



What Would Students Do?: How Students Make Decisions Based on Socio-scientific Issues

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Students without a science background make up a majority of the voting population

- Why is this important? Students need to use evidence and scientific reasoning to make informed decisions on socio-scientific issues.
- We know very little on how students make decisions. Thus, it is vital that we understand the rationales held by students who are non-science majors and analyze their decision process in these cases.

Methodology

Students completed a pre-test on the topic followed by lesson module & a post-test. On the pre- and post-test, students responded to a question asking about actions they would take in response to a current socio-scientific issues (e.g. flu vaccines, CRISPR). Students also completed an active, learner centered module to learn about each topic. In this research, we coded students responses to understand the reasoning behind their decisions. The sample size includes pairing from students that answered both pre- and post-test. Although not all students changed their mind from the pre- to post-test, we specifically only focused on those that changed their answers.

- ❖ Fall semester 2021
- ❖ Biology 126
- ❖ Non-biology general education course
- ❖ Class size of 228
 - ❖ Influenza Data N= 24
 - ❖ CRISPR Data N= 105

Pre/Post-test questions

Influenza vaccine data: Which of these accurately represents your opinion on the influenza vaccination for this year?

- ❖ I already received an influenza vaccination/ plan to in the next few months
- ❖ I do not plan to receive the influenza vaccination in the next few months

CRISPR data: If you had a genetic disease (ex: cystic fibrosis) that could be treated using CRISPR (a gene editing tool), would you use it?

- ❖ Yes
- ❖ No
- ❖ Maybe, I need more information about CRISPR

References
 [1] Centers for Disease Control and Prevention (2021)
 [2] Fernandez (2021) Eight Diseases CRISPR Technology Could Cure

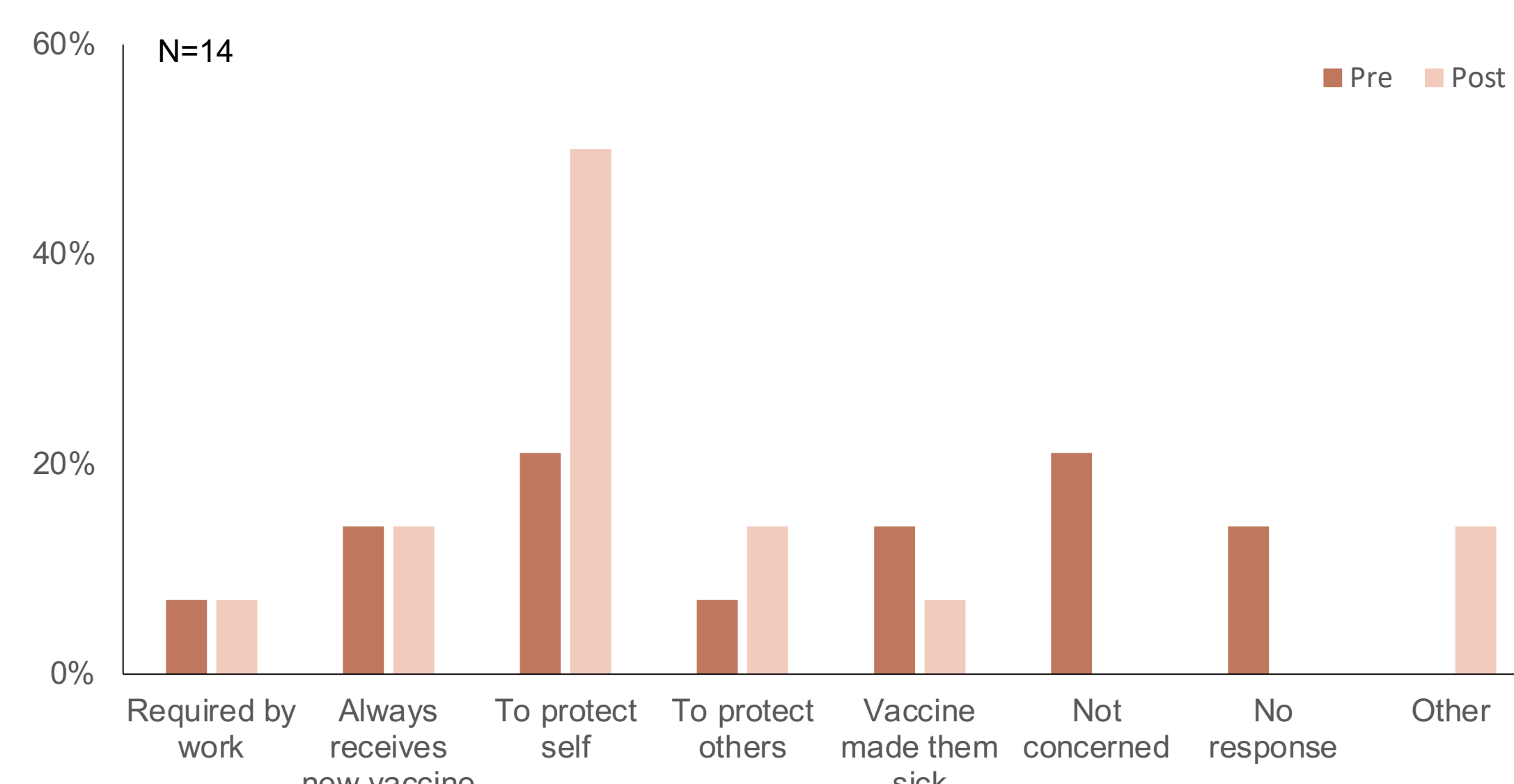
Acknowledgements
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What do students think about getting the influenza vaccine?

Key facts about influenza (Flu) and the vaccine

- ❖ The best way to prevent the flu is by receiving the vaccine annually¹
- ❖ Influenza does NOT cause flu¹
- ❖ There are many flu viruses and they are constantly changing¹
- ❖ Each year a new flu vaccine is made to protect against the influenza viruses believed to be likely to cause disease in the upcoming flu season¹

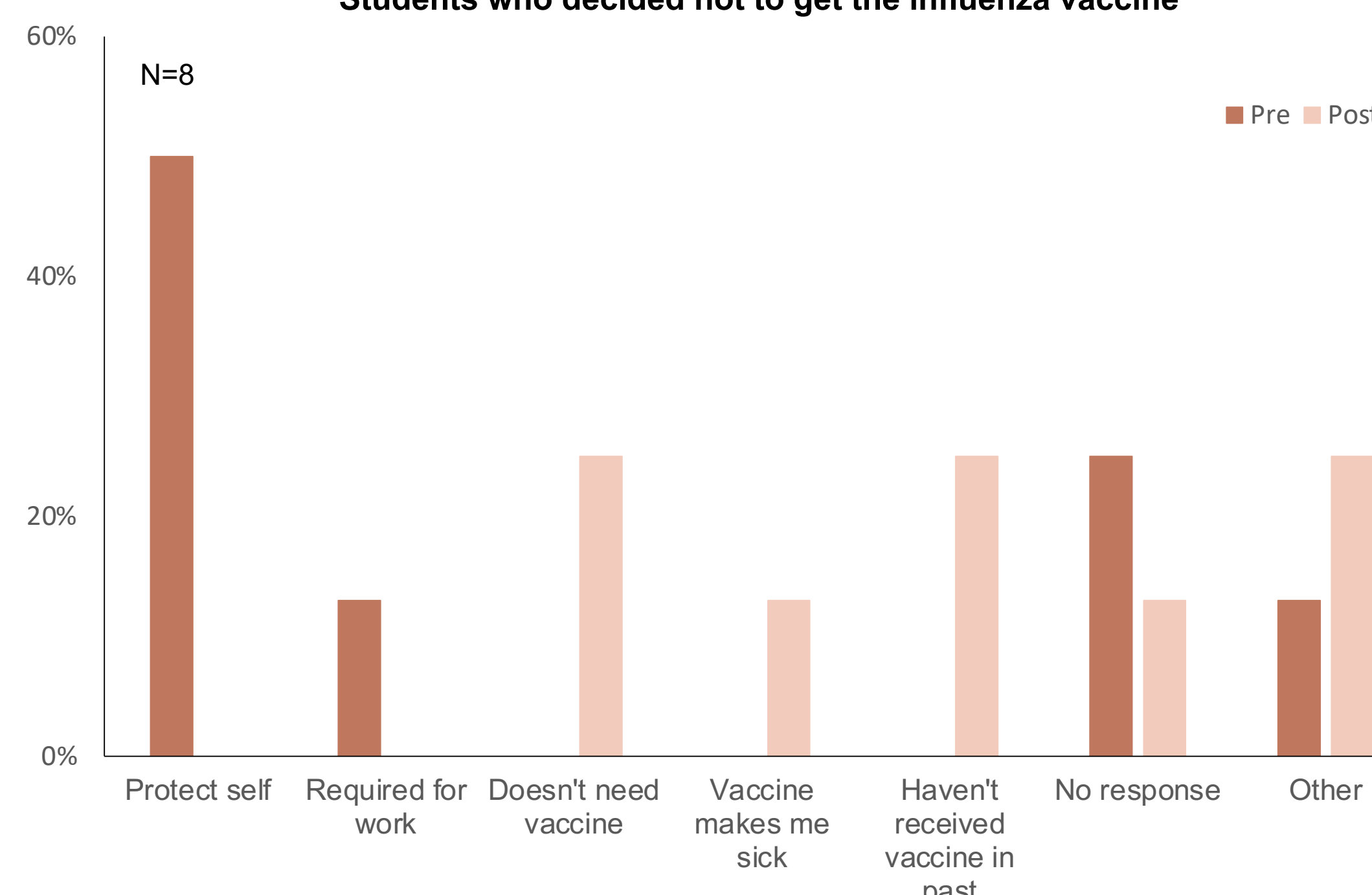
Students who decided to get the influenza vaccine



- ❖ 50% of the students who have gotten the vaccine or plan to get the vaccine said it was to protect themselves.

Required for work	Work required vaccine
Always receives vaccine	Mentioned always receiving the vaccine in the past
To protect self	Mentioned weak immune system or to be healthy
To protect others	Mentioned to protect family, friends, or environment
Vaccine made them sick	Mentioned getting sick as a result of the vaccine
Not concerned	Mentioned the vaccine not being a priority
No response	No response was given
Other	Response did not fit into any category
Doesn't need vaccine	Mentioned not need the vaccine because of their age group
Hasn't received vaccine in past	Mentioned that they never receive vaccine

Students who decided not to get the influenza vaccine



- ❖ 50% of students mentioned in the pre-test that they wanted the vaccine to protect themselves, but then in the post-test that percentage switched to zero.
- ❖ 25% of the students who do not plan on receiving the influenza said it was because they didn't need it.

Conclusion

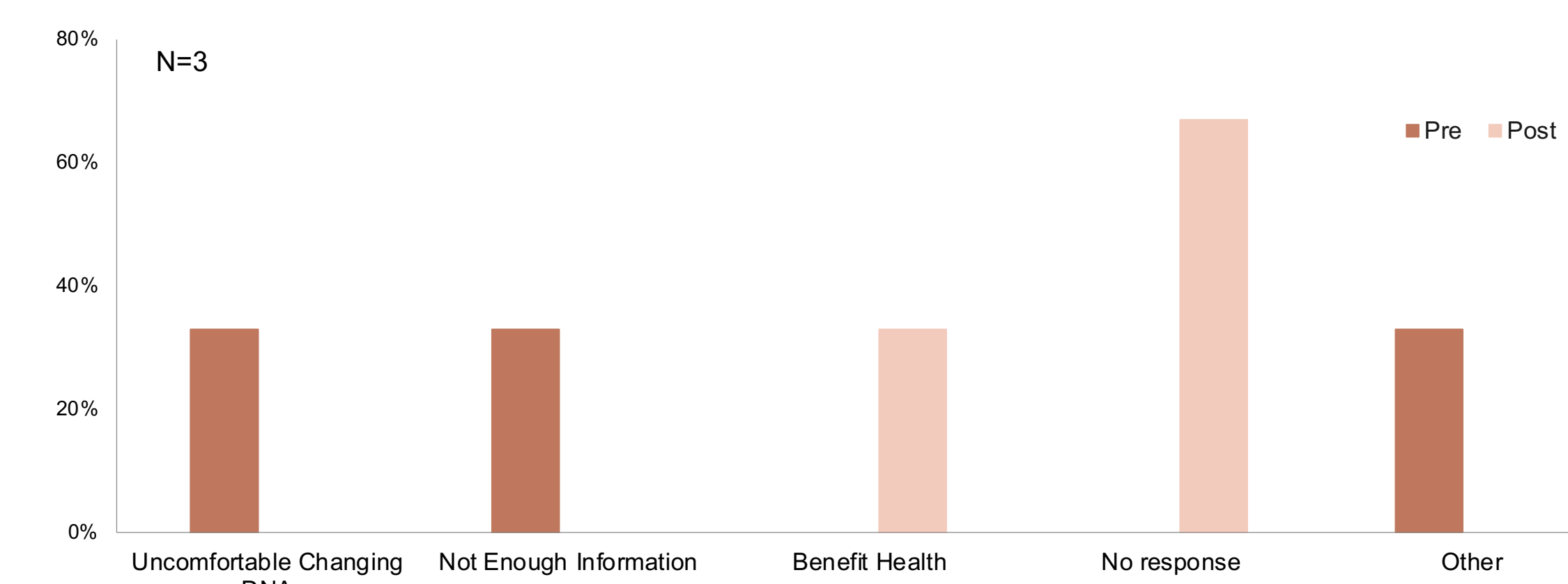
Data showed that for the influenza vaccine most students had their mind set in stone on either receiving the influenza vaccine or not. Which is why so little changed their rationales in the post-test. However, for the CRISPR most students had little information on it and after instruction decided that they would use CRISPR to better their health. Students may be more swayed towards using CRISPR because they had no initial thought about it.

What do students think about using CRISPR (a gene editing tool), to treat a genetic disease (ex: cystic fibrosis)?

Key facts about CRISPR

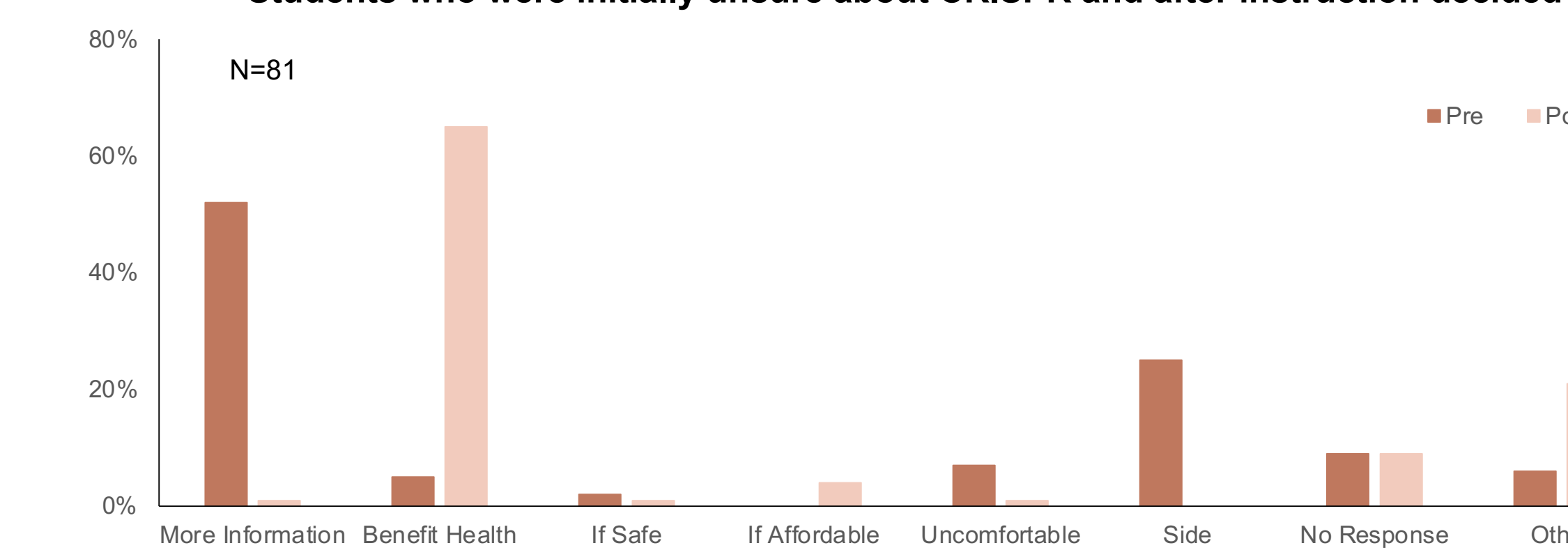
- ❖ CRISPR is short for 'clustered regularly interspaced short palindromic repeats'²
- ❖ Makes reference to a series of repetitive patterns found in the DNA of bacteria that form the basis of a primitive immune system, defending them from viral invaders by cutting their DNA²
- ❖ CRISPR can cut a specific DNA sequence by simply providing it with an RNA template of the target sequence. This allows to then add, delete or replace elements within the target DNA sequence²
- ❖ CRISPR can be used to treat diseases²

Students who initially said they would not use CRISPR and after instruction decided yes



- ❖ 1/3 of the students said that they would use CRISPR to benefit their health

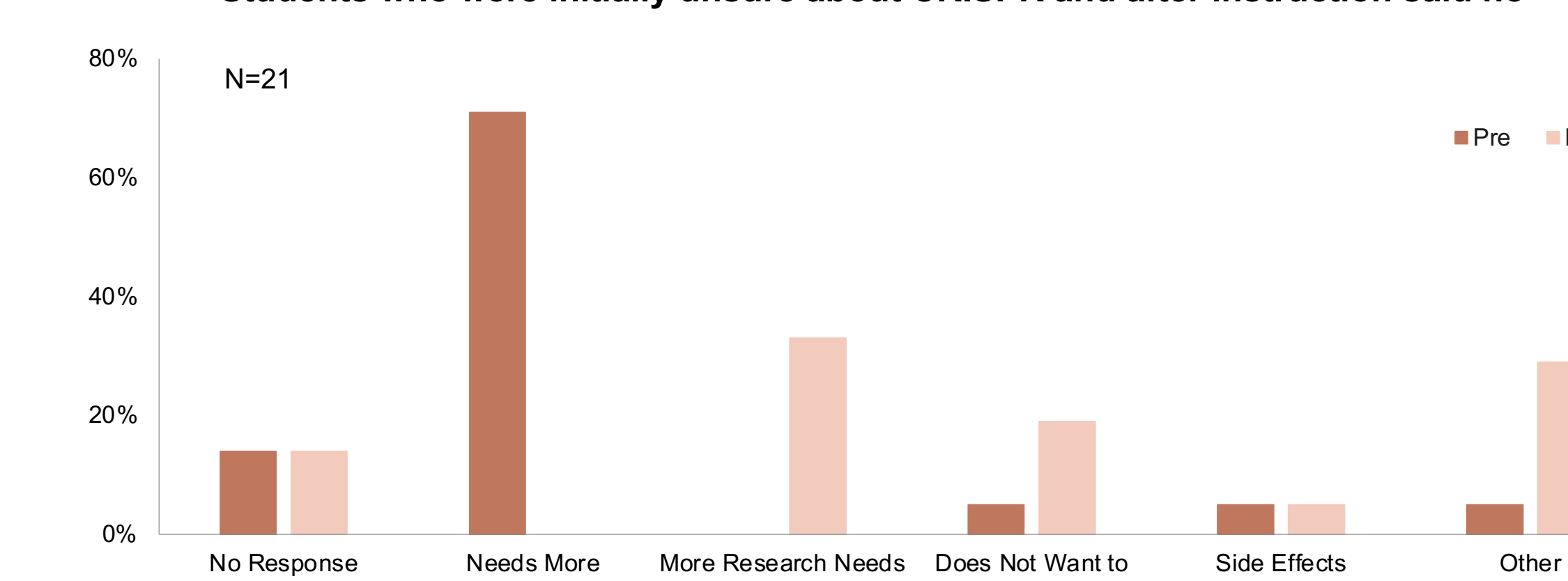
Students who were initially unsure about CRISPR and after instruction decided yes



- ❖ 65% percent of students responded that they would use CRISPR to benefit their health

Uncomfortable changing DNA	Mentioned being uncomfortable changing DNA
Not enough information	Mentioned although they would be interested in using CRISPR, not enough information
Benefit health	Mentioned CRISPR benefiting their wellbeing
More information	Mentioned needing more information before making a solid decision
If safe	Mentioned using CRISPR if it will be safe
If affordable	Mentioned using CRISPR if it is affordable
No response	No response given
Side effects/risks	Mentioned side effects/risks influencing their decision
More research needs to be done	Mentioned that more research needs to be done before using CRISPR
Does not want to change DNA	Mentioned not wanting to change their DNA/genes
Other	Response did not fit into any category

Students who were initially unsure about CRISPR and after instruction said no



- ❖ 1/3 of the students said that more research needs to be done before editing their genes