



# Media Impact on Science Knowledge

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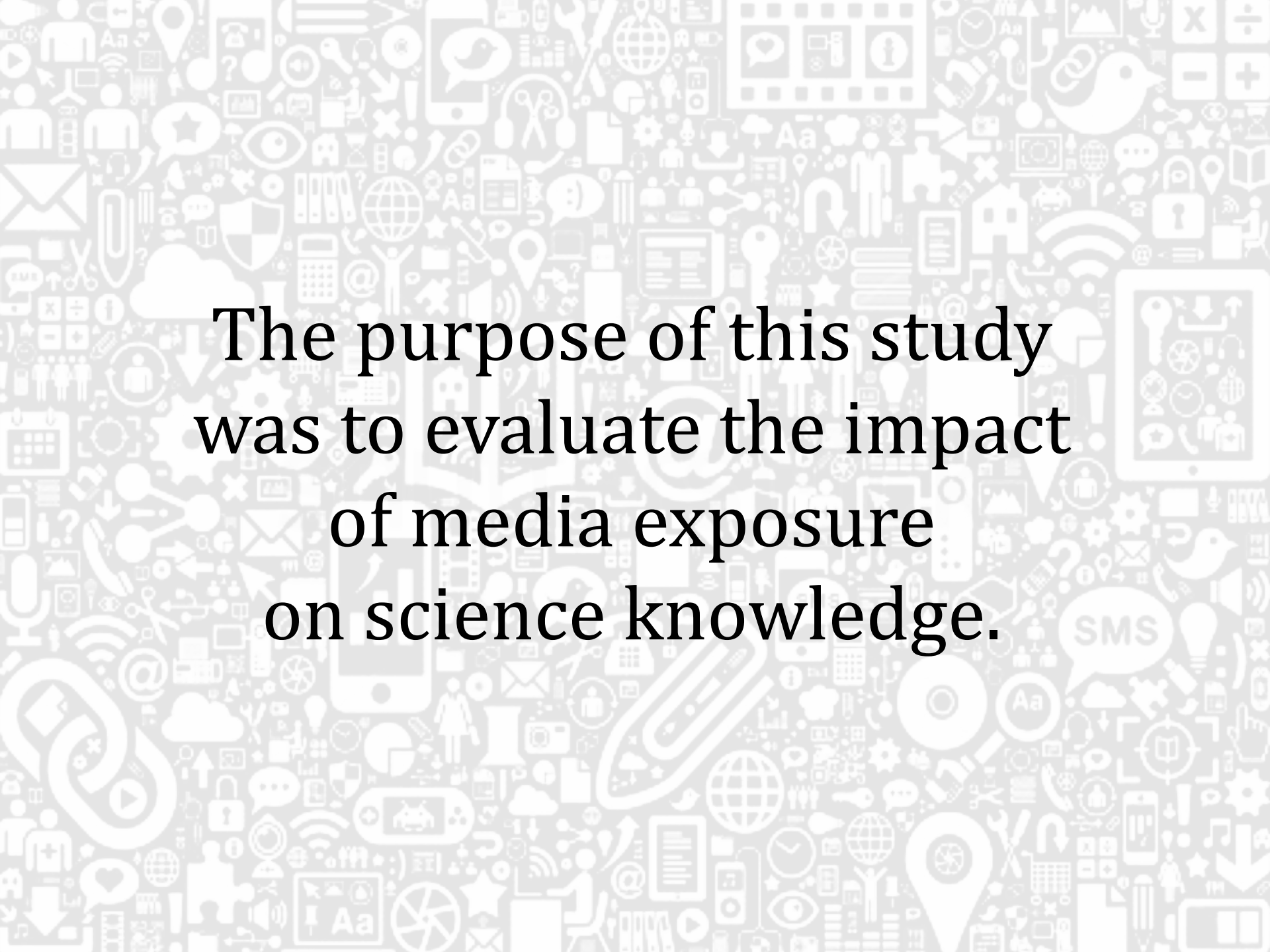


**The dumbing down of America is most evident in the slow decay of substantive content in the enormously influential media, the 30 second sound bites (now down to 10 seconds or less), lowest common denominator programming, credulous presentations on pseudoscience and superstition, but especially a kind of celebration of ignorance.**

*Carl Sagan*

# Project Goals

- Individuals are most likely to acquire science-based knowledge through the media
  - Wellcome Trust Monitor & Pew Research Science Knowledge Quiz
- Web celebrates twenty-five years of existence
  - Achieve greater amounts of knowledge in lesser amounts of time
- Preferred way to seek and access information
  - Vast majority of youth and adult population chose internet
- Access to science knowledge has changed dramatically
  - Less research, books, initiative, time spent, etc.
  - Many are credulous and believe what they are told
- Pseudoscientific theories impact intake of factual knowledge
  - Vaccinations



The purpose of this study  
was to evaluate the impact  
of media exposure  
on science knowledge.

# Methods

- 135 participants gathered using SONA
  - A Psychology department-facilitated system that manages experiments and provides incentive of extra credit in exchange for participation
- Computer-assisted survey
- Analyzed in SPSS, statistical data analysis program

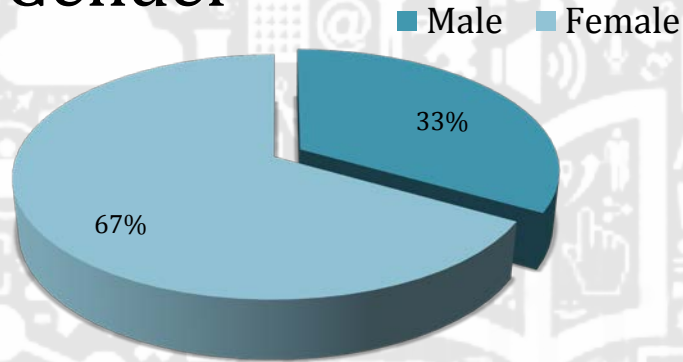
# Survey Variables

- Media Preference
  - Newspaper, television, radio, internet website, social media, other people
- Science Knowledge Scores
  - 9 question true/false
  - 3 question definition pass/fail segment
- Vaccination Risk
  - Very high, fairly high, fairly low, no risk
- College Level
  - Freshman, Sophomore, Junior, Senior, Graduate

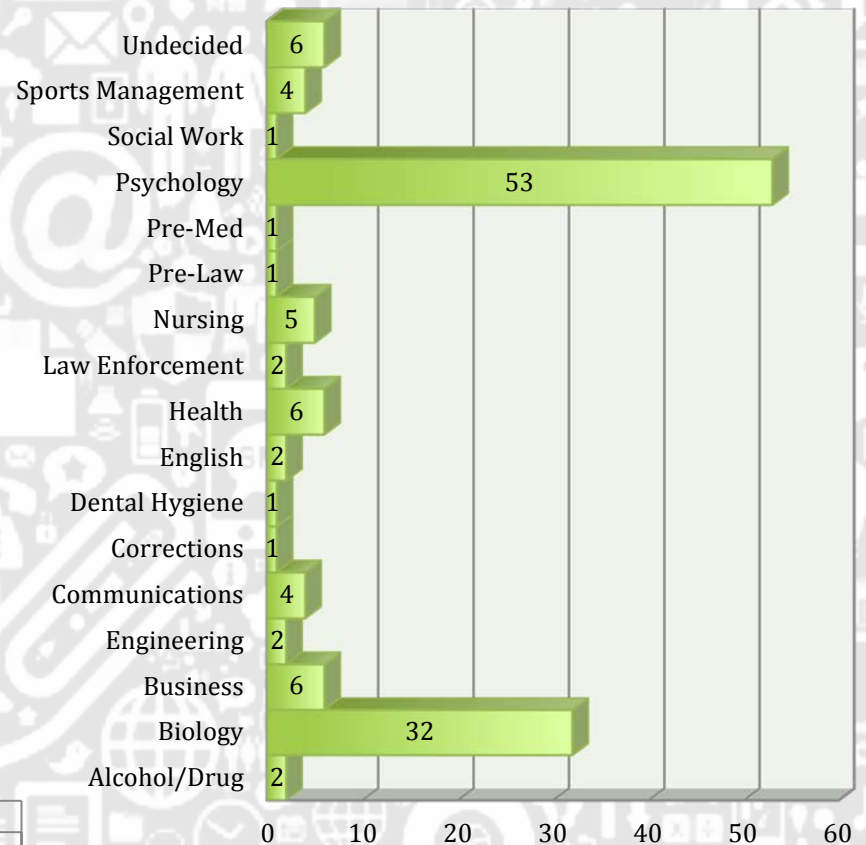
# Participant Breakdown

129 participants

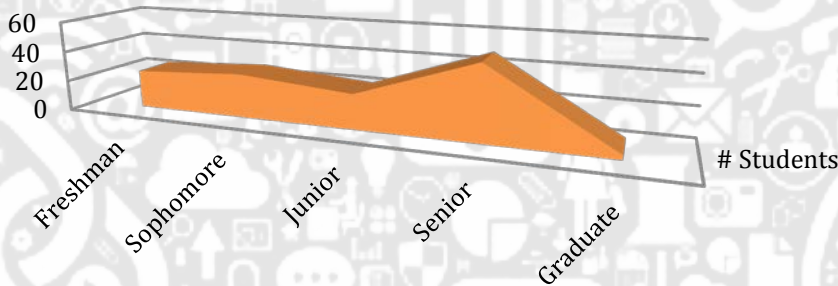
## Gender



## Major



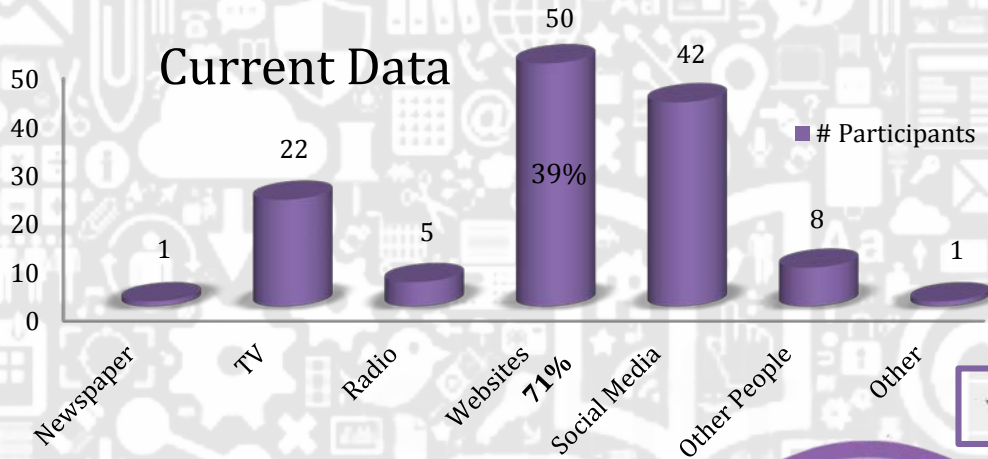
## College Level



	Freshman	Sophomore	Junior	Senior	Graduate
# Students	25	29	23	49	3

# Preferred Media Source

Wellcome Trust Monitor Data



## Encounter

■ Adults ■ Young people

People are most likely to passively come across information about biomedical research through seeing it in the media.



Of those adults who have seen biomedical research information on television, documentaries and news programmes are each mentioned by more than...

**4 in 10**

Base: 1,396 adults and 460 young people

## Wellcome Trust

- United Kingdom, 2012
- 1,396 adults & 406 young

## Current Study

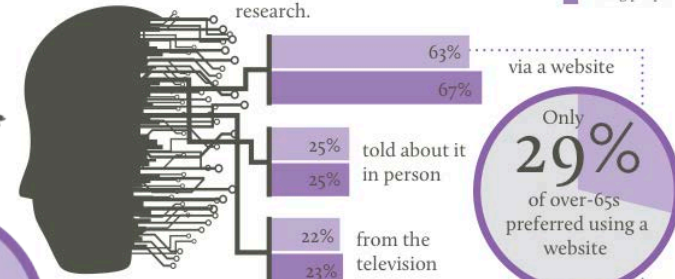
- United States, 2014
- 129 college students



## Access

People were asked how they would prefer to access information about biomedical research.

■ Adults ■ Young people



Only **29%** of over-65s preferred using a website

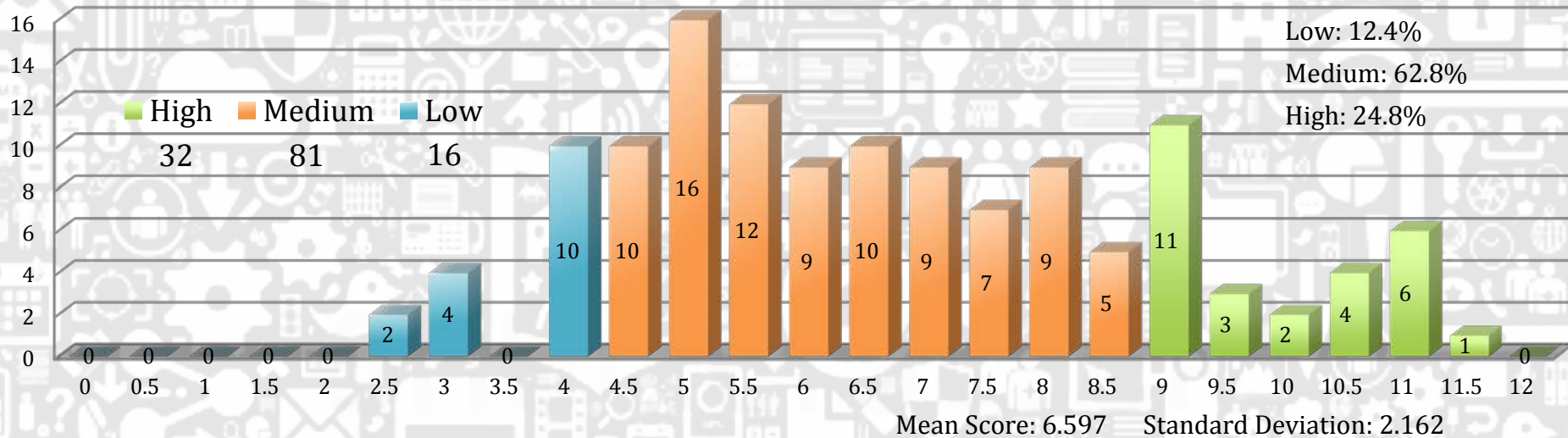
Adults' preference to get information via a website relates to their levels of education



Base: 1,396 adults and 460 young people



# Science Knowledge Scores

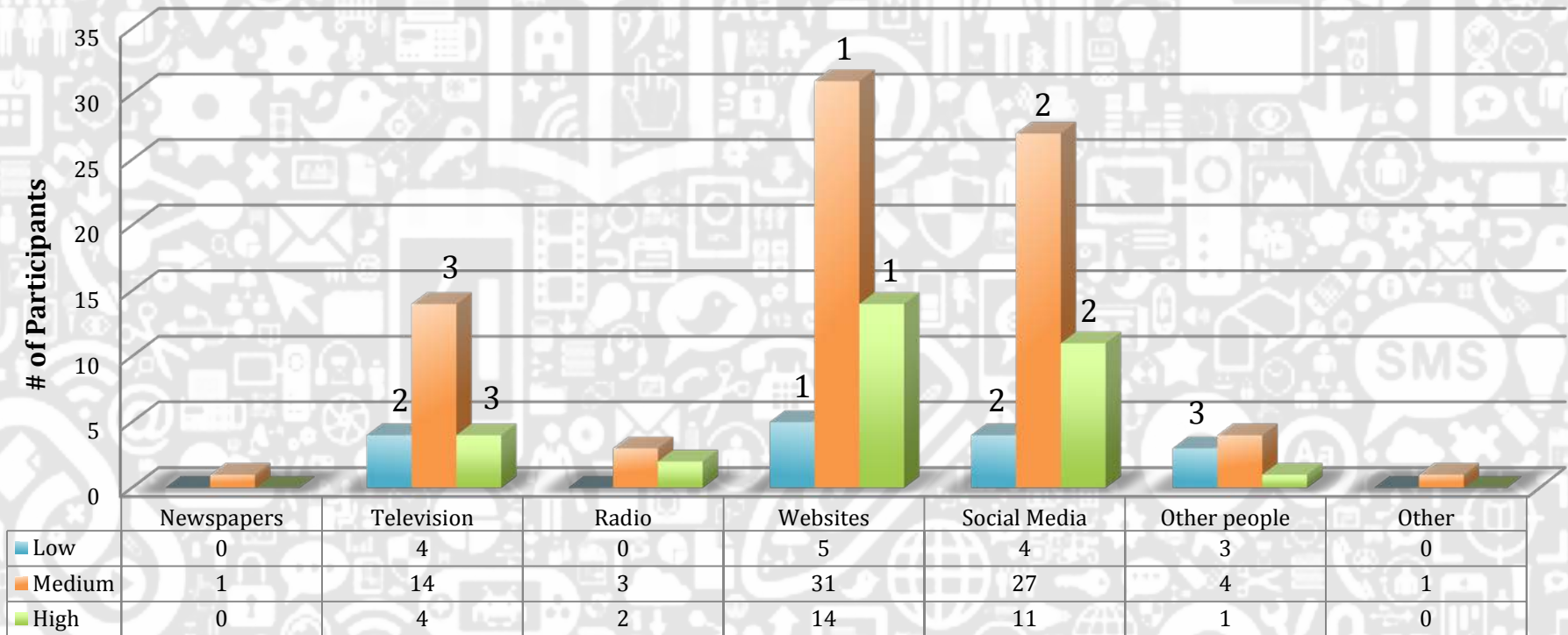


## Computing of Scores

- Utilized similar questions to Pew Research Science Knowledge Quiz
- 9 question, true/false statements
  - “Definitely” correct: 1 point
  - “Probably” correct: 0.5 point
- 3 question, definition recall
  - Pass/fail: 1 point correct, none if incorrect
- Categorized into bins, one standard deviation from the mean
  - Low: 0 to 4.435, Medium: 4.436 to 8.759, High: 8.760 to 12

# Media Source vs. Knowledge Scores

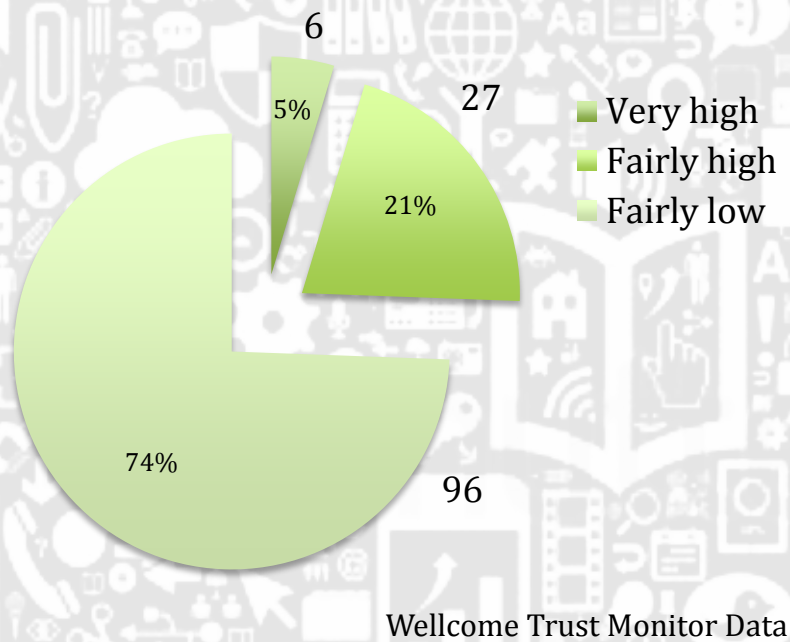
- Preferred media source varies among knowledge groups
- Dominance of website/social media use amongst all groups



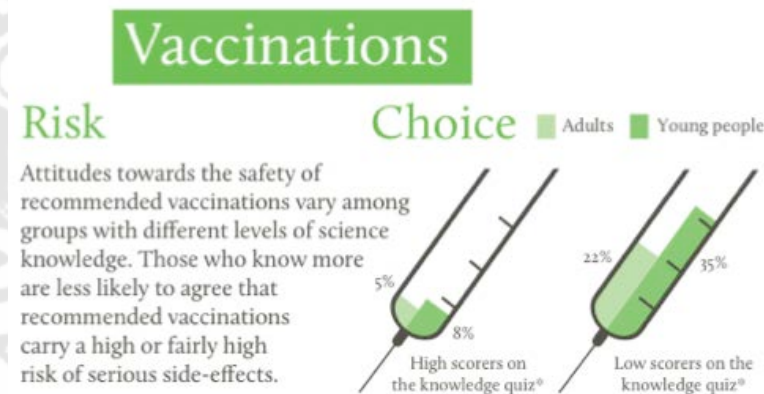
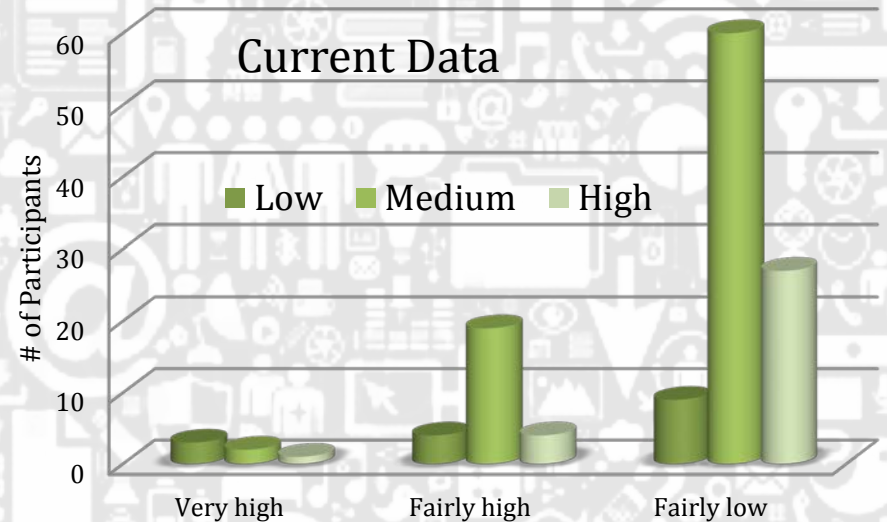
# Media Connection to Vaccinations

- Secondary variable
  - Perceived risks from recommended vaccinations
    - Very high, fairly high, fairly low, no risk
- Vaccinations are often a topic in the media with a range of accurate and inaccurate depictions
  - Internet/pop culture media sources
    - More likely to convey higher risk and harm of vaccines
    - Believe what is commonly reported
  - Traditional/book knowledge media sources
    - More likely to convey lower risk and harm of vaccines
    - Educate with factual knowledge
- HealthDay News
  - 51% believe vaccines don't cause autism, 18% absolutely convinced, 30% fearful but unsure, 16% know of family
  - Translates to millions

# Vaccination Risk vs. Science Knowledge Scores

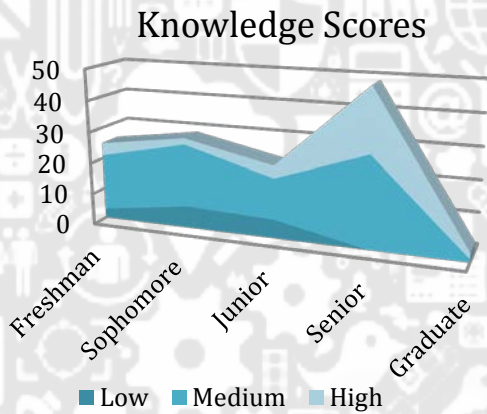


media-influenced vs. traditional/factual

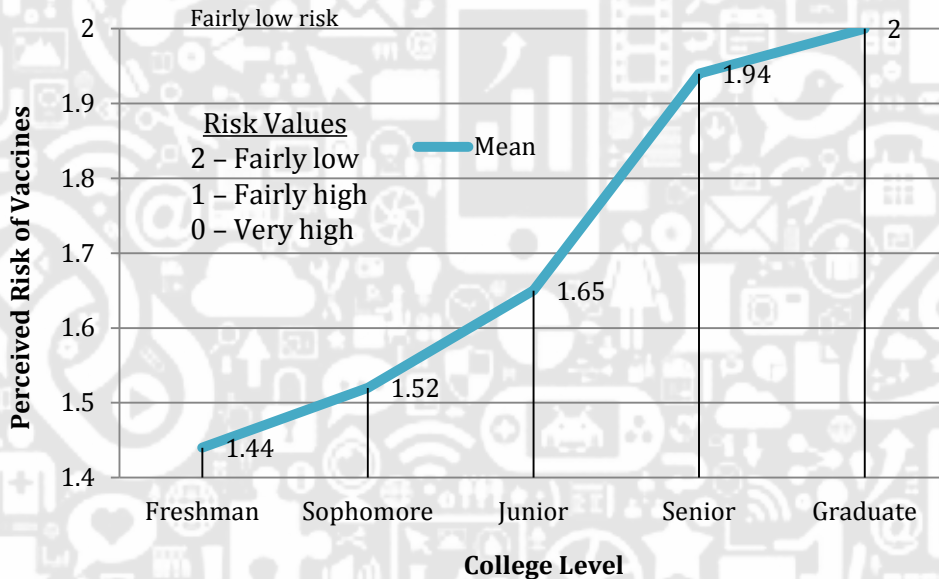
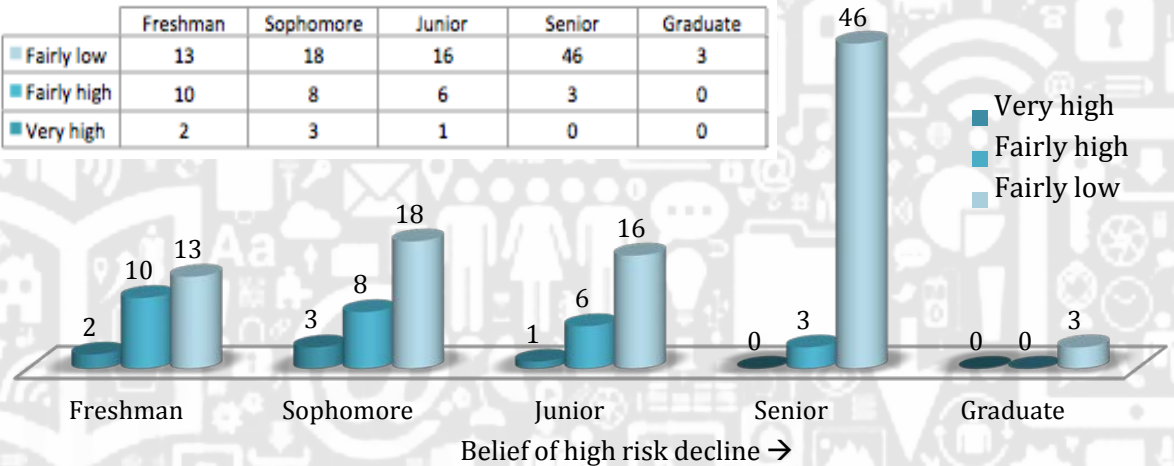


- Similar findings
- Results vary slightly among science knowledge groups
- Follows trend of higher knowledge holding beliefs of lower risks from vaccines

# Vaccination Risk vs. College Level



	Freshman	Sophomore	Junior	Senior	Graduate
Fairly low	13	18	16	46	3
Fairly high	10	8	6	3	0
Very high	2	3	1	0	0



- Correlation between year in college and perceived risk from vaccines
- The longer you are in school, the more likely you are to rate vaccinations as having fairly low risks
  - Due to class exposure of factual knowledge dismissing myths associated with risks of harmful side effects, ex. autism

# Discussion

- Primary variables
  - Type of media source preferred, frequency of exposure and demonstrated level of science knowledge
    - Surprised, overall little to no correlation
- Secondary variables
  - Perceived risk from a recommended vaccination, year in school
    - Correlations between perceived risk factor and knowledge level/year in school
- Original hypothesis
  - Participants in touch with more modern and internet-based sources would exhibit higher levels of science knowledge due to greater accessibility
  - Proved to be too homogeneous amongst population

# Discussion

- Recurring, popular science/health topic in media
- Generation relies heavily on these sources
- Many obtain knowledge from media headlines, celebrities, public figures with opinions
- Jenny McCarthy's "Anti-Vaccine Crusade"
- Depending on level of knowledge, some more likely to disregard as fact and pursue their own knowledge

# Conclusion

The media plays a lead role in facilitating the information we receive about the world around us. Carl Sagan's quote refers to the evident "celebration of ignorance" we see when dangerous amounts of misunderstanding in science is conveyed to mass amounts of people via media sources.

With virtually and literally endless information on the internet and in the media, it is conclusively important to ensure proper utilization of media outlets to obtain genuine knowledge.

## Limitations

- Sample was obtained from a homogeneous population
- Students part of young and similar generation in which modern media consumes our environment
  - On the same page, exposed to same topics and obtain information in similar ways
- SONA utilization
  - Nearly all enrolled in science classes: biology or psychology
  - Increased chance of exposure with vaccines
  - Classes provide knowledge, expose truth behind myths
  - Results in higher knowledge in upperclassmen ratings, matching beliefs of lower risks

## Improvements

- Results may be more accurate with a larger and more diverse population
- Effects would be expected to be more varied in a general population, rather than the college population that was used



# References

Gardner, Amanda (2011, Jan 20). *Slightly More Than Half of Americans Say Vaccines Don't Cause Autism: Poll*. Retrieved from <http://health.usnews.com/health-news/family-health/brain-and-behavior/articles/2011/01/20/slightly-more-than-half-of-americans-say-vaccines-dont-cause-autism-poll>

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# Science Knowledge Quiz

How would you have done?

## True/False

1. Electrons are smaller than atoms.
2. All radioactivity is man-made.
3. All plants and animals have DNA.
4. More than half of human genes are identical to those of mice.
5. The cloning of living things produces genetically identical copies.
6. Lasers work by focusing sound waves.
7. By eating a genetically modified fruit, a person's genes may also become modified.
8. The oxygen we breathe comes from plants.
9. It is the mother's genes that determine the sex of the child.

## Define terms

10. DNA
11. Human genome
12. Genetically modified

# Science Knowledge Quiz

How did you do?

## True/False

1. Electrons are smaller than atoms.
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9. It is the mother's genes that determine the sex of the child.

## Define terms (pass/fail)

10. DNA:  
Deoxyribonucleic acid, a self-replicating material present in nearly all living organisms as the main constituent of chromosomes. It is the carrier of genetic information.

# Science Knowledge Quiz

How did you do?

## Define terms (pass/fail)

11. Human genome:

The complete set of genetic information for humans (*Homo sapiens*). This information is encoded as DNA sequences within the 23 chromosome pairs in cell nuclei and in a small DNA molecule found within individual mitochondria.

12. Genetically modified:

(of an organism or crop) Containing genetic material that has been artificially altered so as to produce a desired characteristic.

(Google Dictionary, 2014).

## Scoring

Low knowledge: 0-4 correct

Medium knowledge: 5-9 correct

High knowledge: 10-12 correct