

COGS 230 / CSE 216 – Interaction Design Research

Design Process

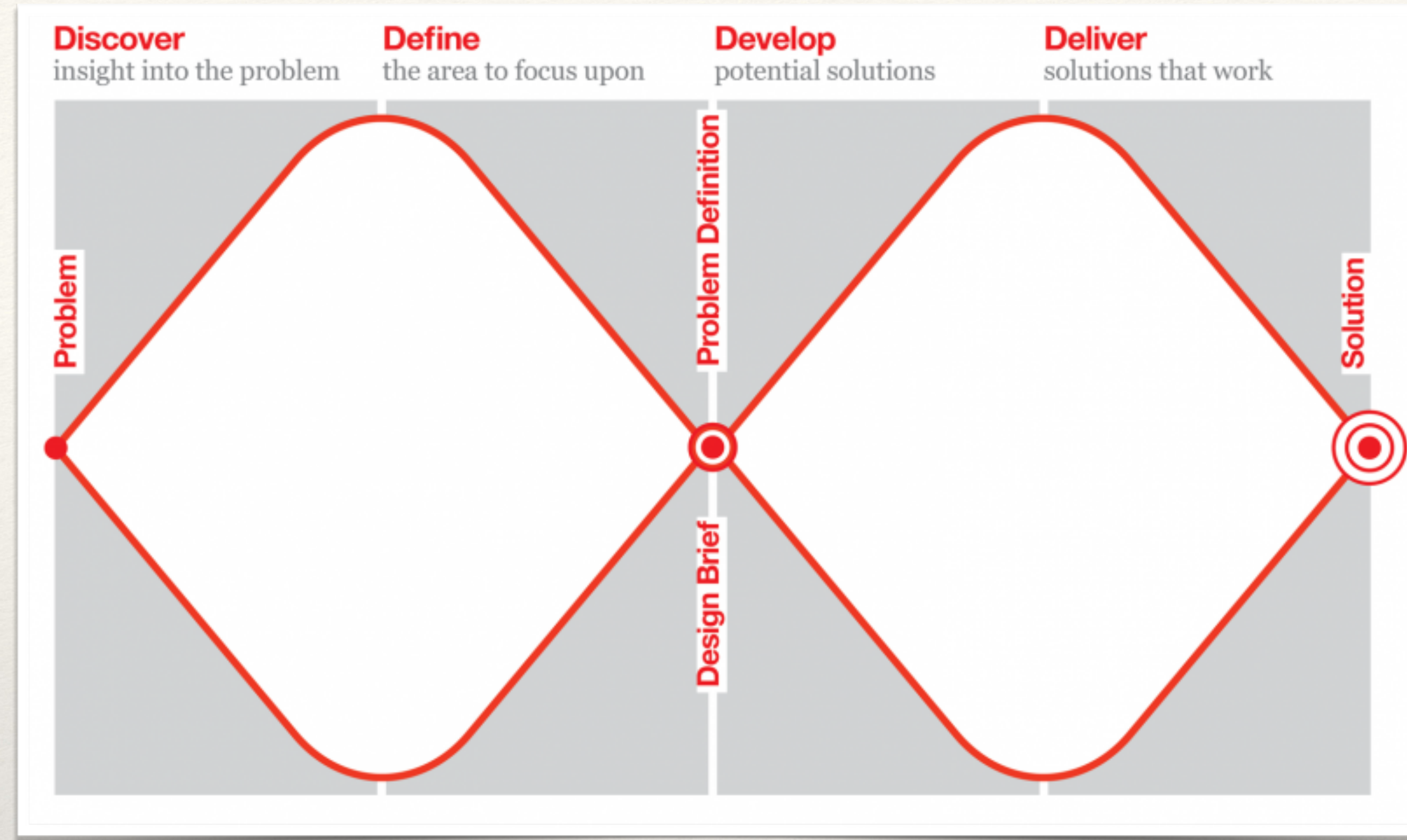
Heitor Schueroff

How are design problems different?

Why do we need a design process?

[DISCUSSION]

Do you think design processes enhance or hurt creativity? Why?



Design Council (<https://www.designcouncil.org.uk>)

Double Diamond

“One of the greatest mistakes is to omit the left-hand diamond and end up solving the wrong problem” – *Design Council*

Parallel Prototyping Leads to Better Design Results, More Divergence, and Increased Self-Efficacy

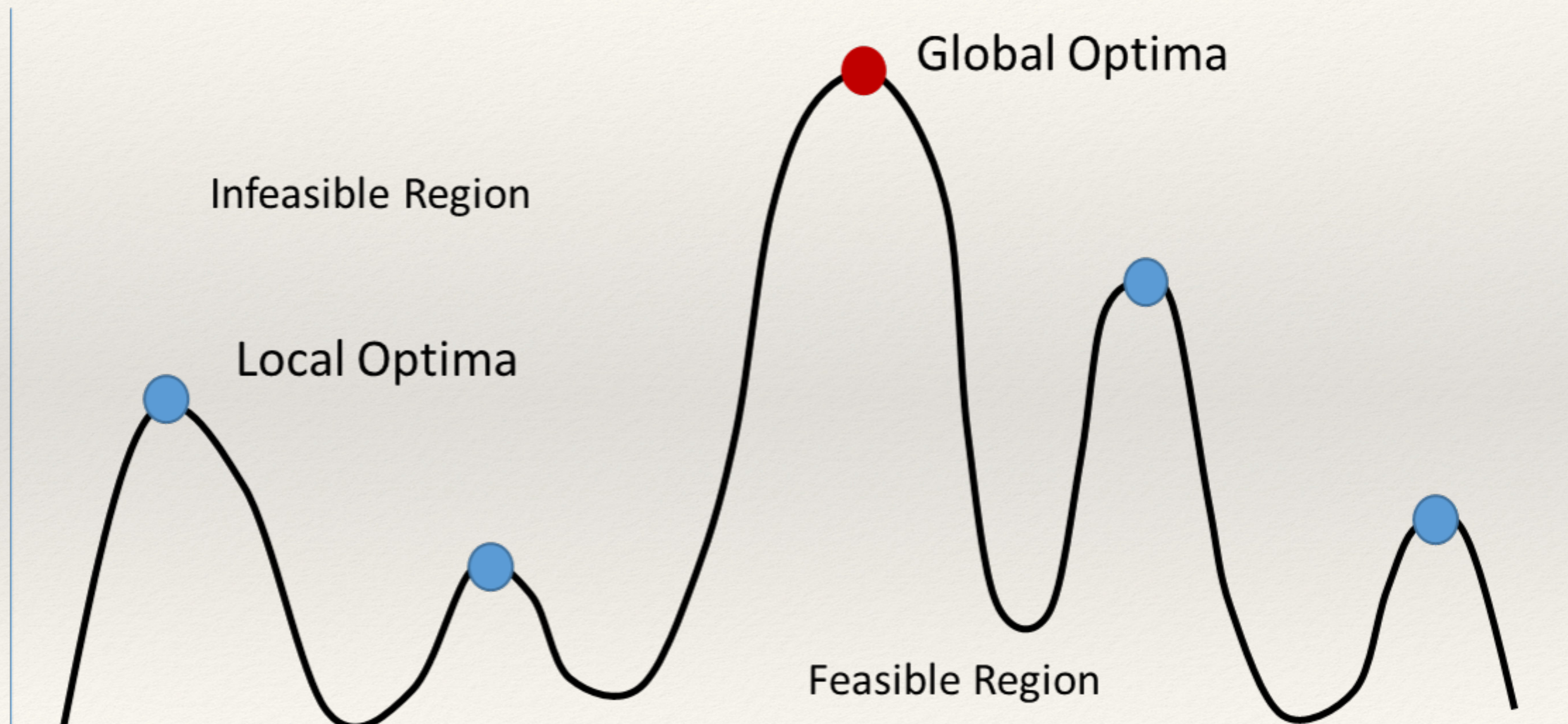
STEVEN P. DOW, ALANA GLASSCO, JONATHAN KASS, MELISSA SCHWARZ,
DANIEL L. SCHWARTZ, and SCOTT R. KLEMMER

Stanford University

What are the problems with iterative design?

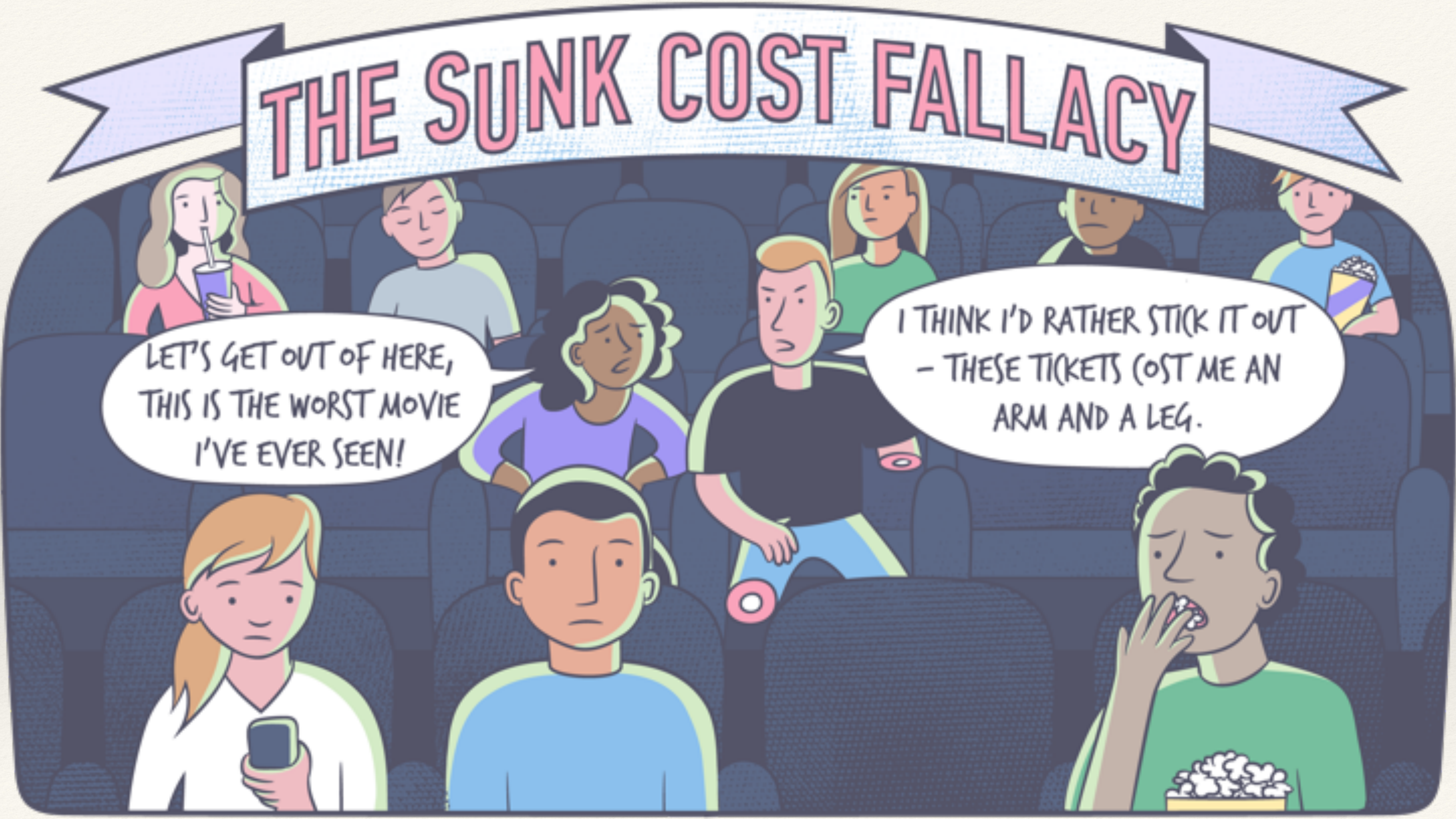
“Iteration... can give rise to **fixation**, continuously refining one option without considering others... steering designers to **local, rather than global, optima**”

Local Optima vs. Global Optima



“Without sufficient exploration, design teams may... **make poor choices to justify prior investments** in money or time.”

THE SUNK COST FALLACY



LET'S GET OUT OF HERE,
THIS IS THE WORST MOVIE
I'VE EVER SEEN!

I THINK I'D RATHER STICK IT OUT
- THESE TICKETS COST ME AN
ARM AND A LEG.

[DISCUSSION]

What are other problems with iterative design?

What are the benefits of parallel design?

Hypothesis 1.

Parallel prototyping leads to feedback comparison and produces **higher quality designs**.

PeerStudio leverages the theory of contrasting cases: **comparing similar artifacts helps people see deeper, subtler distinctions between them.**

<https://www.peerstudio.org>

Evaluate this submission

Upload your poster design as a 11 x 17" image (PDF recommended)



Compare to this submission

Upload your poster design as a 11 x 17" image (PDF recommended)



Hypothesis 2.

Parallel prototyping results in more divergent concepts.

‘...experienced users tended to perform better but also have less variation... there’s a tendency to follow rules once rules are learned.’

–*Fiona Cisternas*

Hypothesis 3.

Parallel prototyping leads to a greater increase in design task-specific self-efficacy.

- ❖ “*Self-efficacy* is a person’s belief about their capabilities to perform towards a specific goal.”
- ❖ “Critic, setback and risks make creative work extremely challenging, and high self-efficacy provides an important robustness.”

[DISCUSSION]

What are other benefits of parallel design?

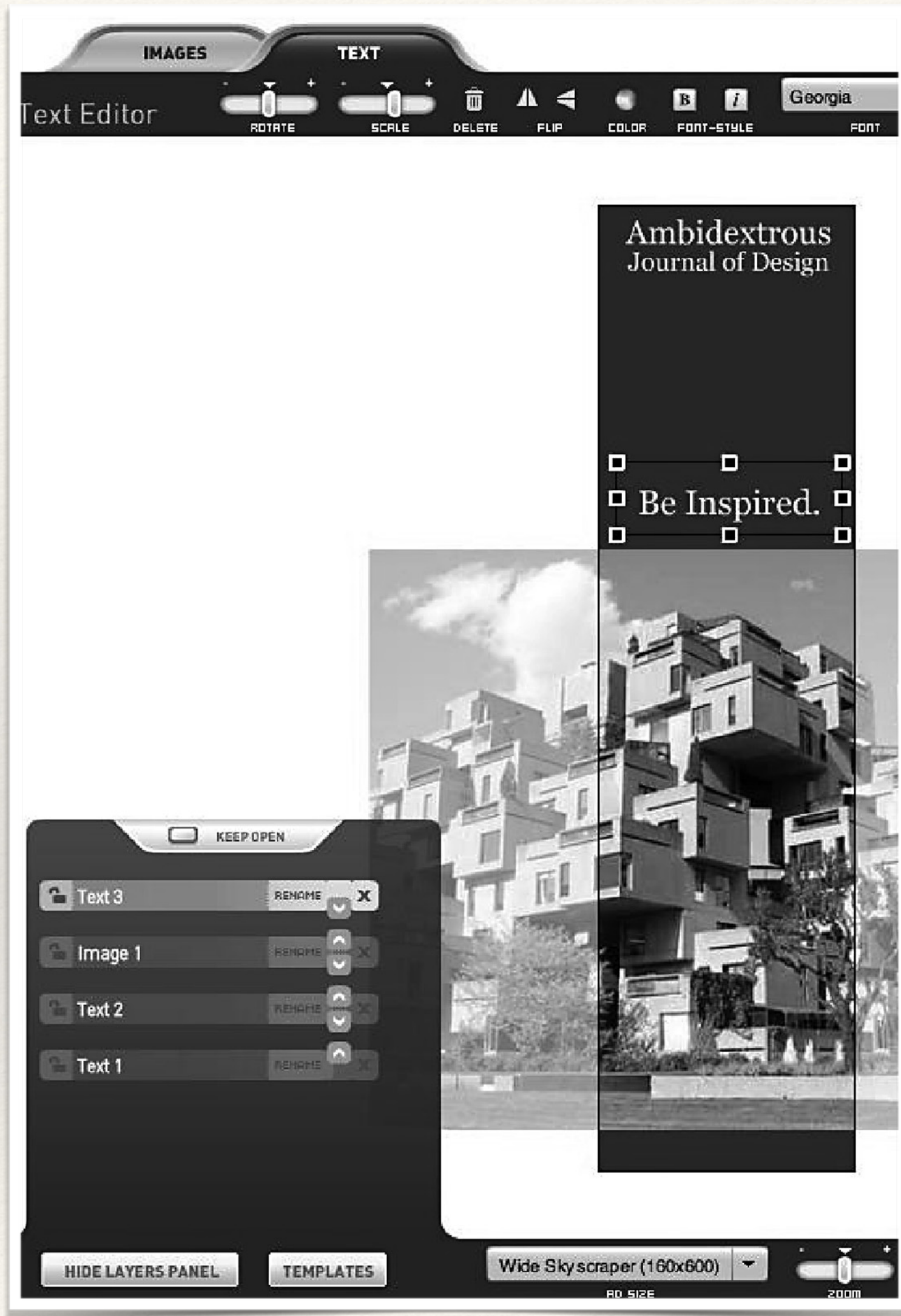
Study Design

Study Design – Participants

- ❖ Between-Subjects Design
- ❖ 33 participants (3 dropped out before the end)
- ❖ Participants were assigned to one of 2 conditions
- ❖ Randomized assignment balancing gender and prior design experience

Study Design – Task

- ❖ Design a banner advertisement for *Ambidextrous* magazine
- ❖ A design brief described the magazine's purpose and desired advertising
- ❖ Three professionals provide critique on designs



MySpace's AdBuilder



Subject ID # __137__

Prototype # __2__

Ambidextrous wants an ad that reaches out to design practitioner students, and researchers.

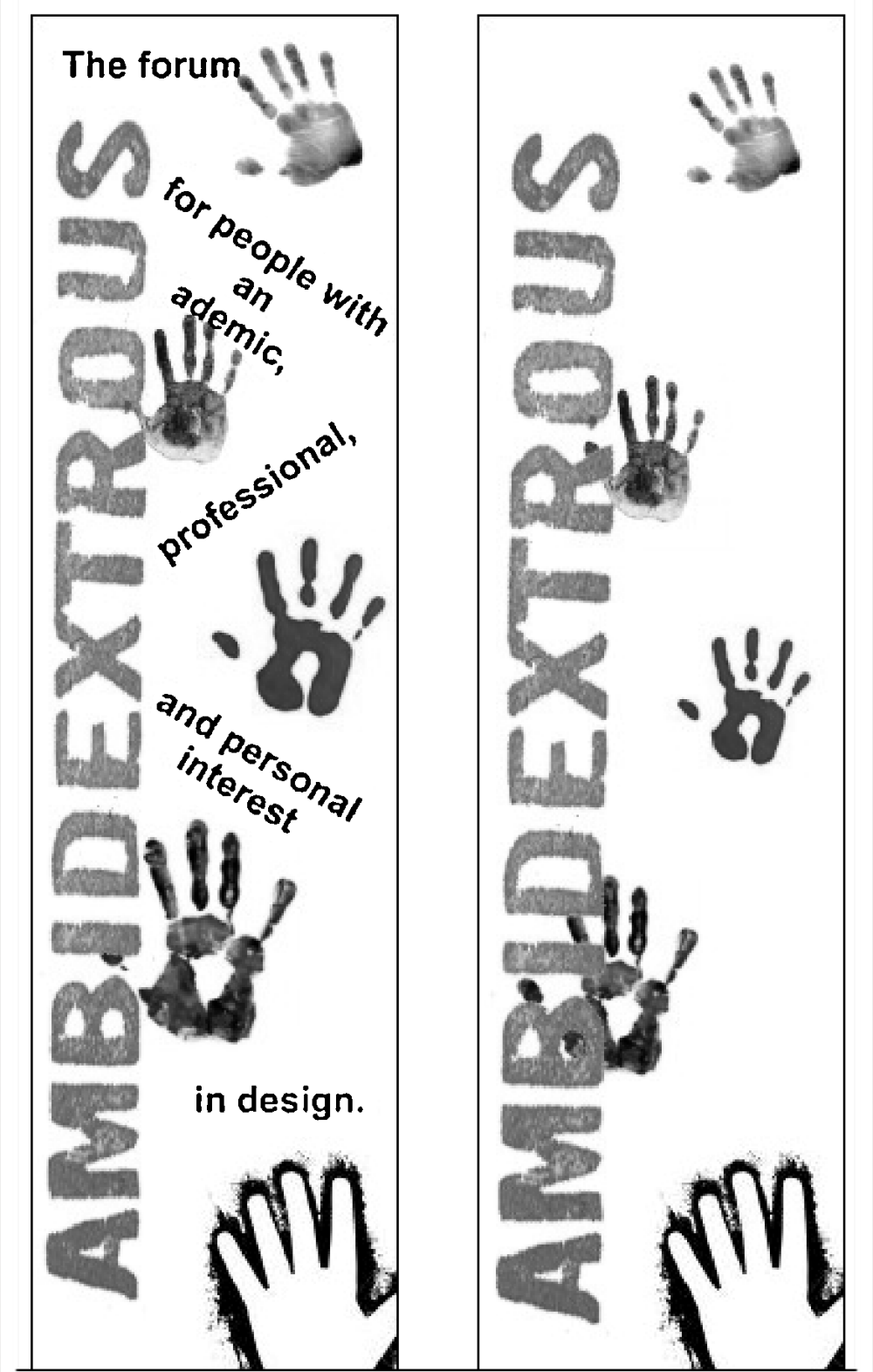
Try to create a visual flow for the viewer—what should the viewer see first?

Use color to create emphasis, to separate different elements, or to categorize content.

Example critique

How similar are these two advertisements?
Take into account the text, images, layout, colors, background, and themes.
(Not all adds will have all attributes.)

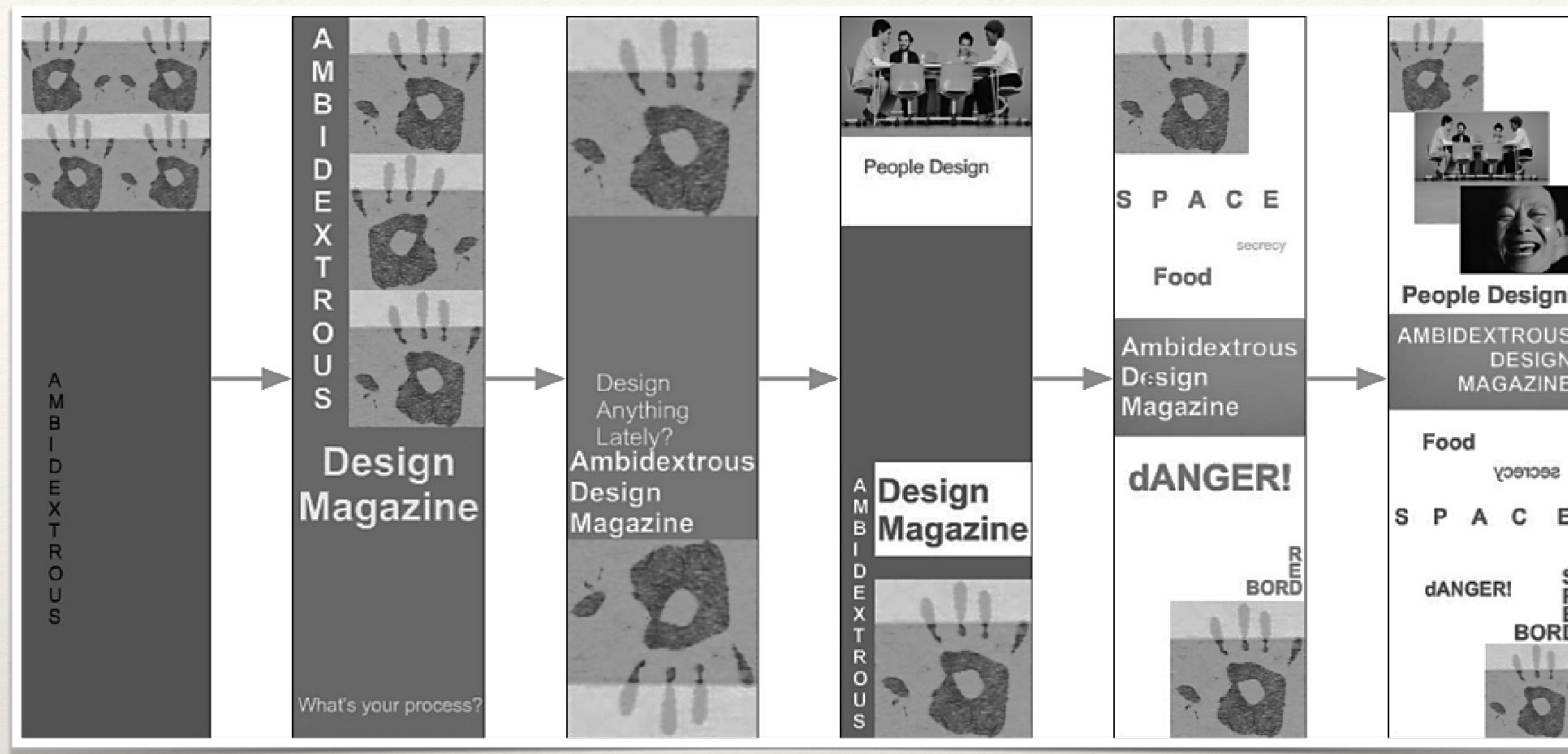
1 2 3 4 5 6 7
not at all similar very similar



Example similarity rating

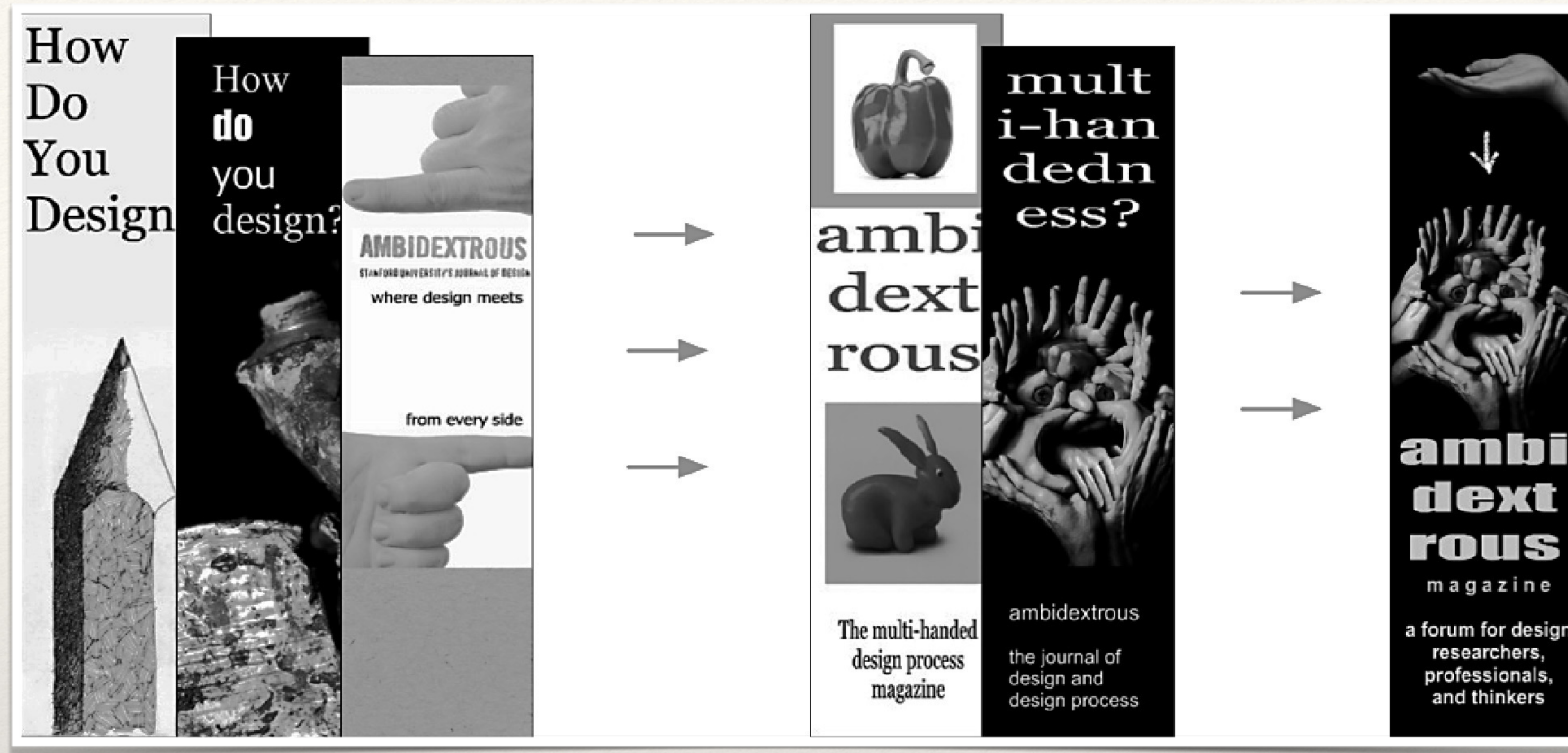
Study Design – Variables

- ❖ **Independent Variable**
 - Structure of the prototyping process
- ❖ **Dependent Variables**
 - Performance
 - Divergence
 - Self-Efficacy
- ❖ **Control Variables**
 - Number of prototypes created
 - Amount of feedback provided
 - Overall time allotted



Serial Condition

- ❖ 5 prototypes in a series
- ❖ Feedback after each prototype
- ❖ Final version



Parallel Condition

- ❖ 3 prototypes then feedback on each
- ❖ 2 more prototypes and then feedback
- ❖ Final version

How the authors minimized confounds

- ❖ **Selection:** Balanced gender and prior design experience in conditions
- ❖ **Fluency and Competence:** Selecting a novel tool removes confound of fluency and by having all participants replicate a sample graphic ensures basic competency with tool
- ❖ **Order Effects:** Experimenters reviewed parallel ads sequentially so the process was equivalent in both conditions.
- ❖ **Experimenter Bias:** Follow-up study showed no bias on providing critique for serial vs. parallel prototypes

[DISCUSSION]

Can you think of other potential confounds?

Student Commentary

‘...the objective function is quite specific to this “mass appeal” form of evaluation, rather than... aesthetic sensibility, and coherence with desired rather than total audience.’

–Maxwell Bland

Student Commentary

‘...the parallel group also had a second iteration. So this group should really be called “hybrid”...’

–*Wei Dai*

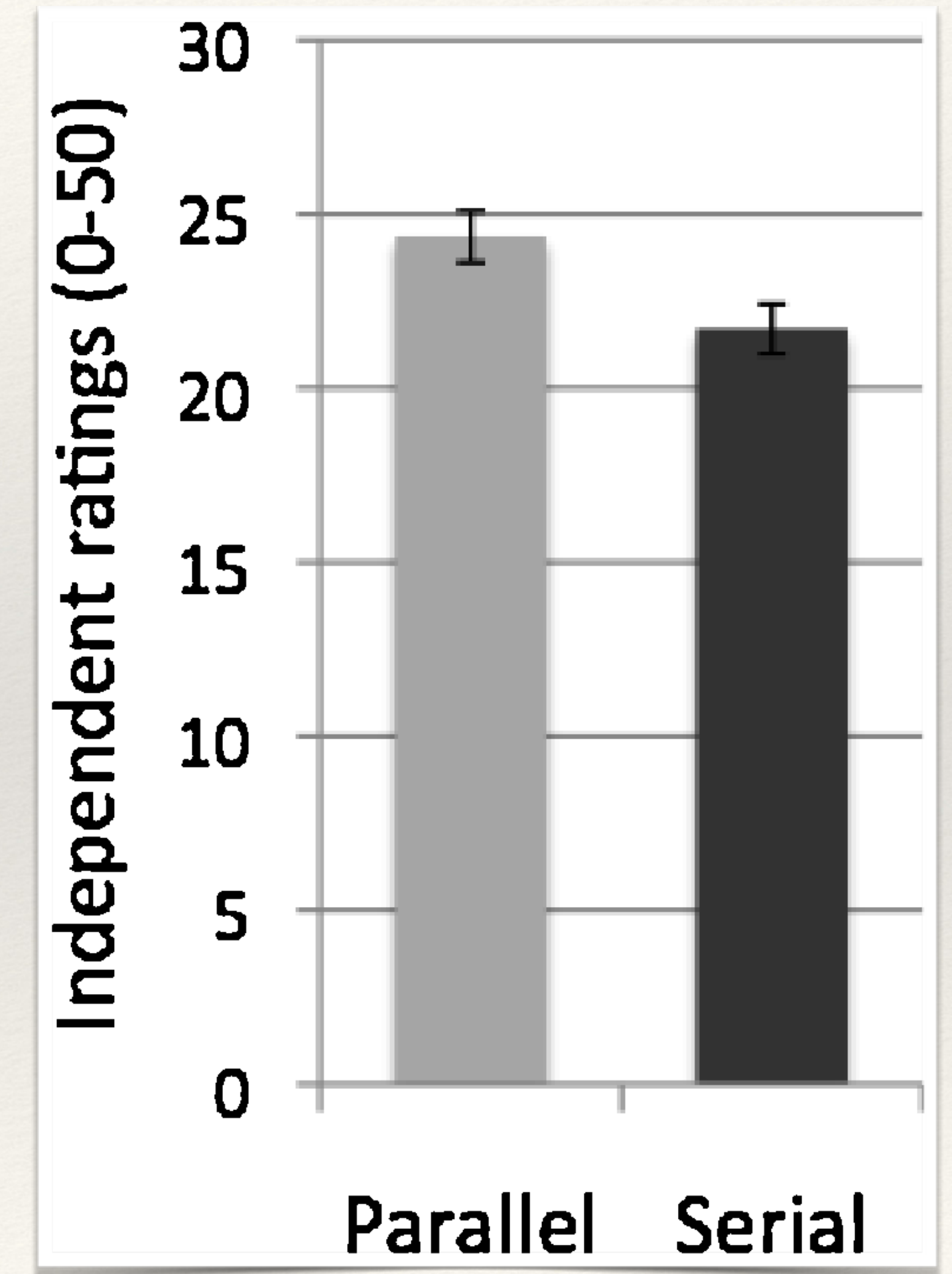
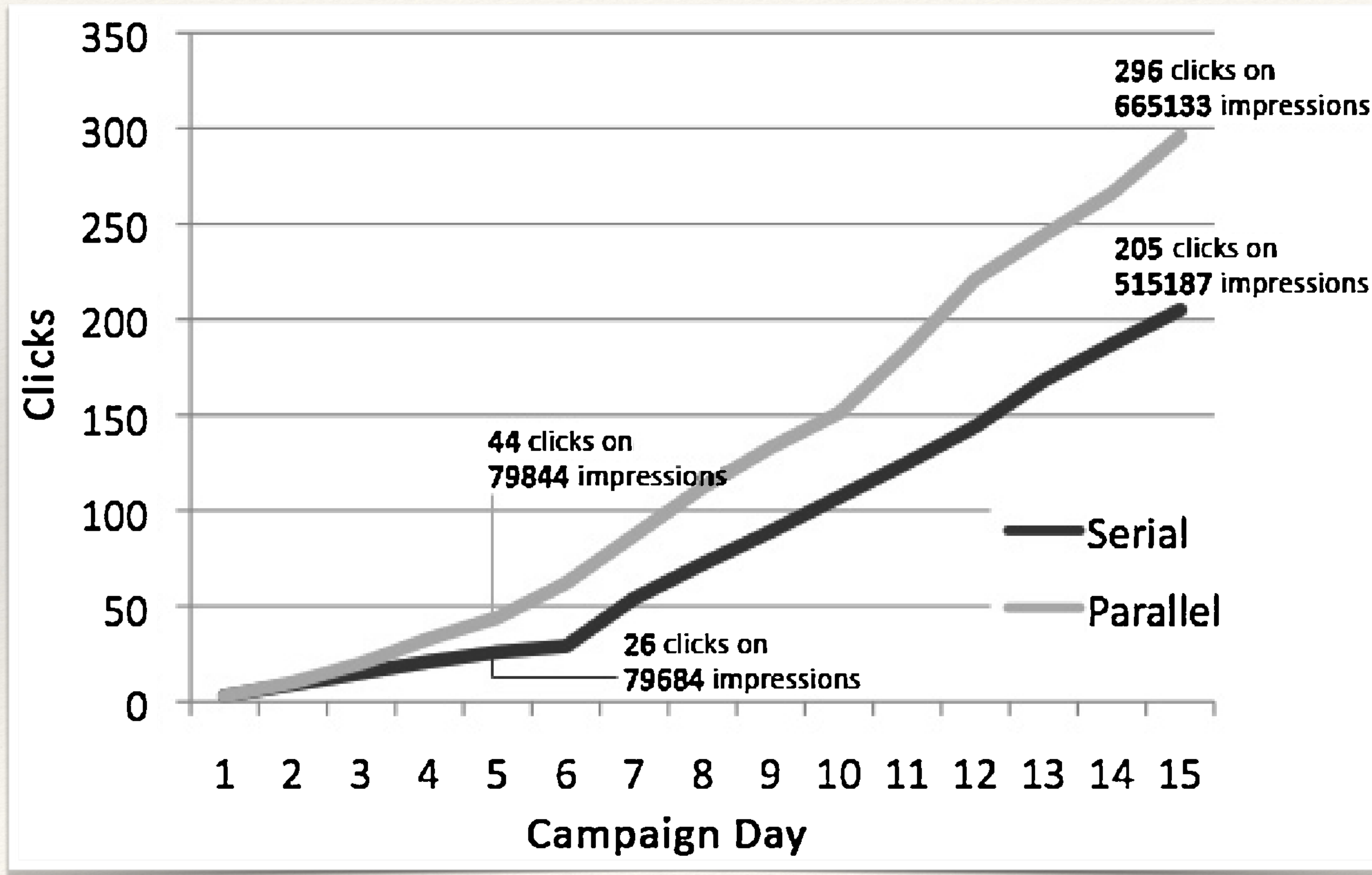
Student Commentary

“MySpace... displays ads more if they are performing better... it had an audience that is not necessarily representative of the population.”

–Dylan Lukes

Results

Parallel Ads Outperformed Serial Ads



[DISCUSSION]

CTR was not a predictor of overall expert rating. Why?

(Left) parallel ad. 1st in CTR, 6th in rating

(Middle) parallel ad. 9th in CTR, 1st in rating

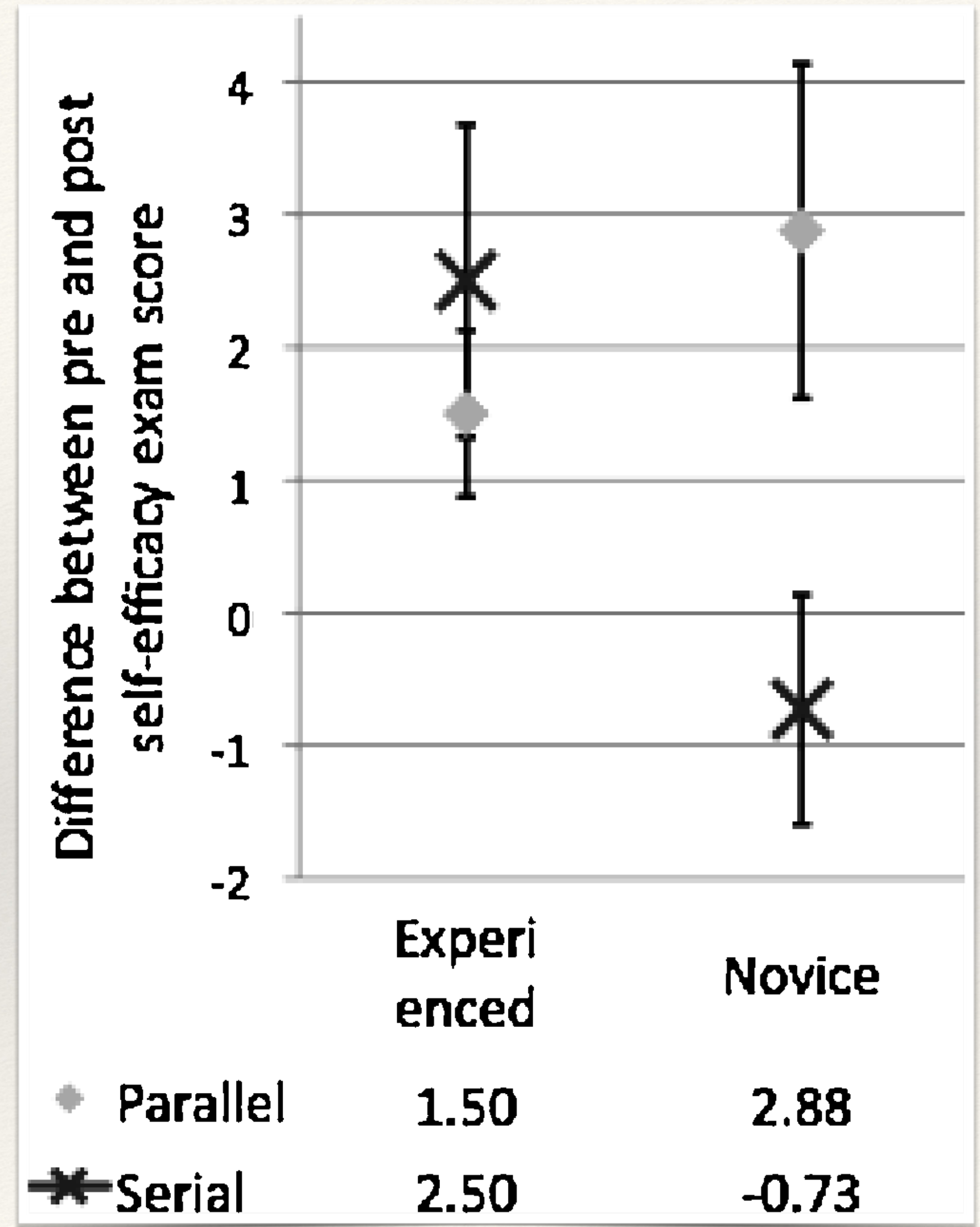
(Right) serial ad. 4th in CTR, 32nd in rating

The image displays three vertical panels of advertisements. The left panel features a hand holding a small globe, with a white arrow pointing down to a group of hands holding a larger globe. Below this is the text 'ambidextrous magazine' and 'a forum for design researchers, professionals, and thinkers'. The middle panel shows a glowing lightbulb with the text 'light me' below it. At the bottom of this panel is the text 'AMBIDEXTROUS stanford university's journal of design'. The right panel has a grey header with the text 'ENTERTAIN INSPIRE & DISCOVER' above a photograph of a modern skyscraper at night. Below the photo is the text 'We don't replicate, we create'.

[DISCUSSION]

Parallel Prototyping Leads to Bigger Gains in Self-Efficacy

Why do you think novices were more affected by serial prototyping than experienced designers? Why does parallel prototyping lead to more self-efficacy?



“I received really negative comments saying (the clients) are looking for a creative and clever ad, which in other words is saying that this is stupid or ridiculous.”

–Participant in Serial Condition

What other fields of design would/wouldn't benefit from parallel prototyping?

Software Engineering

“...performing parallel implementation of several systems can quickly lead to wasted time... needless parallels”

–Maxwell Bland

Chip Design

“...many factors influence the performance of chips, and exploring a large design space is immensely beneficial to avoid local optima.”

–Kasitsak Chupongstimun

Design-oriented Human–Computer Interaction

DANIEL FALLMAN

Department of Informatics and Umeå Institute of Design

What 'is' design and how does it relate to HCI?

“Design is a matter of making... To design is to consciously aim to create and give form to previously nonexistent artifacts.”

Three (3) Accounts of What 'Is' Design

Conservative Account

- ❖ Design as scientific/engineering endeavor
- ❖ Structured requirements specification
- ❖ Methodical: follow design processes



Romantic Account

- ❖ Designers as creative geniuses
- ❖ Creativity over rationalism
- ❖ Mysterious design process
- ❖ Design is a functional piece of art



Pragmatic Account

- ❖ Situated: design at large, in the wild
- ❖ Iterative: reflect on design in action
- ❖ Self-organizing: unique to situation



[DISCUSSION]

Which account do you most agree with? Why?

	Conservative Account	Pragmatic Account	Romantic Account
<i>Designer</i>	An information processor; a 'glass box'	A reflective, know-how bricoleur; a 'self-organizing system'	A creative, imaginative genius; an artist; a 'black box'
<i>Problem</i>	Ill defined and unstructured; to be defined	Unique to the situation; to be set by the designer	Subordinate to the final product
<i>Product</i>	A result of the process	An outcome of the dialogue; integrated in the world	A functional piece of art
<i>Process</i>	A rational search process; fully transparent	A reflective conversation; a dialogue	Largely opaque; mystical
<i>Knowledge</i>	Guidelines; design methods; scientific laws	How each problem should be tackled; compound seeing; experience	Creativity; imagination; craft; drawing
<i>Role model</i>	Natural sciences; engineering; optimization theory	Bricolage; human sciences; sociology	Art; music; poetry; drama

Limits of Design as Science

Limits of Design as a Transparent Process

“Adding iteration to conservative methods is necessary because... one does not really know the problem until one starts working on its solution.”

Sketching as *Archetypal* Design Activity

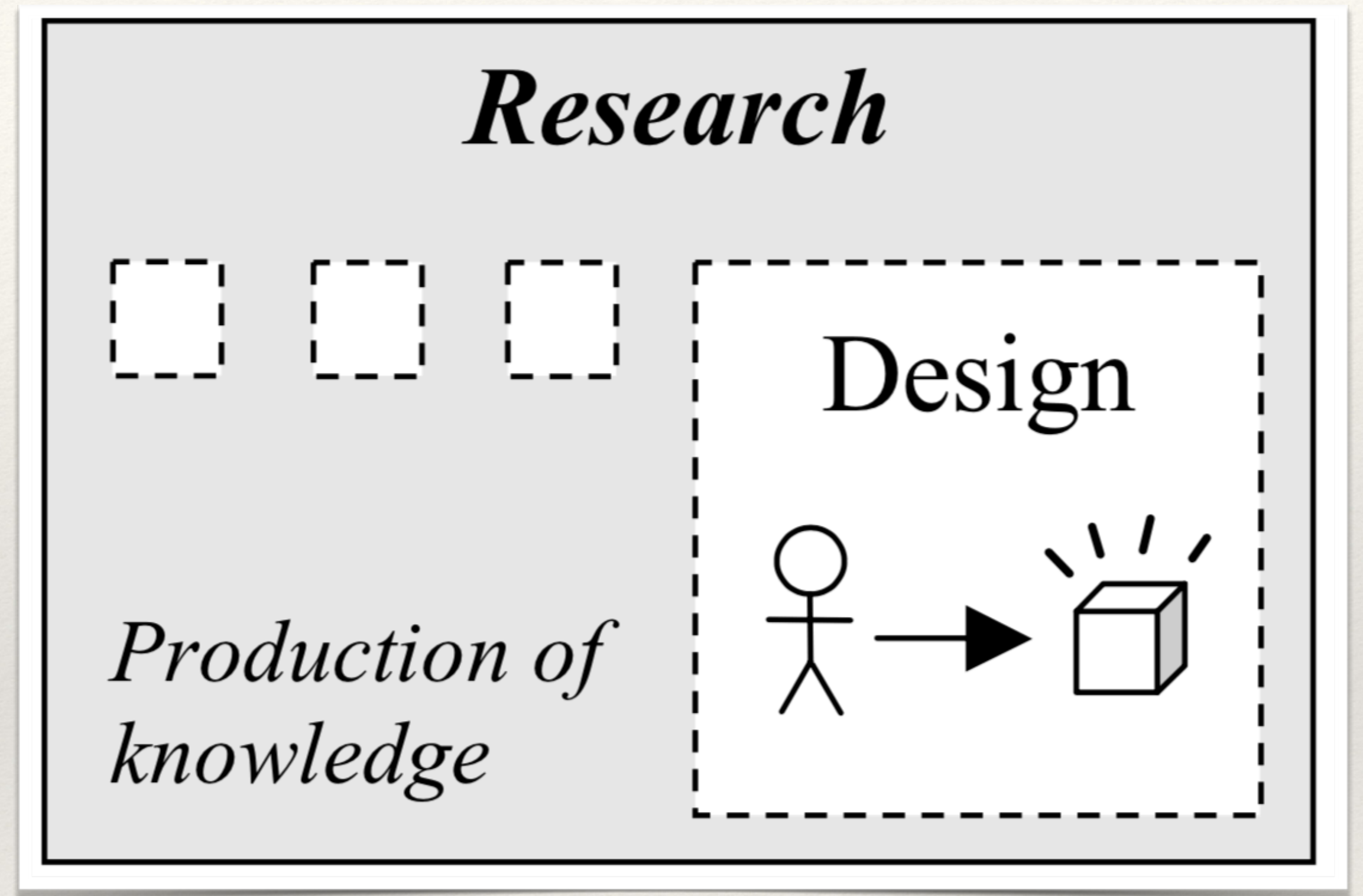
Sketching in HCI is “Prototyping”

Role of Design in HCI

“The role of design in HCI is... to unfold a coherent whole – a previously non-existent artifact – from the various bits and pieces gathered in the process of research.”

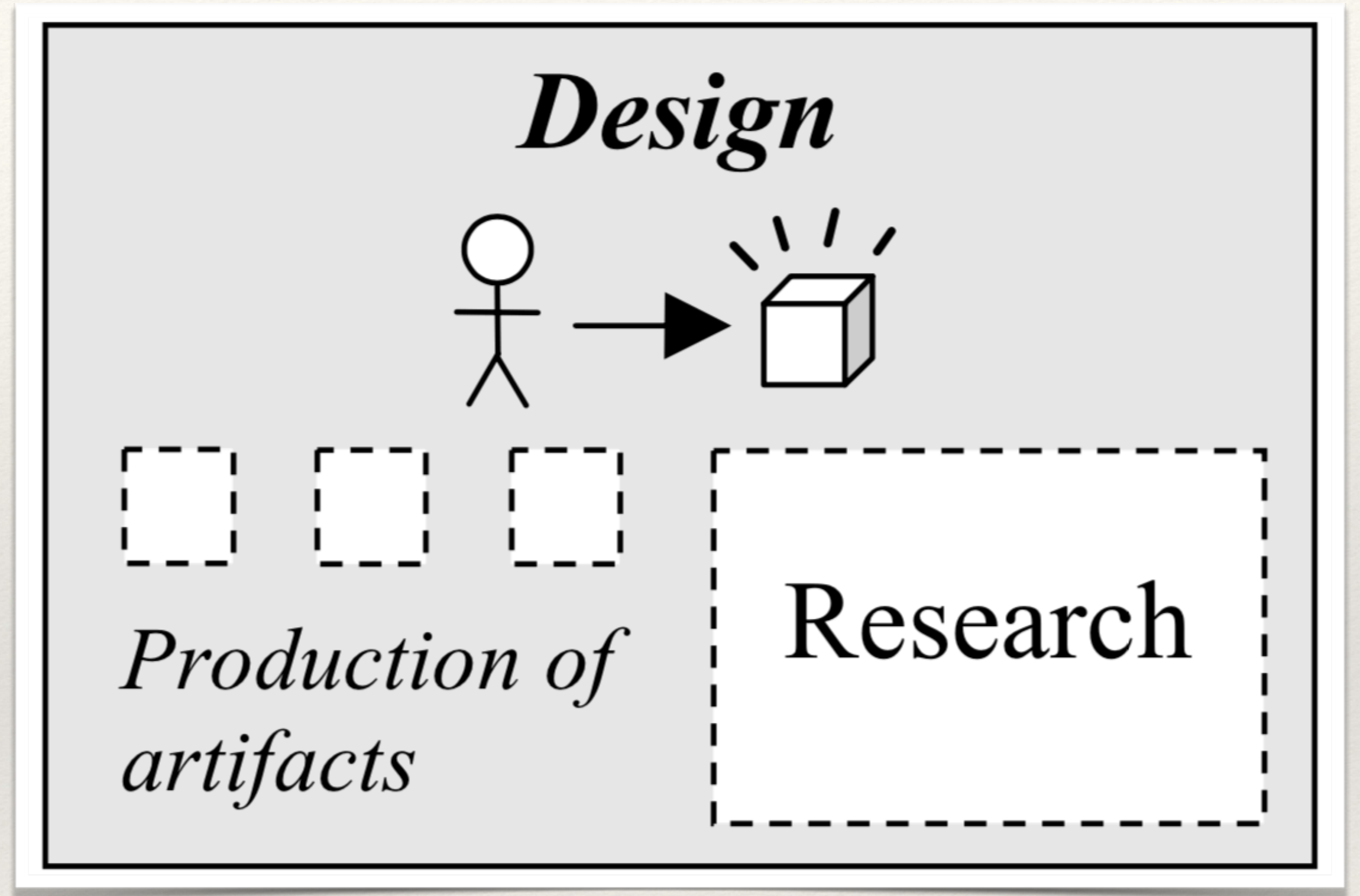
Design-oriented Research

The knowledge from designing the product or studying the designed artifact is the research contribution.



Research-oriented Design

Production of new artifacts as main motivator, not production of knowledge. Relates to consultants, applied researchers, industry designers and HCI design.



[DISCUSSION]

What are examples of design-oriented research and research-oriented design?

Thank You!