

## Introduction

- The number of students attending courses online has increased every year since 2002 (Seaman et al., 2018).
- This trend surged during the COVID-19 pandemic; the majority of universities moved online using videoconferencing platforms like Zoom to continue virtually (Over 700 universities and colleges now use zoom, 2020).
- There is a problem: 80 percent of college students find it harder to focus in newly online classes (Peper et al., 2021).
- Does camera usage during online lectures affect student engagement and fatigue?

## Methods

### Study 1:

- In a within-subjects design, we assigned students ( $N = 65$ ) to have their cameras on or off for the duration of several Zoom-based classes ( $N_{obs} = 319$ ). At the end of each class, students rated their levels of engagement and fatigue.
- We ran a REML multilevel model to estimate the fixed effect of camera condition while also estimating the random intercept and random effect of condition.

### Study 2:

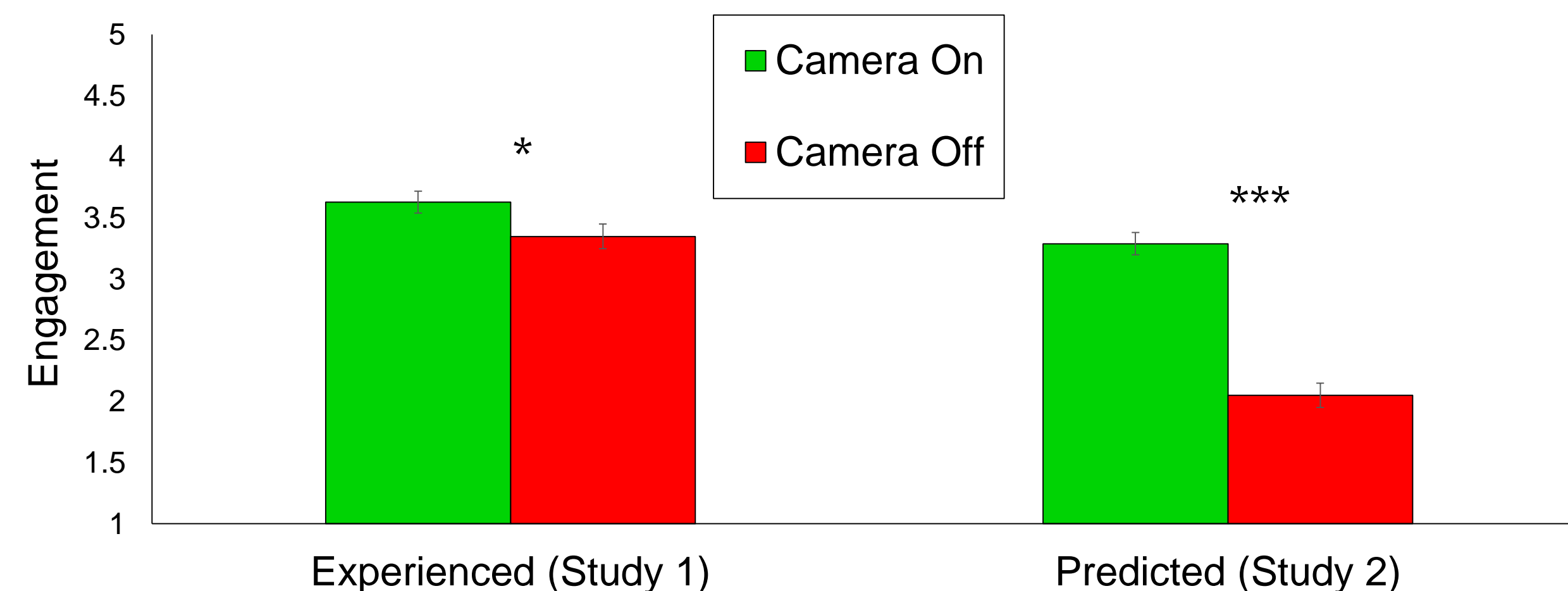
- At the end of an in-person class students from two Georgetown University courses ( $N = 81$ ) were asked to predict how engaged and fatigued they would have felt if:
  - the class they just finished had been online
  - they had had their cameras on or off for its duration.
- Viewing order of the camera usage question was randomized
- We ran two mixed-level ANOVAs using engagement and fatigue as the within-subjects factor and order as the between-subjects factor.

The raw data and questionnaires used in both studies are accessible through the Open Science Framework (OSF): [10.31234/osf.io/5bz3j](https://doi.org/10.31234/osf.io/5bz3j)

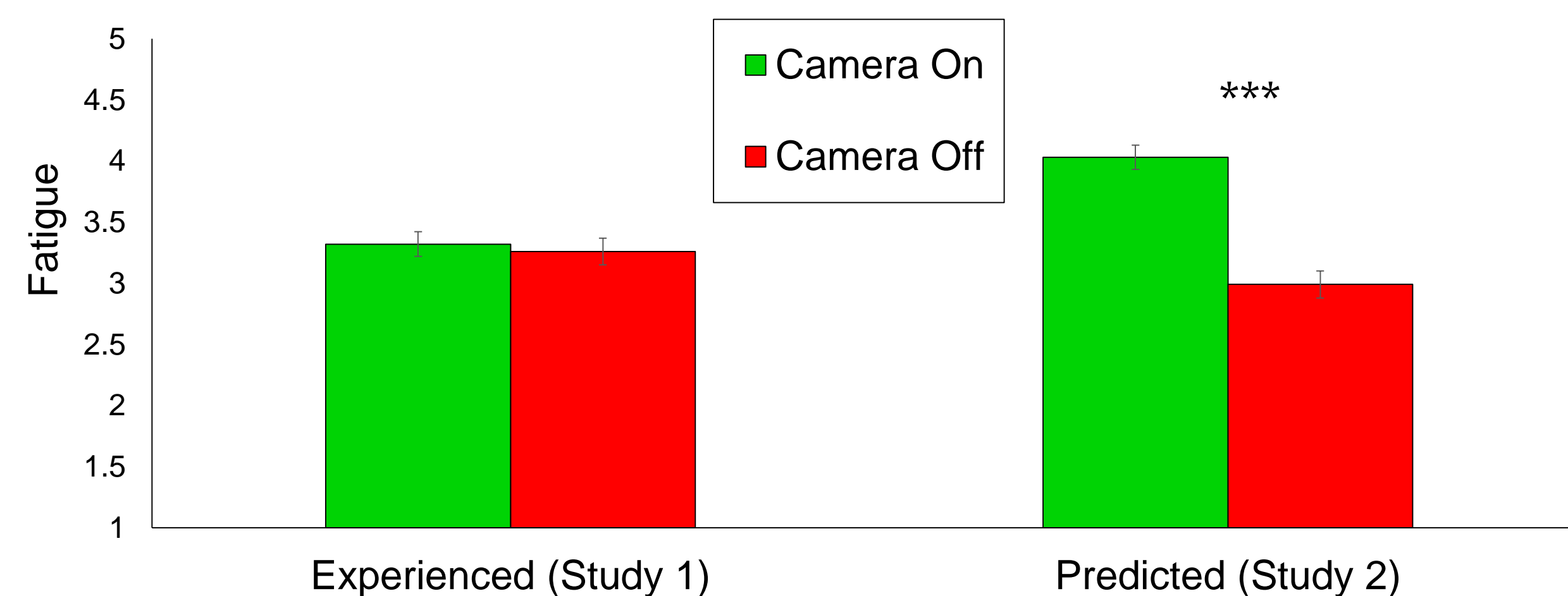
# Lights, Cameras (on), Action! Camera Usage During Zoom Classes Facilitates Student Engagement Without Increasing Fatigue.

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Consistent with students' expectations, camera usage increased engagement.



Contrary to students' expectations, camera usage had no effect on fatigue.



Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$



## Results

### Study 1:

- We found that students with their cameras on were more engaged ( $M = 3.63$ ,  $SE = 0.09$ ) than students with their cameras off ( $M = 3.35$ ,  $SE = 0.10$ ),  $F(1, 56.7) = 8.84$ ,  $p = .004$ .
- We found no significant difference in fatigue between lectures where students had their cameras on ( $M = 3.32$ ,  $SE = 0.10$ ) versus off ( $M = 3.26$ ,  $SE = 0.11$ ),  $F(1, 54.6) = 10.60$ ,  $p < 0.05$ .

### Study 2:

- Consistent with what they experienced, students predicted that they would be more engaged when they had their cameras on ( $M = 3.29$ ,  $SE = 0.11$ ) versus off ( $M = 2.05$ ,  $SE = 0.10$ ),  $F(1, 79) = 93.34$ ,  $p < .001$ .
- Unlike what students experienced, they predicted that they would be more fatigued with their cameras on ( $M = 4.03$ ,  $SE = 0.11$ ) versus off ( $M = 2.99$ ,  $SE = 0.12$ ),  $F(1, 79) = 64.88$ ,  $p < .001$ .

## Discussion

- This study is the first to explore the effect of camera usage on engagement and fatigue in virtual classrooms.
- Our findings, however, are inconsistent with similar research:
  - Camera usage during work meetings *increases* fatigue, likely due to presentational concerns (Fauville et al., 2021; Shockley et al., 2021).
- This divergence could stem from:
  - Increased focus on the teacher and teaching aids in large online lectures.
  - Fewer participants and more focus on each individual in work meetings.

## References

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