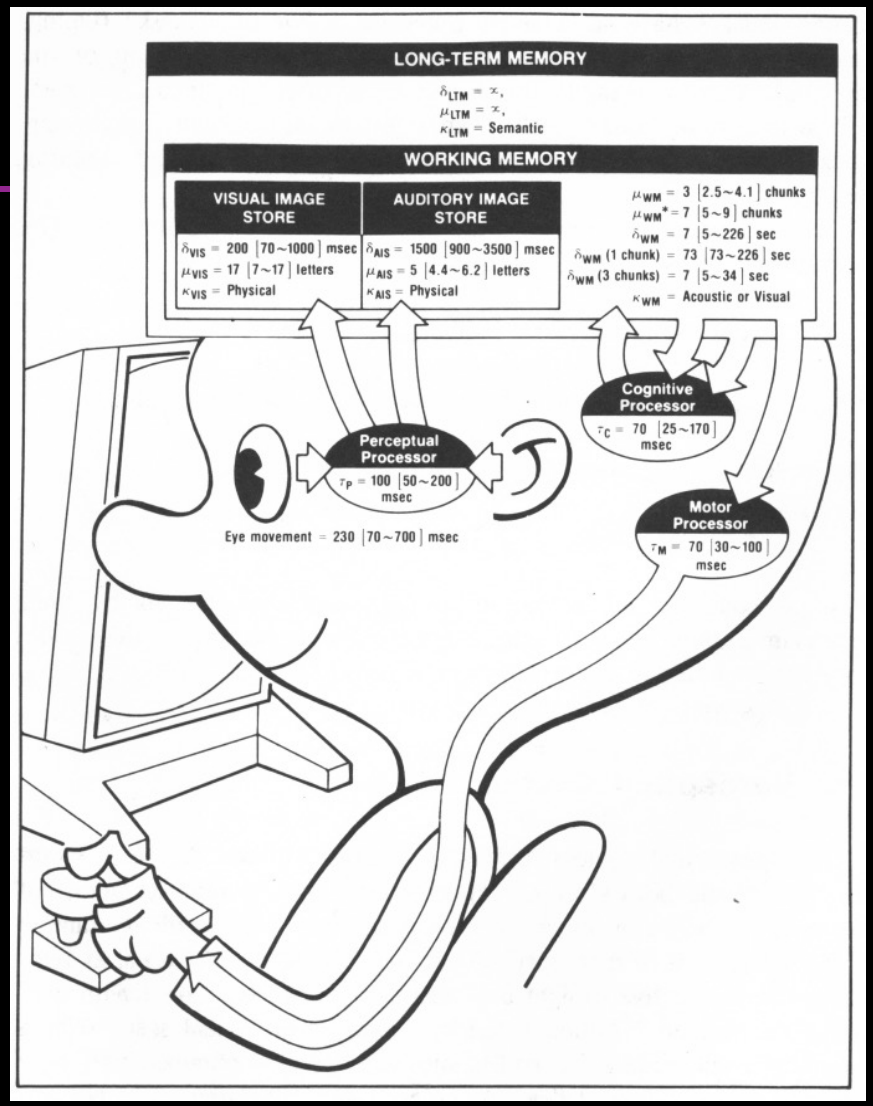
The Model Human Processor

Developed by Card, Moran, & Newell (1983)

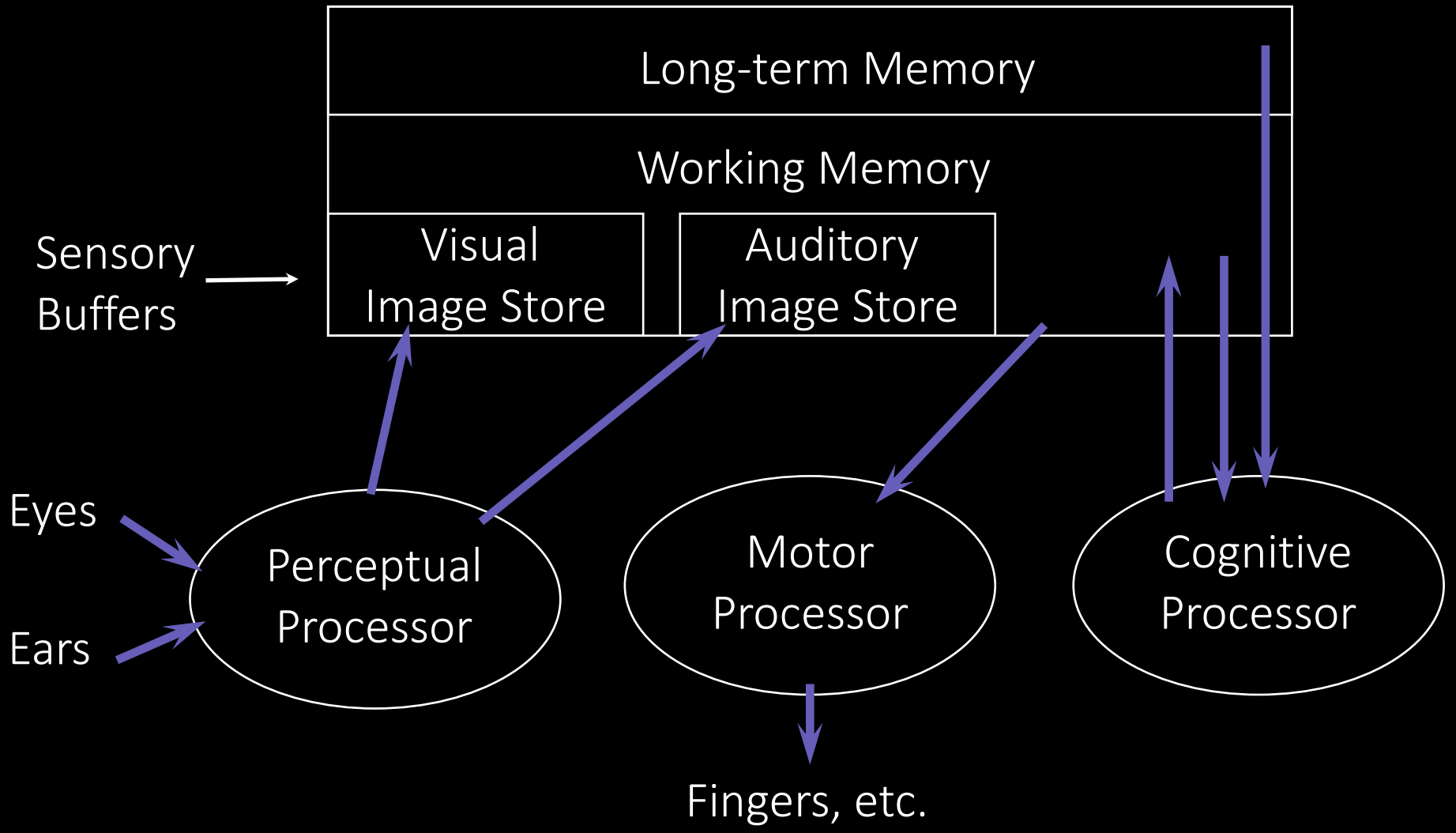
Based on empirical data

- Summarizing human behavior in a manner easy to consume and act upon

Same book that named human computer interaction



The Model Human Processor



Basics of Model Human Processor

- Sometimes serial, sometimes parallel
  - Serial in action and parallel in recognition
    - Pressing key in response to light
    - Driving, reading signs, hearing all simultaneously
- Parameters
  - Processors have cycle time, about 100-200ms
  - Memories have capacity, decay time, and type

A Working Memory Experiment

BMCIACSEI

BM CIA CSE I

IBM CIA CSE

Memory

- Working memory (also known as short-term)
  - Small capacity (7 ± 2 “chunks”)
    - 6174591765 vs. (617) 459-1765
    - IBMCIACSE vs. IBM CIA CSE
  - Rapid access (~ 70ms) and decay (~200 ms)
    - Pass to LTM after a few seconds of continued storage
- Long-term memory
  - Huge (if not “unlimited”)
  - Slower access time (~100 ms) with little decay

Activation Experiment

Volunteer

Activation Experiment

Volunteer

Start saying colors you see in list of words

- When slide comes up, as fast as you can
- There will be three columns of words

Say “done” when finished

- Everyone else time how long it takes

Activation Experiment

word	word	word
word	word	word
word	word	word
word	word	word
word	word	word

Activation Experiment

Volunteer

red	green	blue
yellow	yellow	red
blue	blue	blue
green	yellow	red
red	green	green

Activation Experiment

Do it again

Say “done” when finished

ivd	olftcs	fwax
ncudgt	zjdcv	lxngyt
mkbh	xbts	cfto
bhfe	cnhdes	fwa
cnofgt	uhths	dalcrd

Activation Experiment

Do it again

Say “done” when finished

red	red	green
blue	yellow	red
green	green	green
yellow	blue	blue
blue	yellow	yellow

Model Human Processor Operation

Recognize-Act Cycle of the Cognitive Processor

On each cycle, contents in working memory initiate actions associatively linked in long-term memory

Actions modify the contents of working memory

Discrimination Principle

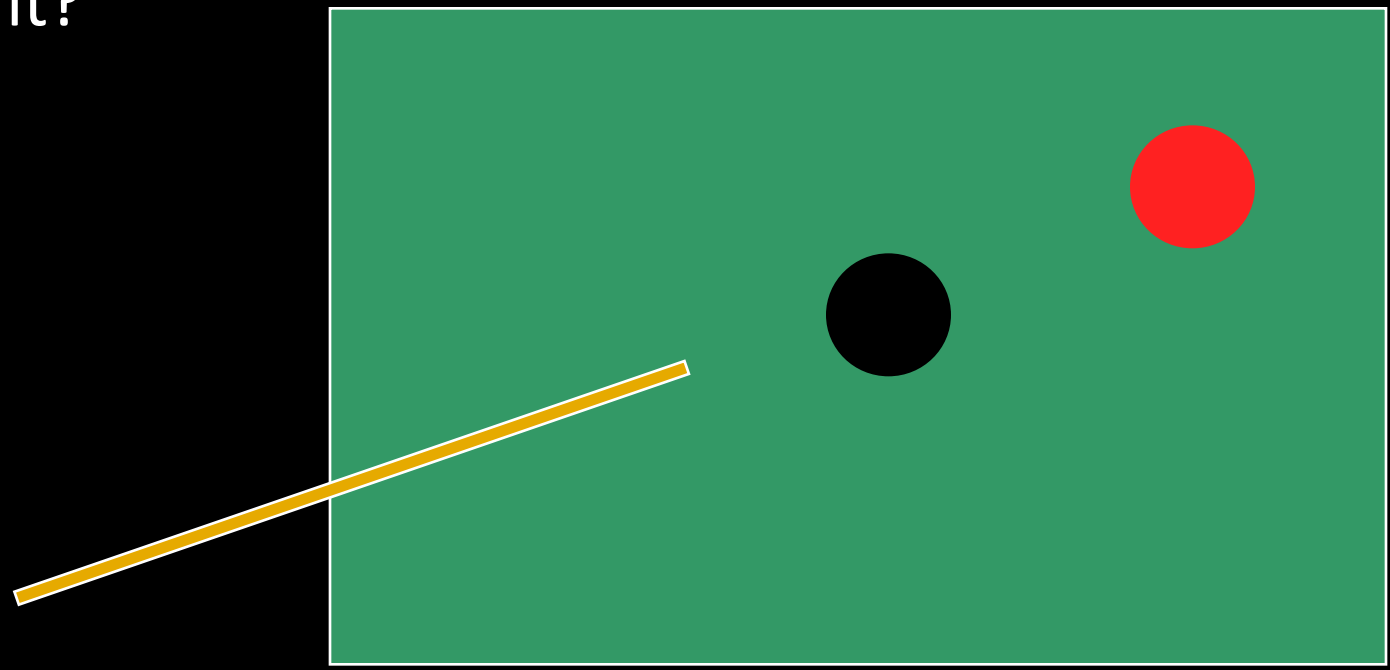
Retrieval is determined by candidates that exist in memory relative to retrieval cues

Interference created by strongly activated chunks

See also: Freudian slips

Perceptual Causality

How soon must the red ball move after cue ball collides with it?



Perceptual Causality

Stimuli that occur within one cycle of the perceptual processor fuse into a single concept

Requirement

- If you want to create the perception of causality, then you need to be sufficiently responsive

Caution

- Two stimuli intended to be distinct can fuse if the first event appears to cause the other

Models from Different Perspectives

Some example models of human performance

Visual System

Model Human Processor

Fitts's Law

Gestalt Principles

Biological Model

Higher-Level Model

Model by Analogy

Predict Interpretation

Fitts's Law (1954)

Models time to acquire targets in aimed movement

- Reaching for a control in a cockpit
- Moving across a dashboard
- Pulling defective items from a conveyor belt
- Clicking on icons using a mouse

Very powerful, widely used

- Holds for many circumstances (e.g., under water)
- Allows for comparison among different experiments
- Used both to measure and to predict

Fitts's Law (1954)

Models time to acquire targets in aimed movement

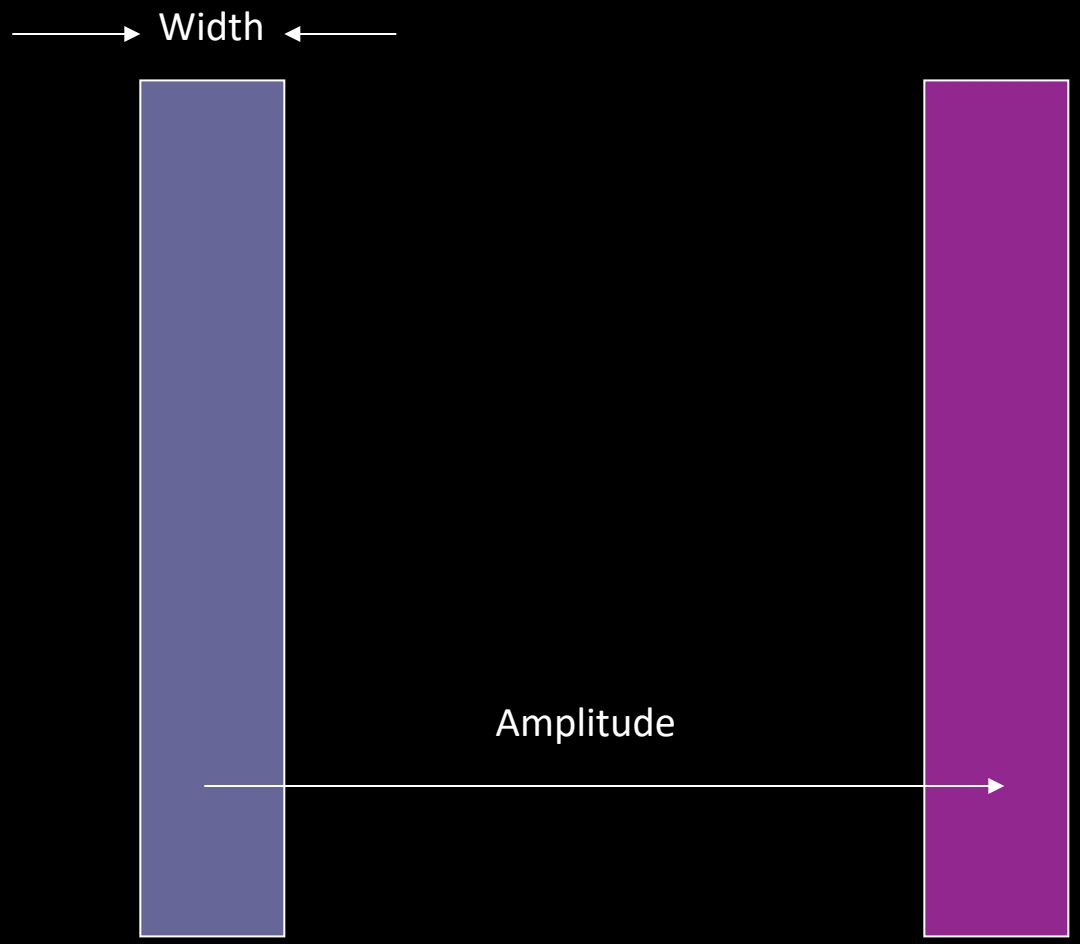
- Reaching for a control in a cockpit
- Moving across a dashboard
- Pulling defective items from a conveyor belt
- Clicking on icons using a mouse

Very powerful, widely used

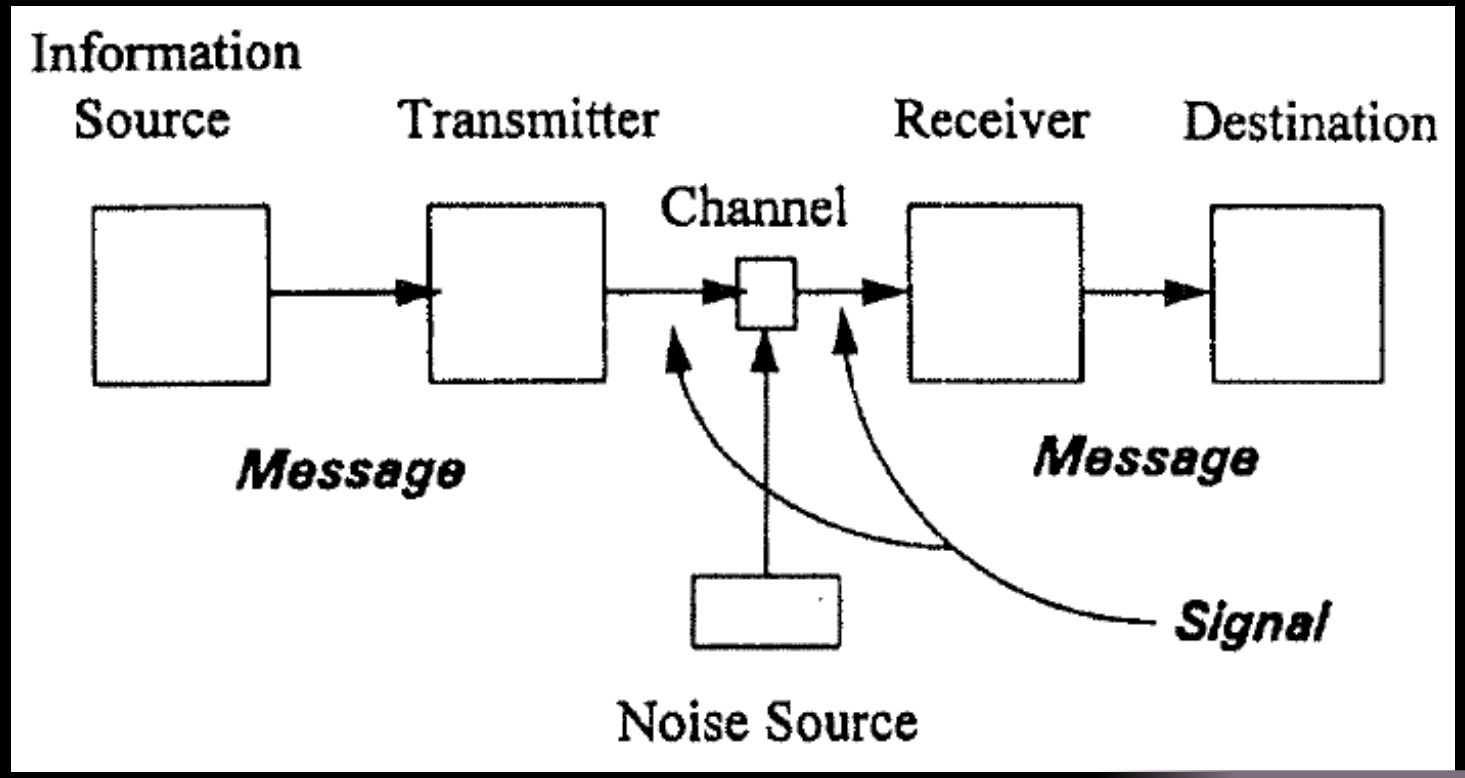
- Holds for many circumstances (e.g., under water)
- Allows for comparison among different experiments
- Used both to measure and to predict

Most people say Fitts' Law,
but I was taught this by a "James"

Reciprocal Point-Select Task



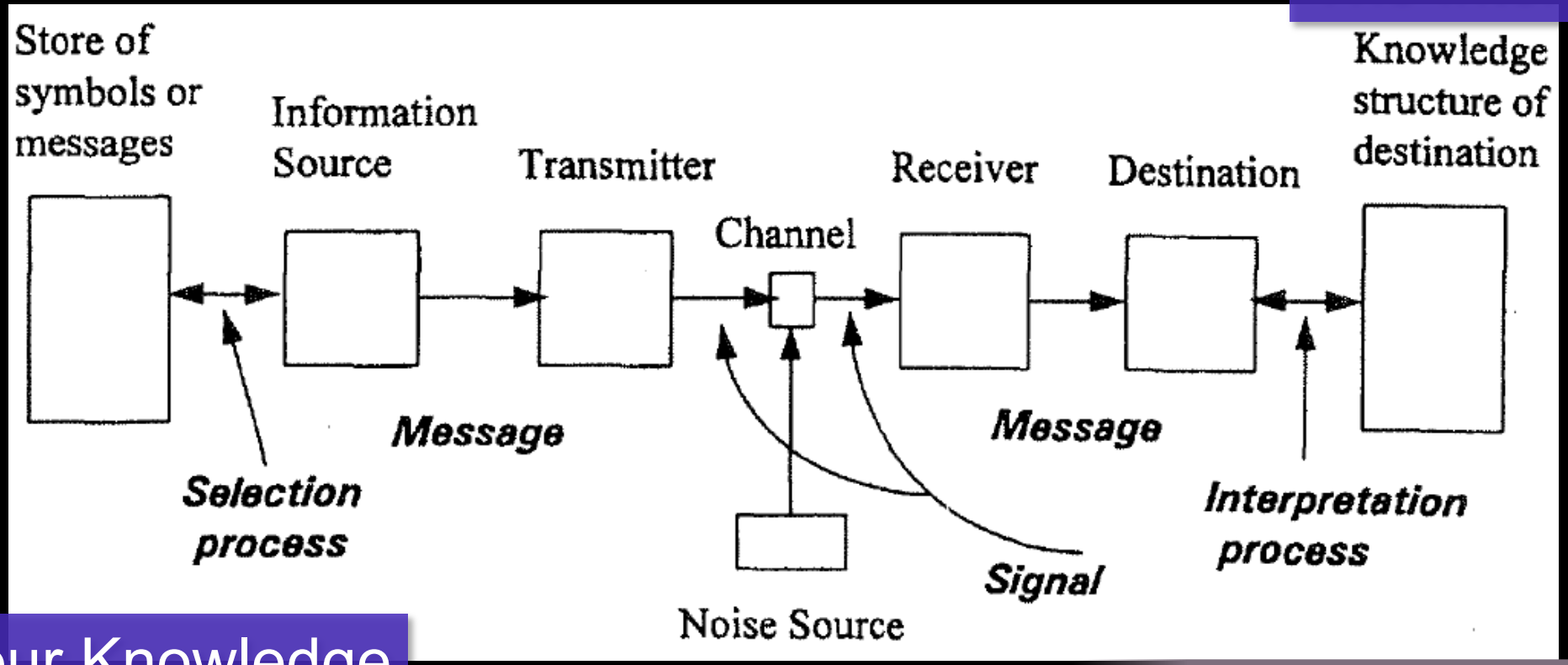
Model by Analogy



Analogy to Information Transmission
Shannon and Weaver, 1959

Model by Analogy

The Interface



Your Knowledge

Analogy to Information Transmission
Shannon and Weaver, 1959

Fitts's Law

$MT = a + b \log_2(A / W + 1)$

What kind of equation does this remind you of?

Fitts's Law

MT = a + b log2(A / W + 1)

What kind of equation does this remind you of?

y = mx + b

MT = a + bx, where x = log2(A / W + 1)

x is called the Index of Difficulty (ID)

As "A" goes up, ID goes up

As "W" goes up, ID goes down

Index of Difficulty (ID)

log2(A / W + 1)

Fitts's Law claims that the time to acquire a target increases linearly with the log of the ratio of the movement distance (A) to target width (W)

Why is it significant that it is a ratio?

Index of Difficulty (ID)

log2(A / W + 1)

- Fitts's Law claims that the time to acquire a target increases linearly with the log of the ratio of the movement distance (A) to target width (W)

Why is it significant that it is a ratio?

- Units of A and W don't matter
- Allows comparison across experiments

ID units typically in "bits"

- Because of association with information capacity and somewhat arbitrary use of base-2 logarithm

“Beating” Fitts’s law

It is the law, right?

MT = a + b log2(A / W + 1)

So how can we reduce movement time?

Reduce A

Increase W

Fitts's Law Related Techniques

Put targets closer together

Make targets bigger

Make cursor bigger

- Area cursors
- Bubble cursor

Use impenetrable edges

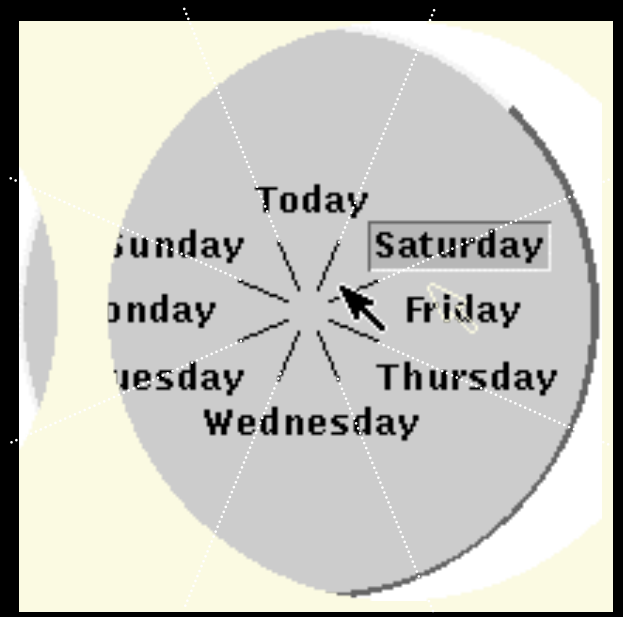
Fitts's Law Examples

Which will be faster on average?

Pop-up Linear Menu

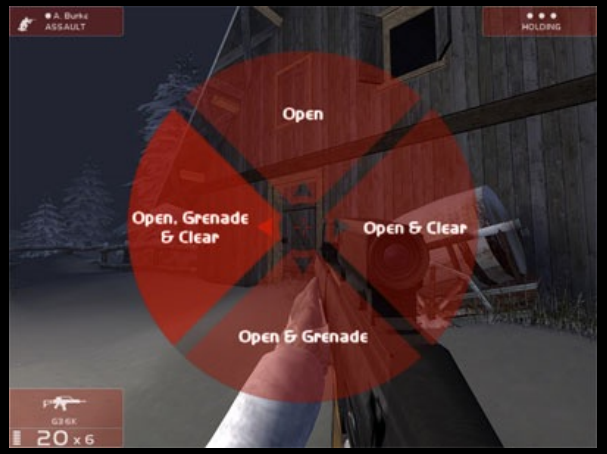
Today
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

Pop-up Pie Menu

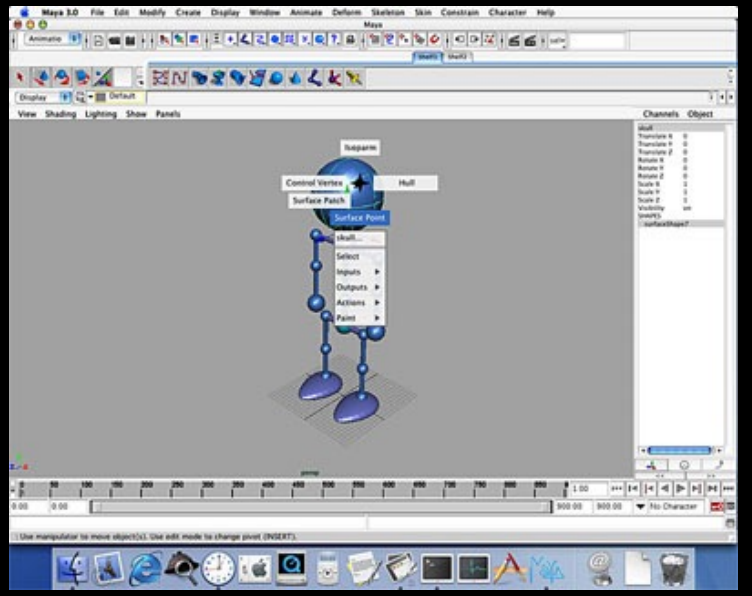


Pie Menus in Use

The Sims



Rainbow 6



Maya

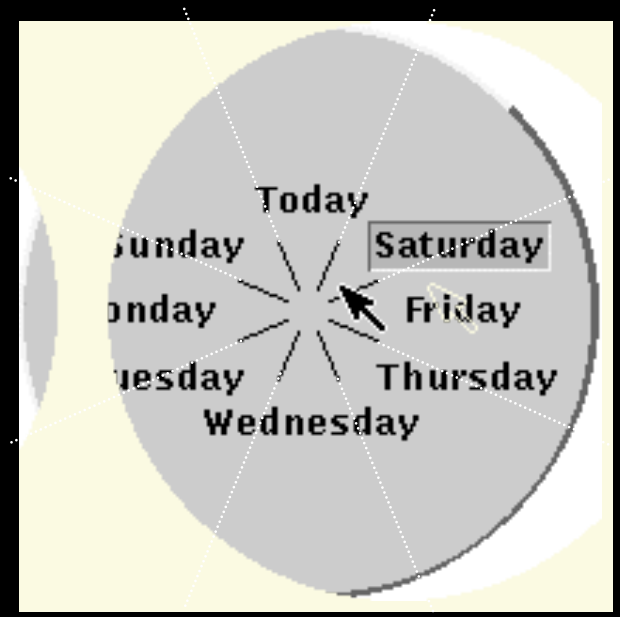
Fitts's Law Examples

Which will be faster on average?

Pop-up Linear Menu

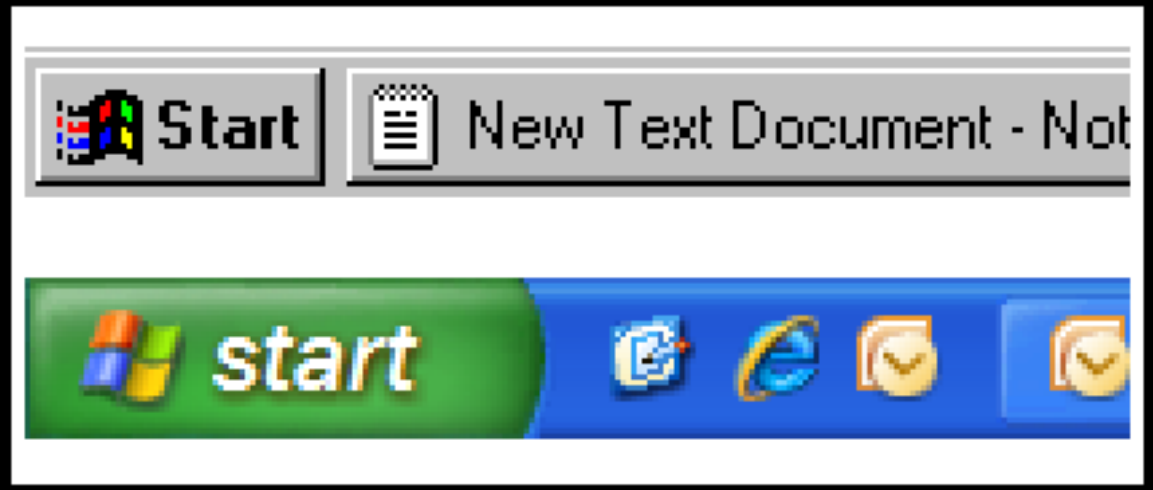
Today
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

Pop-up Pie Menu



What about adaptive menus?

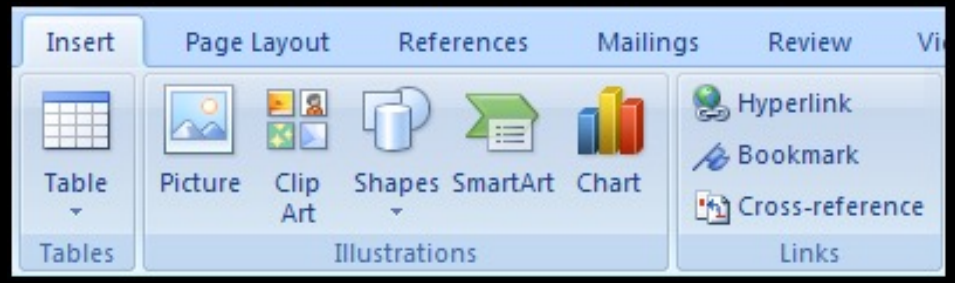
Fitts's Law in Windowing



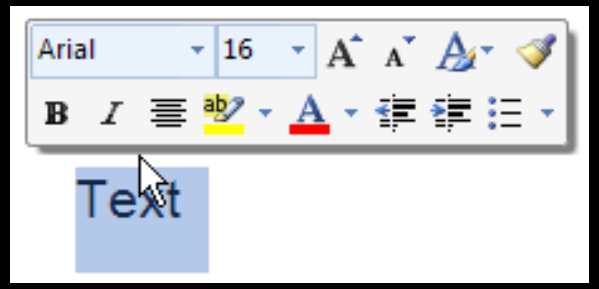
Windows 95: Missed by a pixel
Windows XP: Good to the last drop

Macintosh Menu

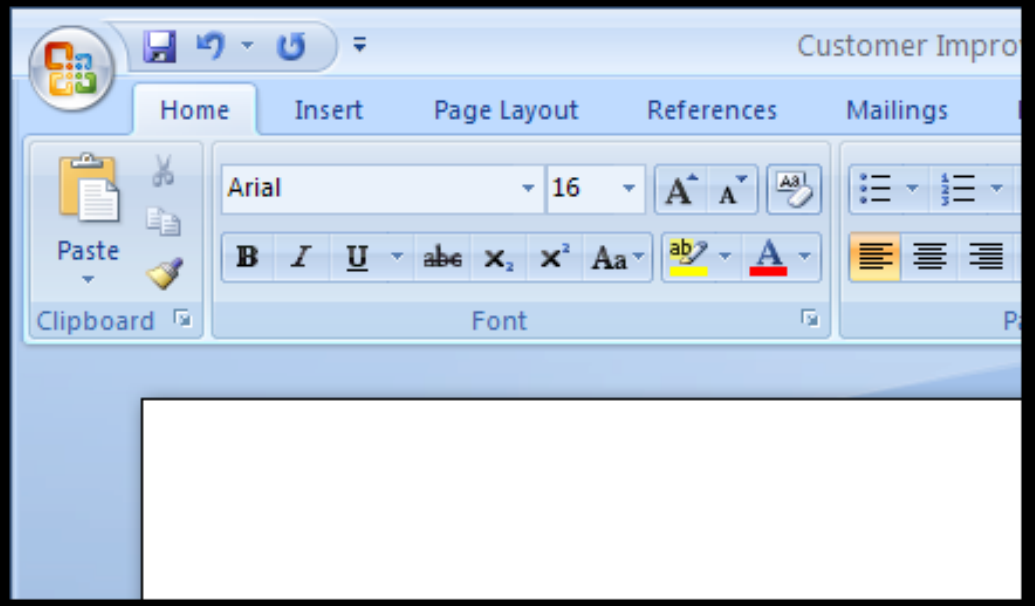
Fitts's Law in MS Office 2007



Larger, labeled controls
can be clicked more quickly



Mini toolbar is close to the cursor



Magic Corner:
Office Button in the upper-left corner

Bubble Cursor

Grossman and Balakrishnan, 2005

Bubble Cursor

Grossman and Balakrishnan, 2005

Bubble Cursor with Prefab

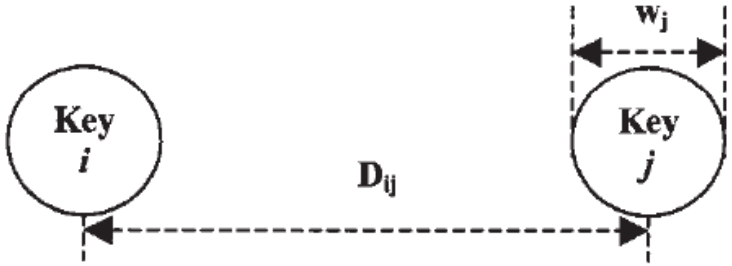
Dixon et al, 2012

Bubble Cursor with Prefab

Dixon et al, 2012

Fitts's Law and Keyboard Layout

Zhai et. al (2002) pose stylus keyboard layout as an optimization of all key pairs, weighted by language frequency

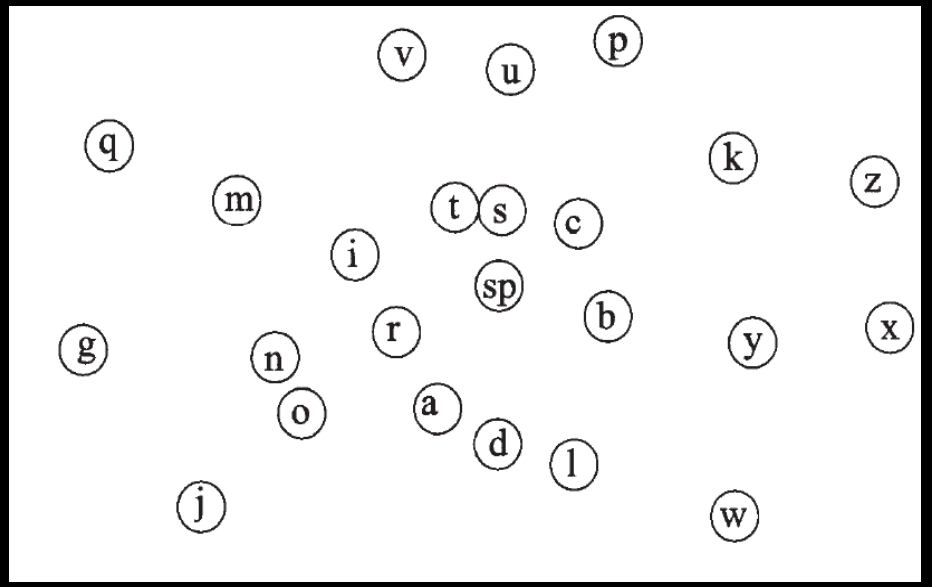


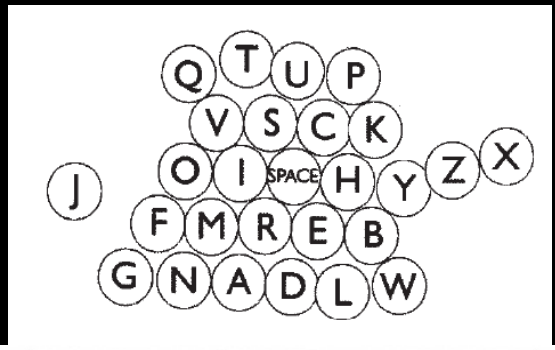
$$MT = a + b\log_2\left(\frac{D_{ij}}{W_j} + 1\right),$$

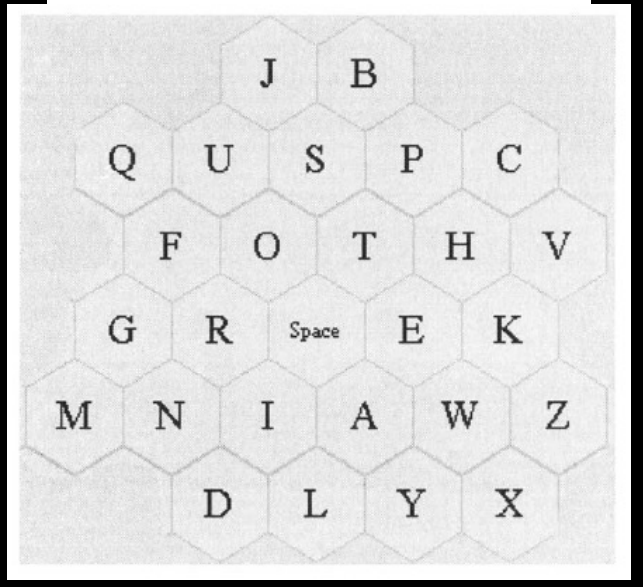
$$t = \sum_{i=1}^{27}\sum_{j=1}^{27} P_{ij}\left[log_2\left(\frac{D_{ij}}{W_j} + 1\right)\right],$$

Metropolis Keyboard

Random walk minimizing scoring function



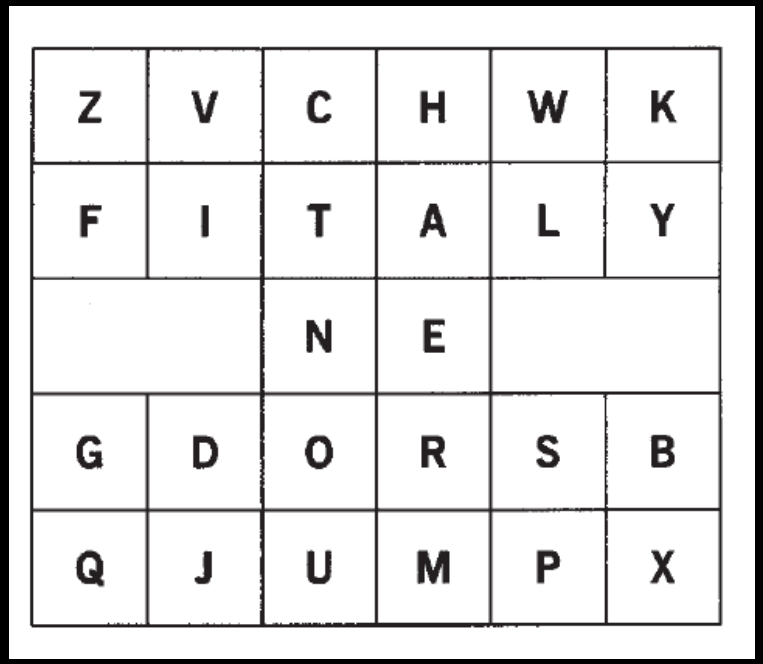




Considering Multiple Space Keys

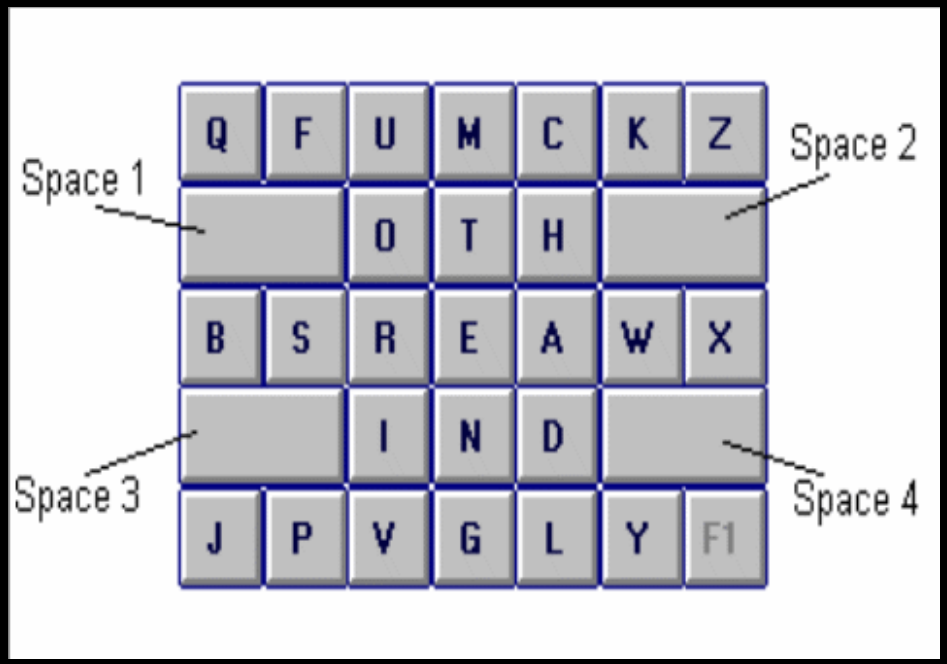
FITALY Keyboard

Textware Solutions



OPTI Keyboard

MacKenzie and Zhang 1999



Considering Multiple Space Keys

FITALY Keyboard

Textware Solutions

Z	V	C	H	W	K
F	I	T	A	L	Y
		N	E		
G	D	O	R	S	B
Q	J	U	M	P	X

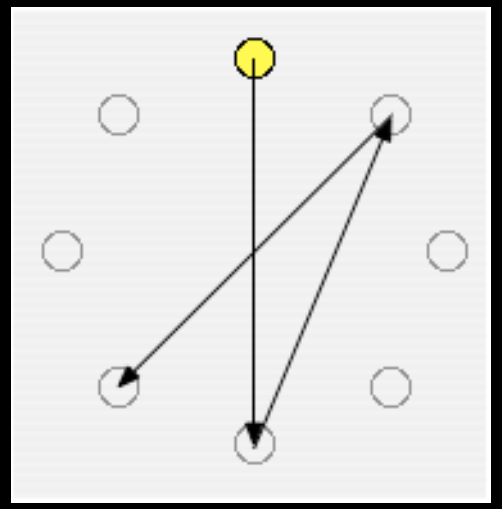
OPTI Keyboard

MacKenzie and Zhang 1999

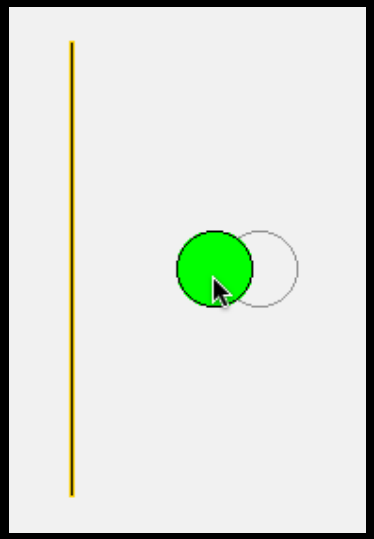
Correct choice of space key becomes important
Requires planning head to be optimal

Using Motor Ability in Design

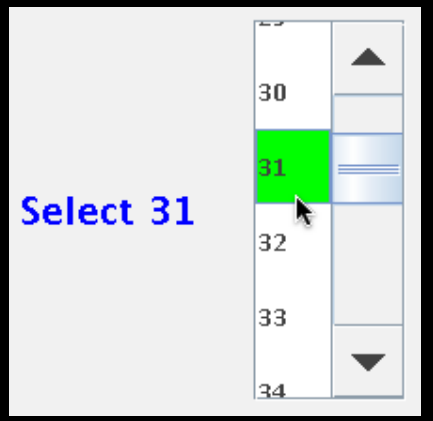
Pointing



Dragging



List Selection



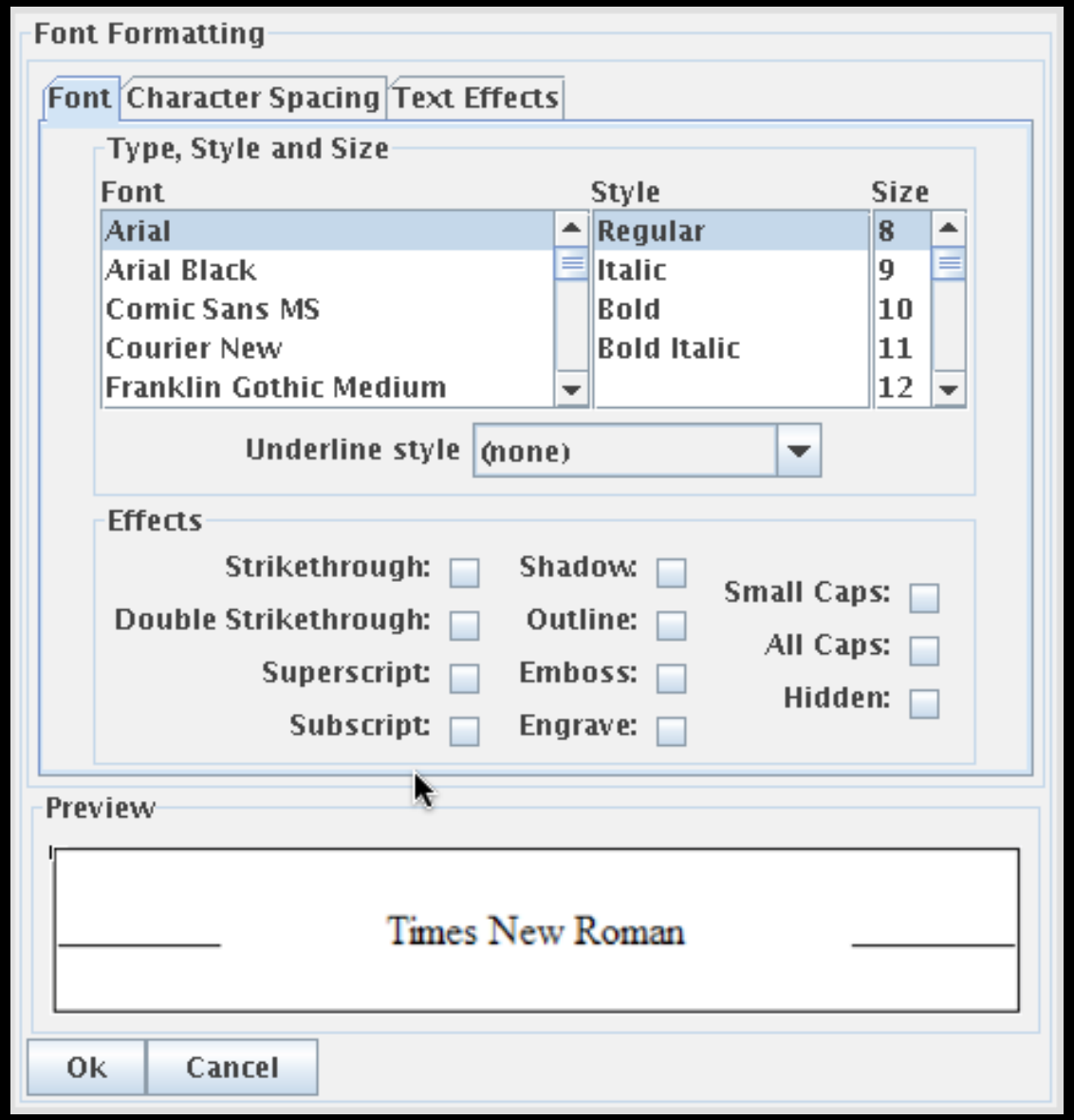
Gajos et al 2007

Interface Generation As Optimization

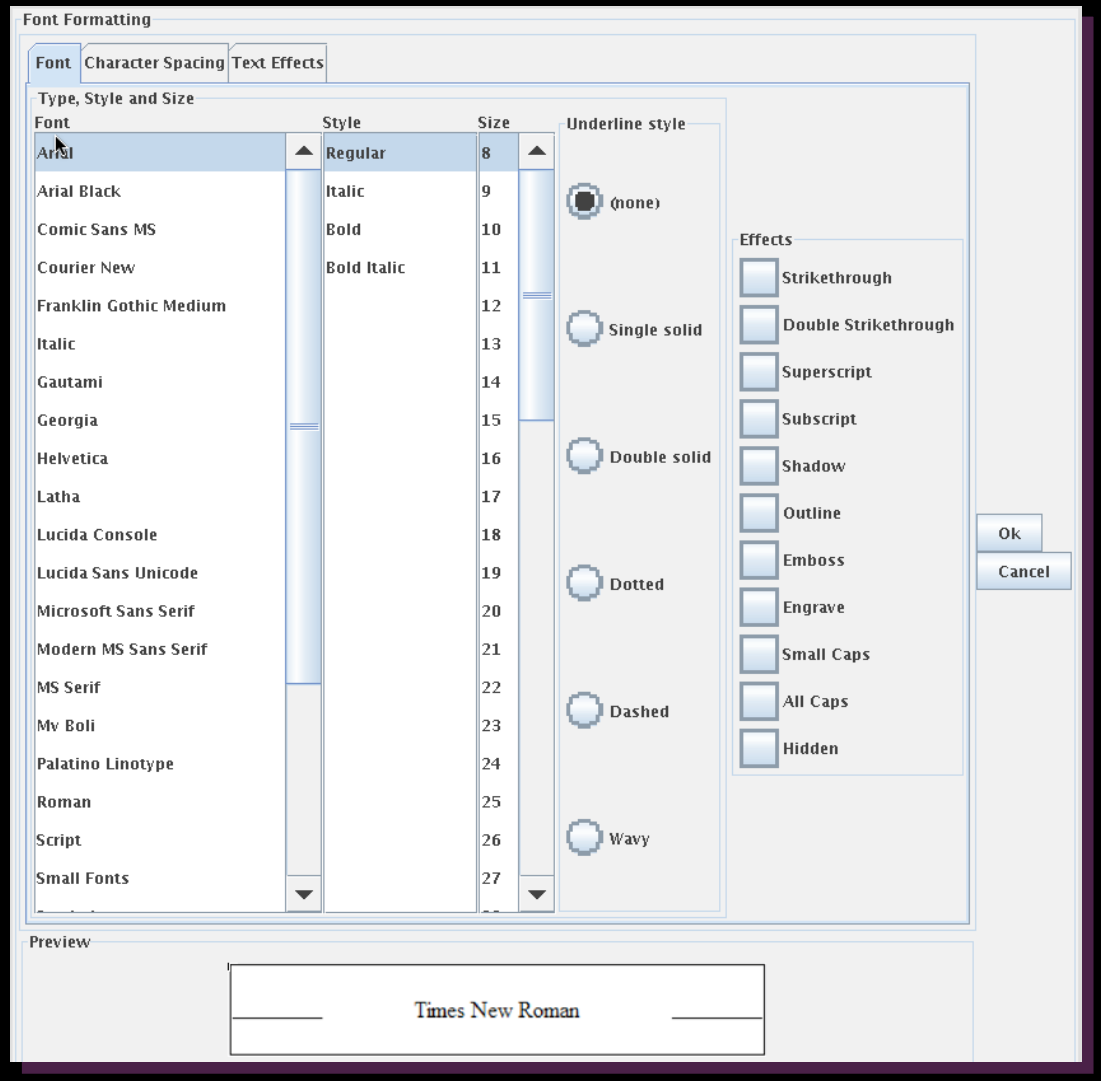
$(

) = Estimated task completion time

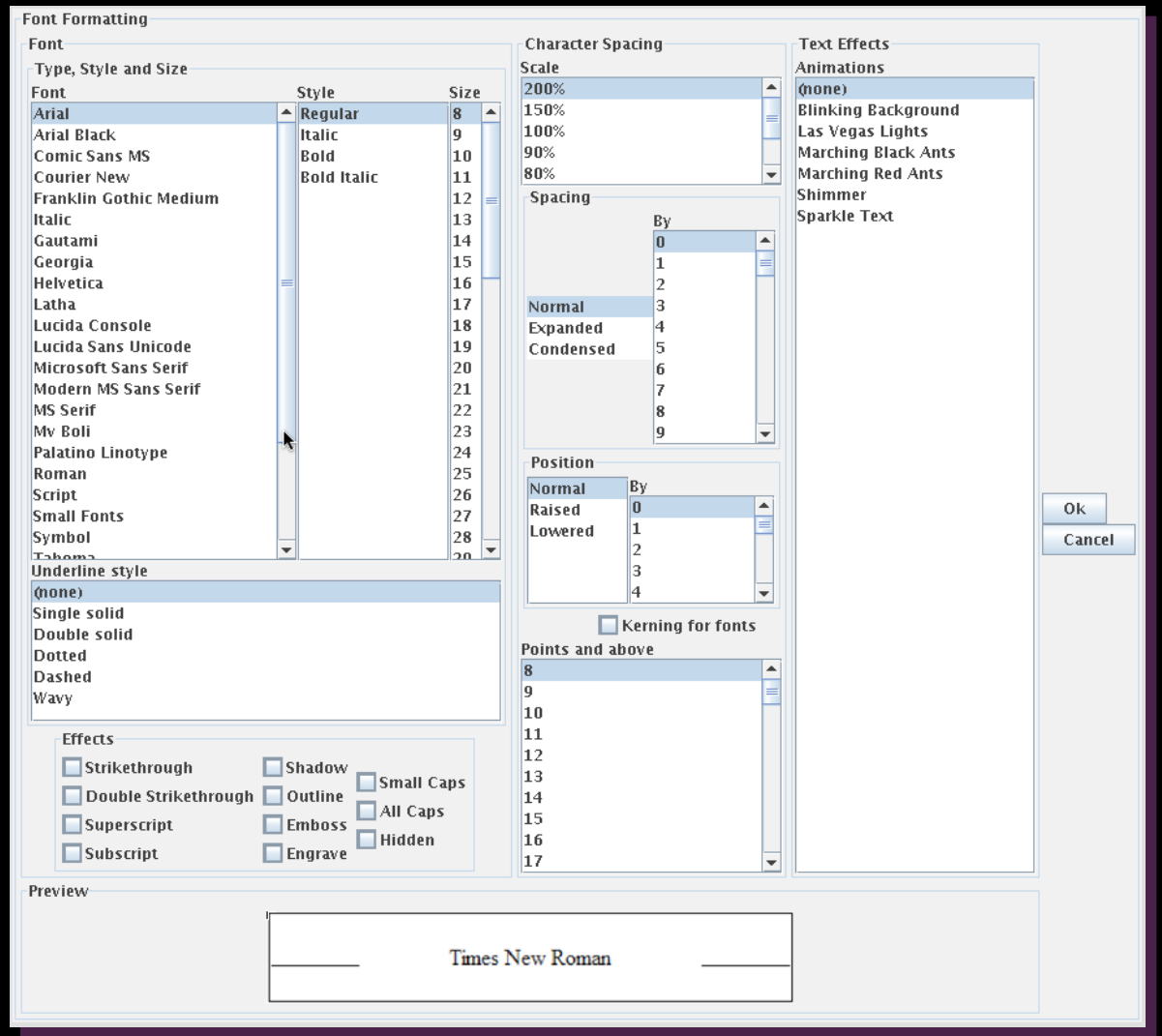
Manufacturer Interface



Custom Interface 1



Custom Interface 2



Fitts's Law Related Techniques

Gravity Fields

- Pointer gets close, gets "sucked in" to target

Sticky Icons

- When within target, pointer "sticks"

Constrained Motion

- Snapping,
  holding Shift to limit degrees of movement

Target Prediction

- Determine likely target,
  move it nearer or expand it

Models from Different Perspectives

Some example models of human performance

Visual System

Model Human Processor

Fitts's Law

Gestalt Principles

Biological Model

Higher-Level Model

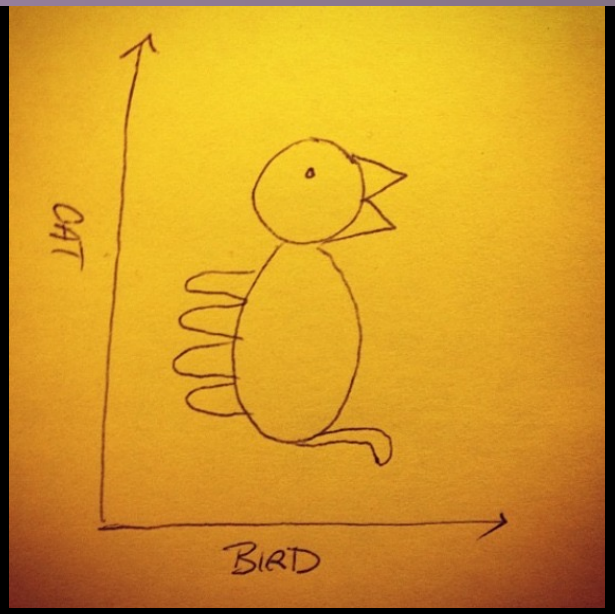
Model by Analogy

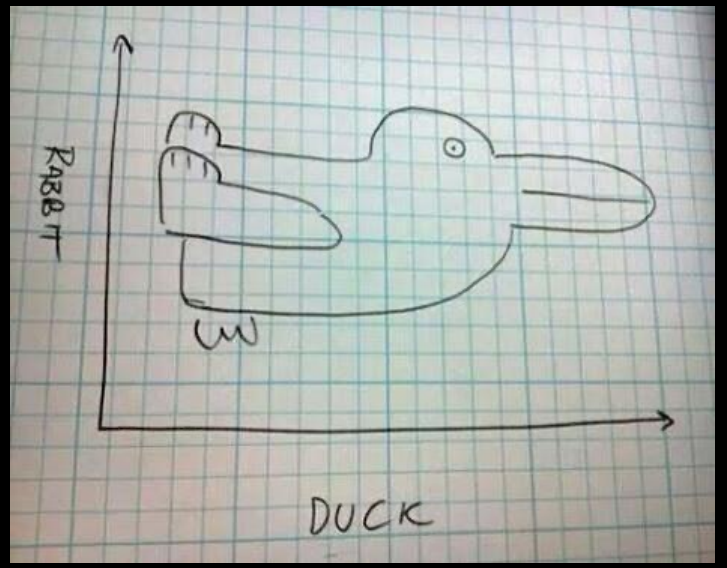
Predict Interpretation

Gestalt Psychology

Described loosely in the context of this lecture and associated work, not a real definition

Perception is neither bottom-up nor top-down, rather both inform the other as a whole





Gestalt Psychology

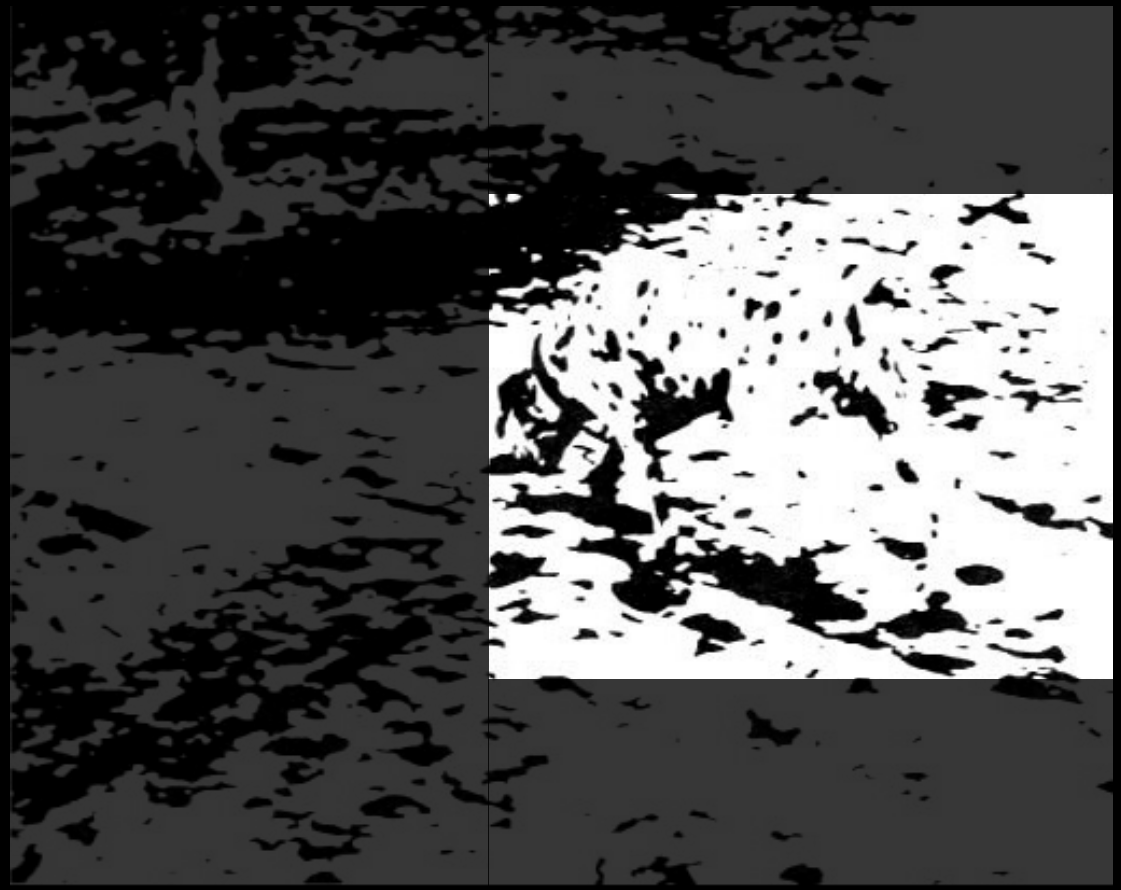
You can still see the dog…

Gestalt Psychology

You can still see the dog…

Gestalt Psychology

You can still see the dog…

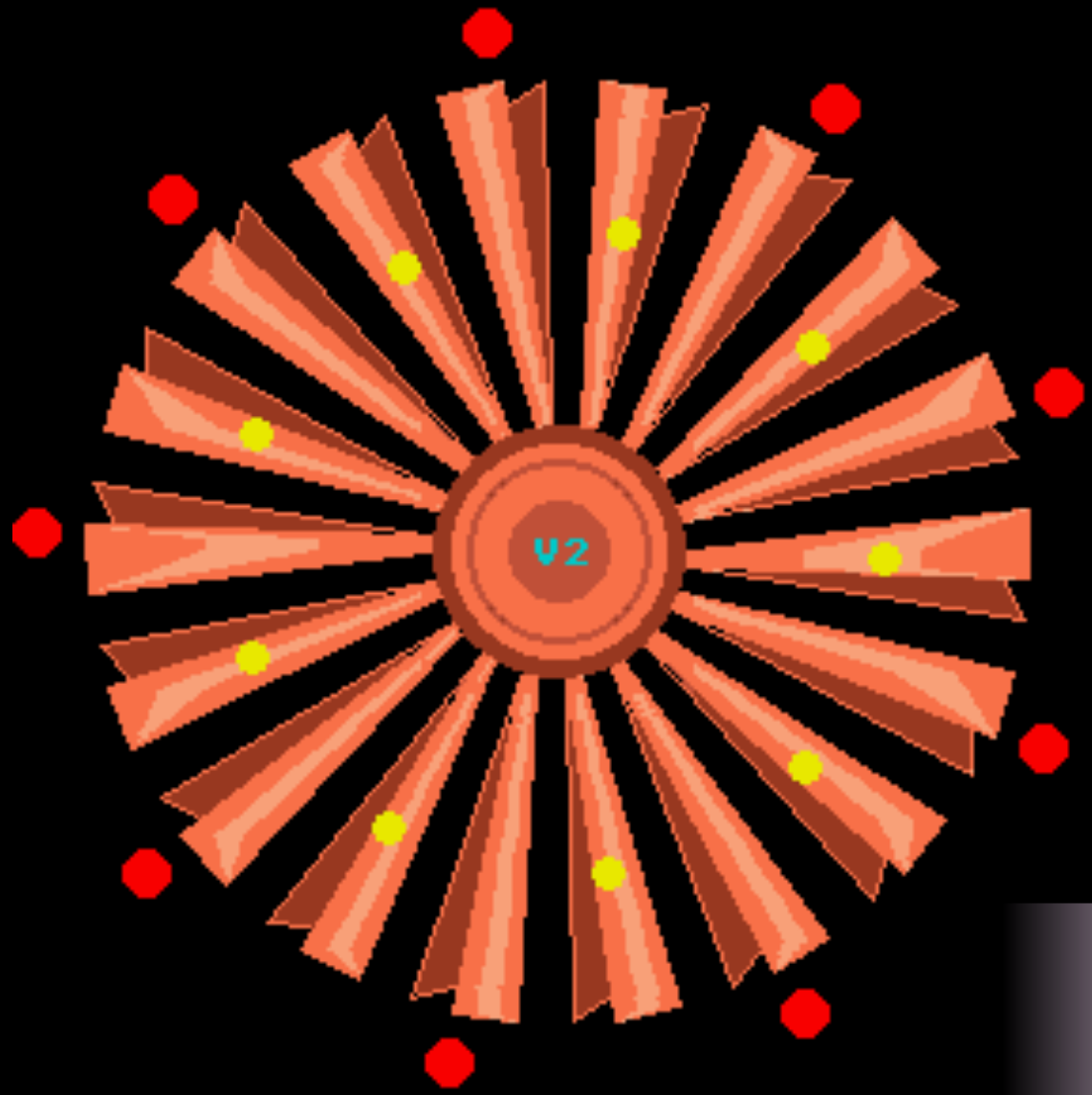


Gestalt Psychology

You can still see the dog…

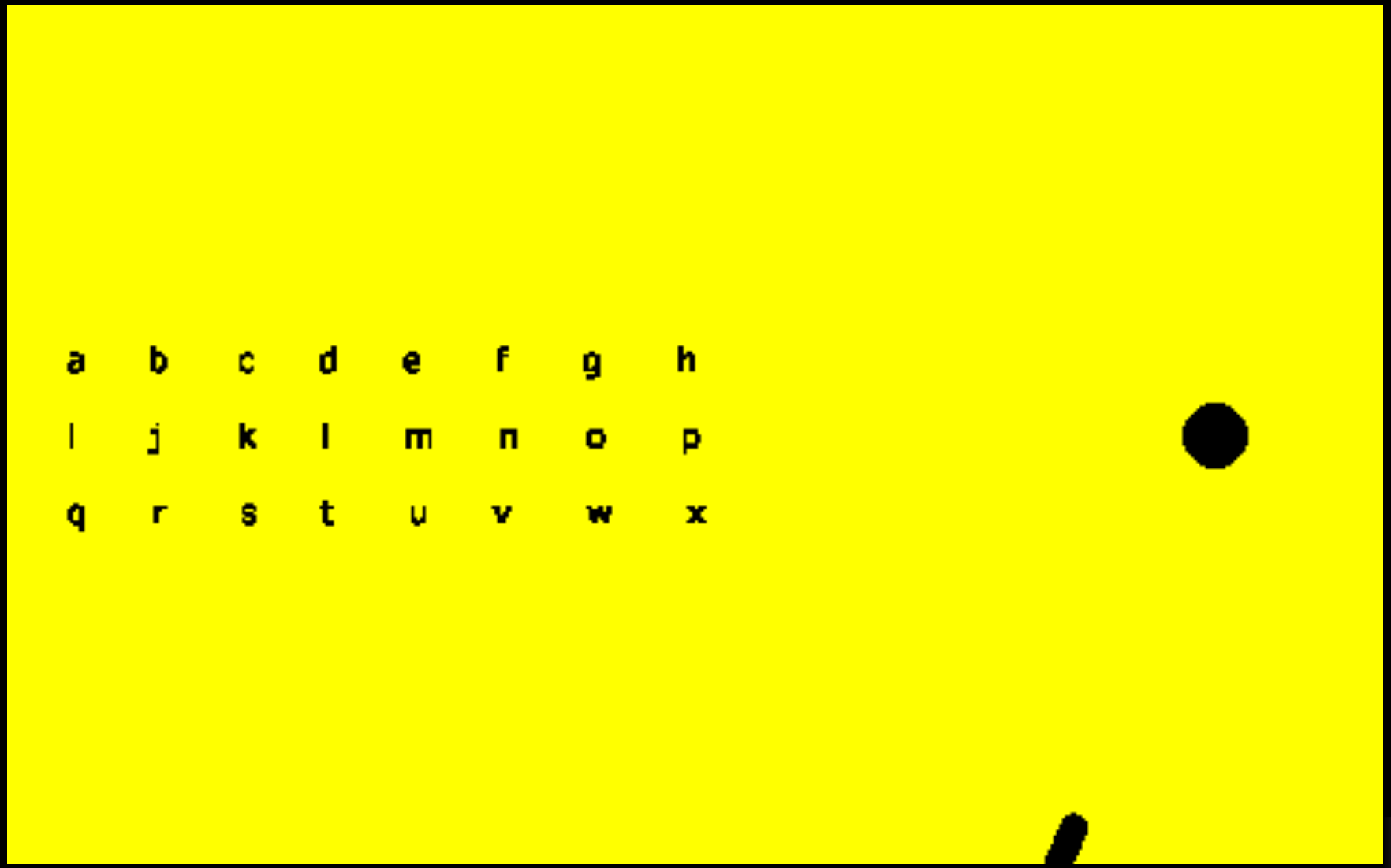
Painful Image Warning

Spinning Wheel



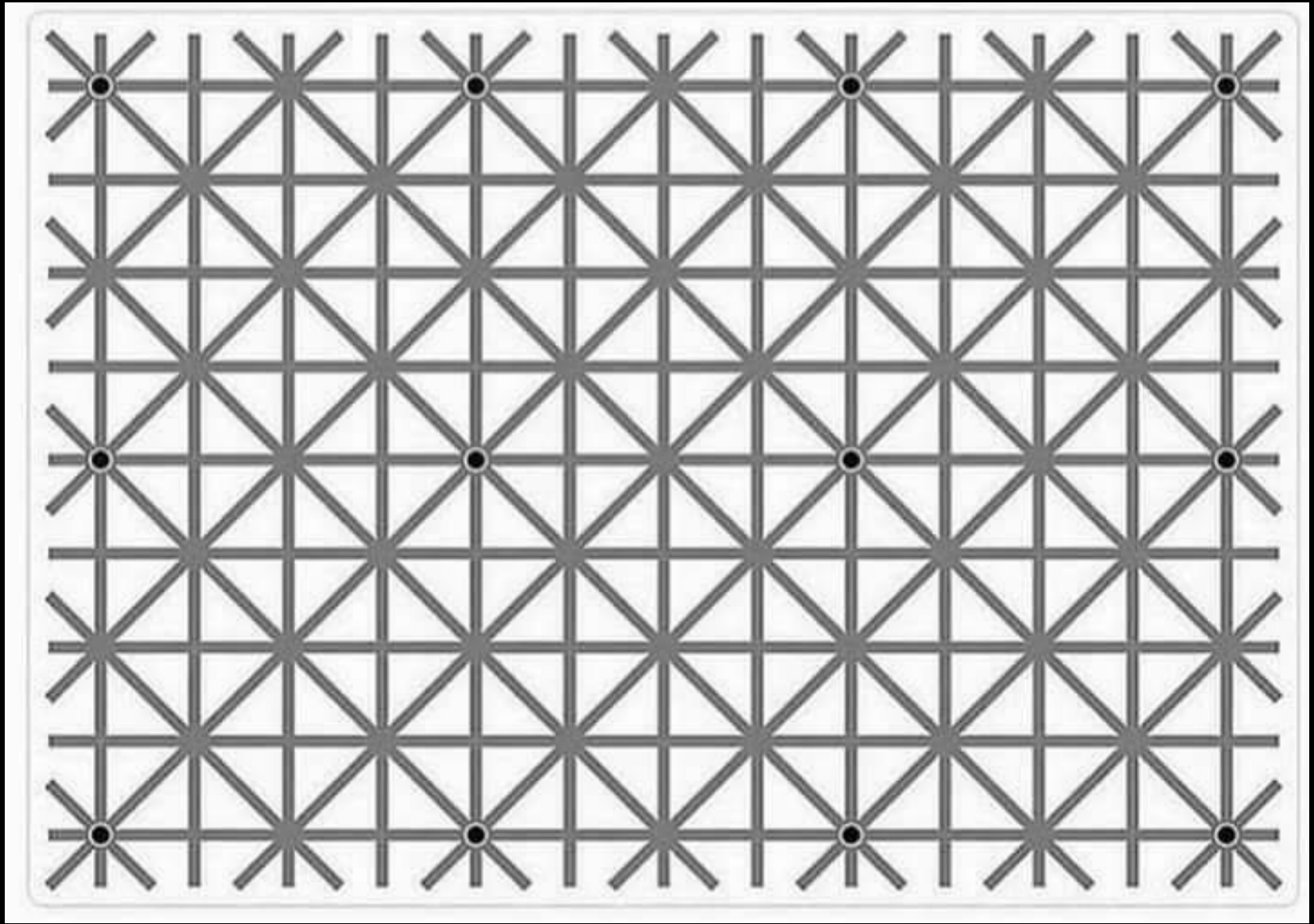
Follow the red dots vs
follow the yellow dots

Blind Spot Interpolation

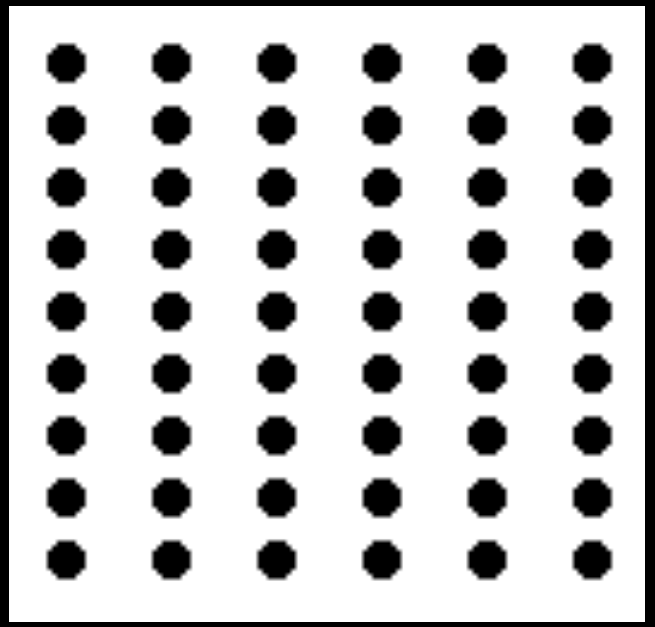


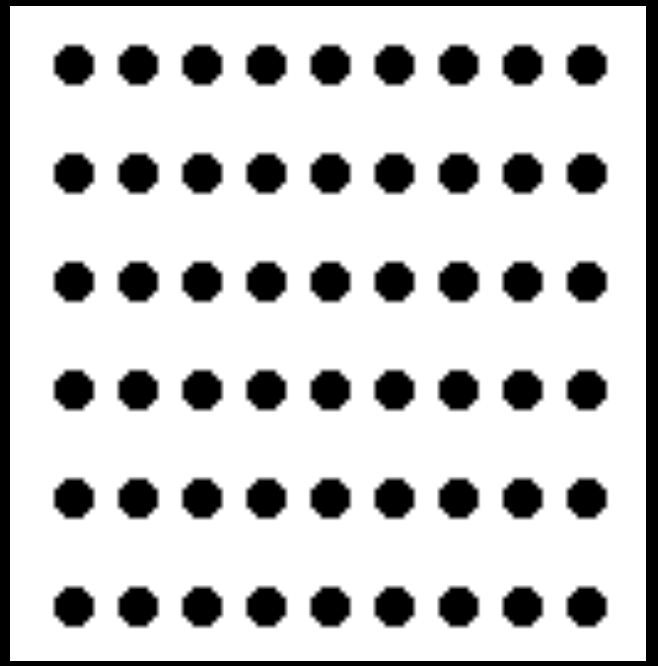
Use right eye, look at letters

12 Dots in this Image



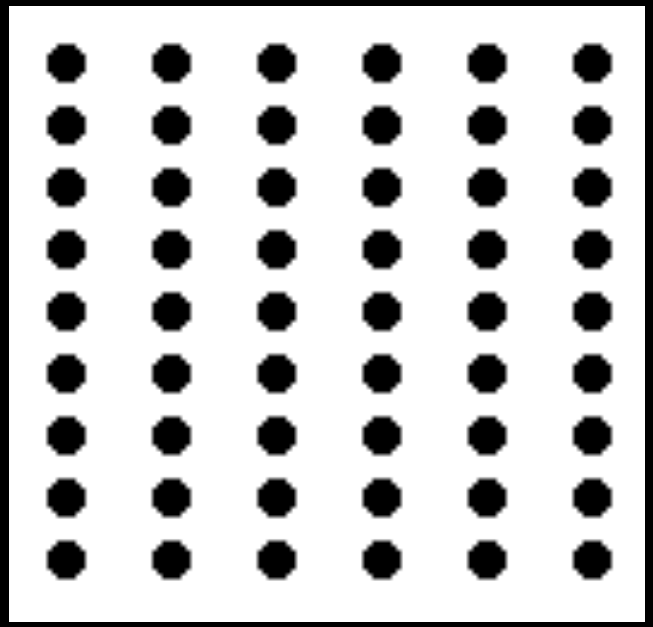
Rows or columns?

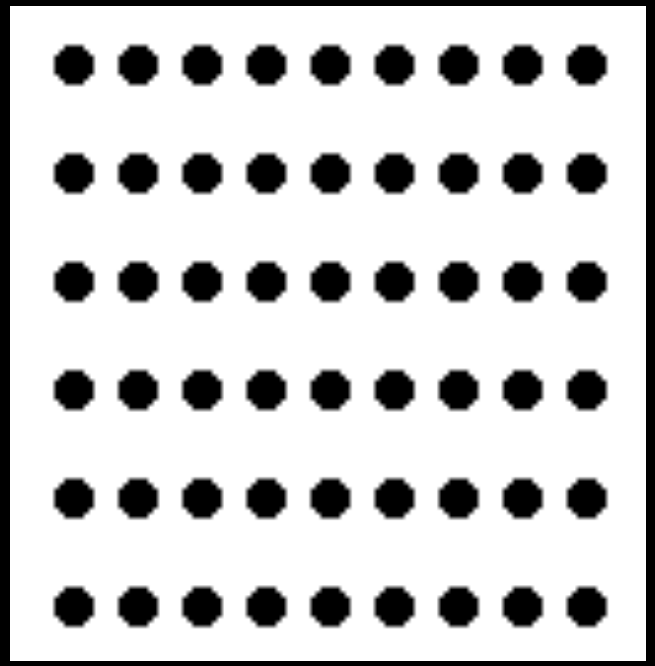




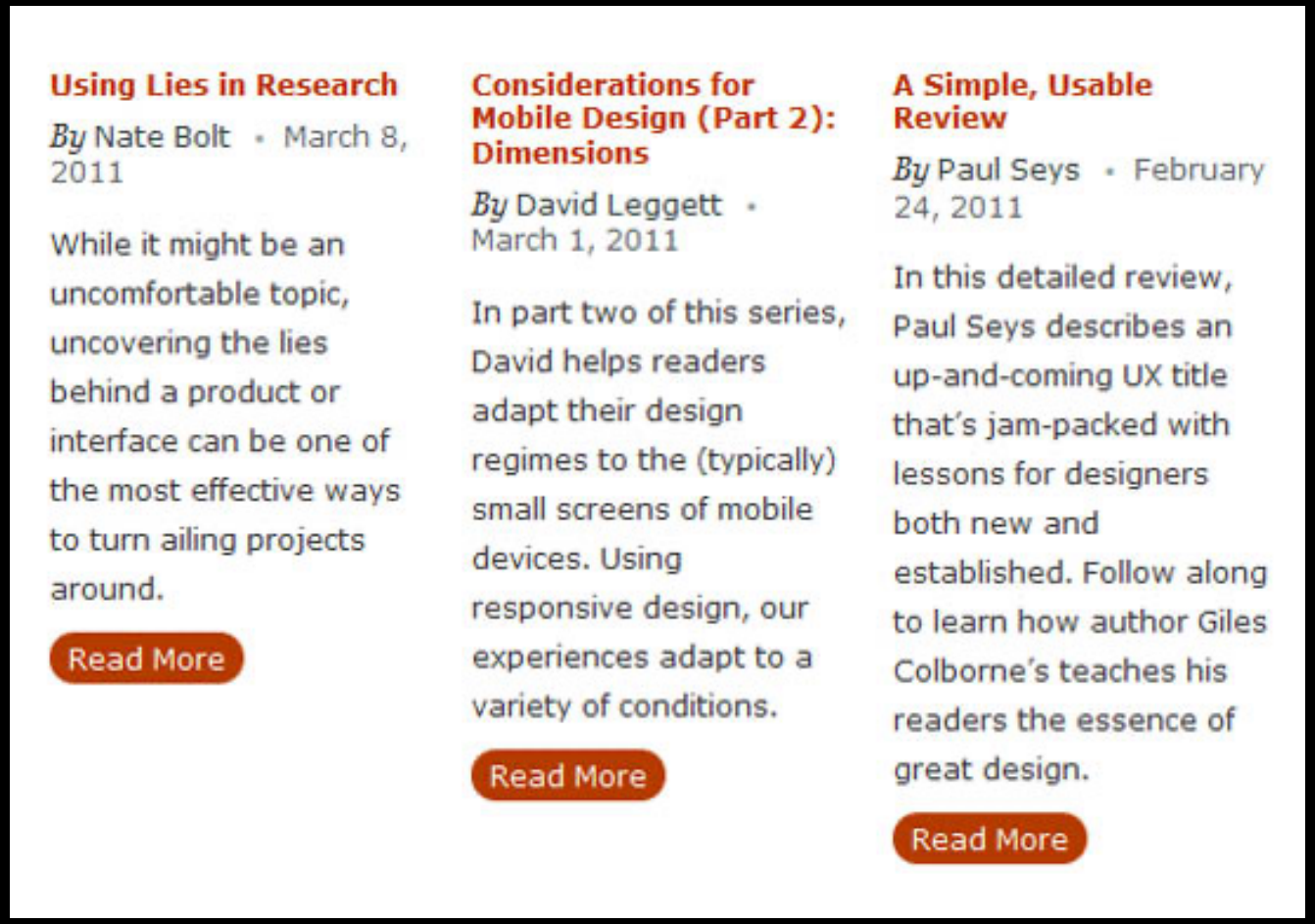
Proximity

Objects close to each other form a group

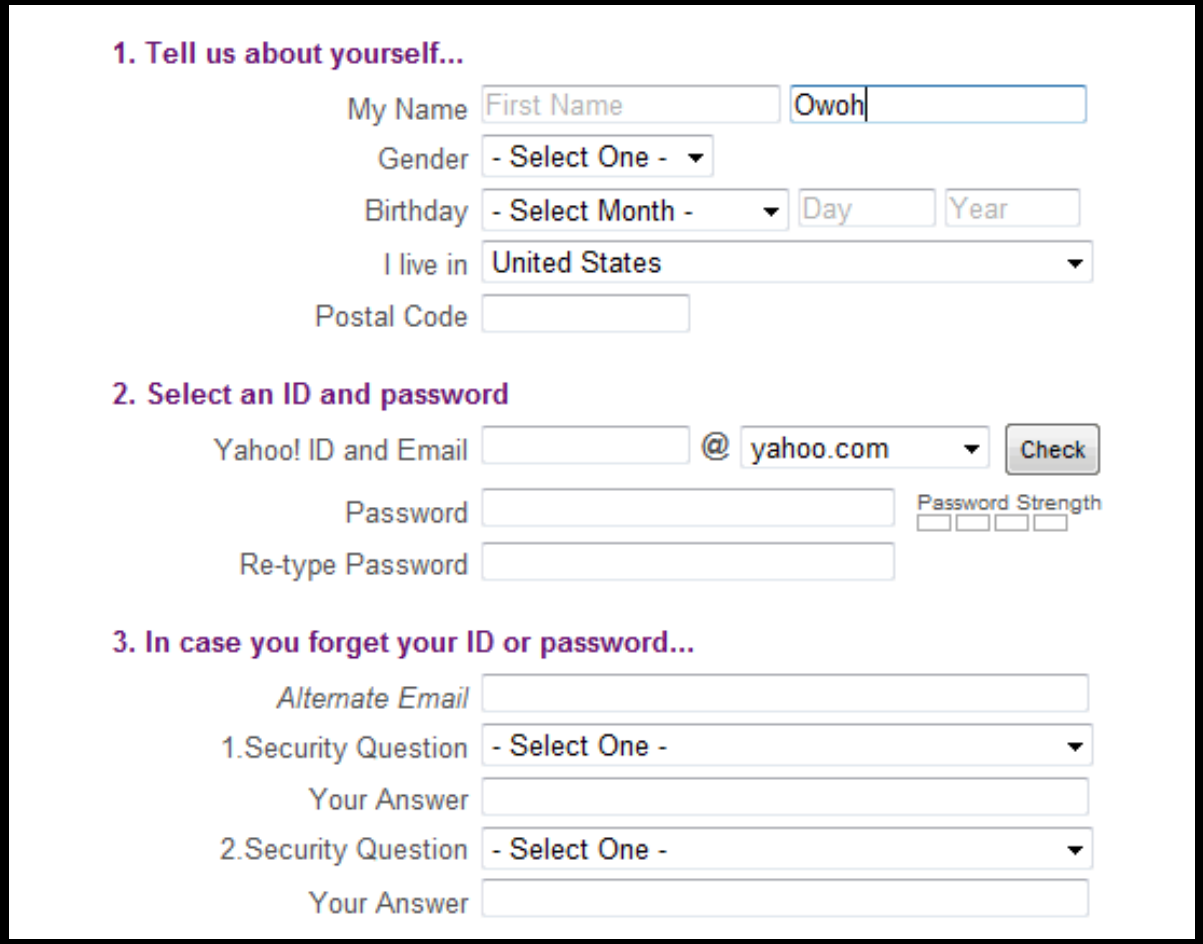




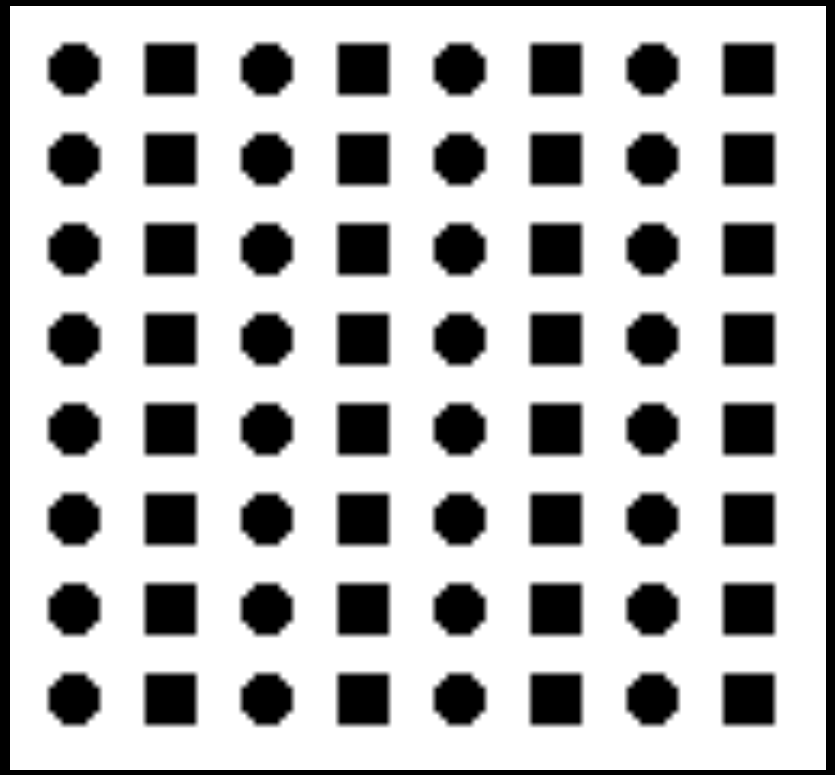
Proximity


Using Lies in Research
By Nate Bolt • March 8, 2011
While it might be an uncomfortable topic, uncovering the lies behind a product or interface can be one of the most effective ways to turn ailing projects around.
Read More
Considerations for Mobile Design (Part 2): Dimensions
By David Leggett • March 1, 2011
In part two of this series, David helps readers adapt their design regimes to the (typically) small screens of mobile devices. Using responsive design, our experiences adapt to a variety of conditions.
Read More
A Simple, Usable Review
By Paul Seys • February 24, 2011
In this detailed review, Paul Seys describes an up-and-coming UX title that's jam-packed with lessons for designers both new and established. Follow along to learn how author Giles Colborne's teaches his readers the essence of great design.
Read More

Proximity

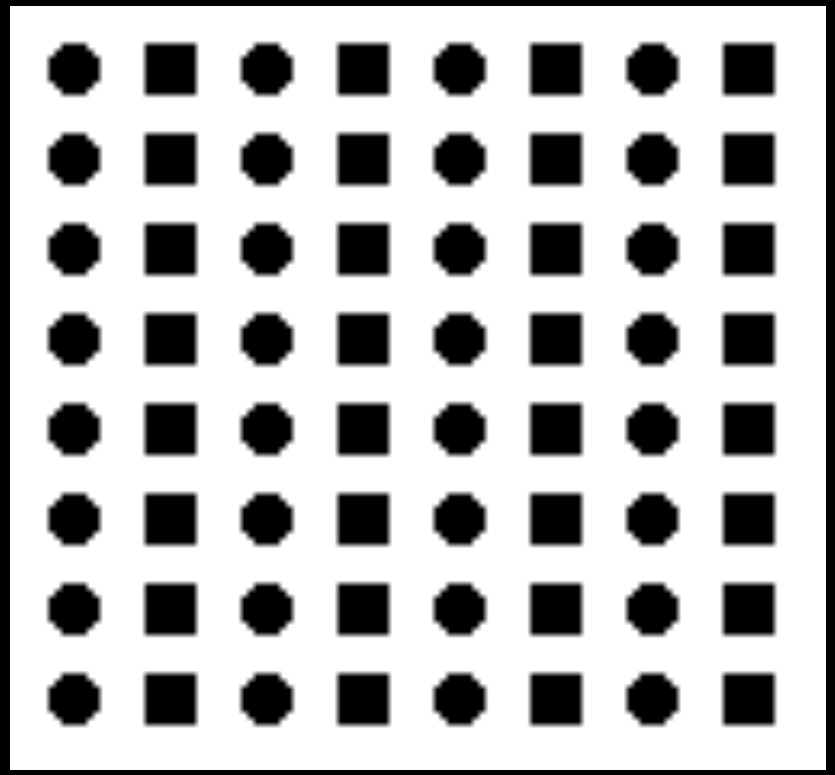

1. Tell us about yourself...
My Name
First Name
Owoh
Gender
- Select One -
Birthday
- Select Month -
Day
Year
I live in
United States
Postal Code
2. Select an ID and password
Yahoo! ID and Email
@
yahoo.com
Check
Password
Password Strength
Re-type Password
3. In case you forget your ID or password...
Alternate Email
1.Security Question
- Select One -
Your Answer
2.Security Question
- Select One -
Your Answer

Rows or Columns?

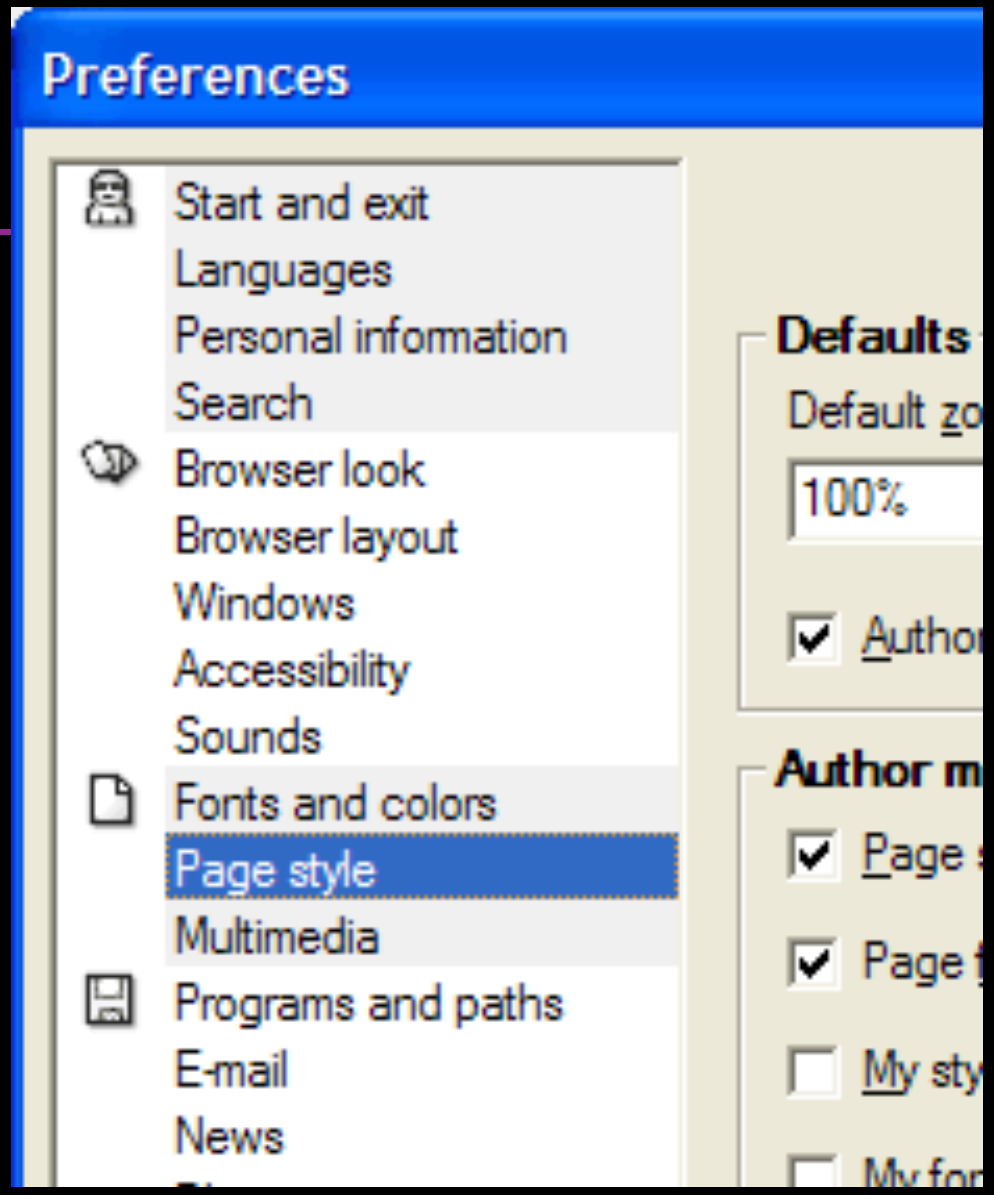


Similarity

Objects that are similar form a group

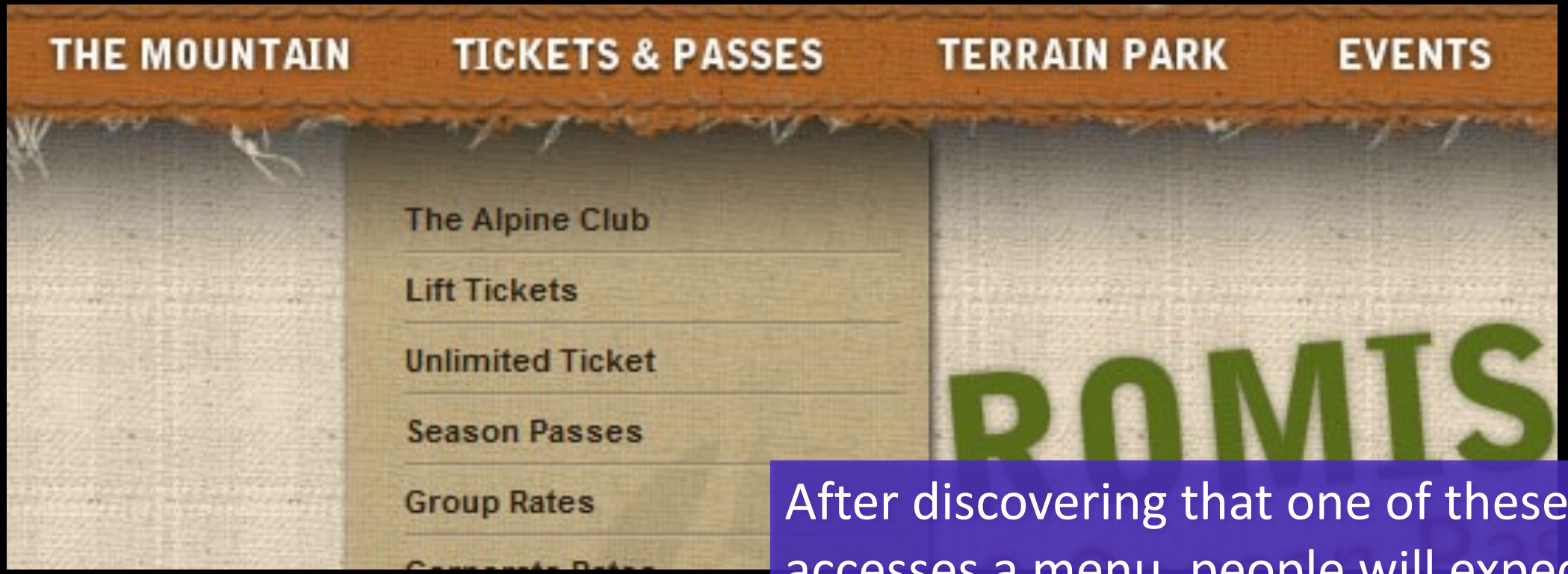


Similarity


Preferences
Start and exit
Languages
Personal information
Search
Browser look
Browser layout
Windows
Accessibility
Sounds
Fonts and colors
Page style
Multimedia
Programs and paths
E-mail
News
Defaults
Default zo
100%
Author
Author m
Page
Page
My sty

Proximity and Similarity

Proximity and Similarity



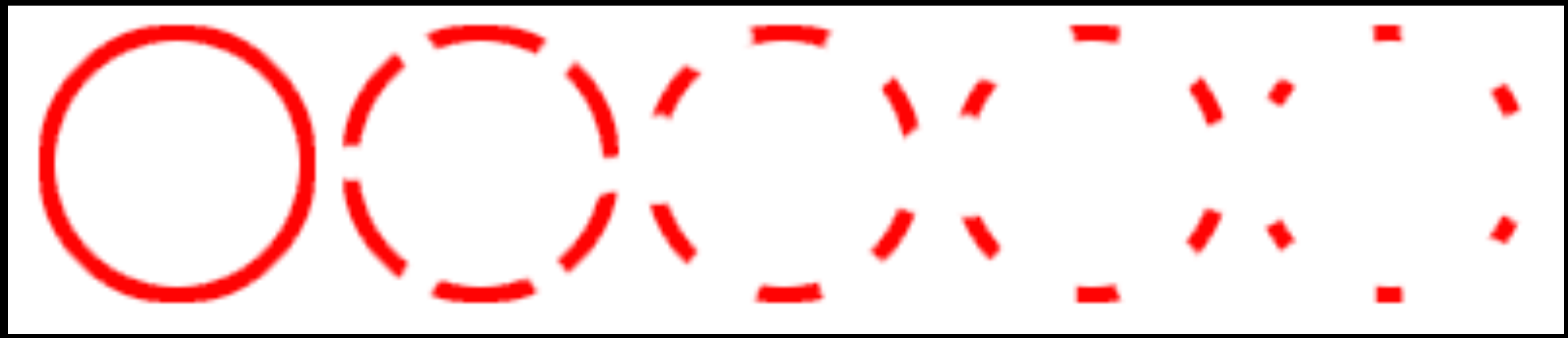
After discovering that one of these accesses a menu, people will expect they all access a menu. They are the same.

How many circles?

Closure

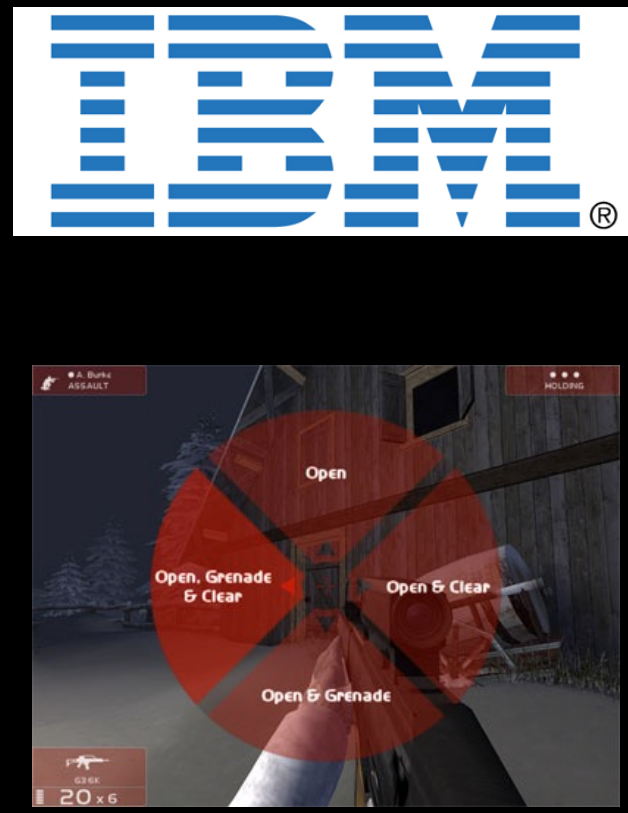
Even incomplete objects are perceived as whole

- Increases regularity of stimuli



Closure

The Sims



Rainbow 6

Symmetry

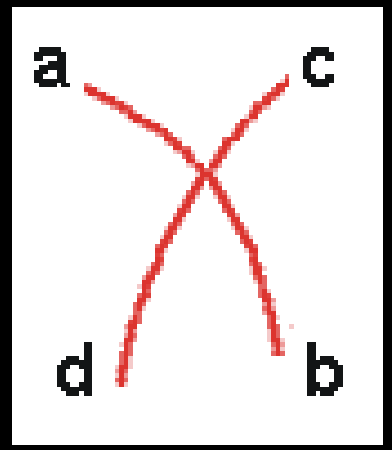
Objects are perceived as symmetrical and forming around a center point

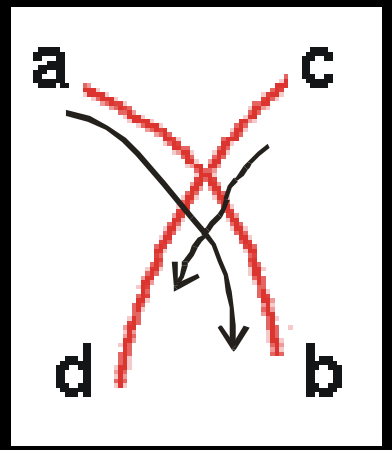
If you fight symmetry, be sure you have a reason

Continuity

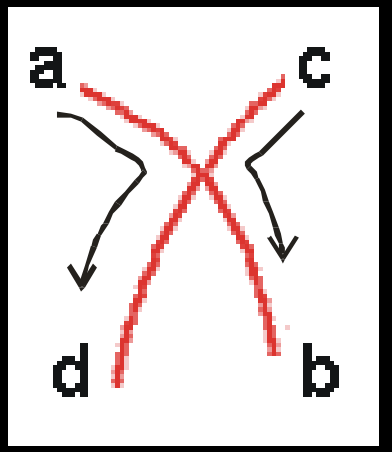
Objects perceived as grouped when they align

- Remain distinct even with overlap
- Preferred over abrupt directional changes



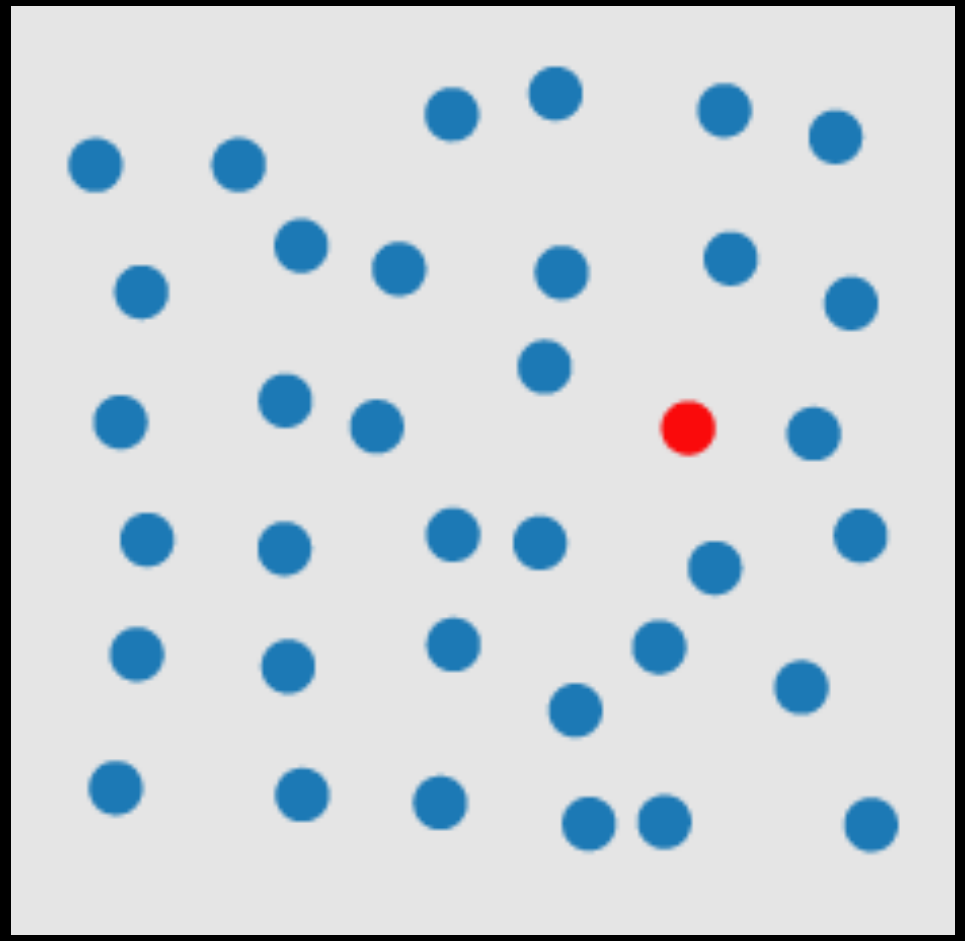


what most people see



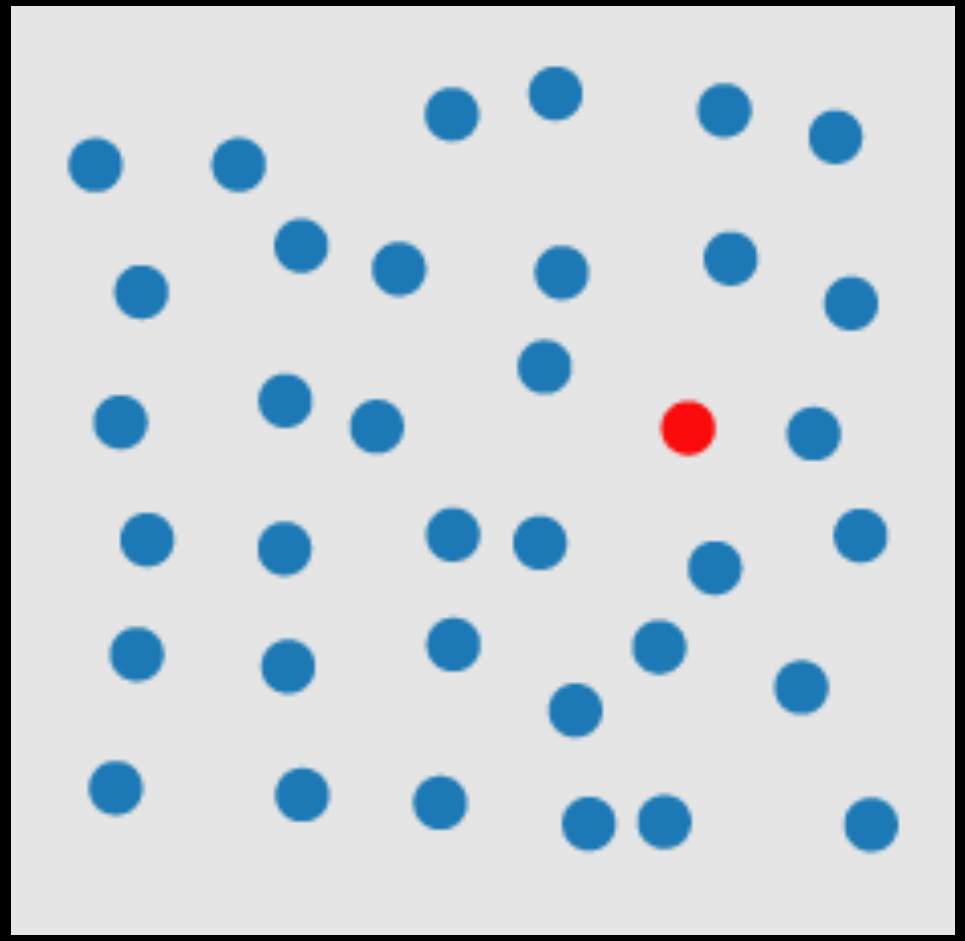
not this

What's the question here?



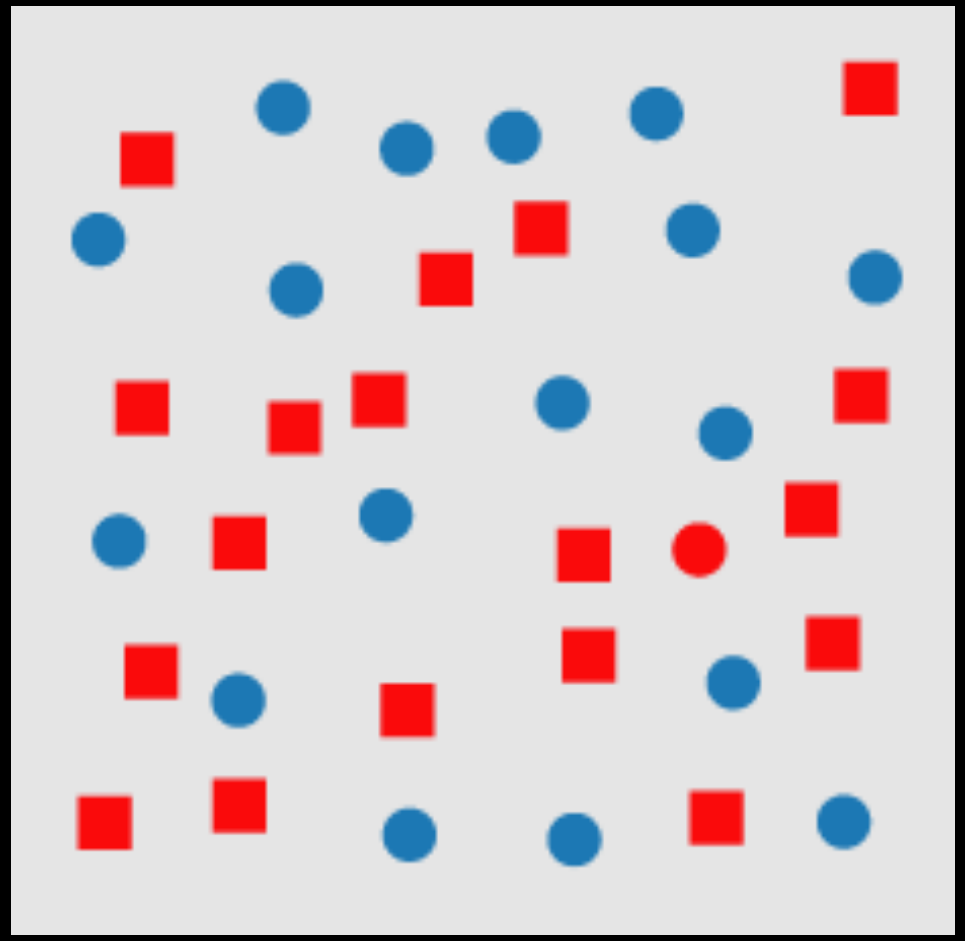
Mike Bostock

No, I wasn't going to ask where the red circle is



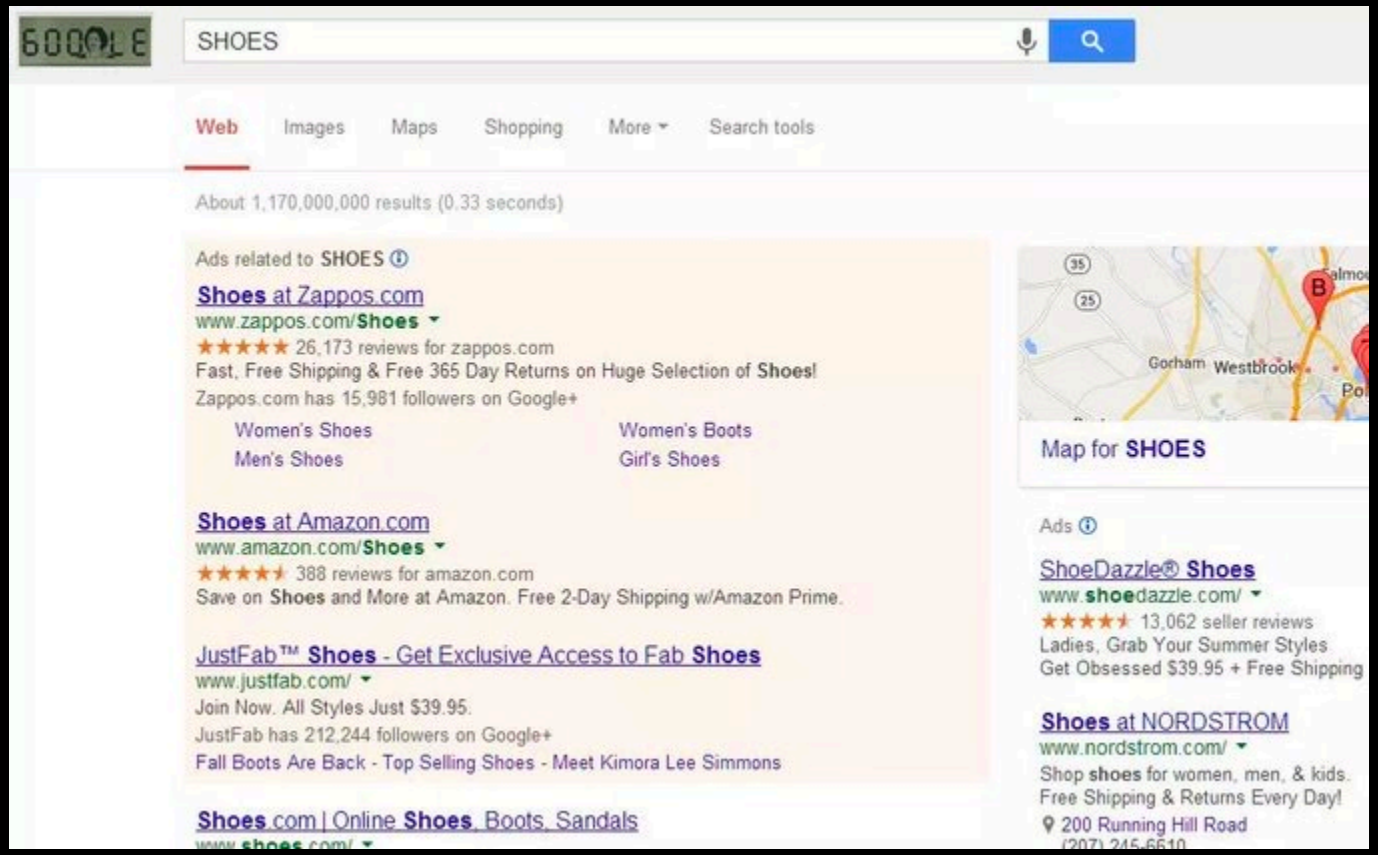
Mike Bostock

Pre-Attentive Processing



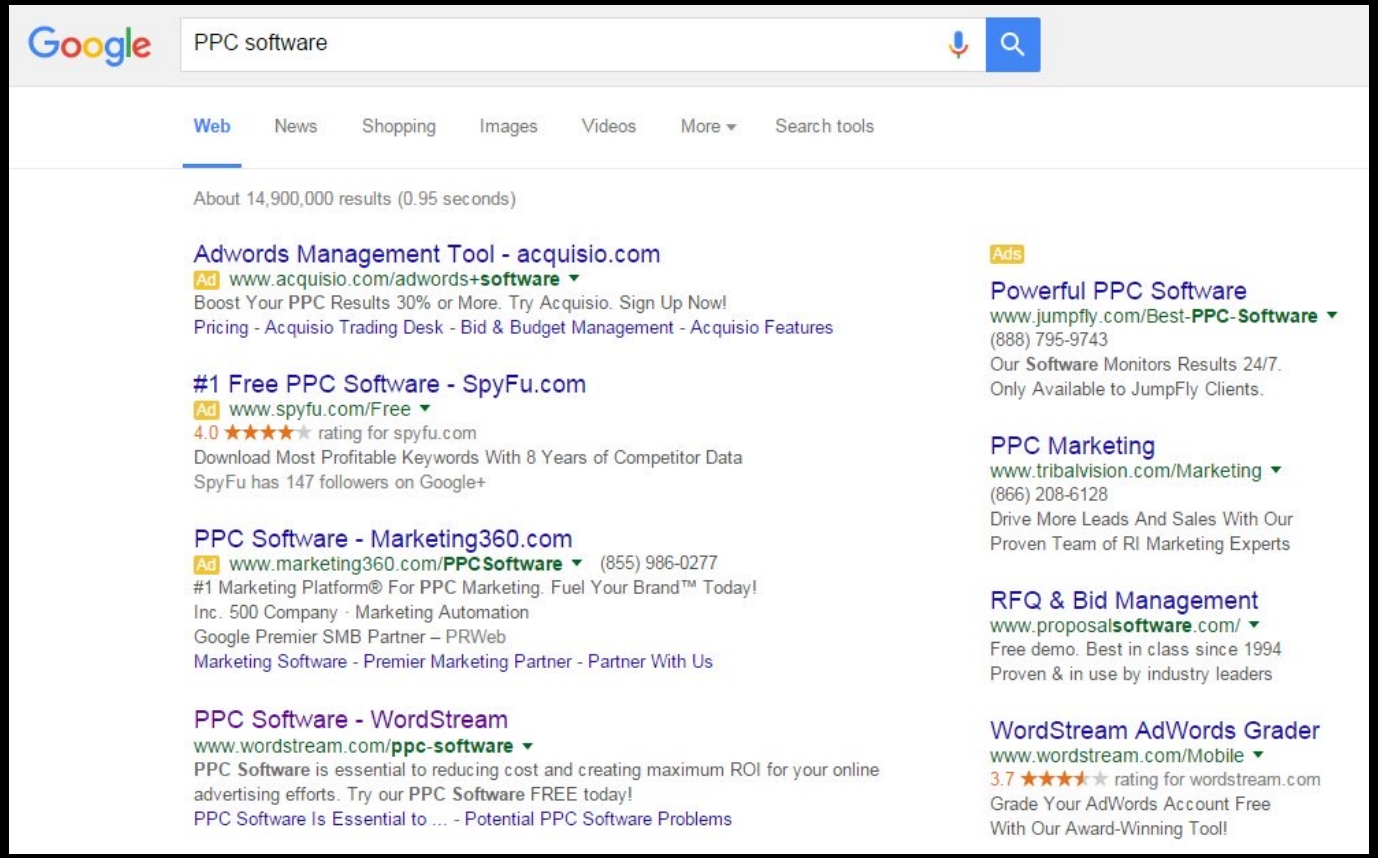
Mike Bostock

Pre-Attentive Processing



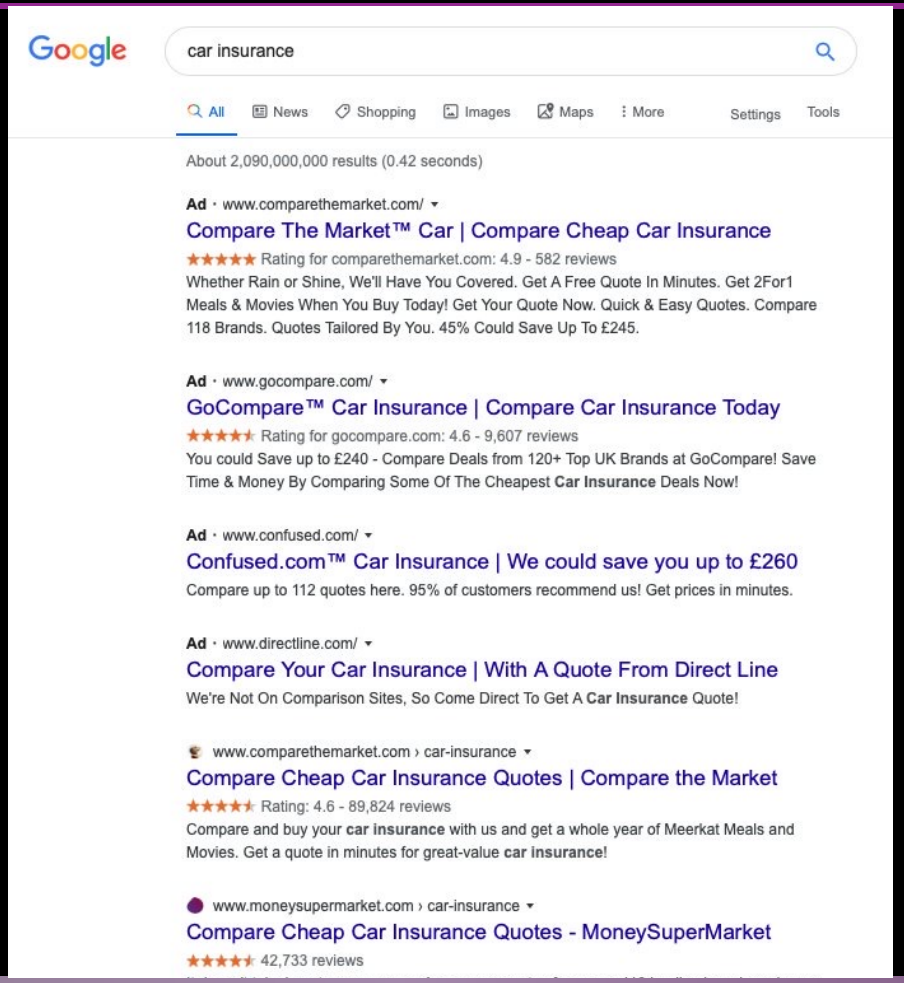
Mike Bostock

Pre-Attentive Processing



Mike Bostock

Pre-Attentive Processing



Mike Bostock

Models from Different Perspectives

Some example models of human performance

Visual System	Biological Model
Model Human Processor	Higher-Level Model
Fitts's Law	Model by Analogy
Gestalt Principles	Predict Interpretation

CSE 440:
Introduction to HCI

08: Models and Human Performance

April 18, 2024

Jesse J. Martinez | Avery Mack | Simona Liao