SWE3053

Human Computer Interaction

Lecture 18

Scientific Method

On Creativity

- Creativity: Ability to generate **original ideas** or solve problems in **novel** ways
- Original:
  - New
  - Fresh
  - Novel
  - Created for the first time

Creative Thinking

- Creative people are divergent thinkers
- Divergent Thinking: The ability to generate unusual, yet appropriate responses to problems or questions.
  - Produces *many* answers to the same question
- Convergent Thinking: The ability to produce responses that are based primarily on knowledge and logic.
  - Produces *one* (or few) answer(s) to the same question

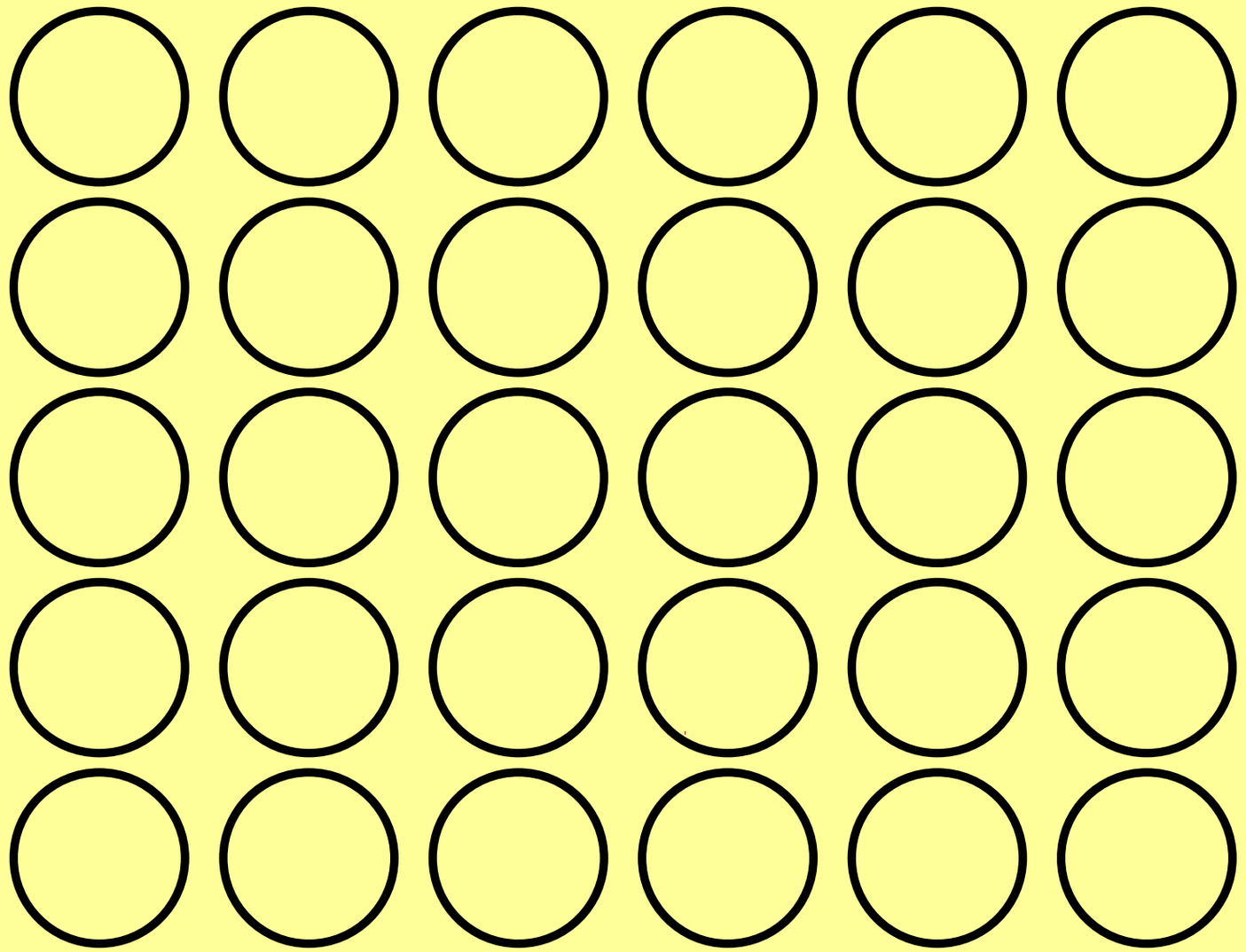
*"The best way to get a good idea is to get a **lot** of ideas."*

Linux Pauling

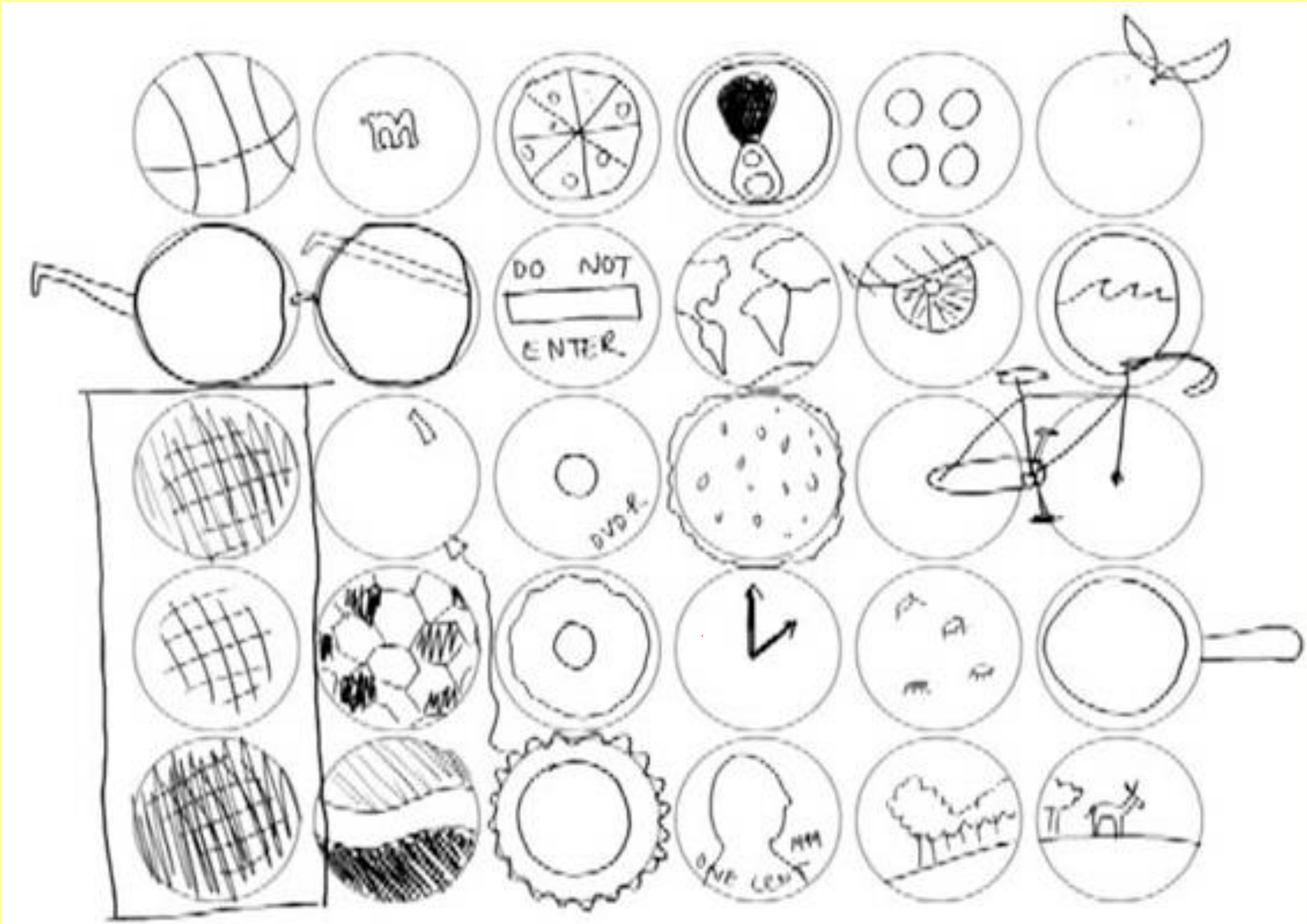
Purdue Creativity Measurement

- Write down as much usage of a newspaper as possible
- A 10-year-old boy:
- Read it; Write on it; Paint a picture; Put it on a chair if it is messy; Shade for something you don’t wanna see; Use it to pick up something hot; Use it to stop bleeding; Catch the drippings; Curtains; Shade light; Make a kite; Wipe windows; Use it as wrapper; Wipe eyeglasses; Make a paper bowl; make a paper hat; Make paper airplane; Use it as dustpan; Make a ball for the cat to play; ……

The “30 Circle” Measurement



The “30 Circle” Measurement



Brainstorming

- Alex Osborn (1953)
- A creativity technique
- For group or individual thinking
- Generating original ideas
-
- Principles of Brainstorming
  1. Defer Judgment
  2. Reach for quantity
  -
  -

Brainstorming Rules

1. Focus on Quantity
   - Fostering divergent thinking!
   - Quantity breeds quality
2. Withhold Criticism
   - Participants should not critise
   - Instead participants should extend or add to the ideas
   - Foster unusual ideas
3. Welcome Unusual Ideas
   - New perspectives
   - Don’t kill good ideas at the early stage
4. Combine and Improve Ideas
   -
-

GROUND RULES*

1. DEFER JUDGEMENT
2. ENCOURAGE WILD IDEAS
3. BUILD ON THE IDEAS OF OTHERS
4. STAY FOCUSED ON THE TOPIC
5. ONE CONVERSATION AT A TIME
6. BE VISUAL
7. GO FOR QUANTITY

---

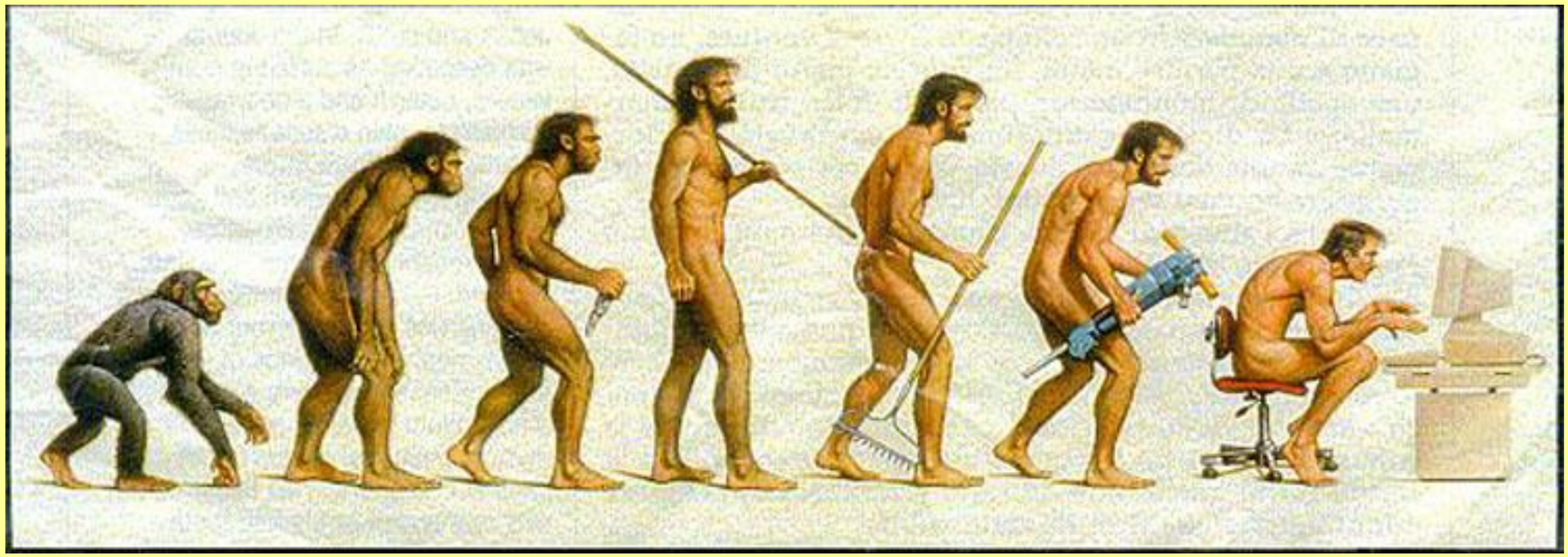
*Borrowed from IDEO

How great ideas were born?

- Really really great ideas were seldom coming from formal methods
  - Focus group interview
  - Users needs analysis
- Really really great ideas came from nowhere!
- E.g. Facebook; Youtube; Post-it Note
- Really Great Creative Ideas were Accidents!!!
-

Evolution

- Evolution – incremental changes over long period of time
-

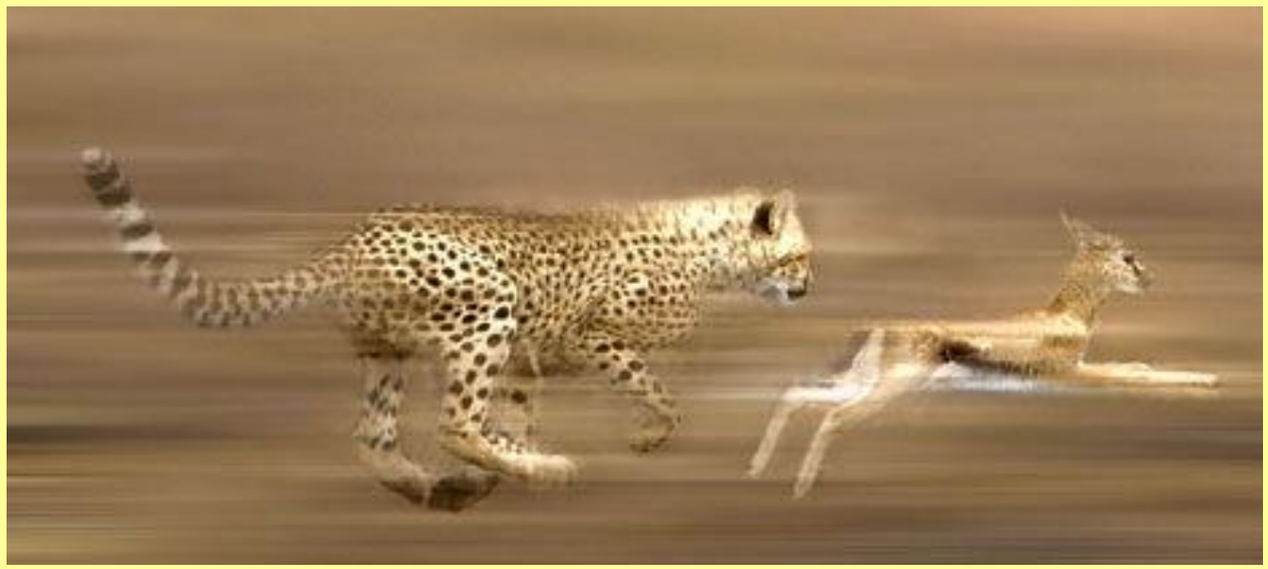


Survival of Fitness

For every living thing on earth, the name of the game is **SURVIVAL**.

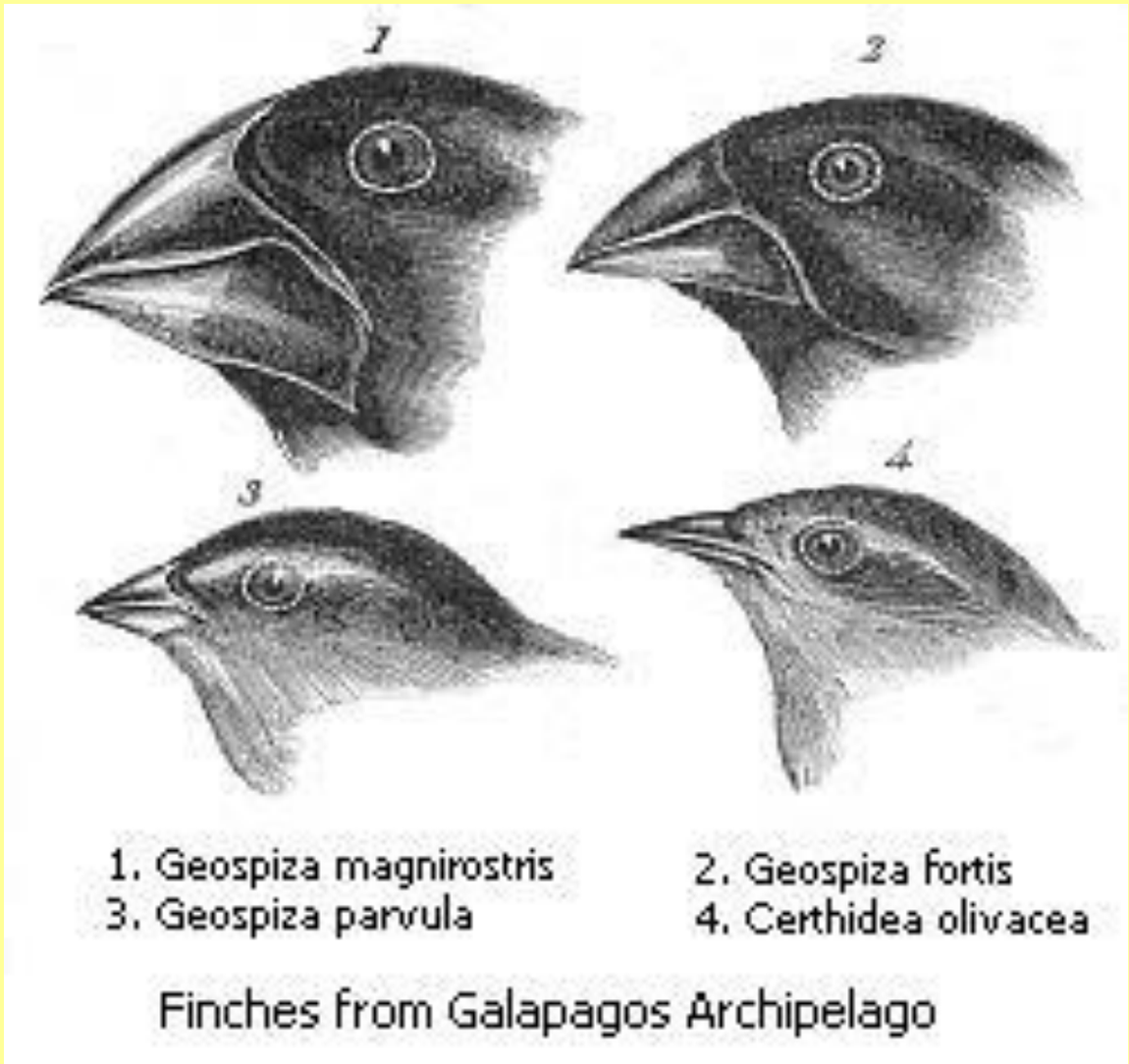
Who can survive?

- Natural Selection
- The species who can **adapt** to the nature will survive
- Those who can’t adapt will extinct: die and disappear
- Cheetah vs. Gazella



Evolutionary Theory

1. Survival of Fitness, Natural selection
2. Variation
3. Heredity



1. Geospiza magnirostris
2. Geospiza fortis
3. Geospiza parvula
4. Certhidea olivacea

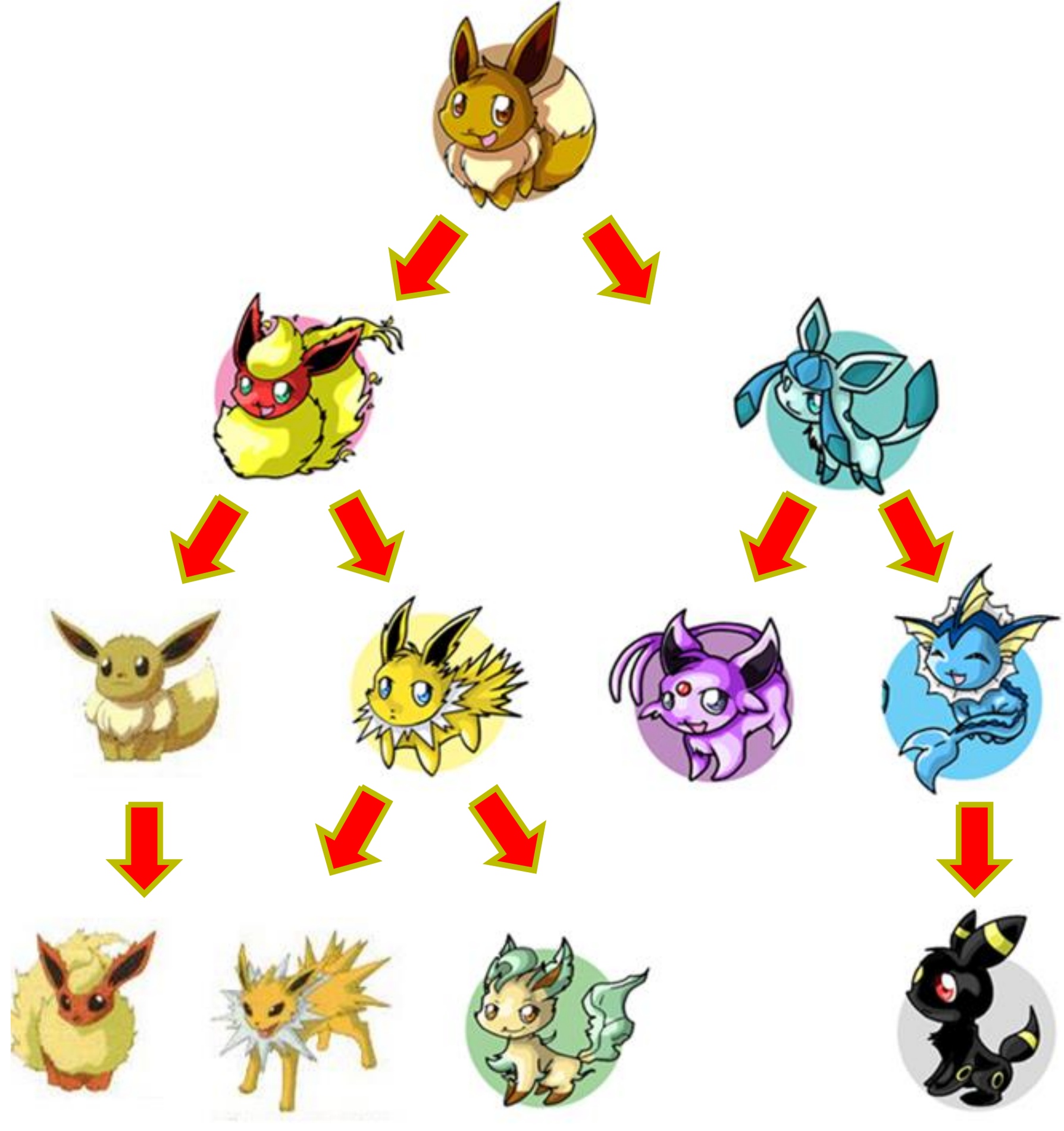
Finches from Galapagos Archipelago

1st Generation

2nd Generation

3rd Generation

4th Generation



Evolutionary Theory Applications

- Creative Ideas!
- No one knows what are great creative ideas (Nature)
-

1. Survival of Fitness, Natural selection
2. Variation
3. Heredity

-

Assignment #8 – Coming up with a Research Question

Submit on iCampus before **(Monday) May 9 23:59 pm**.

A Note on Research Methodology

Simplest design

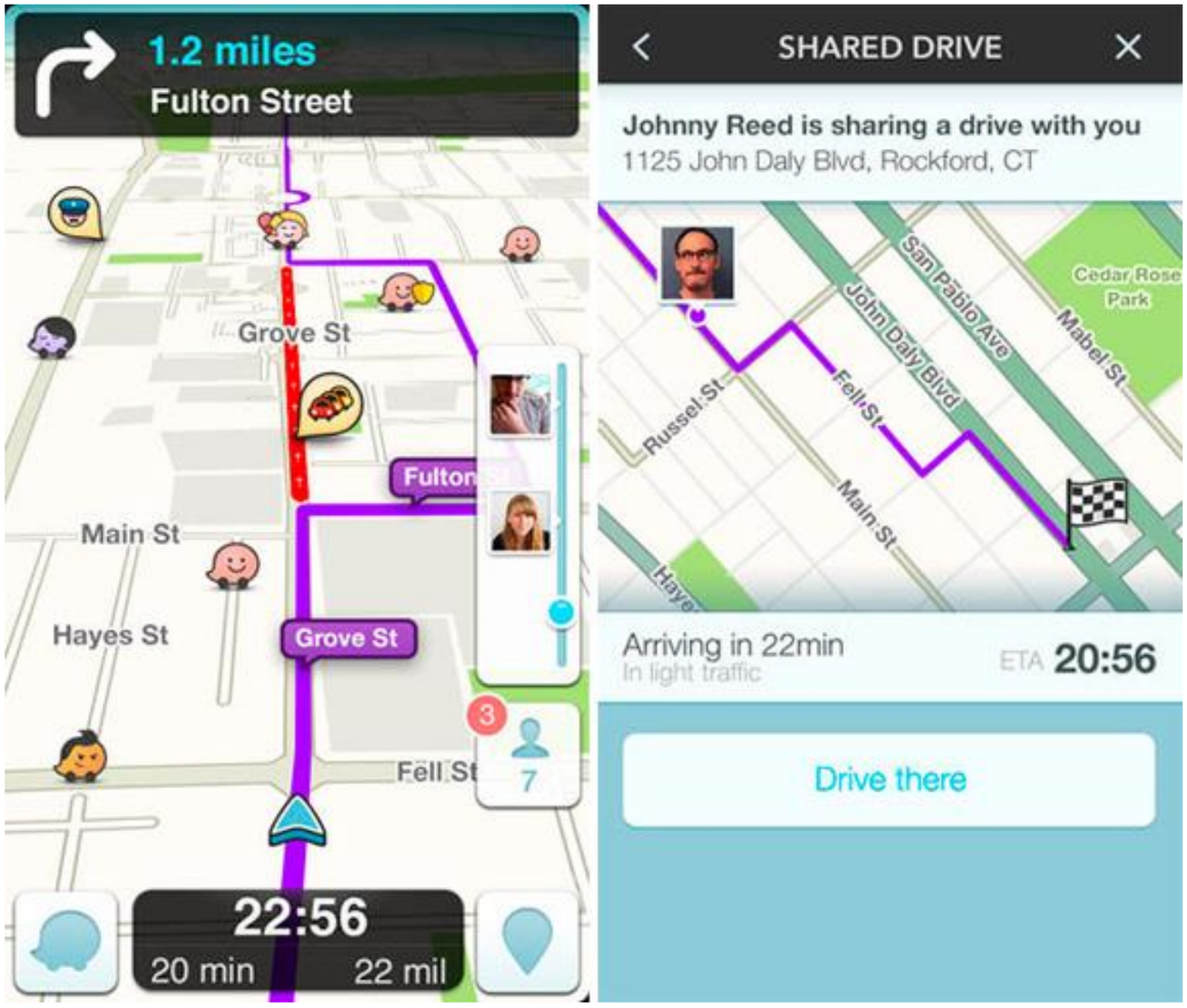
- one independent variable with two levels
- one dependent variable
-

What if we want to manipulate more than one variable?

Complex Design

- Experiments that involve two or more independent variables studies simultaneously

Example: Navigator Interfaces



A few points for brewing research idea...

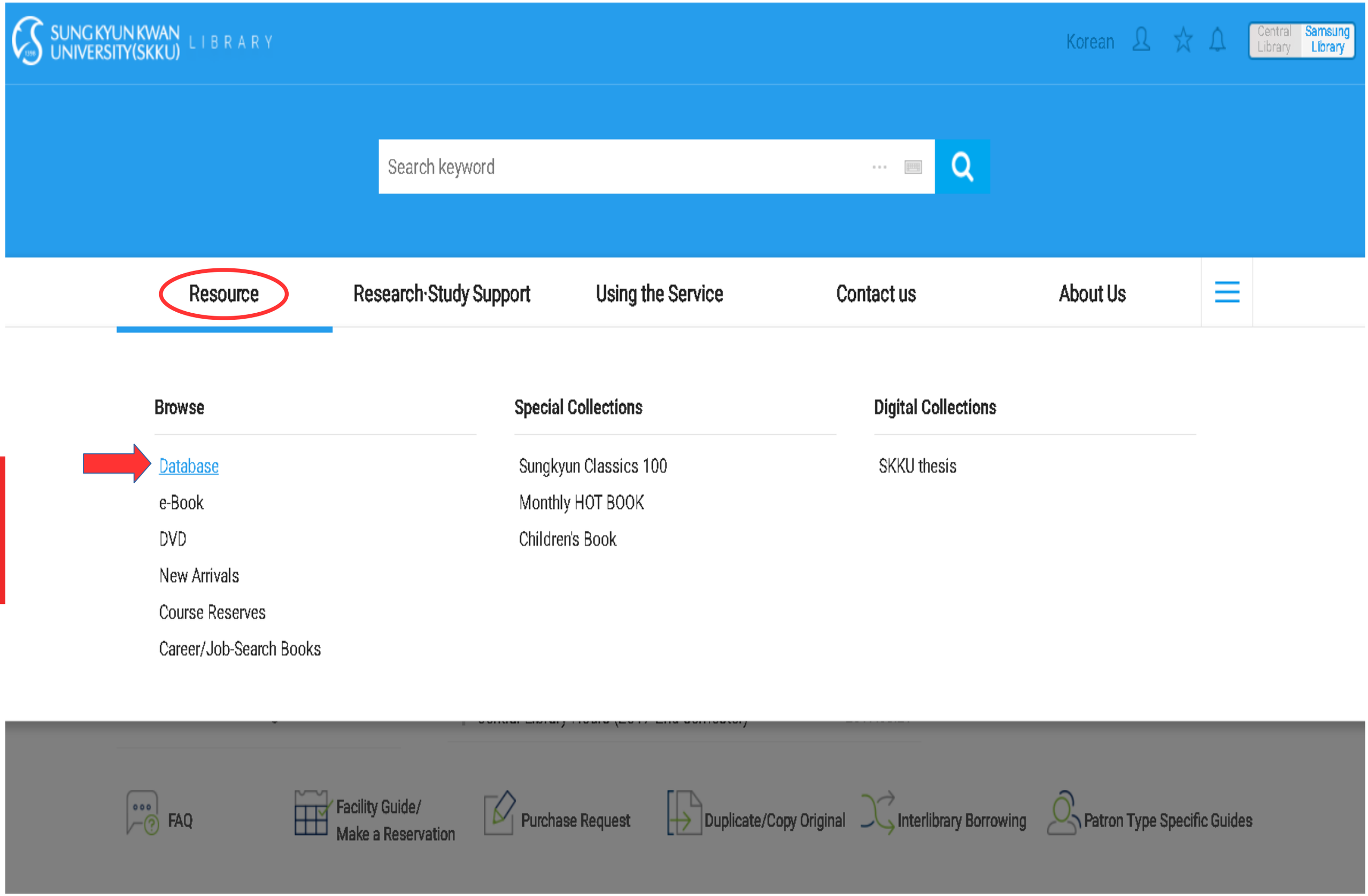
1. Think BIG initially
2. **Pick an area that you LOVE**
3. Narrow it down to a very small question
4. Single out ONE variable you want to explore
5. Check if anyone did this before

A few points for brewing research idea...

- Organized search for published work on a topic
- PsycINFO – a database for psychology literatures

1. Search using **PsycINFO**
   - **Other database: ScienceDirect, ACM Portal, IEEEXplore, PubMed**
2. Treeing backward using reference list
3. Treeing forward using **cited-by**

lib.skku.edu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110	PsycINFO	CLICK	An expansive abstracting and indexing database with more than 3 million records devoted to peer-reviewed literature from the 1800s to the present	+
111	PubChem OA	CLICK	A database that searching information of Chemical molecular and compound structure operated by US National biology engineering information center	+
112	PubMed OA	CLICK	A search engine accessing primarily the MEDLINE database of references and abstracts on life sciences and biomedical topics	+
113	RefWorks	CLICK	An online citation manager that help to keep track of citations to books, articles and other documents(Use after generating ID if you try to access to detail contents)	+
114	Regional Business News(RBN)	CLICK	A database that provides comprehensive coverage for regional business publications including business journals, newspapers and newswires from all metropolitan and rural areas within the United States	+
115	RISS(Academic research information service)	CLICK	The largest academic research information service in Korea, provides Korean universities collection material	+
116	RSC(Royal Society of Chemistry)	CLICK	Provides access to RSC journals, in some cases back to the 19th century. A list of subscribed titles can be found in the library catalog NS Campus	+
117	S2Journal	CLICK	Provides ranking and impact factor of SCIE·SSCI·A&HCI·SCOPUS·KCI journals and various informations about academic journals	+
118	Sage	CLICK	Provide 515 full-text journals in management, economy, education, history, medical, social science, technology area	+
119	SAMILi.com	CLICK	Korean tax law related information including more than 300,000 regulation, precedents and specialized contents and solutions	+
120	Samsung design net	CLICK	Online fashion information of Samsung fashion lab (need login-refer to detailed contents)	+
121	Science	CLICK	International weekly science journal, published by the American Association for the Advancement of Science NS Campus	+
122	Science.gov OA	CLICK	A web portal and specialized search engine, using federated search technol serves as a gateway to United States government scientific and technical information and research	+
123	ScienceDirect	CLICK	Access to a large database of scientific and medical research. It hosts over 12 million pieces of content from 3,500 academic journals and 34,000 e-books	+

Literature Search

EXAMPLE

“Mozart Effect”

entertainment **music**

Georgia program bringing classics to newborns


(CNN)

The program will hand out classical music CDs and cassettes to the parents of newborns in the state. Although Miller delivered the first tapes from his office in Atlanta, it officially gets underway next month.

The program will hand out classical music CDs and cassettes to the parents of newborns in the state. Although Miller delivered the first tapes from his office in Atlanta, it officially

In studies, kids who listen to compl
music show better math scores and
skills

kind of like spaghetti right a
stimuli that you provide to a
noodles make," explained p

And there is evidence that
soothing sounds of the classics.

The governor's initiative comes on the heels of new research showing a link between listening to classical music and enhanced brain development in infants. Previous studies have shown the complicated compositions of Mozart and other classical musicians can improve mathematical and logic skills in older children.

Trusted by Parents!

There's a big fun-filled world out there for babies to discover. Baby Einstein™ helps by using music, language, nature and art in playful ways to entertain and engage little ones from birth and up. Explore our entire line of playful and interactive DVDs, videos, books, music CDs, and toys today. You'll see how Baby Einstein can help you and your little one discover the world together.

The Walt Disney Company Stands by Its Retraction Request of the University of Washington

Bob Iger Letter to the University of Washington
(Adobe Acrobat Reader required)

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sign up

what is baby einstein?

Hear about our award-winning collection of interactive infant products

go

Steps in Literature Search

search using PsychINFO

-
- treeing backward from references
-
- treeing forward using Web of Knowledge

PSYCHINFO

Thompson et al. (2001)

Search with PsycInfo

PSYCHOLOGICAL SCIENCE

Research Report

AROUSAL, MOOD, AND THE MOZART EFFECT

William Forde Thompson,[1] E. Glenn Schellenberg,[2] and Gabriela Husain[1]

[1]York University, Toronto, Ontario, Canada, and [2]University of Toronto, Mississauga, Ontario, Canada

Abstract—*The "Mozart effect" refers to claims that people perform better on tests of spatial abilities after listening to music composed by Mozart. We examined whether the Mozart effect is a consequence of between-condition differences in arousal and mood. Participants completed a test of spatial abilities after listening to music or sitting in silence. The music was a Mozart sonata (a pleasant and energetic piece) for some participants and an Albinoni adagio (a slow, sad piece) for others. We also measured enjoyment, arousal, and mood. Performance on the spatial task was better following the music than the silence condition, but only for participants who heard Mozart. The*

an example of enhanced performance caused by manipulation of arousal or mood. Such effects are well established. Very high or low levels of anxiety or arousal inhibit performance on cognitive tasks, whereas moderate levels facilitate performance (Berlyne, 1967; Sarason, 1980; Solomon & Corbit, 1974; Yerkes & Dodson, 1908). Moreover, negative moods and boredom can produce deficits in performance and learning (Koester & Farley, 1982; Kovacs & Beck, 1977; O'Hanlon, 1981), whereas positive moods can lead to improved performance on various cognitive and problem-solving tasks (Ashby, Isen, & Turken, 1999; Isen, 1999).

not identical. Performance on certain tasks, such as creative problem solving, may be facilitated by positive affect but not by arousal. According to Ashby et al. (1999), effects of positive mood are associated with increased levels of dopamine, which project from the ventral tegmental area to several brain areas, including the locus ceruleus. The locus ceruleus, in turn, is the largest producer of norepinephrine, the neurotransmitter most strongly associated with arousal. Thus, although mood and arousal rely on different neurochemical systems, these systems have overlapping neural substrates and may have similar effects on performance in many instances.

In sum, claims that brief exposure to music leads to short-term enhancement of nonmusical skills are misleading. Rather, the Mozart effect can be explained simply: Enjoyable stimuli induce positive affect and heightened levels of arousal, which lead to modest improvements in performance on a variety of tasks.

Acknowledgments—This research was supported by the Natural Sciences and Engineering Research Council of Canada. Doug Gifford and Paul Pilon provided technical assistance. Sandra Trehub provided helpful comments on an earlier version of the manuscript.

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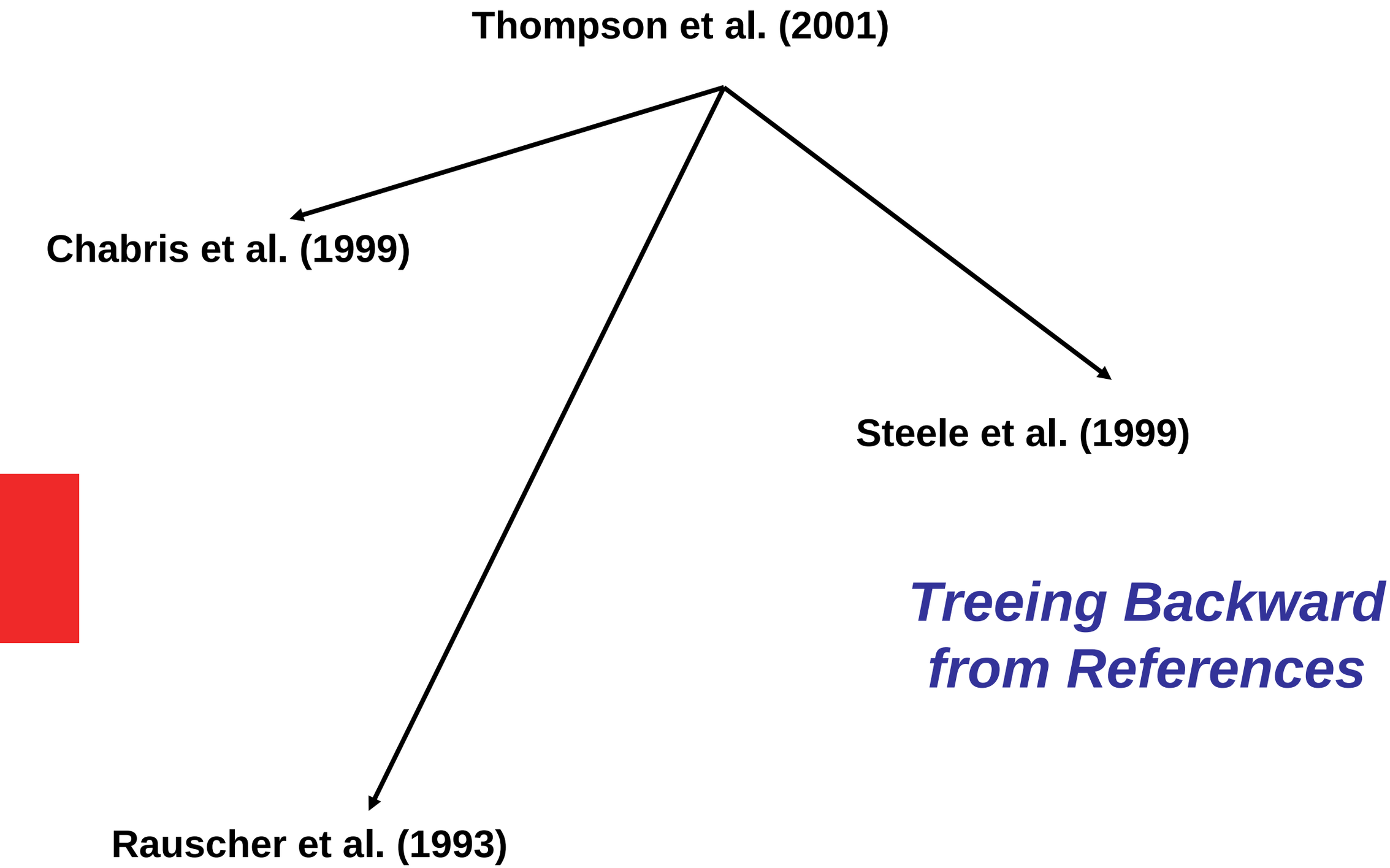

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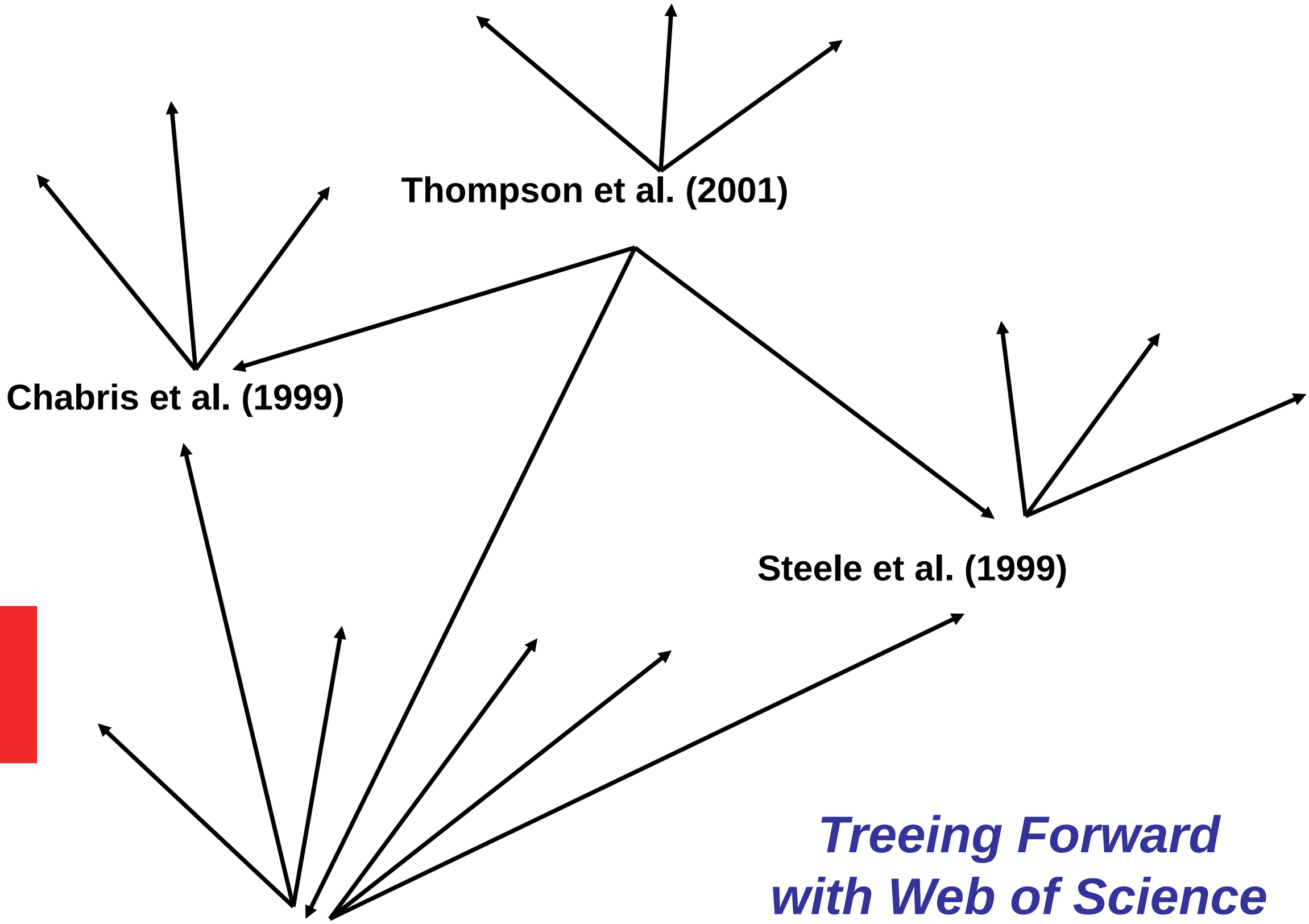
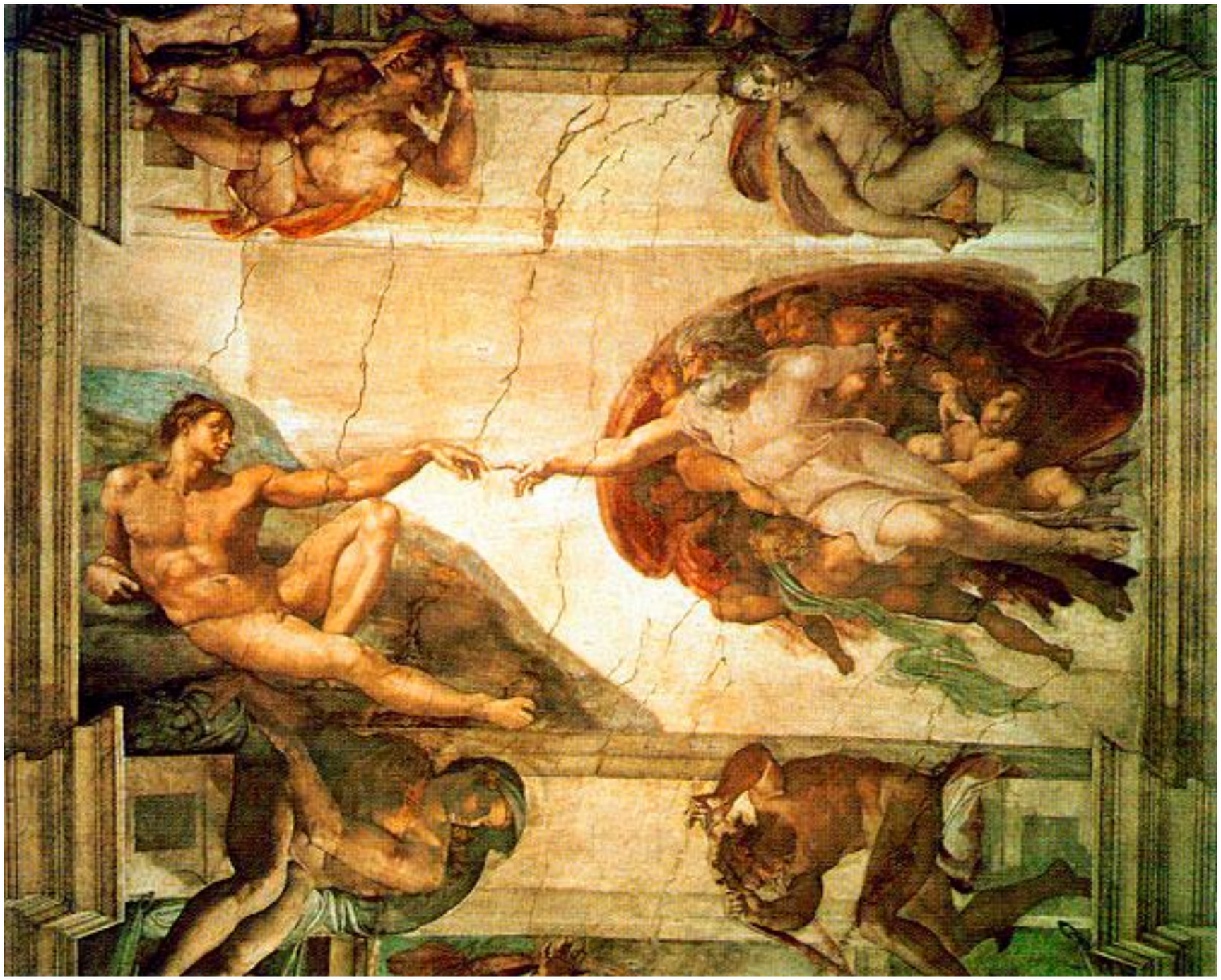


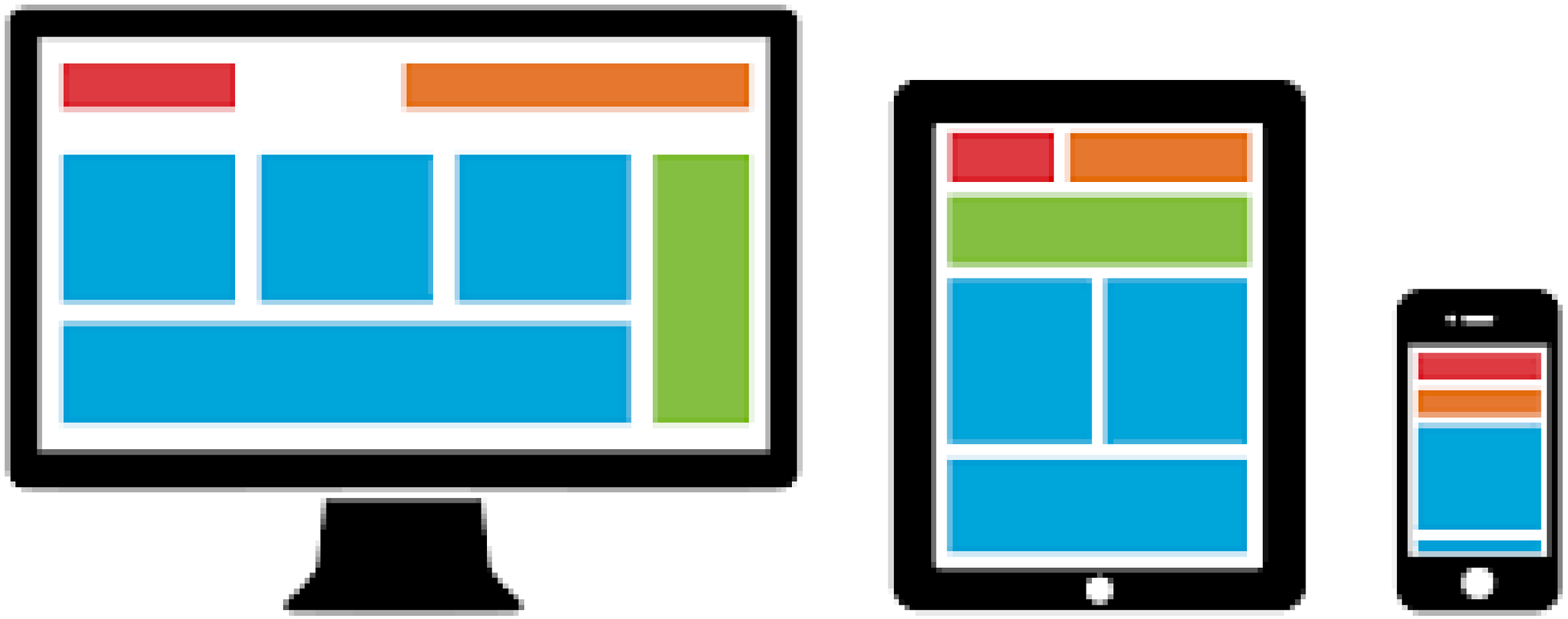
Treeing Forward with Web of Science

A Challenge to your Creativity ...



If you’re not prepared to be wrong, we will never come up with anything original.

Example 1: Position of website



Example 1: Effect of position/layout to choice

[General Topic]
I am interested in human behavior when browsing website, specifically how people make choice (e.g. purchasing decision).
- People make choice based on a lot of different criteria ……

[Be More Specific: effect of location to user's choice on a webpage]
If I place an item on a different location, is it going to have any effect to user's decision on making choice?

[Hypothesis]
Given everything being identical, will the position of an object affect user's choice on a webpage?

→ Go to do literature search
→ Design experiment to test out this hypothesis

1. Think BIG initially
2. Pick an area that you LOVE
3. Narrow it down to a very small question
4. Single out ONE variable you want to explore
5. Check if anyone did this before

Independent Variable

What is the effect of *position of identical options* on *choice*?

Dependent Variable