

# THUNDERBRAIN

## *Results & Validation*

Validation is a huge part of our project, so we've created this document to summarize our data, and our analysis that validates our work.

### ***Needfinding survey results***

Our needfinding survey provided us with a lot of data on how people approach brainstorming today.

#### **Participants:**

University of rochester undergraduates and graduate students

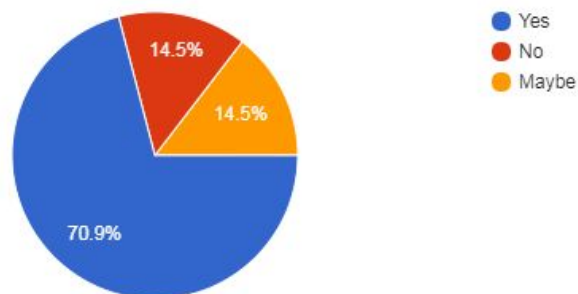
Total Participants: 55

#### **Quantifiable results:**

Here's some statistics we collected from the non-short answer parts of survey:

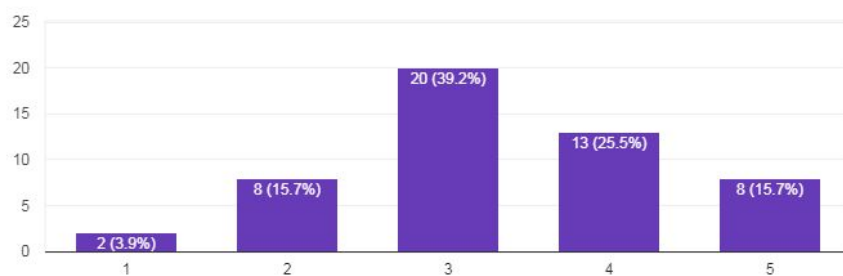
Have you ever participated in a group brainstorming session?

55 responses



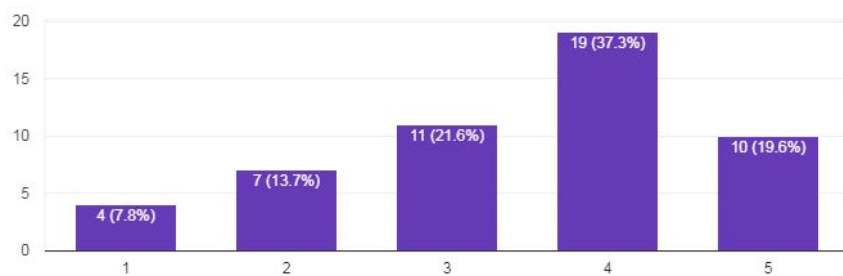
I supported my idea over others.

51 responses



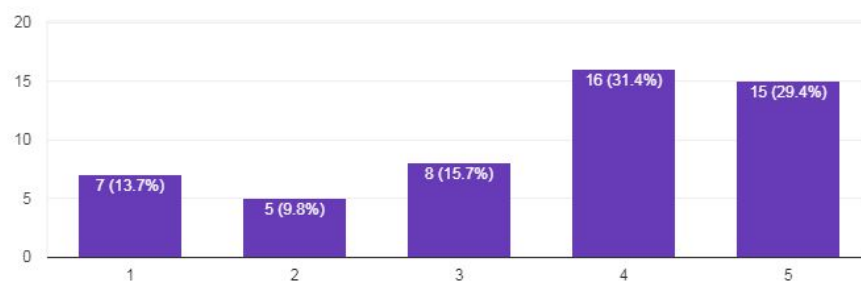
I considered all ideas objectively and equally.

51 responses



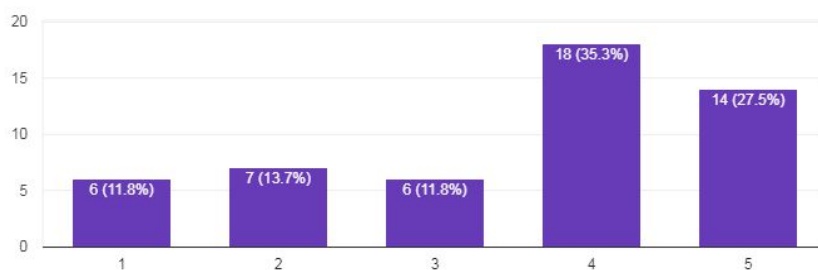
I felt uncomfortable shooting down the idea of a friend

51 responses



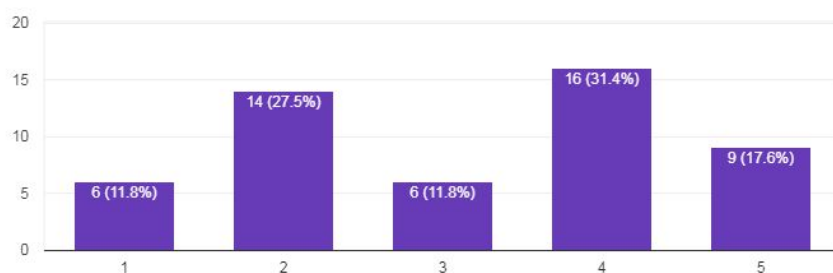
I disliked one of the members of the group i was brainstorming with

51 responses



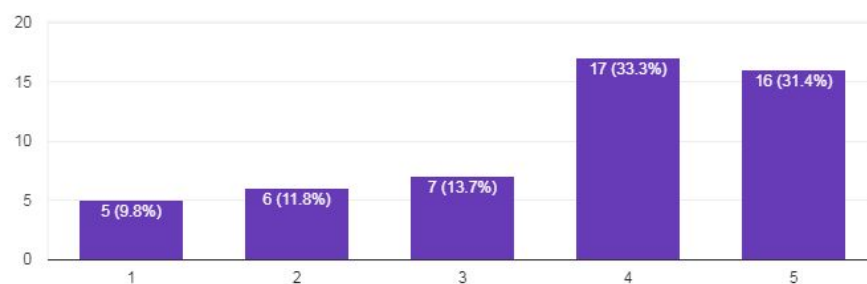
I thought less of an idea because it came from someone I don't like

51 responses



How much would it help you to objectively evaluate ideas in a group discussion if the ideas were anonymous?

51 responses



## Qualitative results

We had one short answer question on our survey, here's a collection of the results. (troll answers that are not related to the question were removed)

**Do you have any other thoughts about how personal bias may affect the result of a brainstorming session?**

- If the decisions are taken democratically, and everyone is honest about their choice, then personal bias shouldn't be that big of a problem.
- Personal bias has an effect on everything we do, not just brainstorming session.
- no
- I think gender and age (particularly in a college sense where older folks tend to be in higher years and thus have taken more classes and may be seen as more of "experts")
- A person with a bad track record (either attitude wise or technical capability wise) will have their ideas looked down on more often (if ideas are even considered)
- Nah fam
- flash judgements, time constraints
- As a BME, we've done many group projects over undergrad... at least in my experience I think it's not so much liking or disliking an individual but having positive or negative previous group experiences with them.
- I think there definitely is a personal bias especially toward those you may not like.
- I sometimes favor other people's ideas over my own - and play down my own -
- because I don't want to seem pushy.
- There are a lot of reasons why one might have a bias against another person. You can think someone is a jerk, but acknowledge that they are much more knowledgeable on a topic than yourself. Alternatively, you can be best buds with someone, but recognize that they aren't the right person for a certain job.
- Personally, I think a big factor in bias is how well you know someone, and how much you can trust the ideas of strangers. Making ideas anonymous does remove a possible preconception, but preconceptions might be more or less helpful depending on how you can handle your own preconceptions.
- No because I don't have a way to objectively evaluate ideas
- If someone simply appears to be smart, their ideas may get taken more seriously
- You might also consider your friend's ideas more than other people in the group (to go along with the question about rejecting ideas of people you dislike). Also, maybe something with the bystander effect (sort of) - you might not vocalize everything with larger groups. Also, consider groupthink as an influence - don't always think the first idea(s) you agree on are necessarily the right ones.
- I think it's a big issue because when I am in a situation where I have to develop ideas with someone I am very uncomfortable with, it's very hard to objectively analyze his/her thoughts.

## Analysis

From our quantitative data, we know most people have use brainstorming in the past. Being biased against an idea from someone you dislike is a problem, but not asbig as feeling uncomfortable shooting down the idea of a friend. People are optimistic about how anonymizing ideas can help objectively evaluate them.

From our qualitative data, we see that many people are concerned about bias in brainstorming. Factors that contribute to forming biases against or for members include gender, age, how well you know someone, and the quality of previous group experiences with them

## **Paper prototype results:**

We implemented a paper prototype to test the effects of anonymizing ideas.

We have three sources of information:

- The list of ideas generated at 2 of the trials
- Our notes on the trials
- The survey results from after the trials

## Participants

### **Control Group:**

Four male freshmen, University of Rochester students

Data science, molecular genetics, data science, comp sci/econ

Group is all familiar with each other but met whole group only recently

### **Experimental Group**

Three female juniors, one male sophomore,all are University of Rochester students

Fields: 3x linguistics, 1 mech E

## Quantifiable results

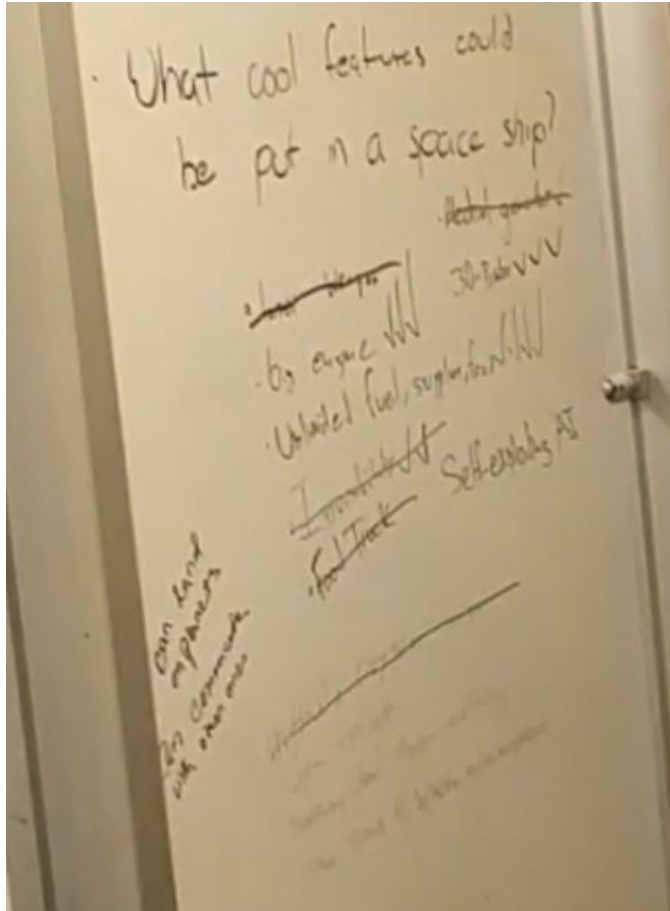
For one of our control and experimental trials, we wrote down all of the ideas people produced, so we can analyze the number of ideas.

Number of ideas generated by control group: 8

Number of ideas generated by experimental group: 14

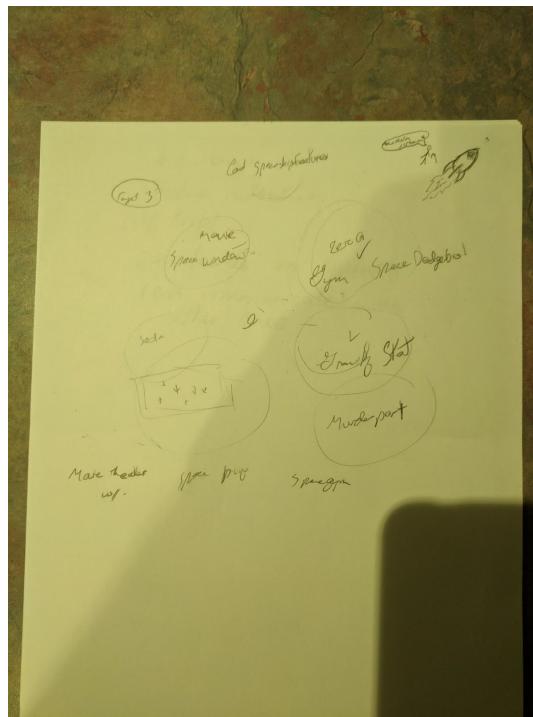
Members of the control group recorded different numbers of ideas, even though they were recording all ideas generated by everyone. The numbers were 7, 8, 8

Experimental:



Control:

movie theater: window or screen  
 launching device  
 bungee cord  
 - space dodgeball court → space gym  
 popcorn machine  
 soda fountain  
 - gravity room or gravity stat in every room  
 - move popcorn by window that zooms in



movie theater  
 ✓ Movie Theater / space window  
 Space Walk Cord  
 Murder Port  
 ✓ Space Dodgeball / OG  
 Popcorn  
 Space Soda Fountain  
 ✓ Gravity - stat (in every room)

## Qualitative Results

**Method:** On-spot interview with the participants after their experience/

### **CONTROL**

- What parts of the brainstorming session did you enjoy?
  - Talking about the ideas
  - Voting process was pretty good, liked the iterative nature
- What parts of the brainstorming session do you feel could be improved?
  - More rigid defaults for initial parameters of the question
- What are your thoughts on your group's final ideas?
  - Things that are definitely needed in the context
  - Features are pretty basic
  - Group came down to the most basic necessary needs
- Describe some of your feelings during the session.
  - Funny, inspired discussion
  - Trend of trying to figure out who the people who came up with the ideas are as the session progresses
- How did not knowing whose ideas were whose impact your thinking
  - Assumption that first person to come to the idea's defense was the idea person
  - One person says they didn't find any specific differences
  - Admittance of feeling the rejection of the ideas of others if they didn't like them, def a thing

### **EXPERIMENTAL**

- What parts of the brainstorming session did you enjoy?
  - It
  - Being creative
  - Thinking outside of the box
  - Ideas combined near end
  - Getting hyped about possibilities
- What parts of the brainstorming session do you feel could be improved?
  - Could have been more specific guidelines
  - Ability to do research in advance/during
- What are your thoughts on your group's final ideas?
  - Good
- Describe some of your feelings during the session.
  - Intrigued
  - Disappointed when ideas got shot down



## Analysis

### **Control**

- Clear that people are more likely to even criticize their own ideas when they are dissociated with themselves
  - No loss of ego to the person if their idea is rejected
  - One dude shot down his own idea readily after people pointed out its flaws
- We had to moderate a good amount for them to move forward, otherwise it's just a time limit
- How do we deal with the order in which ideas are presented? This affects people's voting strategies, especially if they can't go back and change their answers

### **Prototype**

- We have no functionality to add ideas as the process goes on, ideas can't combine
- Sporadic discussion vs. freeform, freeform = a facilitator gets socially chosen
  - You NEED a facilitator of some kind
  - Breadth vs depth of ideas
- Way more unique ideas from the first group than the second
- Maybe the focus should be on what kinds of results automated systems give vs human-moderated stuff
- When you tell people to just shoot the shit they're not afraid to say something "stupid" vs. when it's a completely organic discussion

Additionally, the number of ideas produced by the experimental groups exceeded that produced by the control group.

## ***Application Use results***

We also tested our final app both to analyze its success at reducing bias and to see its other effects on users.

We have three sources of information:

- The list of ideas generated at 2 of the trials
- Our notes on the trials
- The survey results from after the trials

## Participants

### Control group

Total number of groups: 2

Total number of participants: 3

Participant type: Undergraduate students at the University of Rochester

### Experimental group

Total number of groups: 2

Total number of participants: 3

Participant type: Undergraduate students at the University of Rochester

## Quantitative data

### Survey:

In your group, did you feel one person led or dominated the conversation?

- 100% of the Experimental group said no
- also 75% of the control group said no, 25% said yes.

### Idea list:

We recorded the ideas from one of our experimental trials and one of our control trials

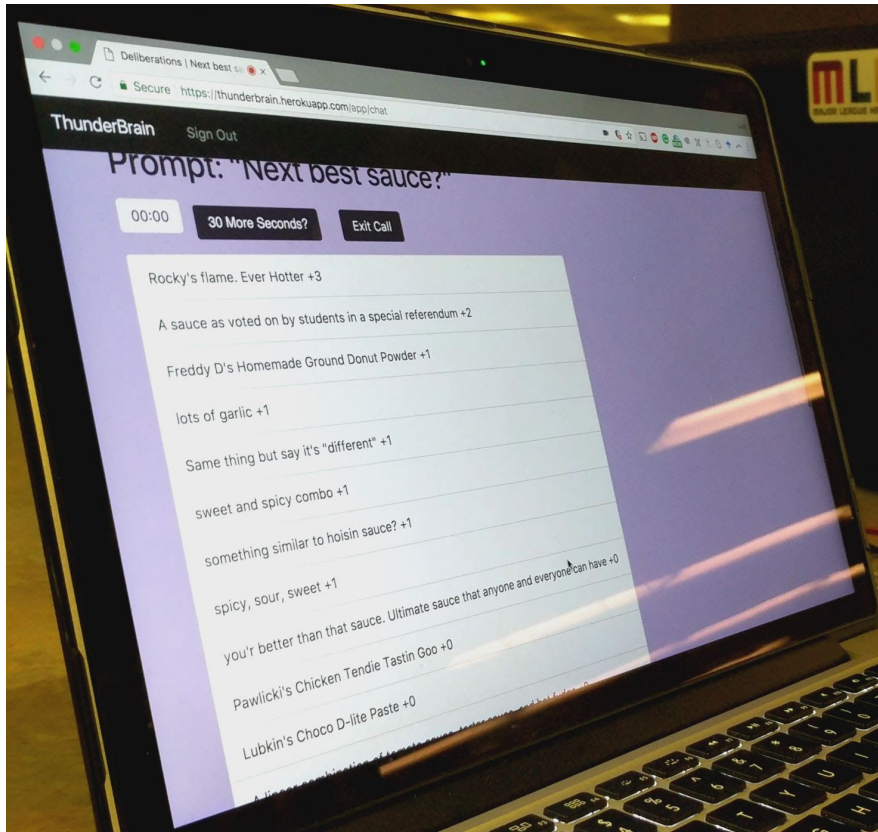
Total number of unique individual ideas generated by experimental group: 18

Total number of unique individual ideas generated by control group: 11

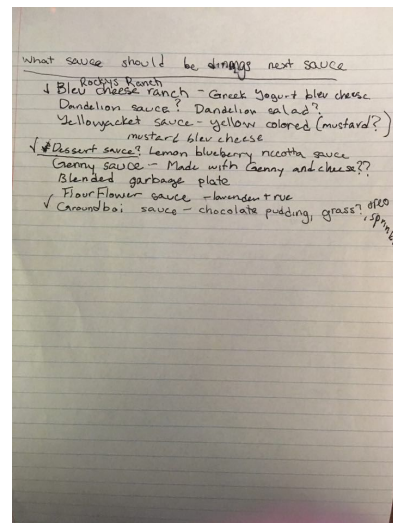
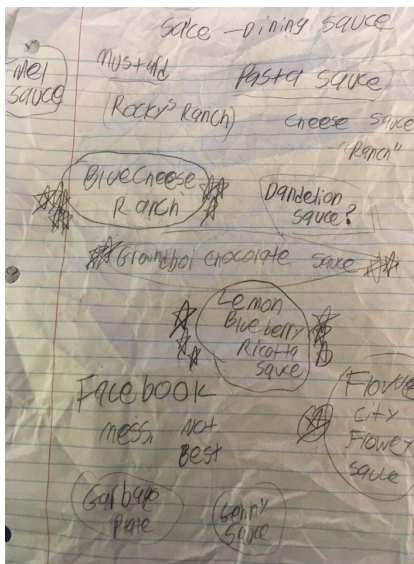
Note: Each member wrote down a different number of ideas, even though they were recording all of the ideas their group produced. The numbers were 11, 8, and 7.

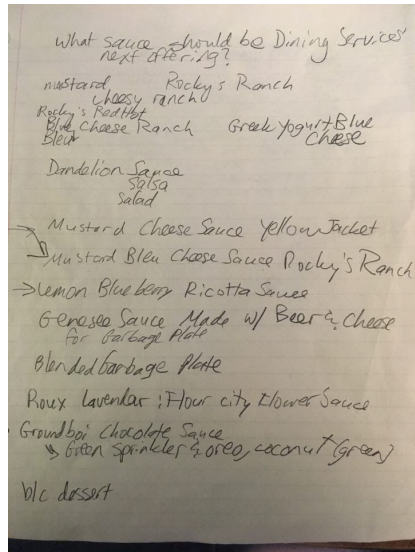
For the control group, each person wrote down all of the ideas. So we are

The number of ideas recorded varied between users in the control group.



## Control





## Qualitative data

### List of Ideas:

In the control group, users recorded different numbers ideas on their note Sheet, and the ideas were not well defined.

### Notes on Trials:

#### Experiment:

- Short vs paragraph format for ideas? How do we deal with long bars
- Entering time in seconds is such a bad idea, people were confused
- Can you add ideas about post brainstorm?
  - Desire for this functionality
- After people run out of ideas they just had to wait
- Lots of ideas ! But hard to all view, too much spacing
- Video chat working a major problem
- Discussion of pros & Cons actually happening
- End idea lost takes up the whole scores

#### CONTROL

- Definitely more subdued
- Ideas have more interplay theres more back and fourth during brainstorming
- Idea generation role i a lot slower
- More off-tpoic w/o a timer or visible structure

- Total 6 ideas: top :3

## Analysis

Our data suggests that it may prevent people from dominating the conversation, although it is inconclusive. Our data also tells us people are more excited when using ThunderBrain than when using a basic video chat application. Additionally, more ideas were generated using ThunderBrain than in the control group. This backs up our analysis of our paper prototype. Additionally, users in the control group had inconsistent idea lists near the end. What they did all to merely select one idea, this meant if we ever wanted to look at other ones they came up with, they would have inconsistent records. This points out another positive of ThunderBrain: consistent recordings of ideas.

## Conclusion

From our initial need finding, we can conclude that from our sample of participants, there was a higher frequency who recognized the impact that personal bias has during brainstorming. From our paper prototype and application testing we could conclude that the anonymous idea model allows groups to produce a larger number of ideas, encourages people to suggest ideas they might not feel entirely confident about, and criticize ideas from others.

We don't have enough results to conclude if Thunderbrain can actually eliminate personal bias during brainstorming. However, we did find that Thunder branding does have a significant effect on the brainstorming process. It increases the number of ideas in production, it helps keep these ideas organized and consistent across users, and it makes these brainstorming processes more enjoyable than simply using a normal video chat service.