Life on a Sterile Planet – Results From a Pilot Study on Misconceptions of Mass Extinctions

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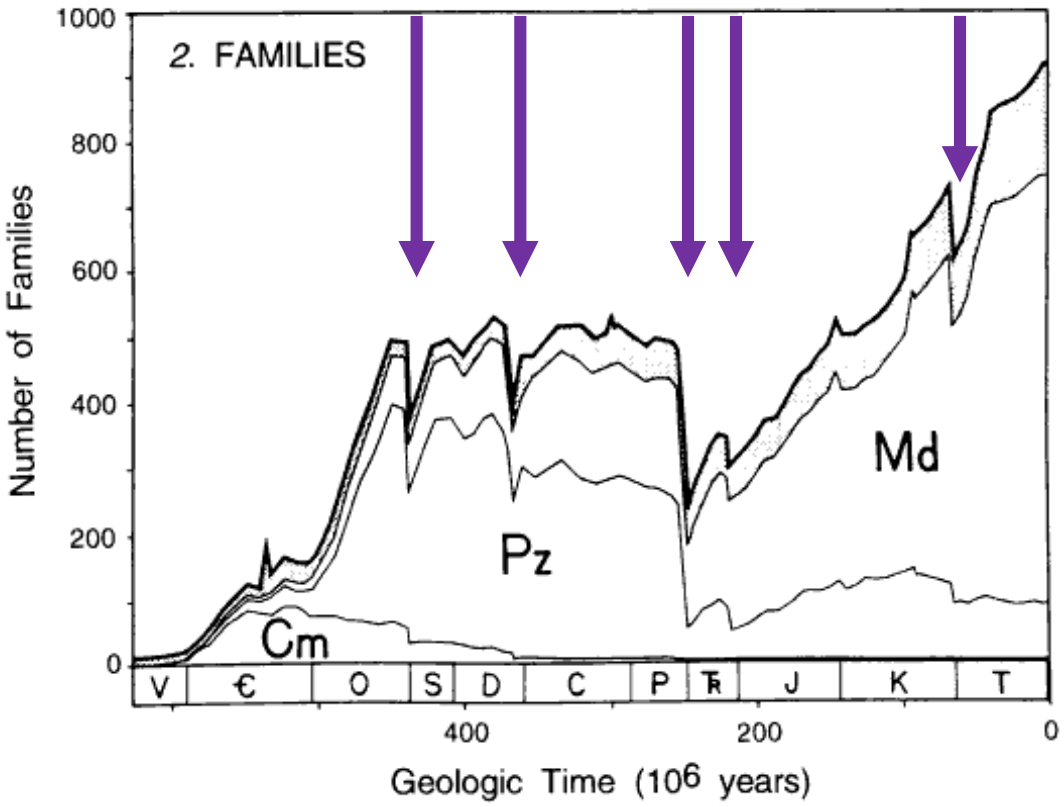
Mass Extinctions - Scientific Definition

- Marine biodiversity
- Three Faunal Groups
- Big 5 Mass Extinctions



Sepkoski, 1997

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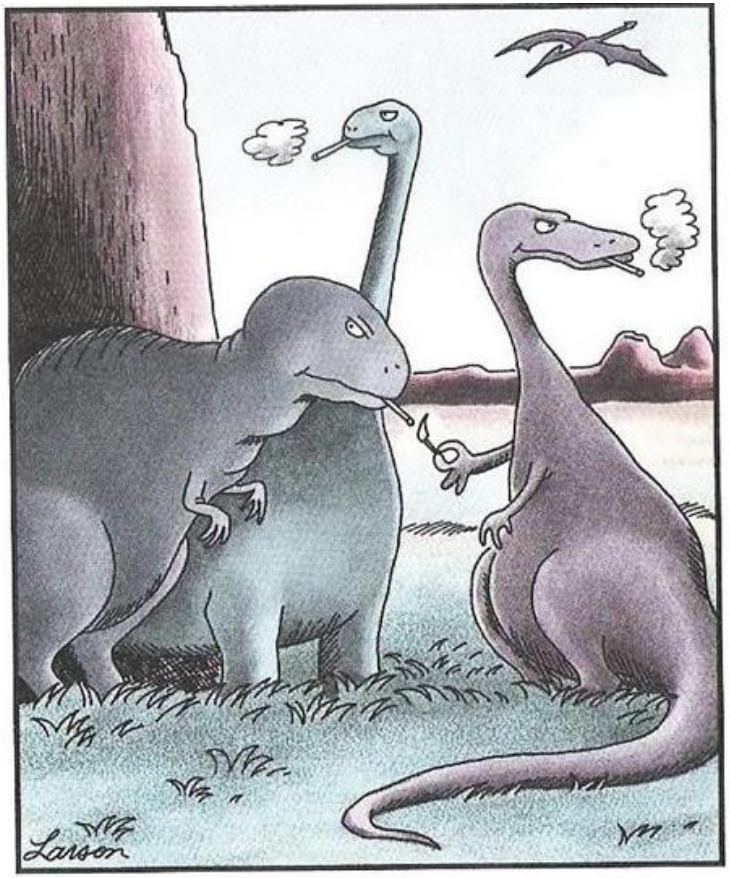
Mass Extinction – Contributing Factors

- Climate Change
  - –Cooling and warming
- LIPS volcanism
  - –Siberian Traps
  - –Deccan Traps
  - –CAMP Volcanism
- Bolide Impacts



The real reason dinosaurs became extinct

Pilot Study

Open-Ended Survey

- Define a ME.
- When did you first learn about MEs?
- How many MEs have there been?
- What causes MEs?
- If you travel back in time, what would it look like?

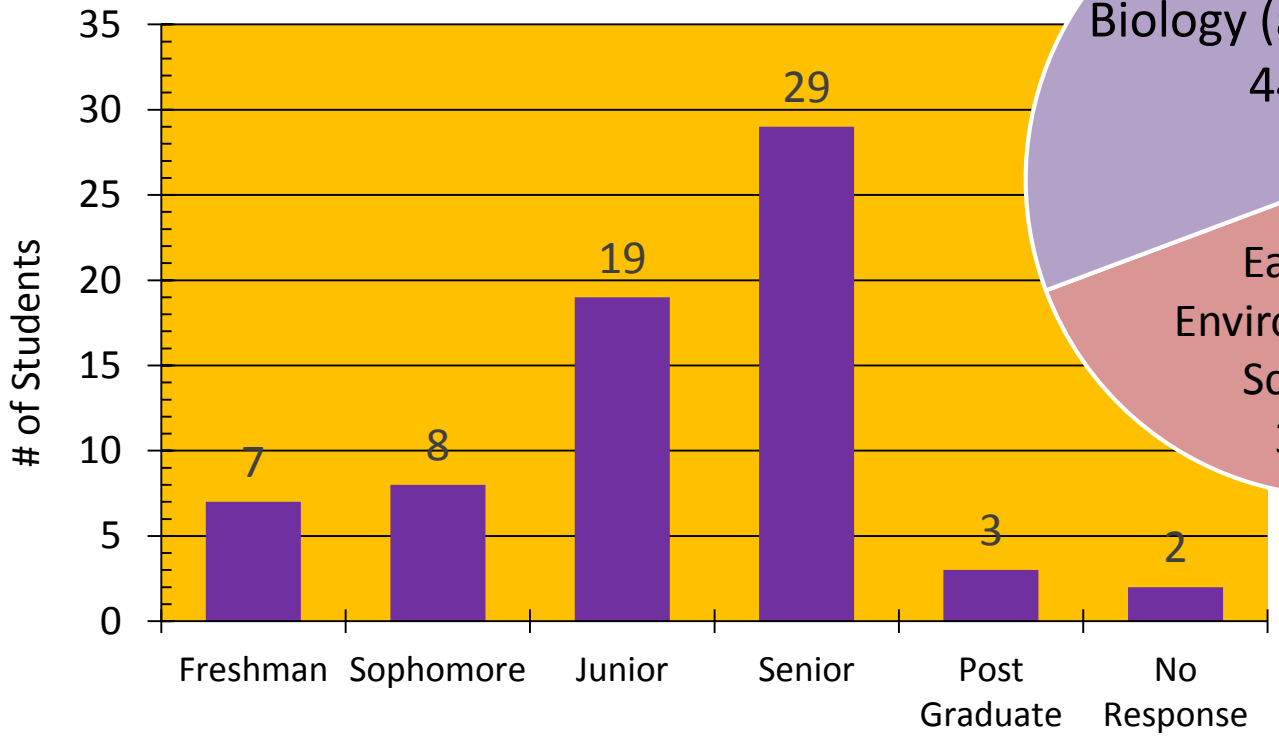
Pilot Study

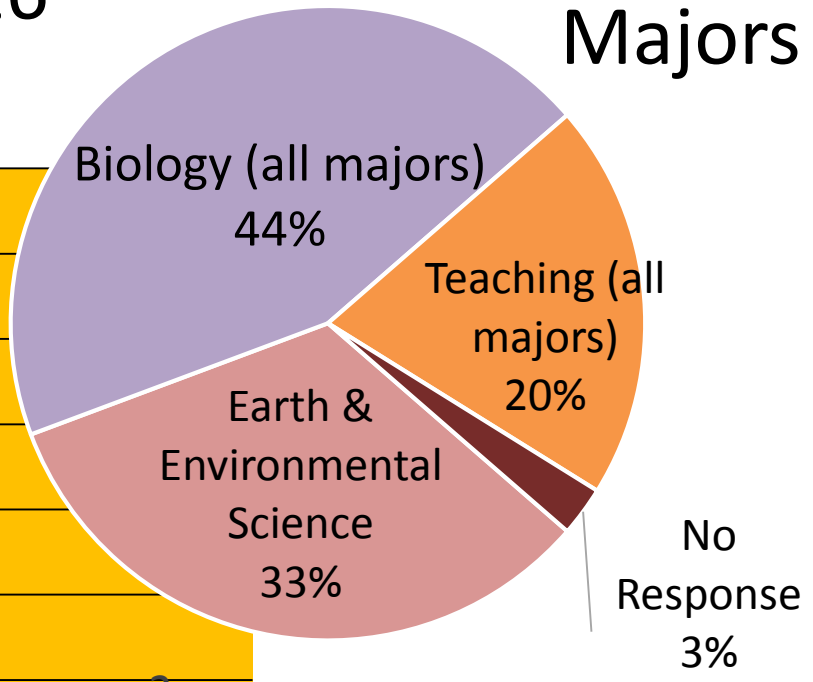
Administered to Earth History (18 – 30 students/semester)

- Earth & Environmental Sci Majors
- Biology
- Science Teaching (about 30% of students)

Demographics

- 68 students F14, Sp15, Sp16
- Female = 27, Male = 40





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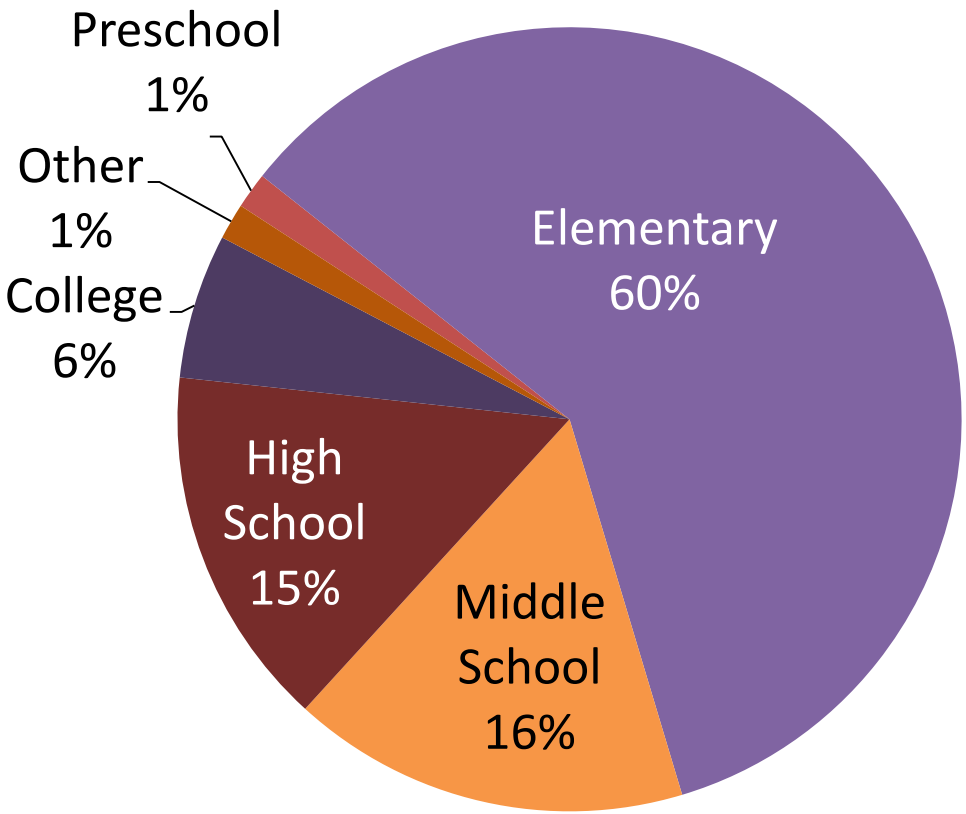
First Learn – Age and Context



When did you first learn about MEs?

No Response = 1

First Learn – Age and Context

How did you first learn about MEs?

Media

- History Channel
- Discovery Channel
- Science Documentary

Other

- Field Museum
- Ice Age, Mammoth, Dodo
- The apocalypse of 2011

No Response = 18

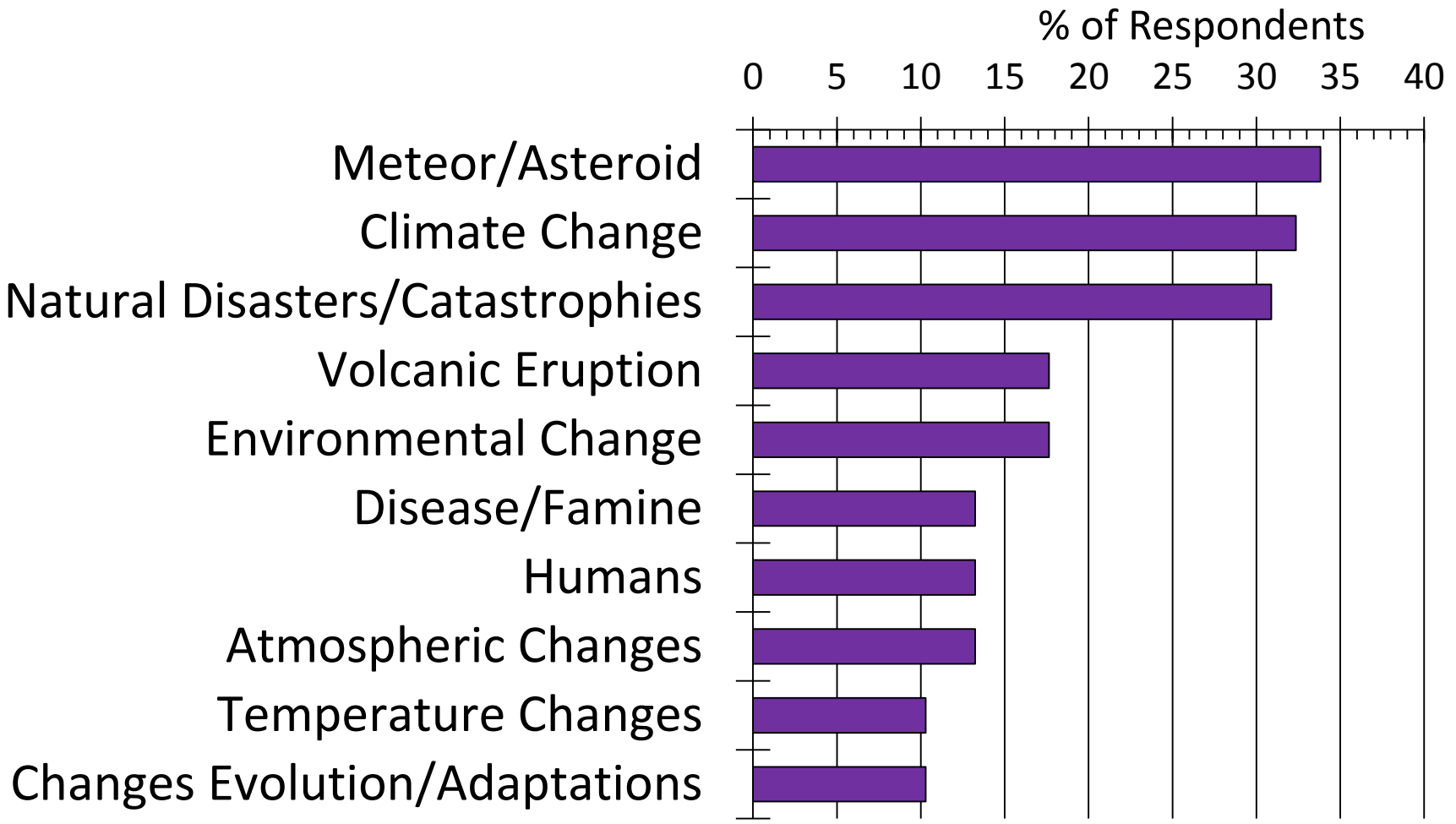
Causes

Either an ice age, meteor, volcano eruption, just some big, lethal event that takes place that kills organisms.

Some sort of mass climate change event changing the global temperature or atmosphere composition

Disease, natural disaster, famine, starvation, poaching, meteor, bad environment, etc.

Causes


% of Respondents
0
5
10
15
20
25
30
35
40
Meteor/Asteroid
Climate Change
Natural Disasters/Catastrophies
Volcanic Eruption
Environmental Change
Disease/Famine
Humans
Atmospheric Changes
Temperature Changes
Changes Evolution/Adaptations

How Many Mass Extinctions?

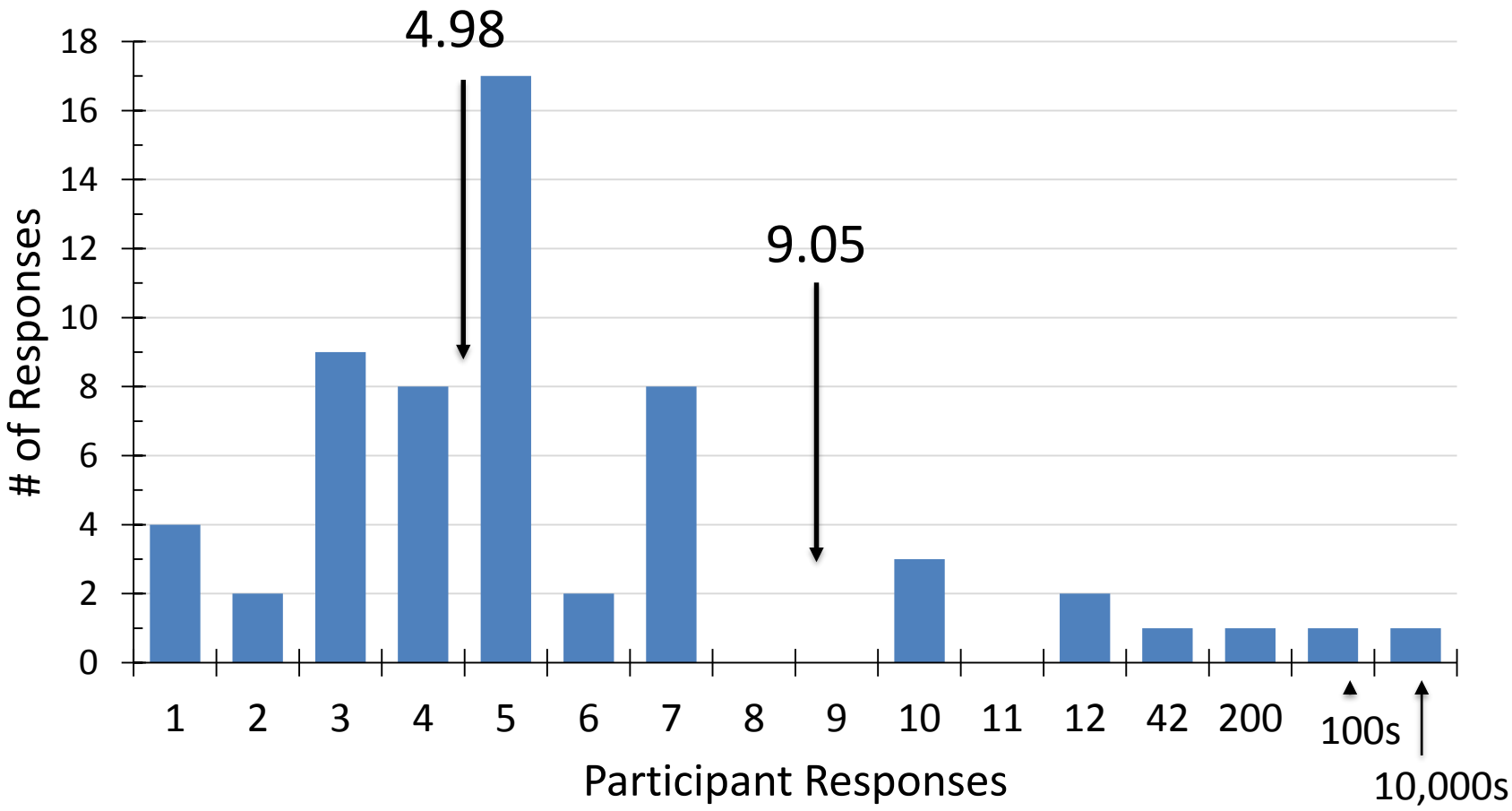
7 - Complete guess

There have been five mass extinctions. I watch Cosmos.

42- the answer is always 42

I would guess in the ten-thousands. The term "mass extinction" seems kind of vague… there have been many different types of mass.

How Many Mass Extinctions?



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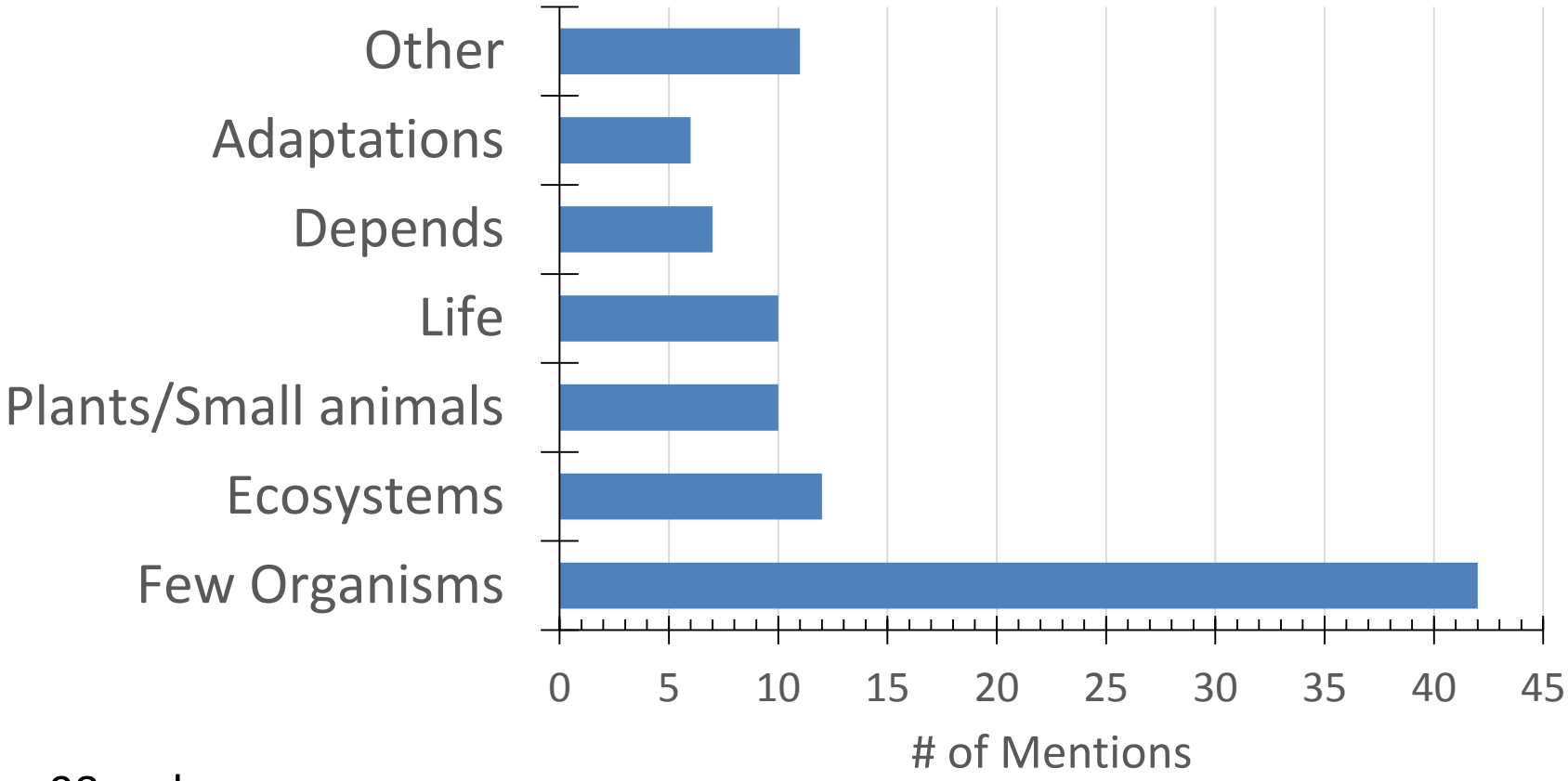
What would you see afterwards?



n = 98 codes

What would you see afterwards?

Barren Land (aka The Desolation of Chicxulub) N =17

No vegetation. No animal life on hand or marine life

Lots of barren wasteland

A whole lot of nothing. A lot of volcanic ash maybe, some flooding, or even massive glaciers

Little to no life with some life such as bacteria

What would you see afterwards?

Carnage

n =14

A lot of dead animals and empty habitats. It'd probably be very eerie.

A lot of carnage. Many bodies of organisms that perished.

Lots of dead animals laying on the ground with forests of dead vegetation.

Few Organisms

n =11

Very few if any living organism, be it animal or plant life

Only a few animals left on the planet, so I imagine it would be hard to find animals.

What would you see afterwards?

Wrecked Ecosystems

n =7

Lots of decomposition. Unbalanced ecosystems. Decrease in plant life

There would be problems in the food chain. If they were herbivores there would be more vegetation

Normal Ecosystems

n =4

Nothing extremely different than what is normal. Just less animals who weren't able to make it through the event.

Biological View Of Extinction

Depending on the mass extinction the view would vary. One of the first mass extinctions occurred when oxygen was produced in large enough quantities to be toxic to anaerobes. I would expect to see large amounts of species filling new niches. The more famous mass extinction occurred when an asteroid struck the Earth. I would expect to see more mammalian type creatures filling new niches.
Alex – Senior Biology

Conclusions

- Many students think MEs nearly “sterilize” the planet. (37% of participants)
- Concept initiated at an early age
- Dinosaurs are a “gateway” topic
- Few students understand how MEs can look “normal”
- Sample biased by upper-level biology students

Implications

- K-6 teachers need to understand MEs
  - Emphasis in our El Ed content courses?
- Dinosaurs are a “gateway” topic
- Emphasize survivors when talking about MEs

Next Steps

- Broaden Sample to Non-Science Majors
- Participant Interviews
- Expand to Other Locations/Populations
- Best Teaching Practices
- Media/Film Studies

Questions??

Interested in collaborating?
Contact Kyle Gray
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