

# **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, & Scott R Klemmer**

# Quantity vs. Quality?



Bayles and Orland, 2001

# Quantity vs. Quality?

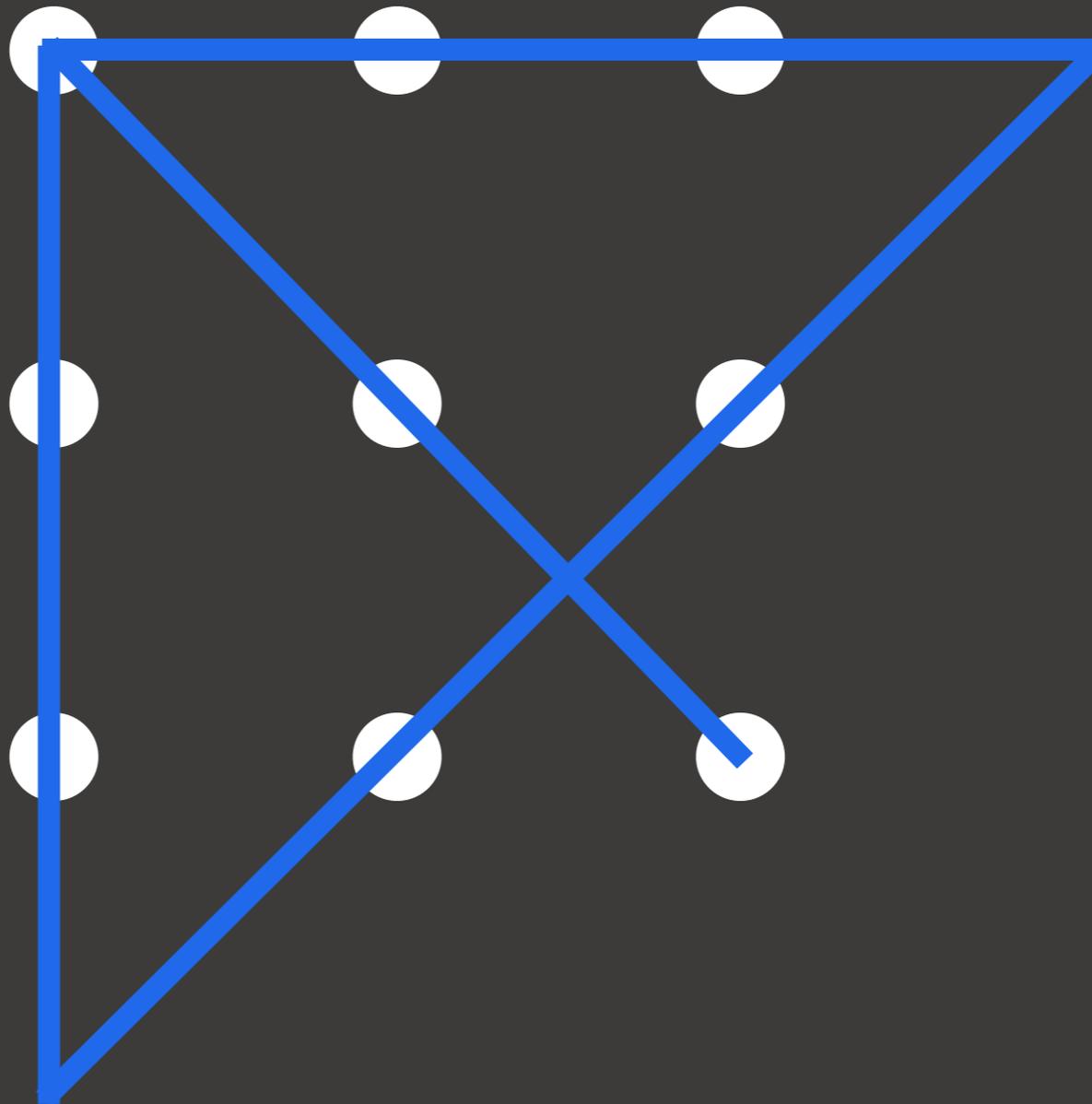


“While the quantity group was busily churning out piles of work—and learning from their mistakes—the quality group had sat theorizing about perfection, and in the end had little more to show for their efforts than grandiose theories and a pile of dead clay”

—Bayles and Orland, 2001

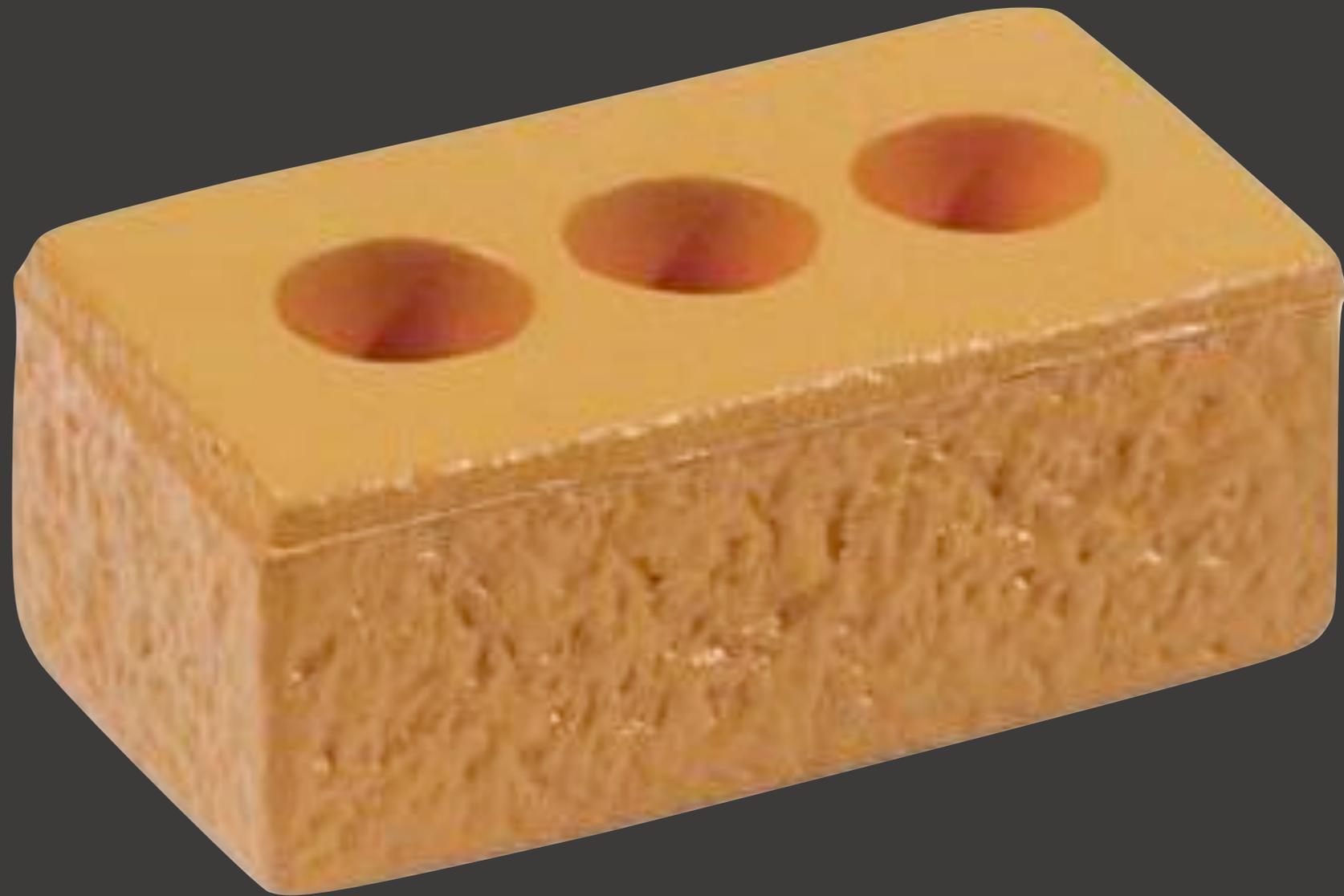
(How) can we measure  
creative results?

# Connect all 9 dots with 4 lines



Maier, 1930

# Generate uses for a brick



# Sketch a creature



# Design task selection

**Demonstrate  
creativity**

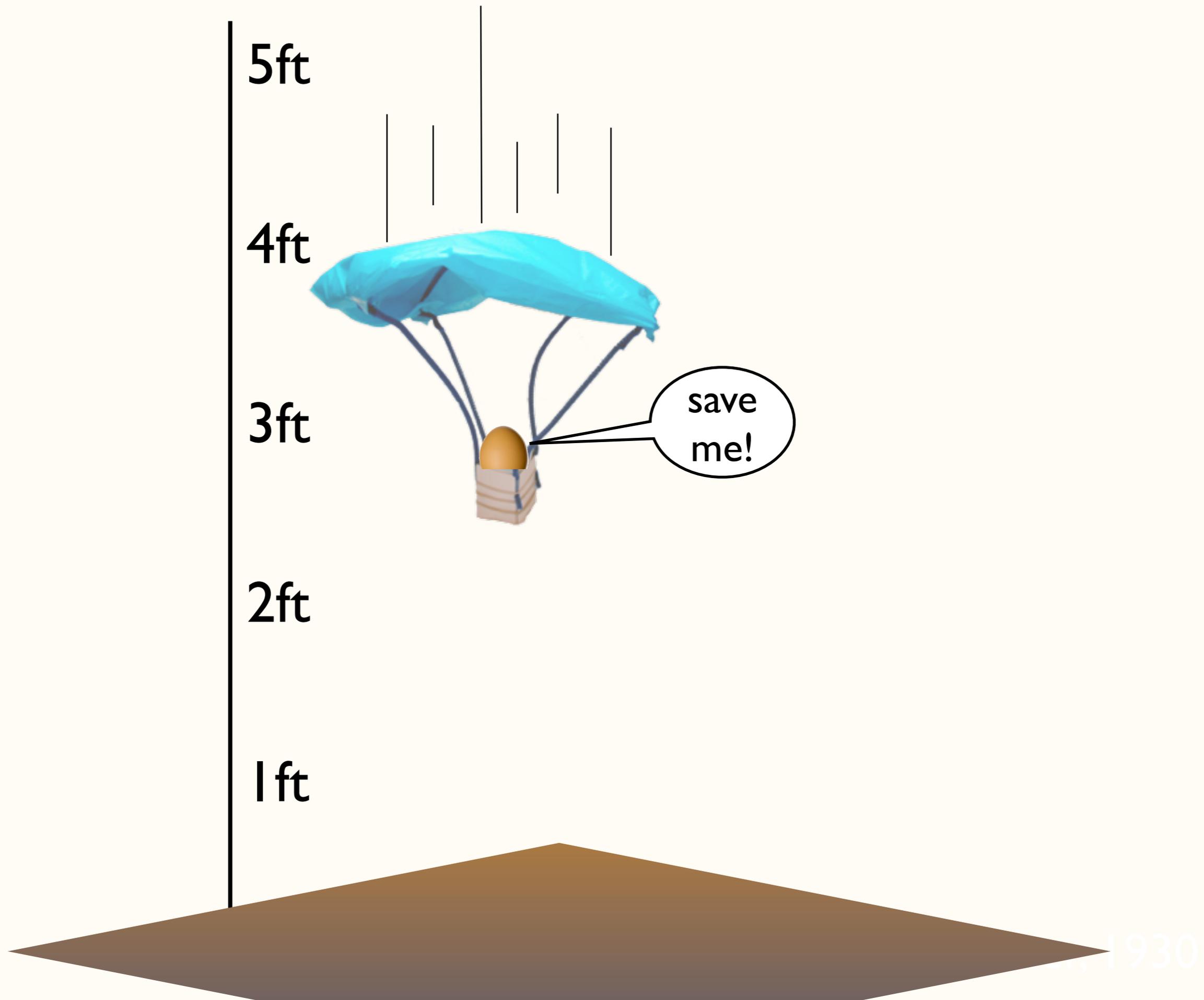
No “right” or “wrong” solutions  
Many paths to solution

**Contrast  
designs**

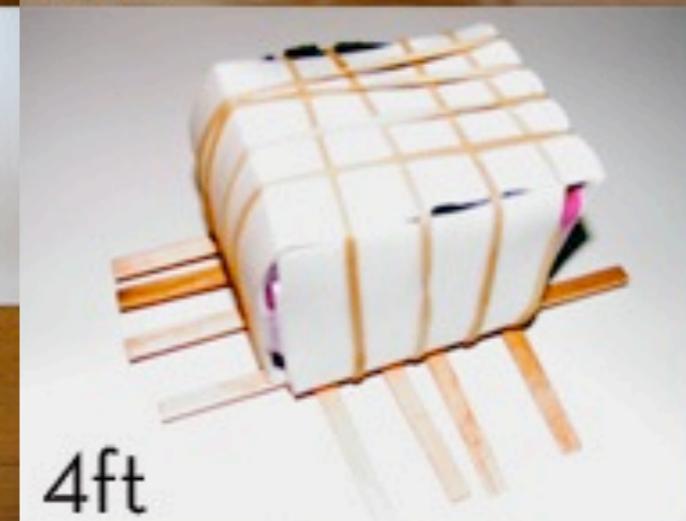
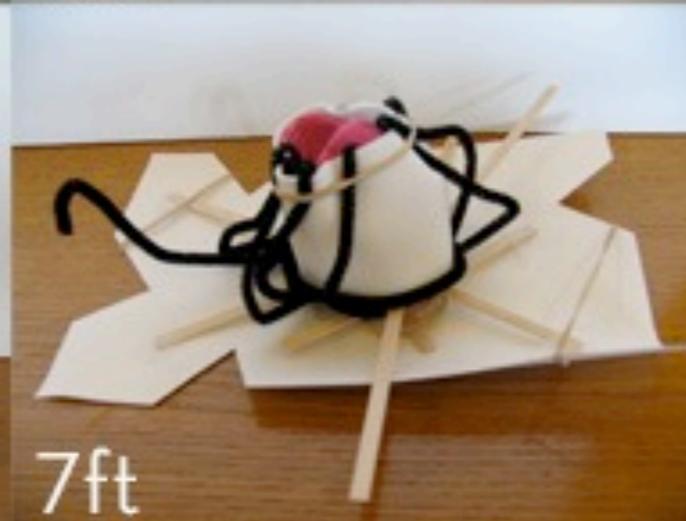
Objective and subjective  
outcome measures

# Design an egg drop vessel





save me!



# Participants picked their concept early



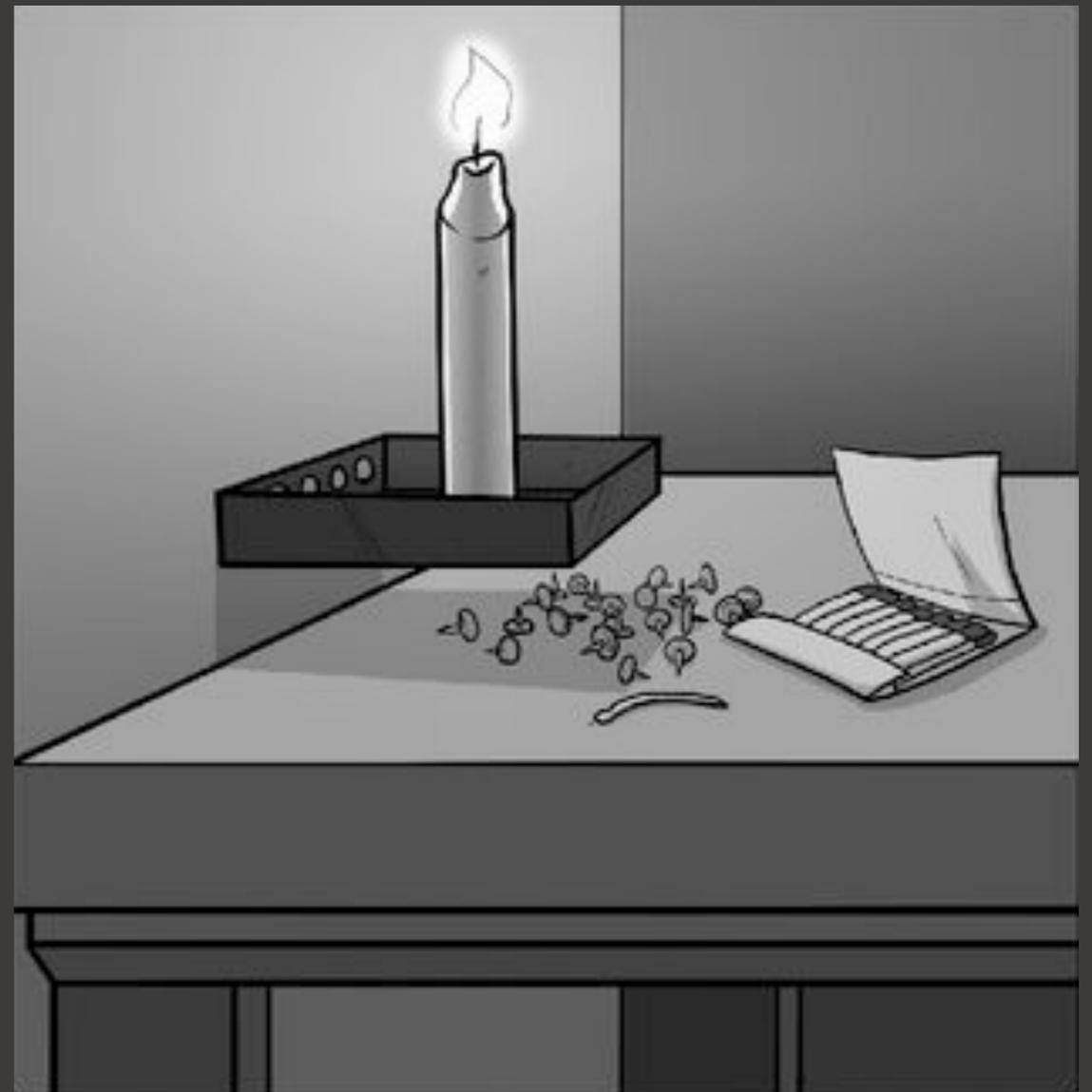
ITERATION  
PARTICIPANT

"From the first time I picked up the materials, I knew I had the idea. I just started to give it a go. I had a good idea of what I wanted to do, and I was able to make it as possible... I don't see any other

# Functional fixation

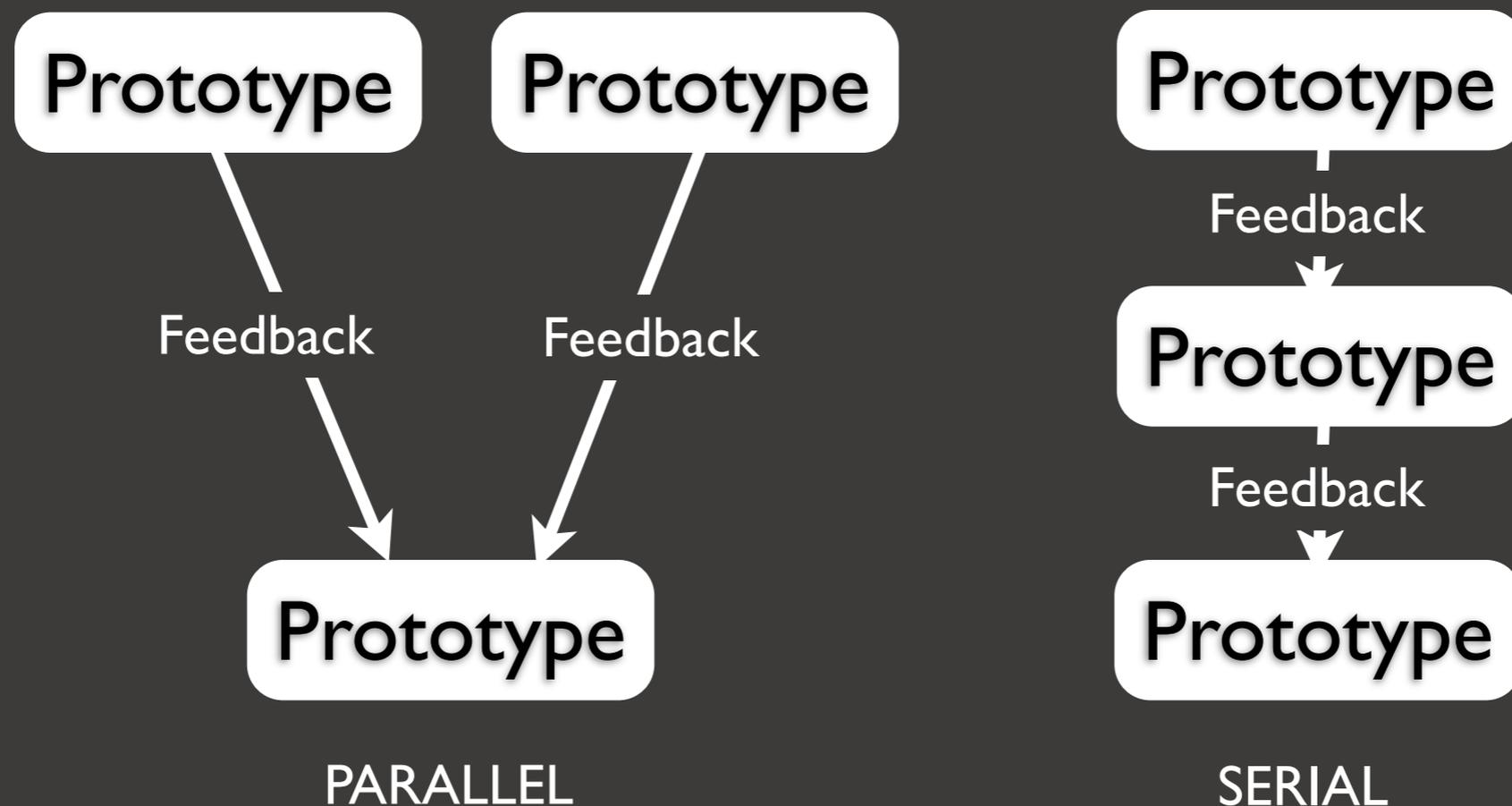


# Functional fixation



# Research question

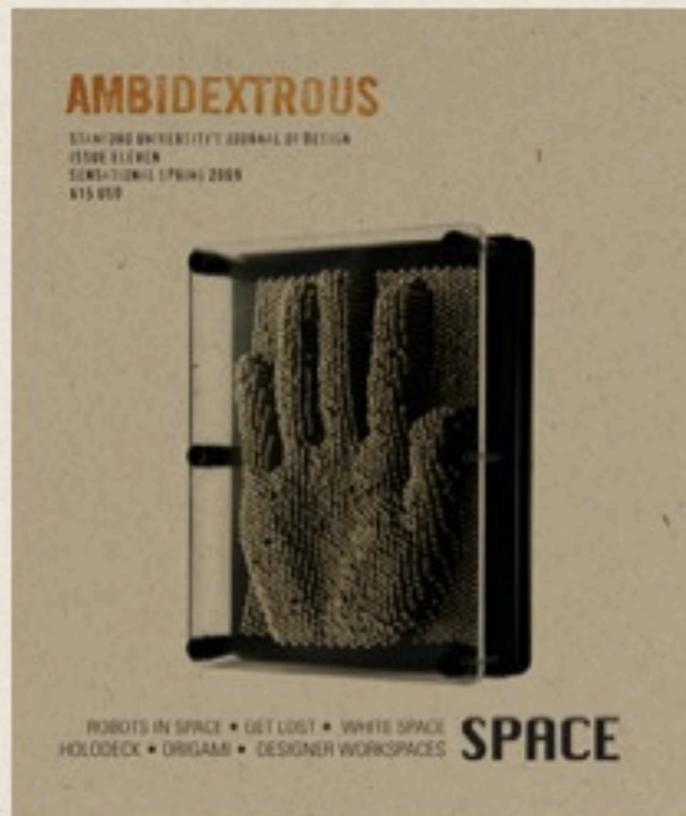
How does parallel design  
– rather than a serial approach –  
affect performance?



# Task: design an advertisement

AMBIDEXTROUS

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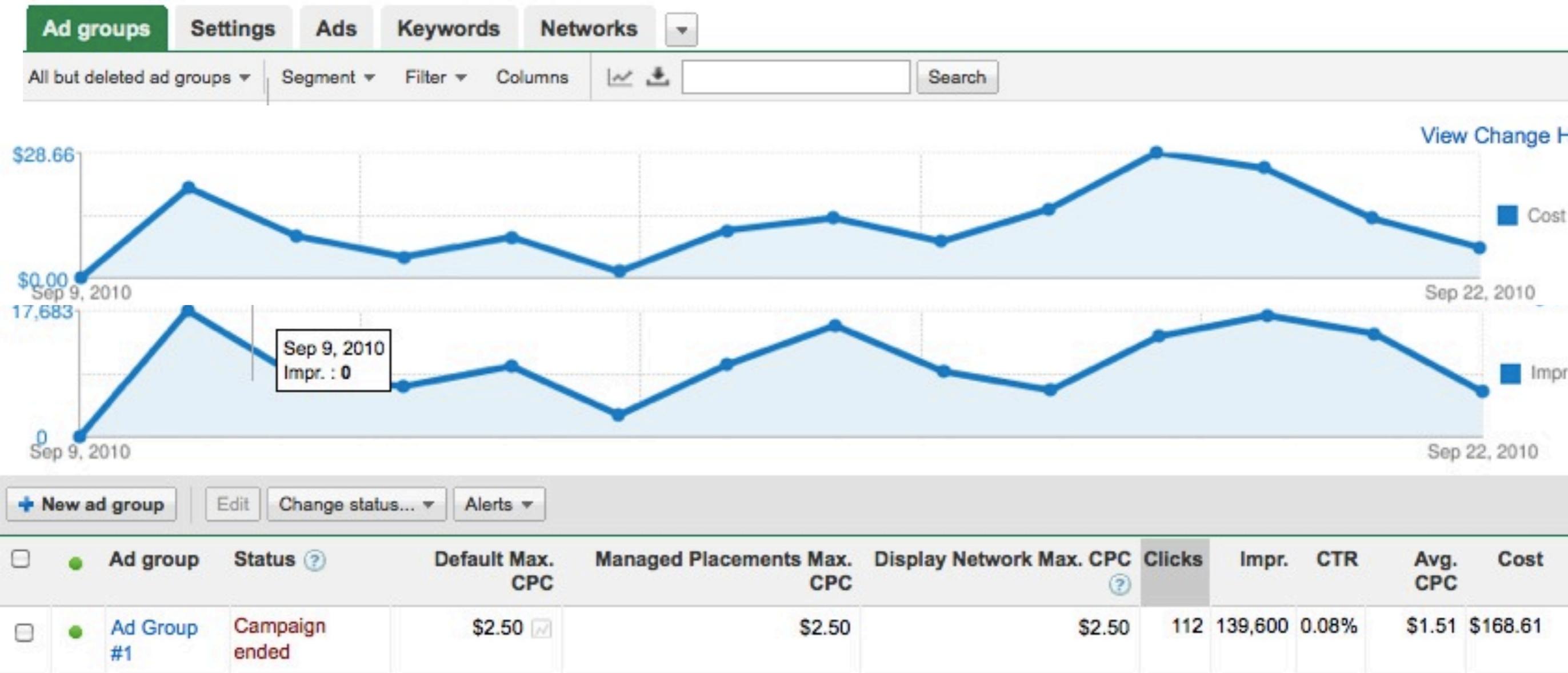
## issue 11

### Spring 2009: Space

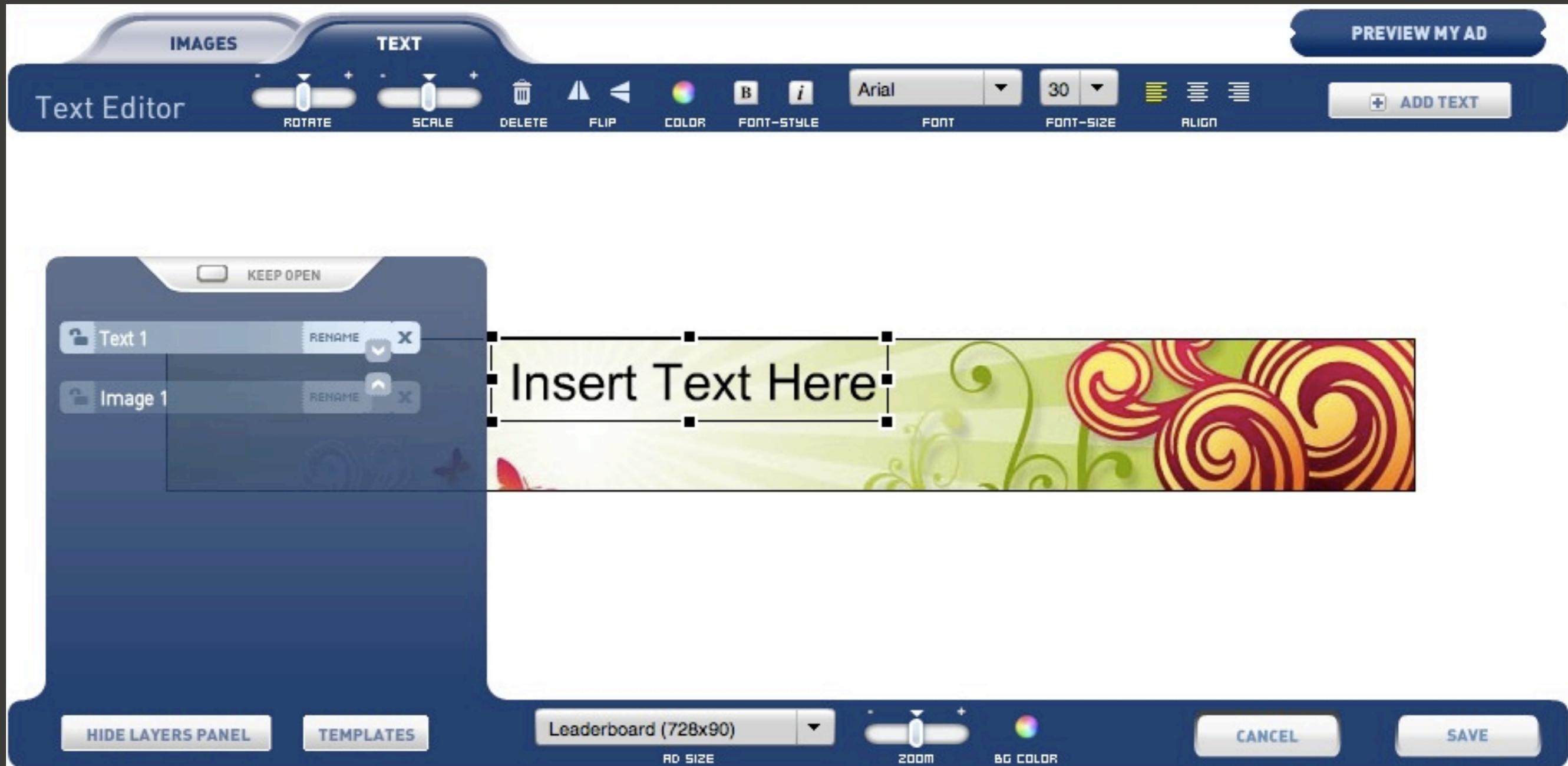
As children some of you may have dreamed of becoming astronauts, or at least vied for a spot in Space Camp. Maybe you were inspired by the worlds of Flash Gordon or those created by Frank Lloyd Wright. In this issue of *Ambidextrous*, we tackle space and beyond in all of its frontiers.

[An Ode to White Space](#)

# Web advertising analytics



# Advertisement design task



# Procedure (N=33)

serial  
prototyping  
condition



parallel  
prototyping  
condition



# Expert critique

## overall theme

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

## composition and layout

Try to create visual flow for the viewer; what should the viewer see?

## surface features

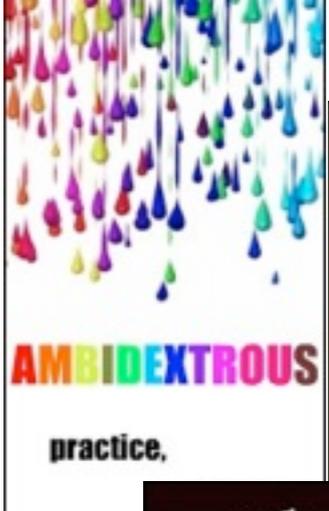
Use color to create emphasis, to separate different elements, or to categorize content.



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AMBIDEXTROUS  
JOURNAL OF DESIGN  
CULTURAL FOODS  
THOUGHT FOR THOUGHT  
AND COMICS  
DESIGN PROCESS  
FOR ANYTHING  
RESEARCH LABS  
WRITER'S CRITICISM  
ON TODAY'S  
TECHNOLOGY



Who can I meet?  
d we learned  
something from



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practice.

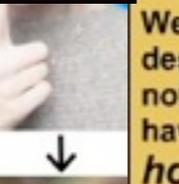
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Space  
your design world.

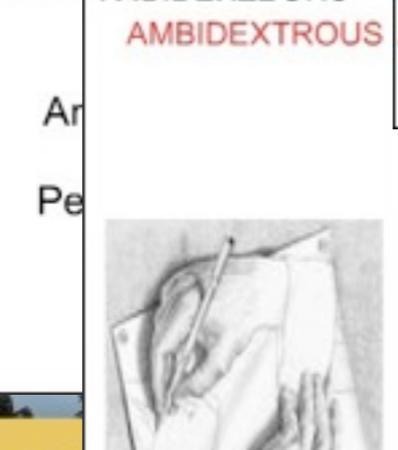


Thinking.  
Processing.  
Designing.  
**Ambidextrous**  
Join our magazine:  
gateway  
into  
your design world.



Are you interested  
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**DESIGN?**  
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**AMBIDEXTROUS**  
stanford university's  
journal of design



DESIGN?  
There's no right...  
DESIGN:  
written, illustrated,  
photographed, and  
edited by volunteers  
ambidextrous  
(or left)



Are you  
**AMBI  
DEXTROUS**

People  
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our brain

A journal about  
**DESIGNING  
THE FUTURE**  
both hands  
at a time

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Fall 2008  
ucky Issue

Evoked on a n  
venture...

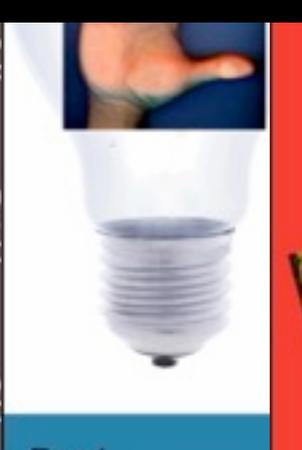
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magazine  
a forum for design  
researchers,  
professionals,  
and thinkers



Stanford's magaz  
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Design Cmmu



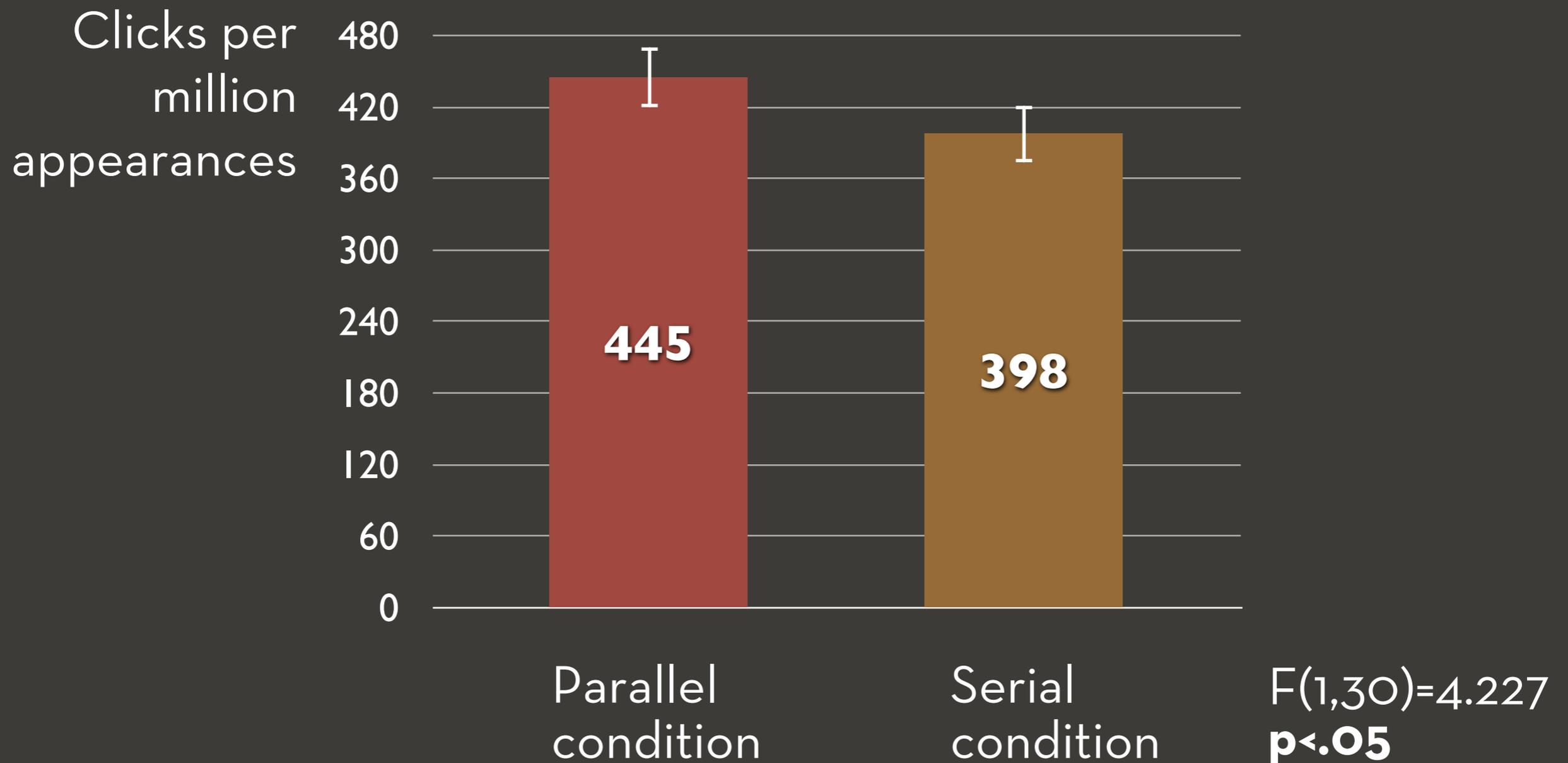
AMBIDEXTRO  
AMBIDEXTROU  
fifth Issue

**DESIGNERS  
WANTED**



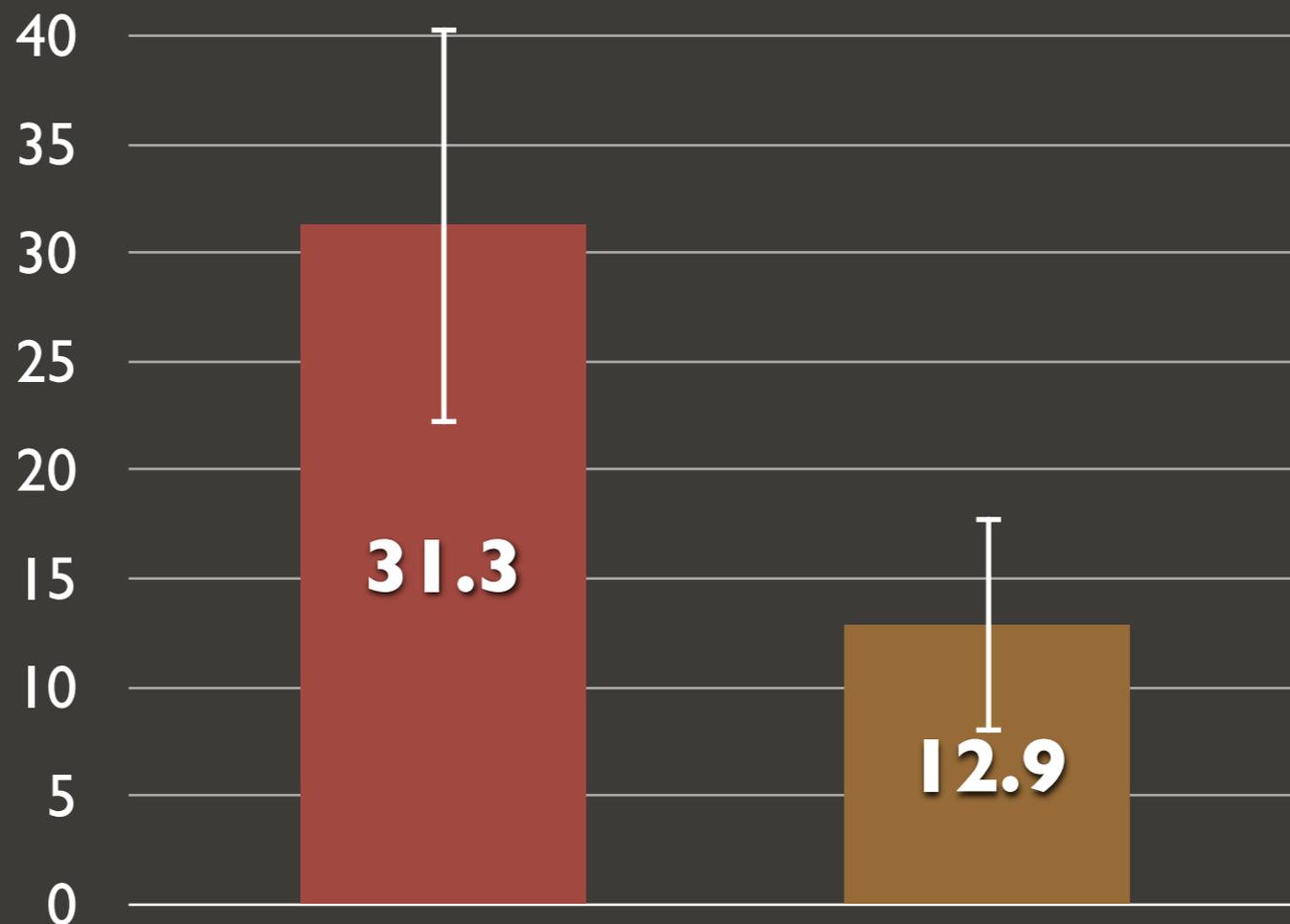
Perspectives for  
the next decade  
Where are we goin

# Web users clicked more Parallel ads per appearance than Serial



# Visitors from parallel ads spent more time on the client website

Average time  
on client site  
per visitor  
(seconds)



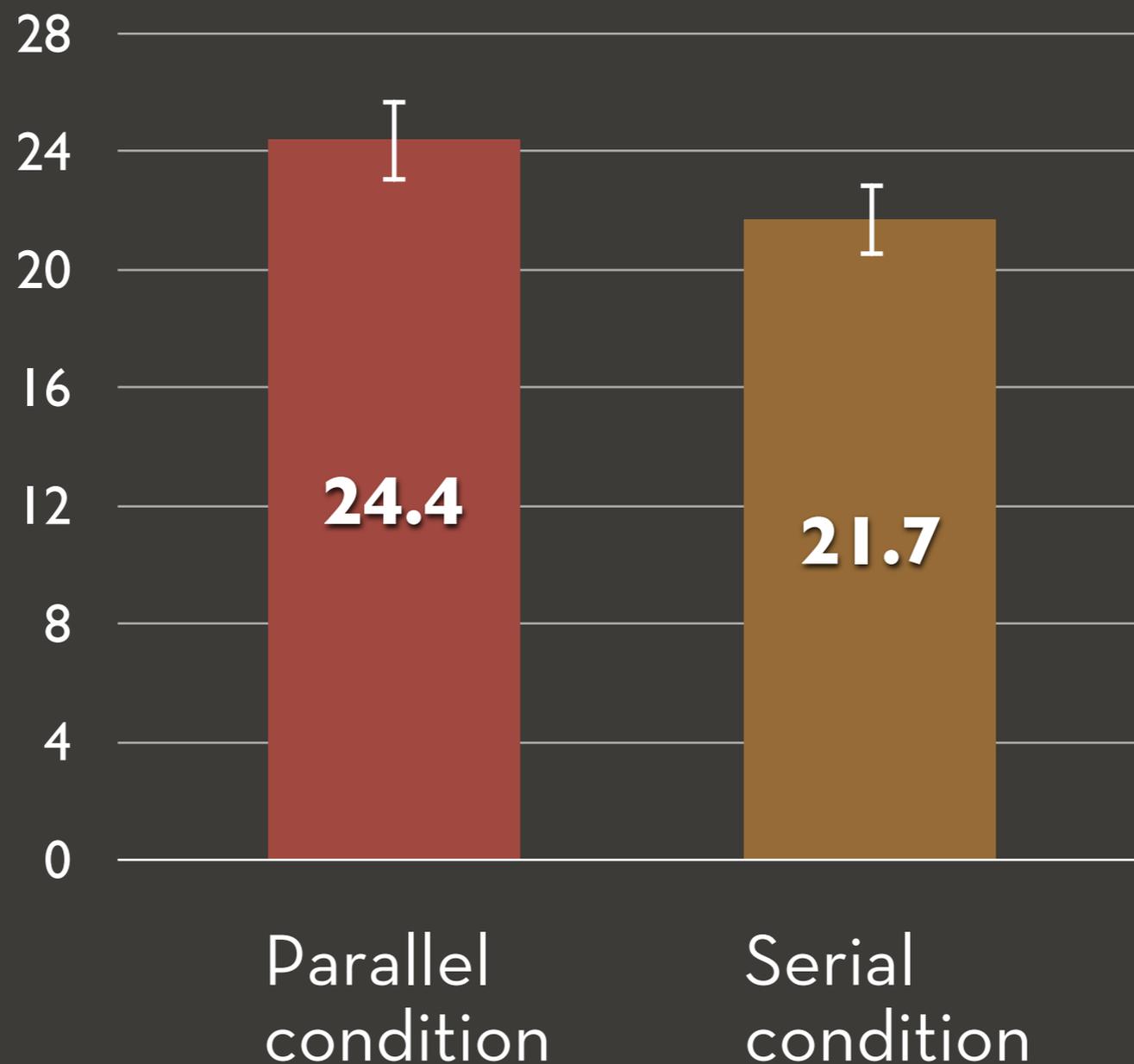
Parallel  
condition

Serial  
condition

$F(1,493)=1.781$   
 $p=0.076$

# Experts rated Parallel ads higher than Serial ads

Likert-scale  
rating (0-50)



$F(1,5)=7.948$   
 $p<0.05$

Why does parallel  
outperform serial?

# Comparison aids learning

training  
session

SEPARATE CASES

CASE#1

“Describe the solution.”

CASE#2

“Describe the solution.”

COMPARISON CASES

CASE#1

CASE#2

“Describe the  
**parallels** of  
these solutions”

~ 3 times

learning  
outcome

Solutions to a related  
problem

# Fixation in serial condition

I tried to find a good idea, and then use that idea and keep improving it and getting feedback. So I pretty much stuck with the same idea.

--*Serial participant*



The image displays a sequence of six vertical panels, each featuring a handprint in sand. The panels are arranged in a row, and each panel contains text related to the 'Ambidextrous' journal. The text in the panels is as follows:

- Panel 1: **Leave your mark!**
- Panel 2: **Leave your mark!**
- Panel 3: **Leave your mark!**
- Panel 4: **Leave your mark!**
- Panel 5: **Leave your mark!**
- Panel 6: **Leave your mark!**

Below the handprints, the text reads:

*Ambidextrous*

**Leave your mark!**

Have you ever created a product, or designed an innovative solution to a daily problem?

Then you're already a product designer!

Join a community of designers who create products that transform our world and the way we live our lives.

Professional product designers aren't the only people with innovative ideas.

Get **your ideas** out there, by joining a community of designers who create the products that **transform our world.**

*Ambidextrous* is a journal about the designs that **transform our world.**

Join this innovative community and **get your ideas** out there!

*Ambidextrous* is a journal about the people and the designs that **transform our world.**

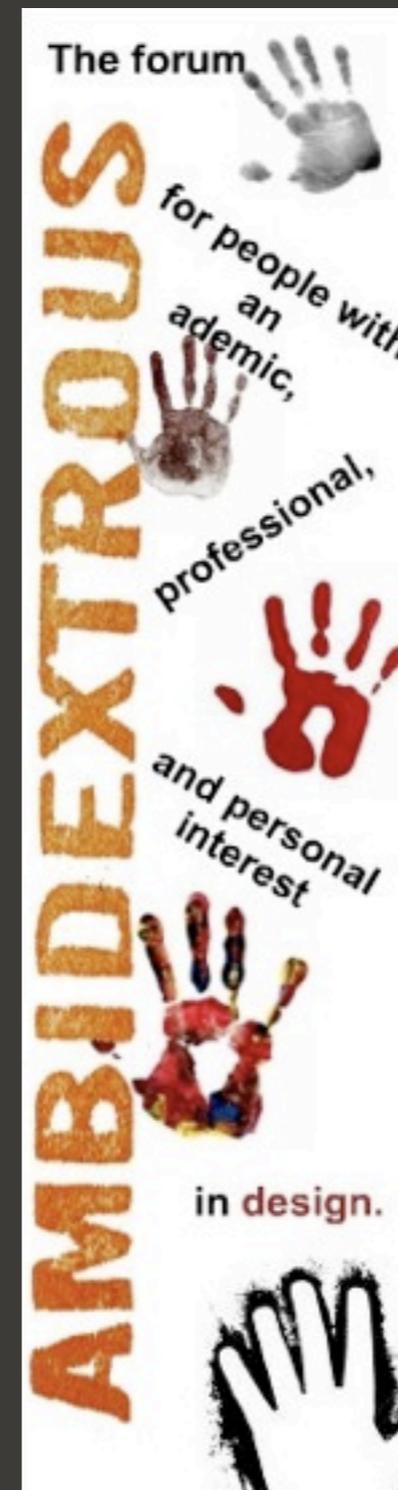
Join this innovative community and **get your ideas** out there!

*Ambidextrous* is a journal about the designs that **transform our world.** Join this innovative community now and **get your ideas** out there!

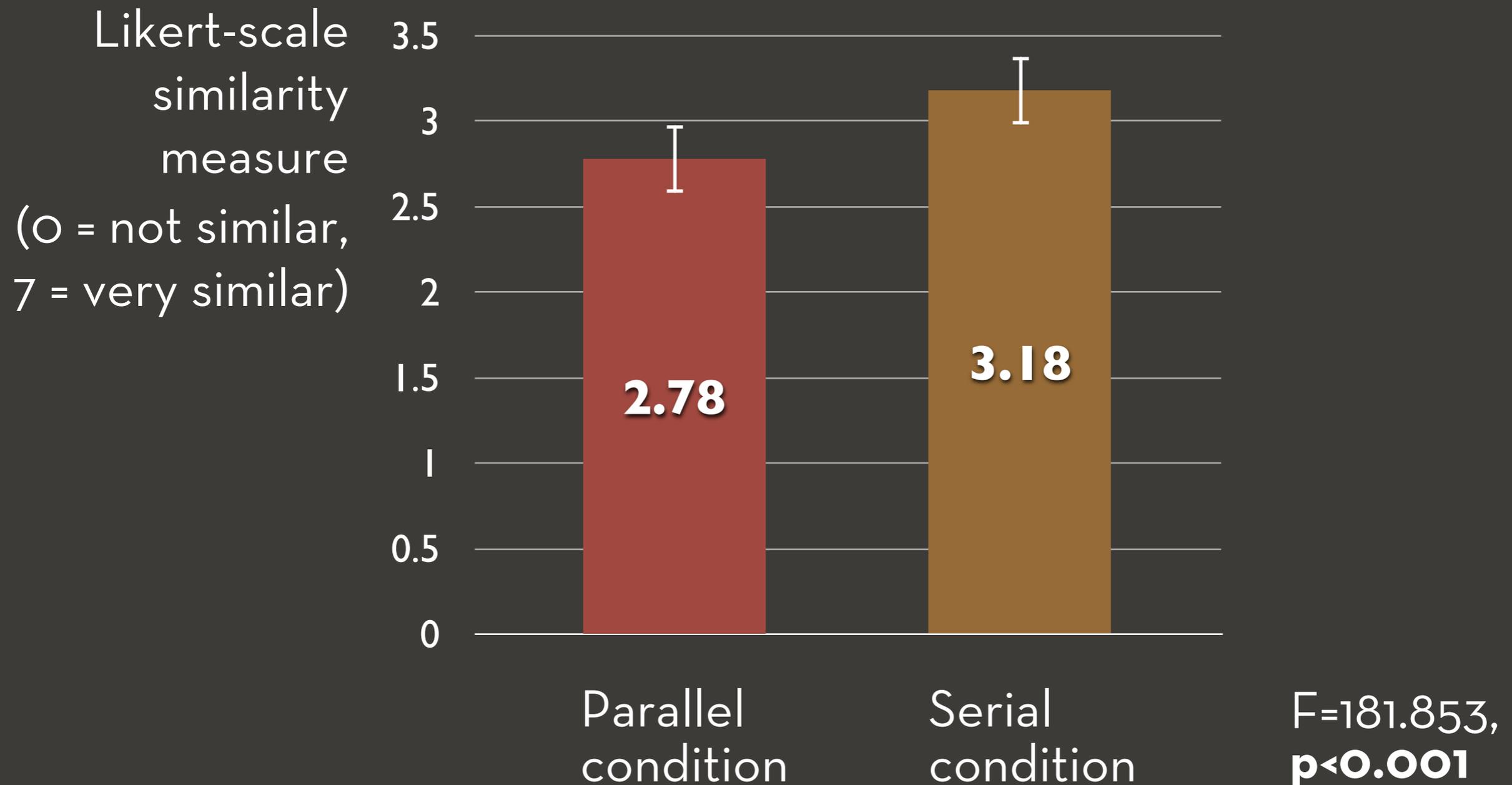
# Divergence/similarity measure

How **similar** are these two advertisements?

Not at all (0) - very similar (7)



# Sets of parallel ads were rated less similar than serial ads



# Critique provides advice and stirs emotions



“These guys, you know, I’ve tried to get them to do something, any positive biological, in fact that at this time, I’ve got to go” ...I’m a failure at this...”

# Self-efficacy measure

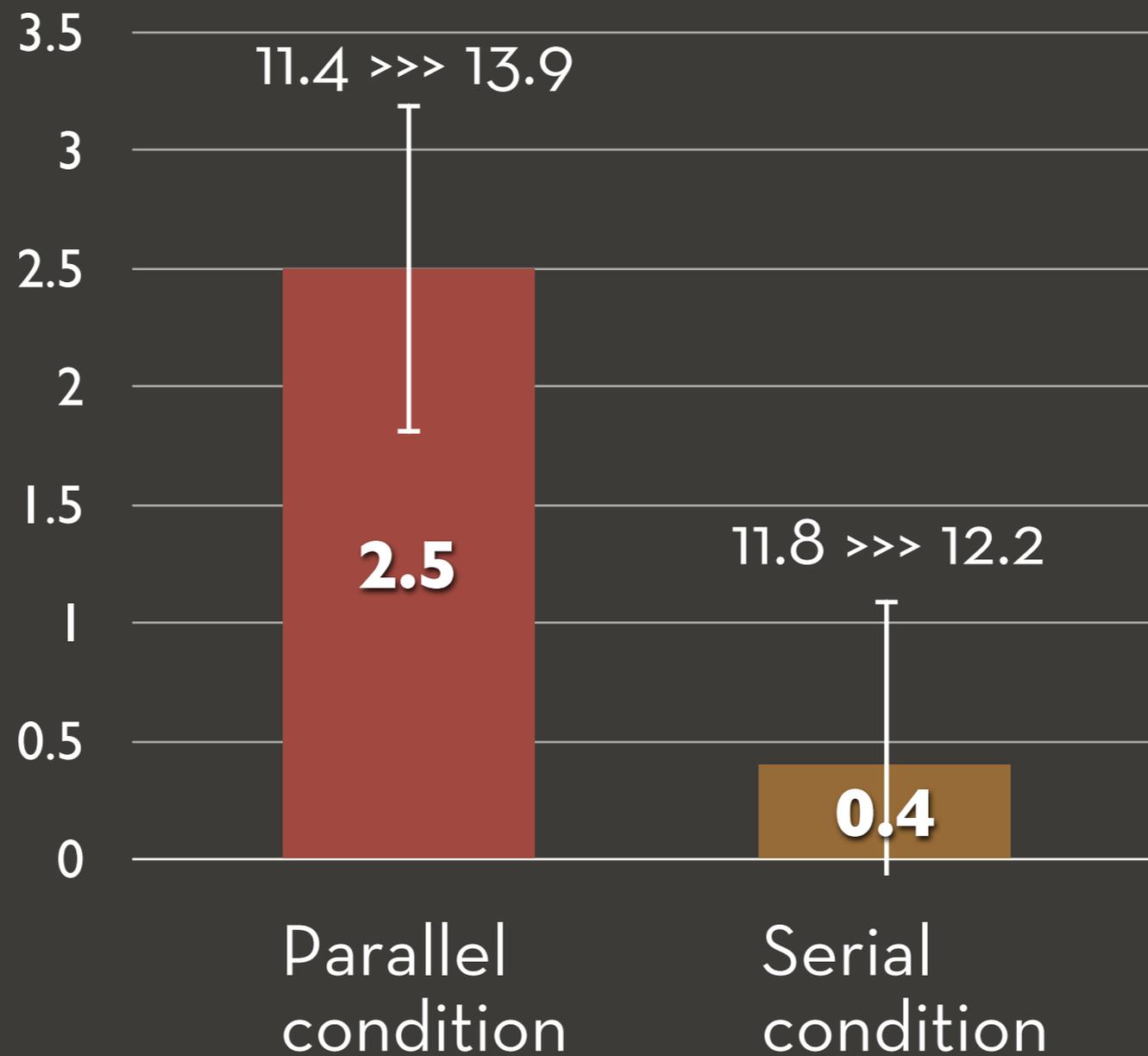
Rate your ability:  
no ability (0) - strong ability (7)

- 1) create advertisements
- 2) understand design problems
- 3) detect problems in a design idea
- 4) incorporate feedback into a design idea

Range of self-efficacy measure: 0 - 28

# Parallel participants gained more self-efficacy for the task

**Gain in self-efficacy**  
Pre and post  
Likert-scale  
self-efficacy  
measure  
(0 = no gain)



$F(1,28)=4.210$   
 $p<0.05$

# Benefits of parallel feedback

- Better comparison
- More individual exploration
- Less fixated investments
- Increased self-efficacy



VISION

RELEASE DATE

DEV. STATUS

IDENTITY

RELFACE

author is

contact info is

EMAIL - ADDR

availability is

REGISTRATION (to be defined)

SUPPLY

DATA

DATA FILE

PLATFORM

UI/UX

PLATFORM ALTERNATIVE

COMMUNITY UPTAKE

is it still supported. e.g. Stader

Stability - beta?

DEPENDENCIES

dependency (SW) etc

user-friendly?

UI

INTERFACE TYPE

STANDARDS COMPLIANCE

INTERFACE

Core Unit based e.g. for security

Formal code e.g. Java 8

COST

PRICE

...

...

...

...

Large cluster of various colored sticky notes on the right side of the whiteboard.

# Parallel prototyping in practice

IDEO shopping cart mockups



# Parallel prototyping in practice

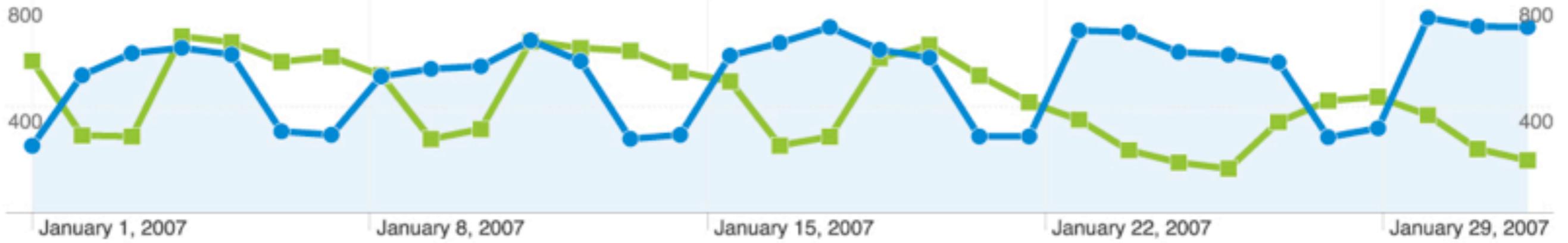
Obama campaign website variations



# Parallel prototyping in practice

Stanford's project-based HCI course





## Site Usage

 **16,107** Visits  
Dec 1, 2006 - Dec 31, 2006: 13,209 (21.94%)

 **3,86** Pages/Visit  
Dec 1, 2006 - Dec 31, 2006: 4.08 (-5.37%)

 **36,81%** Bounce Rate  
Dec 1, 2006 - Dec 31, 2006: 35.98% (2.30%)

 **62,142** Pageviews  
Dec 1, 2006 - Dec 31, 2006: 53,855 (15.39%)

 **00:03:22** Avg. Time on Site  
Dec 1, 2006 - Dec 31, 2006: 00:03:31 (-4.27%)

 **50.44%** % New Visits  
Dec 1, 2006 - Dec 31, 2006: 49.73% (1.42%)

## Visitors Overview



Visitors  
**10,160**

## Map Overlay world



## Traffic Sources Overview



## Browsers

Browser	Visits	% visits
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**Later today!!**

## **Prototyping Dynamics:**

Sharing Multiple Designs Improves  
Exploration, Group Rapport, and Results

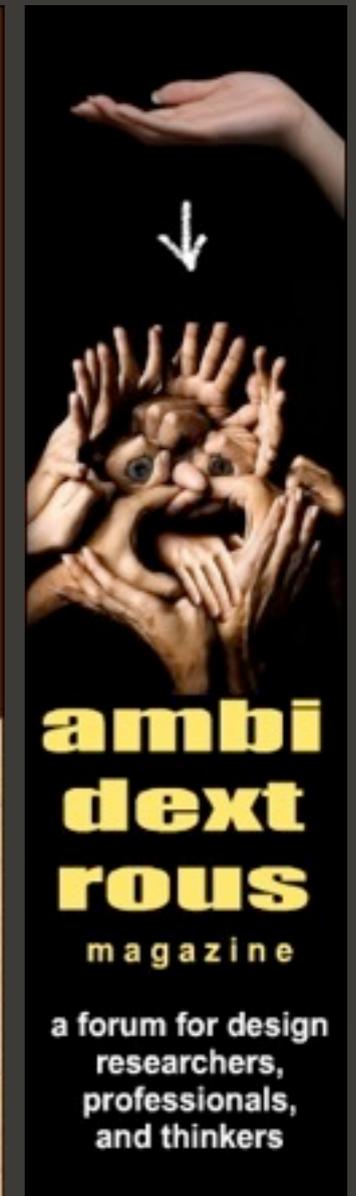
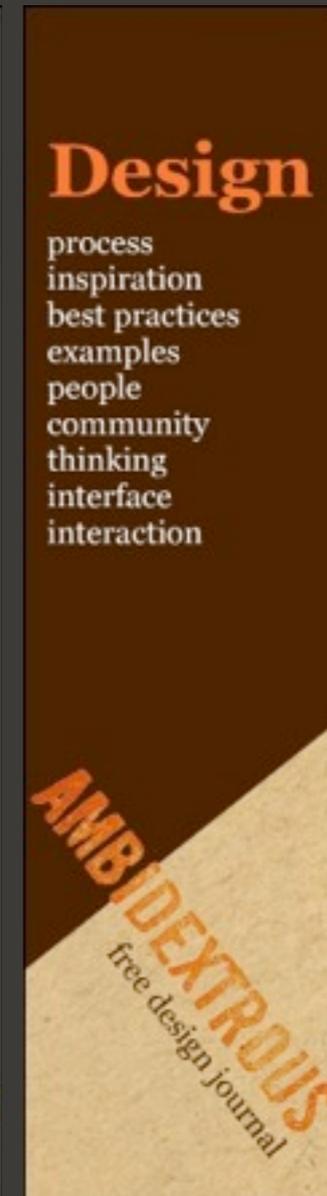
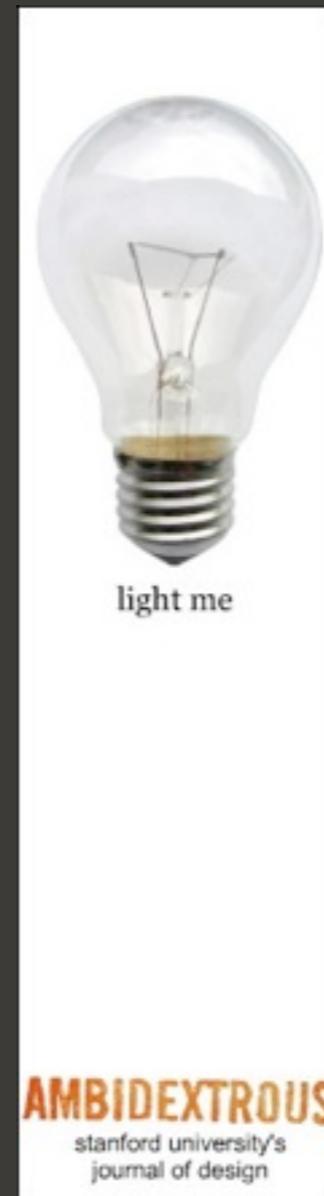
Dow, Fortuna, Schwartz, Altringer, Schwartz, & Klemmer

**This room @ 17:00 (5p)**

# hci.stanford.edu/prototyping

## Authors

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*Hasso Plattner Design Thinking Research Program*

# Tool support

- Juxtapose
- M. Terry's work