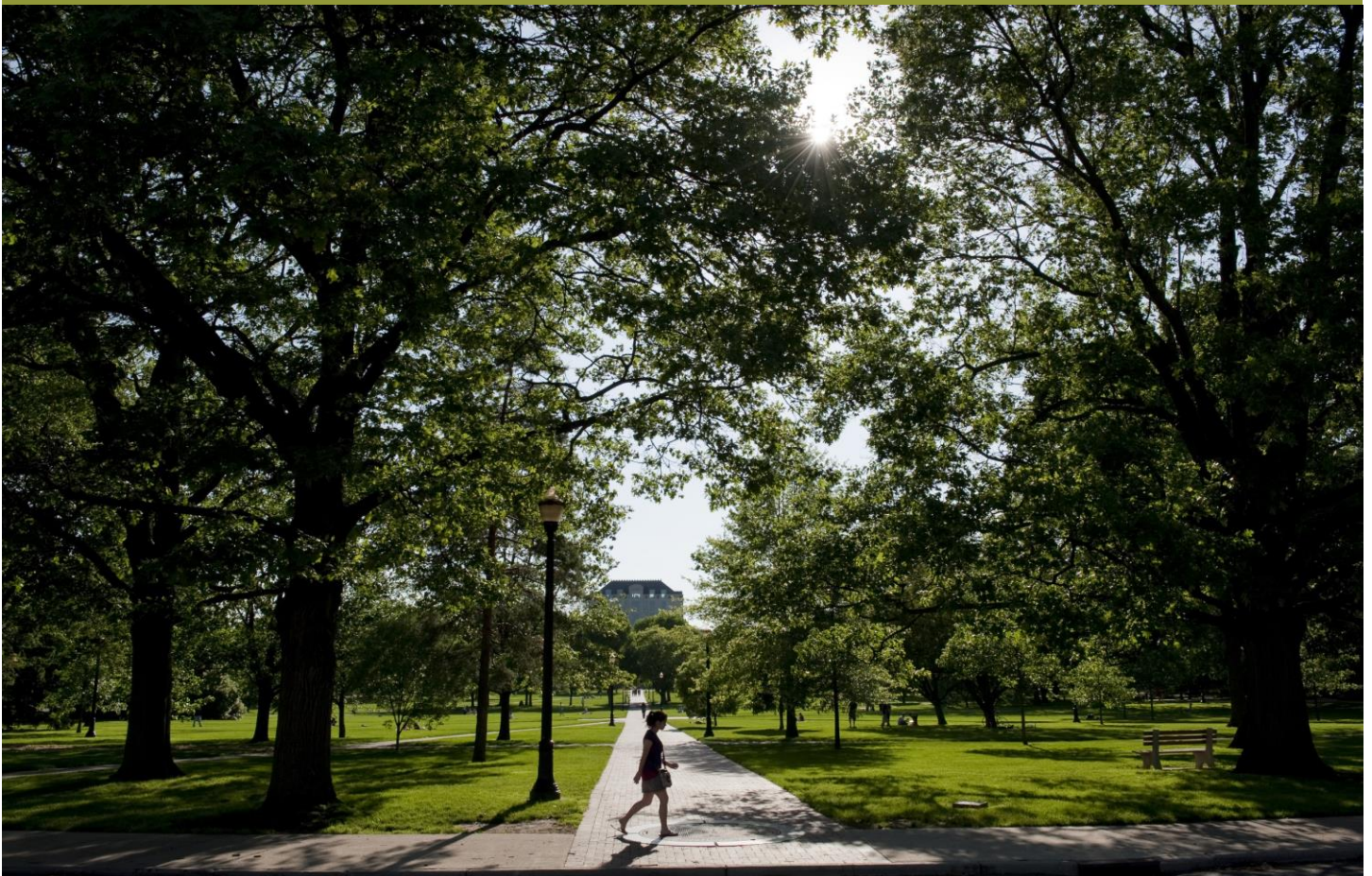**SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES**

2020 Campus Sustainability Survey: Results and Trends

A Report from the Environmental and Social Sustainability Lab (2020)

THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

In Collaboration with the Ohio State University Sustainability Institute

About the Environmental and Social Sustainability Lab

The Environmental and Social Sustainability (ESS) Lab is a collaborative community of scholars working to build scientific understanding of environmental and social sustainability in an interdisciplinary context. Housed within the School of Environmental and Natural Resources within The College of Food, Agriculture, and Environmental Sciences, we are staffed by a core group of affiliated faculty members, students, and research staff representing a broad range of social science expertise. Our mission is to support a viable socio-ecological future through applied social science research, and to serve as a hub of sustainability research at Ohio State.

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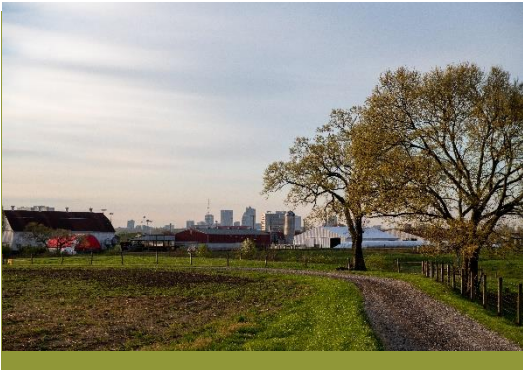
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OHIO STATE SUSTAINABILITY GOALS

Strategic Vision

Ohio State is a recognized leader in developing durable solutions to the pressing challenges of sustainability and in evolving a culture of sustainability through collaborative teaching, pioneering research, comprehensive outreach, and innovative operations, practices, and policies.

As progress is made toward realizing institutional sustainability aspirations, four overarching, foundational principles of the university must take hold to ensure that accountability and a culture of sustainability becomes pervasive throughout Ohio State's culture, practices and programs:

- Ensure a transformational approach by establishing a generational timeline to consider the impacts and trade-offs of decisions and economic, environmental, and social outcomes over many years and decades, instead of only the perspective of short-term economic returns.

- Utilize a council of internal and external stakeholders (i.e., students, staff, faculty, alumni/ae, companies, non-governmental organizations, agencies) to serve in an advisory capacity for the ongoing formulation, development, implementation, and assessment of goals, initiatives, and outcomes.

- Conduct research on our progress by developing and/or adapting research methodology to review and assess operational goals, and evaluate and publish the results with the aim of developing best practices and innovation for sustainability measurement.

- Incorporate relevant elements of sustainability into all college and support units' strategic plans, physical plans, and other university guiding documents.

Teaching and Learning

1. Deliver a Curriculum that provides Ohio State students at all stages of instruction – from General Education to professional and technical programs – with opportunities to understand sustainability holistically, framed by the environment, science, technology, society, the economy, history, culture, and politics.

2. Address the Complexities of Sustainability through a variety of learning formats, strategies, and occasions.

Research and Innovation

3. Reward Sustainability Scholarship, including the scholarship of engagement, by providing incentives for students, faculty and staff to make discoveries and stimulate creative efforts that promote and achieve sustainability.

4. Magnify Sustainability Scholarly Output and Impact to create new knowledge, solve real world problems, including for our own operations, and increase Ohio State's national/international reputation as a sustainability research leader.

Outreach and Engagement

5. Foster Campus-to-Community, Students-to-Alumni Culture of sustainability-oriented practices and educational and research experiences that students and alumni transfer into local and global communities.

6. Catalyze Engagement, Ownership, and Buy-In to Sustainability via engaged and inclusive partnerships, on and off campus, that support the long-term economic, social and environmental welfare of the campus, surrounding neighborhoods and the global community.

Resource Stewardship

7. Implement specific, "world-leading" university-wide operational goals to reduce resource consumption, neutralize carbon emissions and minimize waste, including:

a. Achieve carbon neutrality by 2050 per Presidents' Climate Leadership Commitment;

b. Reduce total campus building energy consumption by 25% by 2025;

c. Reduce potable water consumption by 5% per capita every five years, resetting baseline every five years;

d. Increase campus ecosystem services by 60%, by 2025;

e. Reduce carbon footprint of university fleet by 25% by 2025;

f. Achieve zero waste by 2025 by diverting 90% of waste away from landfills;

g. Increase production and purchase of locally and sustainably sourced food to 40% by 2025; and

h. Develop university-wide standards for targeted environmentally preferred products and fully implement preferable products and services by 2025.

Executive Summary

The Ohio State Campus Sustainability Survey represents a joint effort on the parts of numerous campus partners to measure current and longitudinal trends in undergraduate behaviors, beliefs, values, attitudes, and knowledge regarding sustainability at The Ohio State University. This report explores the results of that effort in 2020, through online survey responses from 2,800 Undergraduate students from the Columbus campus (out of 20,500 randomly selected students originally contacted; a response rate of approximately 15%). Please see the following sections for more details on our survey methods and student sample, as well as survey results in each of five major areas.

Engagement in sustainable behaviors:

In total, undergraduate student engagement in sustainability-related behaviors such as carrying a reusable water bottle, turning off the lights in an empty room, printing on both sides of the paper, and utilizing public transportation remain quite high, suggesting progress towards OSU Sustainability goals #7a and #7b. However, opportunities to further promote campus sustainability goals continue to present themselves in emphasizing behaviors that are low cost, but that many students have not yet adopted, such as limiting purchases of new items and shifting purchases to second hand wherever possible, which could also inform OSU Sustainability goal #5 (For more on these results, please see Section 1).

Recommendation: When asked, students prioritized recycling and composting over other sustainability projects on campus, but 1 in 5 students mistakenly believed that recycling was more sustainable than reducing consumption. Likewise, roughly 1 in 5 students reported that they never or rarely purchased items second hand or limited purchases of new items, suggesting a gap that might be reduced by highlighting the 4 R's together: ***Refuse, Reduce***, ***Reuse, Recycle.*** By pairing these impactful behaviors in a familiar way with a high priority action, this simple messaging could improve sustainable behavior both on and off campus, in support of OSU Sustainability goals #5 and #6.

Sustainability knowledge:

When assessed through quiz-type questions **student knowledge of sustainability-related topics remains higher than that assessed in 2014.** However, some

misconceptions remain on topics regarding the causes of pollution and environmental degradation (please see Section 2 for detail).

Recommendation: One-quarter of students incorrectly believed that keeping a cell phone charger plugged into an electrical outlet had greater environmental impact than producing a McDonald's quarter pounder or chicken sandwich. In addition, fewer than one-third of students correctly identified overfishing as a leading cause of depleted fish stocks. In terms of behavior, about two-thirds of students are currently omnivorous with no dietary restrictions, and most students reported often or always eating various animal products. Students seem to struggle to link diet with environmental impacts, so efforts to 1) correct misperceptions and strengthen that linkage while 2) provide opportunities to easily shift diets toward more sustainable consumption could improve sustainable behaviors among students overall. For example, communication efforts could highlight strong positive attitudes toward sustainability among OSU students (i.e, highlight the norm), while pointing out a common misperception and creating dissonance, and then provide a way to rectify these ideas moving forward (e.g., always choose sustainably-sourced fish, download the Seafood Watch app, etc.). Creating stronger cognitive linkages between diet and sustainability inside classrooms and at dining areas on campus would support OSU Sustainability goals #1 and #2, while providing greater opportunity for dietary shifts among students could support OSU Sustainability goals #7g and #7h

Student awareness and support for campus initiatives:

The 2020 survey contained several items developed in collaboration with the Sustainability Institute, the Office of Student Life, and OSU Facilities, Operations and Development. Together, these items provide insights about student prioritization sustainability initiatives on campus. Additionally, we provide data related to sustainability curriculum development with the Sustainability Education and Learning Committee (see OSU Sustainability goal #1).

Recycling Barriers: While students prioritize recycling on campus, they did identify some barriers as more important than others. About half of respondents (56%) agreed that there were not enough recycling bins on campus and that they were unsure of which items could be recycled on campus (54%). **Recommendation**: While students generally disagreed that labels were confusing (62%) it seems that some clarification could be made for the half who are unsure of what can be recycled.

Sustainability Curriculum: Most respondents indicated that they had taken no classes related to sustainability or the environment at Ohio State (66%). We also note a jump in taking three or four classes from 4% in 2019 to 11% in 2020, suggesting a potential cumulative effect among higher ranking cohorts as sustainability courses become more

available across the curriculum. On average, students agreed that employers are interested in students with sustainability-related knowledge and skills, and that they were aware and informed of opportunities to acquire such knowledge and skills. However, students generally disagreed with the statement, "I actively seek sustainability-related courses when enrolling in classes." **Recommendation:** One approach to increasing interest and enrollment in sustainability-related courses might be to provide simple notations for courses that have officially integrated sustainability into their syllabi. This compilation of sustainability courses at OSU may be a critical first step. Likewise, the "Sustainability" theme that has been included in the new GE curriculum is also likely to result in an increase in the number of sustainability-related courses at OSU as well as an overall increase in enrollment in sustainability-related courses. See Section 5 for further detail and additional findings.

Future plans:

The ESS lab plans to continue using an annual survey and a panel of undergraduate students to measure changes in sustainability knowledge, attitudes, and values as well as engagement in sustainable behaviors. Such data is intended to help broadly inform and assess sustainability efforts taking place at Ohio State.
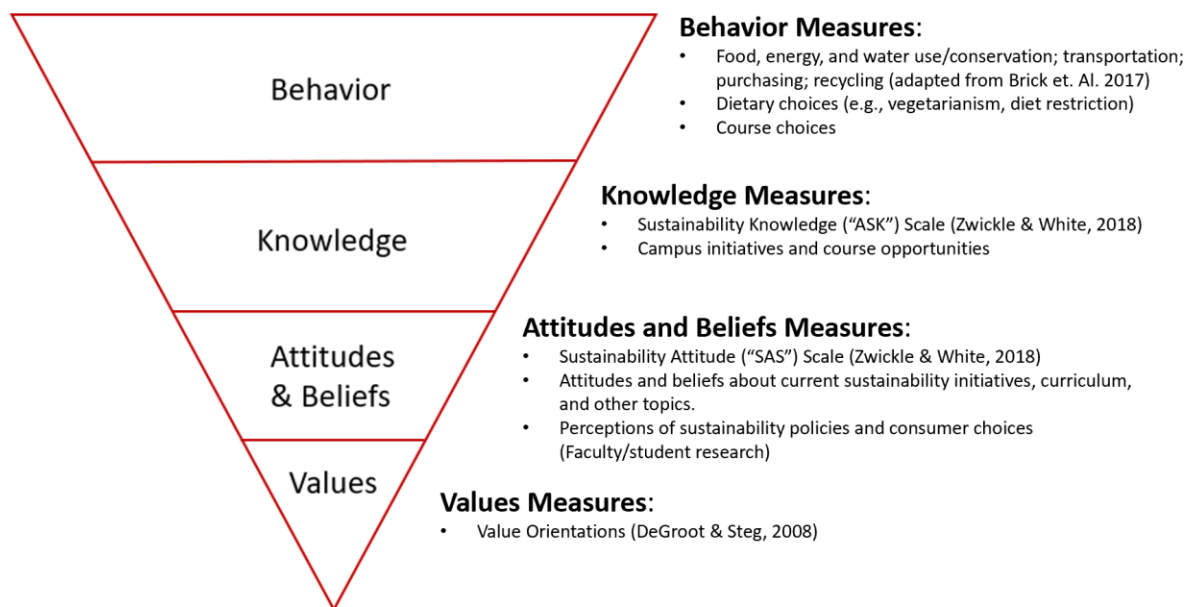
Methodology and Design

The 2020 Campus Sustainability Survey was organized and administered by members of the Environmental and Social Sustainability (ESS) Lab in the School of Environment and Natural Resources, in collaboration with the Ohio State Sustainability Institute, Facilities Operations and Development, and the Office of Student Life. Data were collected in Autumn 2020, during a period of the COVID-19 pandemic when classes tended to be remote.

Survey Design:

Items were based on established scales where possible and were designed to capture a full suite of sustainability-related constructs including values, attitudes, beliefs, knowledge, and behaviors. Figure 1 below provides a summary of this approach and the types of scales used. The figure takes the shape of an inverted pyramid to represent the idea that behaviors at the top of the pyramid are many and varied, while values at the bottom are few in number and foundational. If not otherwise noted, items were self-generated with input from ESS Faculty members and/or our campus partners. (For the citations noted in Figure 1 please see the "References" section at the end of the report).

Figure 1. Cognitive hierarchy

Behavior Measures:
- Food, energy, and water use/conservation; transportation; purchasing; recycling (adapted from Brick et. Al. 2017)
- Dietary choices (e.g., vegetarianism, diet restriction)
- Course choices

Knowledge Measures:
- Sustainability Knowledge ("ASK") Scale (Zwickle & White, 2018)
- Campus initiatives and course opportunities

Attitudes and Beliefs Measures:
- Sustainability Attitude ("SAS") Scale (Zwickle & White, 2018)
- Attitudes and beliefs about current sustainability initiatives, curriculum, and other topics.
- Perceptions of sustainability policies and consumer choices (Faculty/student research)

Values Measures:
- Value Orientations (DeGroot & Steg, 2008)

Overall, there were three types of survey items developed:

1) **Longitudinal items** (i.e. annually recurring): These items are intended to track changes in sustainability behaviors (adapted from Brick et.al. 2017), sustainability knowledge ("ASK" scale, Zwickle and Jones 2018), and sustainability attitudes ("SAS" scale, Zwickle and Jones 2018) over time. Some of these items can be compared to survey results from 2010 - 2014.

2) **One-time items**: These items address topics that are of interest to our campus partners, such as support for current and future sustainability initiatives and development of a sustainability curriculum. Some of these items are kept year-to-year, per discussions with campus partners.

3) **Faculty research items**: In 2020, faculty research items aimed to understand identities around eating meat and views on restricting markets (Drs. K. Hurst & N. Sintov—SENR), behaviors concerning the use of reverse vending machines (Drs. A. Herziger N. Sintov, & G. Donnely—STEAM Factory/Sustainability Institute/SENR/Fisher College of Business), and the use of resuable shopping bags (J. Huang & Dr. B. Shoots-Reinhard—Psychology). Dr. Ken Fujita and Ph.D. candidate, Tina Nguyen (Psychology) utilized the longitudinal behaviors section and some additional measures as a means of understanding motivations for sustainable behaviors. Faculty research results will be developed into scholarly publications and are not included in this report. Typically, there is an open call for faculty research items each year. OSU faculty have the opportunity to request a limited number of items to be included in the survey and these requests are reviewed by the ESSL lab manager and leadership committee.

Survey Implementation:

In order to maintain a panel and assess how individuals have changed over time, our sampling frame for 2020 included all students that responded to the 2019 survey and were still enrolled at OSU in 2020 (N = 1,521). These 2019 respondents were separated by rank, and each total was subtracted from 5,000 to determine the number of new students randomly sampled from each rank for the 2020 effort. As was done in 2018 and 2019, we oversampled 5,500 first year students to account for sample attrition over time. Due to a duplication error, respondents from 2019 were counted twice, and the actual sample sizes for second, third, and fourth year students were lower than anticipated (see Table 1). In October of 2020, survey invitations were emailed to the full sample of 18,979 non-transfer undergraduate students from OSU's Columbus campus via Qualtrics. In addition to an invitation, after one week, participants were emailed a reminder, and one week later they received a third and final reminder.

Table 1. Sample sizes by rank and response N

Rank	Respondents from 2019	New contacts 2020	Overall Respondents 2020	Recontacted Respondents 2020
First year	1,040	--	681	3
Second year	756	--	648	154
Third year	714	--	586	257
Fourth year	648	--	874	408
Total	3,276	16,495	2,800	822

Of the 18,979 students contacted, 2,909 started the survey and 2,408 completed it (12.7% completion rate). The final sample size used for this report (i.e. students who began the survey and answered at least one behavior question) was 2,800 students, for a final response rate of 14.8%. Excluding outliers[1], the average completion time for the survey was approximately 19 minutes and 36 seconds (with a mode of 18 minutes and 2 seconds). We did not perform listwise deletion, rather, we report results for all responents who answered a given question. Respondents may have skipped some questions and remained in the dataset for others.
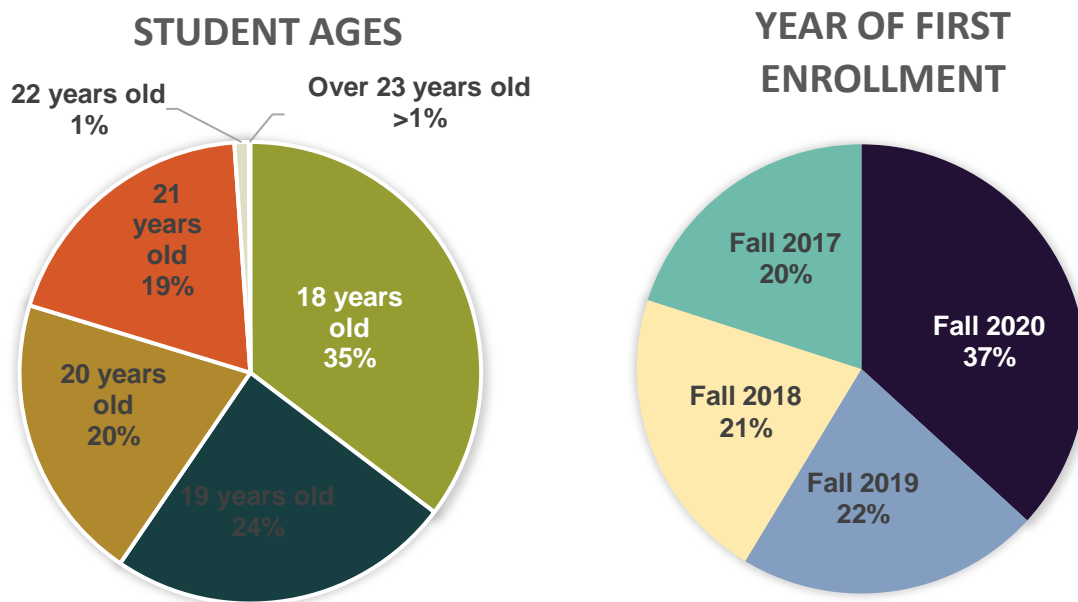
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[1] Outliers were identified using the box and whisker plot function in SPSS.

Sample Characteristics

Our sample consisted of 2,853 undergraduate students who began the survey. Where appropriate comparisons may be made, we provide the 15th Day Enrollment numbers for Autumn 2020 (AU20). Respondents were more female than male (67.7% female; AU20: 49.6% female), with an average age of 19 years old (AU20: 18.8). By design, participants were skewed towards first-year students at Ohio State: 681 (24.3%; AU20: 16.2%) were first-year freshmen, 648 (23.1%; AU20: 20.5%) were second years, 586 (20.9%; AU20: 23.8%) were third-years, and 874 (31.2%; AU20: 39.3%) were in their fourth year since first enrolling. Additionally, the average (non-zero) GPA of our participants was a 3.56 (SD = 0.49).

Figure 2. Distribution of respondent age and year of first enrollment.

STUDENT AGES

- 22 years old 1%
- Over 23 years old >1%
- 21 years old 19%
- 18 years old 35%
- 20 years old 20%
- 19 years old 24%

YEAR OF FIRST ENROLLMENT

- Fall 2017 20%
- Fall 2020 37%
- Fall 2018 21%
- Fall 2019 22%

In terms of race and ethnicity, the majority of students in our sample identified as white (71.4%; AU20: 65.6%), with a minority of students identifying themselves as Asian (8.8%; AU20: 8.0%), Hispanic (5.3%; AU20: 5.1%), Black/African American (3.7%; AU20: 7.2%), Native Hawaiian/Pacific Islander (0.04%; AU20: 0.1%), American Indian/Alaskan Native (NA%; AU20: 0.1%) or two or more races (4.6%%; AU20: 4.3%). In addition, 3.1% of our sample were international students studying at Ohio State (AU20: 6.8%).

In terms of living situation and financial independence, our participants most commonly live in student residence halls (42.1%), although a substantial minority live in a house or apartment with other students (36.7%), and a minority live on their own (8.0%) or with family (12.6%). Students reported that, on average, 40.6% of their living expenses came from personal earnings or savings (with a standard deviation of 31.2%), meaning the average student in our sample had roughly 59% of their living expenses financed by others.

In terms of where students grew up and their political affiliations, the majority of our sample report growing up in a suburban setting (67.6%), 10.1% in an urban setting, 11.0% in a small town, and 11.3% in a rural or agricultural environment. In addition, 53.5% described themselves as Democrats, 11.4% as Republicans, 26.5% as independents, 3.9% as Libertarians, and 4.6% as other political affiliations.

Lastly, in terms of academic programs and exposure to sustainability coursework, students most commonly reported that they had taken no classes related to sustainability or the environment at Ohio State (66.2%), while 25.9% reported taking just one or two classes; only 8% of our sample had taken three or more such classes (see Figure 11 in Section 5. Please see Table 2 for a breakdown of programs of study (in major categories).

We do not associate these demographic variables with values, knowledge, or behavior in this report, and it remains an open opportunity for interested undergraduate or graduate students to ask questions and conduct analyses. We welcome and encourage student inquiries, which can be sent to essl@osu.edu.

Table 2. Response by program of study

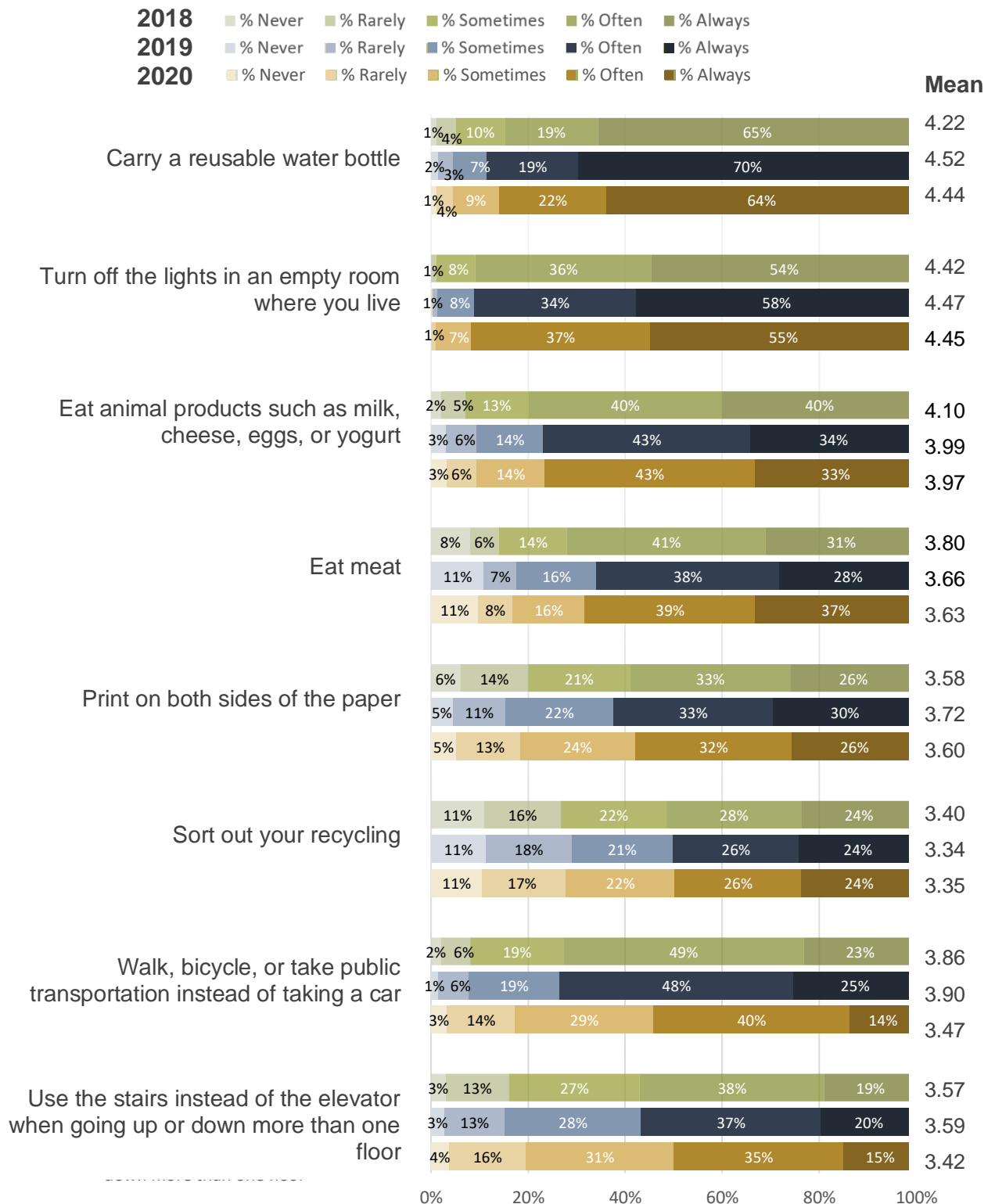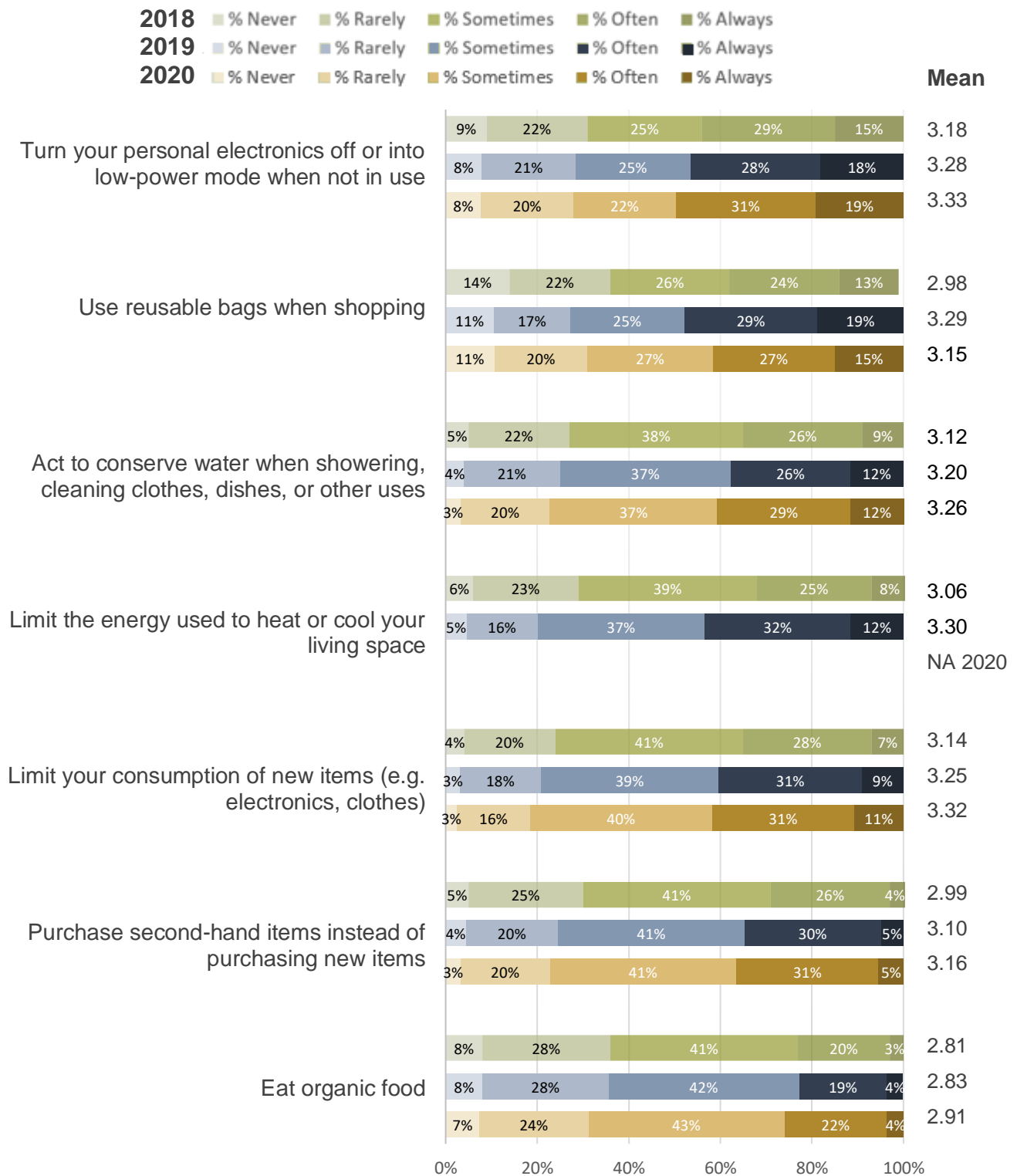| Program	Percent of respondents	Enrollment AU20
Arts and Sciences	36.7	37.9
Engineering	19.1	17.9
Business	11.2	15.6
Education and Human Ecology	4.8	6.7
Exploration Program (no declared major)	4.9	5.0
Health and Rehabilitation Sciences	4.4	4.4
Agriculture	3.3	3.2
Environment and Natural Resources	4.3	1.8
Nursing, Dental, and Medical	3.5	2.9
Pharmacy	1.5	1.0
Public Health	1.1	0.7
Architecture	1.3	1.2
John Glenn Public Affairs	1.1	0.7
Social Work	0.8	1.0
Total N	2,800	46,352

Section 1: Sustainable Behaviors

Replicating the survey from 2019, we again used the first section of the 2020 survey to ask students about their engagement in 15 pro-environmental and sustainability-related behaviors, including those that take place on and off-campus. Students were asked how often they engaged in these behaviors on a 1 – 5 "never" to "always" scale. Some of the behaviors were adapted from Brick et.al. (2017), and others were based on past surveys.

Similar to 2019, we find that in 2020, some behaviors are quite common among undergraduate students at Ohio State (Figures 3.1 and 3.2). For example, more than half of students say they "often" or "always" carry a reusable water bottle (M = 4.52 SD = 0.86), turn off the lights in an empty room (M = 4.44; SD = 0.88), print on both sides of the paper (M = 3.60, SD = 1.15), or turn off lights in an empty room they live in (M= 4.45; SD= 0.67). **The walk, bicycle, or take public transportation instead of using a car behavior saw a significant mean decrease between 2019 and 2020: from 3.90 to 3.47. The COVID-19 pandemic may have contributed to this decrease, specifically regarding public transportation.** Meanwhile, behaviors such purchasing second-hand items instead of purchasing new items (M = 3.16, SD = 0.91), using reusable bags when shopping (M=3.15, SD=1.21) and limiting consumption of new items (e.g. electronics, clothes) (M = 3.32, SD = 0.95) were less frequent. Some observations from these patterns is that, understandably, **easier behaviors performed on campus are more common than more effortful ones.** In addition, several behaviors that are adopted less frequently by students are ones over which they may have limited control, such as eating organic food on campus (M = 2.91, SD = 0.95). However, there remain several **low-cost and relatively easy behaviors that may merit further emphasis** to promote campus sustainability goals. Namely, having students conserve water (M = 3.26, SD = 1.01), and turn personal electronics off or into low-power mode when not in use (M = 3.33, SD = 1.21).

Figure 3.1. Sustainable behaviors: "Below is a list of behaviors you may or may not do. Please indicate how often you do these behaviors." (N = 2761 to 2768)

2018	% Never	% Rarely	% Sometimes	% Often	% Always
2019	% Never	% Rarely	% Sometimes	% Often	% Always
2020	% Never	% Rarely	% Sometimes	% Often	% Always

Mean

Carry a reusable water bottle
- 2018: 1% 4% 10% 19% 65% — 4.22
- 2019: 2% 3% 7% 19% 70% — 4.52
- 2020: 1% 4% 9% 22% 64% — 4.44

Turn off the lights in an empty room where you live
- 2018: 1% 8% 36% 54% — 4.42
- 2019: 1% 8% 34% 58% — 4.47
- 2020: 1% 7% 37% 55% — 4.45

Eat animal products such as milk, cheese, eggs, or yogurt
- 2018: 2% 5% 13% 40% 40% — 4.10
- 2019: 3% 6% 14% 43% 34% — 3.99
- 2020: 3% 6% 14% 43% 33% — 3.97

Eat meat
- 2018: 8% 6% 14% 41% 31% — 3.80
- 2019: 11% 7% 16% 38% 28% — 3.66
- 2020: 11% 8% 16% 39% 37% — 3.63

Print on both sides of the paper
- 2018: 6% 14% 21% 33% 26% — 3.58
- 2019: 5% 11% 22% 33% 30% — 3.72
- 2020: 5% 13% 24% 32% 26% — 3.60

Sort out your recycling
- 2018: 11% 16% 22% 28% 24% — 3.40
- 2019: 11% 18% 21% 26% 24% — 3.34
- 2020: 11% 17% 22% 26% 24% — 3.35

Walk, bicycle, or take public transportation instead of taking a car
- 2018: 2% 6% 19% 49% 23% — 3.86
- 2019: 1% 6% 19% 48% 25% — 3.90
- 2020: 3% 14% 29% 40% 14% — 3.47

Use the stairs instead of the elevator when going up or down more than one floor
- 2018: 3% 13% 27% 38% 19% — 3.57
- 2019: 3% 13% 28% 37% 20% — 3.59
- 2020: 4% 16% 31% 35% 15% — 3.42

(x-axis: 0% 20% 40% 60% 80% 100%)

Figure 3.2. Sustainable behaviors: "Below is a list of behaviors you may or may not do. Please indicate how often you do these behaviors." (N = 2,761 to 2,768)

	% Never	% Rarely	% Sometimes	% Often	% Always
2018					
2019					
2020					

Mean

Turn your personal electronics off or into low-power mode when not in use
- 2018: 9% | 22% | 25% | 29% | 15% — 3.18
- 2019: 8% | 21% | 25% | 28% | 18% — 3.28
- 2020: 8% | 20% | 22% | 31% | 19% — 3.33

Use reusable bags when shopping
- 2018: 14% | 22% | 26% | 24% | 13% — 2.98
- 2019: 11% | 17% | 25% | 29% | 19% — 3.29
- 2020: 11% | 20% | 27% | 27% | 15% — 3.15

Act to conserve water when showering, cleaning clothes, dishes, or other uses
- 2018: 5% | 22% | 38% | 26% | 9% — 3.12
- 2019: 4% | 21% | 37% | 26% | 12% — 3.20
- 2020: 3% | 20% | 37% | 29% | 12% — 3.26

Limit the energy used to heat or cool your living space
- 2018: 6% | 23% | 39% | 25% | 8% — 3.06
- 2019: 5% | 16% | 37% | 32% | 12% — 3.30
- 2020: NA 2020

Limit your consumption of new items (e.g. electronics, clothes)
- 2018: 4% | 20% | 41% | 28% | 7% — 3.14
- 2019: 3% | 18% | 39% | 31% | 9% — 3.25
- 2020: 3% | 16% | 40% | 31% | 11% — 3.32

Purchase second-hand items instead of purchasing new items
- 2018: 5% | 25% | 41% | 26% | 4% — 2.99
- 2019: 4% | 20% | 41% | 30% | 5% — 3.10
- 2020: 3% | 20% | 41% | 31% | 5% — 3.16

Eat organic food
- 2018: 8% | 28% | 41% | 20% | 3% — 2.81
- 2019: 8% | 28% | 42% | 19% | 4% — 2.83
- 2020: 7% | 24% | 43% | 22% | 4% — 2.91

0%   20%   40%   60%   80%   100%

Section 2: Attitudes Towards Campus Initiatives

In addition to the longitudinal scales, the survey also included items of interest to our collaborators in Student Life and Facilities Operations and Development to gauge support for current or possible sustainability initiatives at Ohio State. These items were largely self-generated, and we will review them section-by-section in the following pages.

To begin, students were asked: "When deciding to come to Ohio State, were you influenced by the university's sustainability programming? See graph below for a breakdown of responses on a 1 – 5 scale of "not at all" to "a great deal". **Response scores to this question were again generally quite low**, with an average of 1.61 (SD = 0.93, N = 1,207, Figure 4). This remains **an area for improvement**: as Ohio State continues to build on its reputation for being a sustainable and innovative campus, these responses may become higher in the future.

Figure 4. Influence of sustainability programming on student choice to attend OSU in 2018, 2019 and 2020.
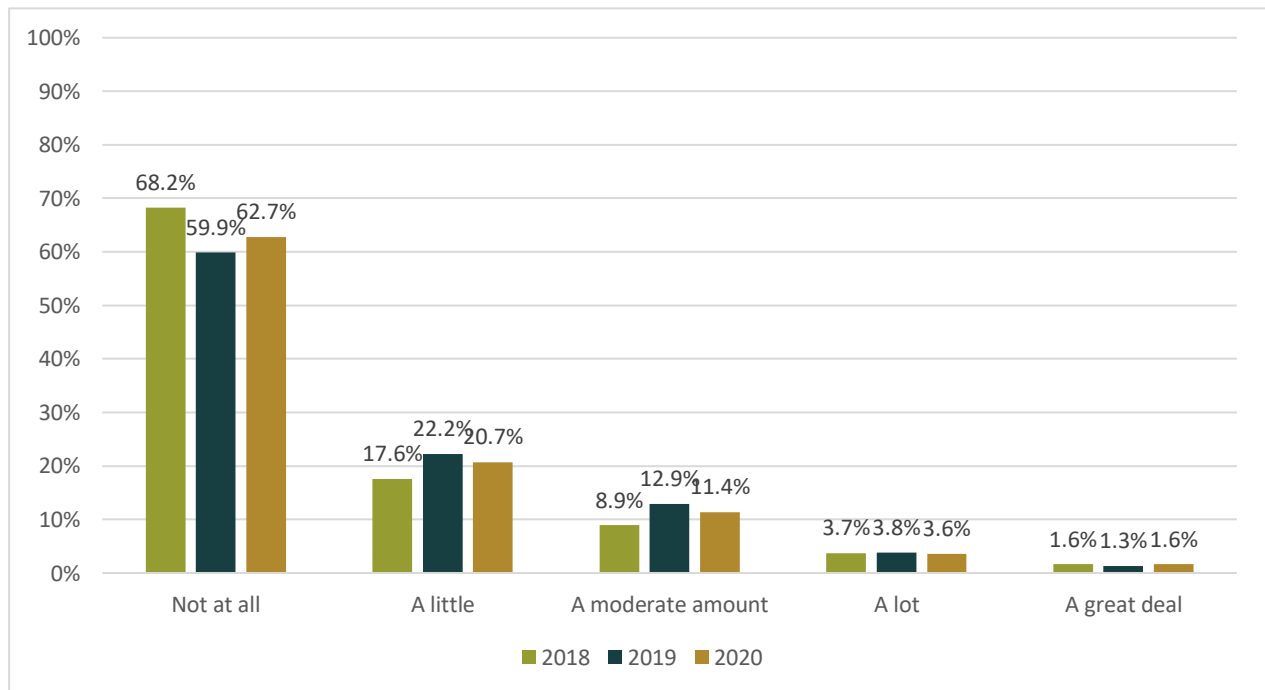
Then, students were asked about their knowledge of various sustainability initiatives on campus (e.g., Low Emission or Fuel-Efficient Vehicle Parking, Zero-Waste/recycling) on a 1 – 5 scale of "not at all" to "a great deal". Students averaged between a little and a moderate amount of knowledge, with an average of 2.25, just below the midpoint (SD = 0.92, N = 1,206; Figure 5). These initiatives were not assessed separately, so we are unable to determine which one may be driving perceptions, but it is possible to assess initiatives at a more refined scale in future iterations of the survey. This could help with future programming and outreach efforts.

Figure 5. Self-assessed student knowledge of sustainability initiatives on campus.
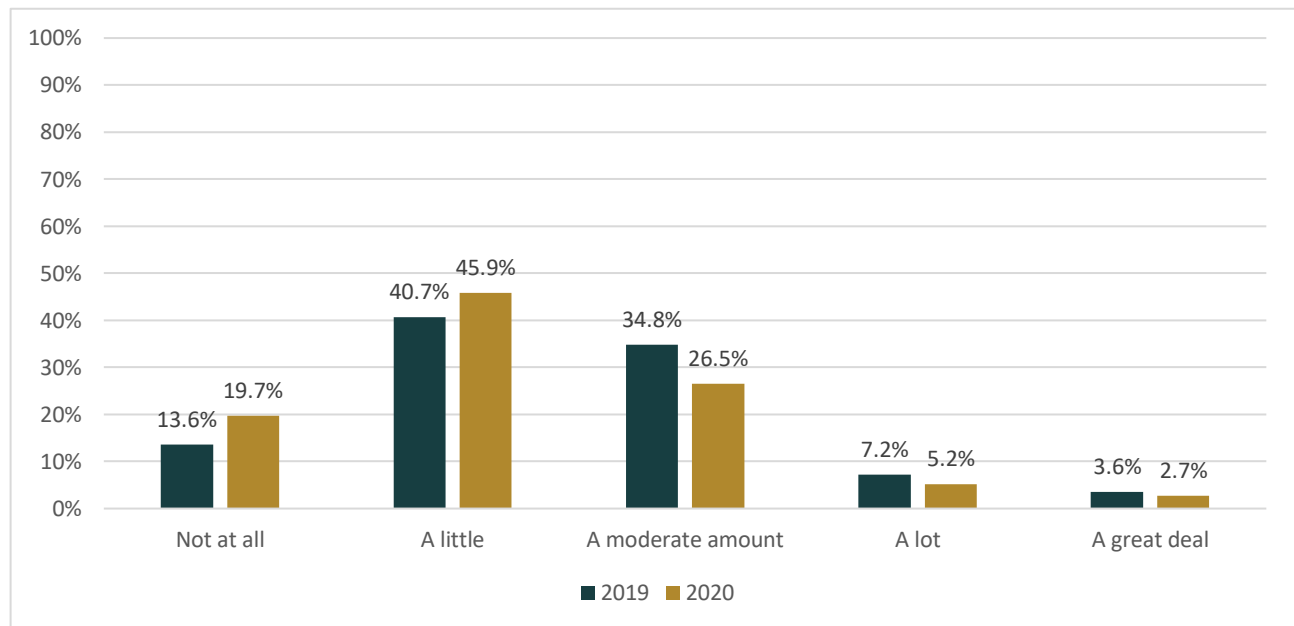
Students were also asked how they would allocate resources to various sustainability initiatives on campus, divided among different project areas so that the total equals 100% (N = 1198 to 1221; Figure 6). Overall, students prioritized recycling/composting with an average of 20.8%, followed by low/zero carbon transportation (M = 16.4%, SD = 10.6), and residence hall energy conservation (M = 15.7%, SD = 10.6).

*Figure 6. Allocation of resources to sustainability initiatives on campus*
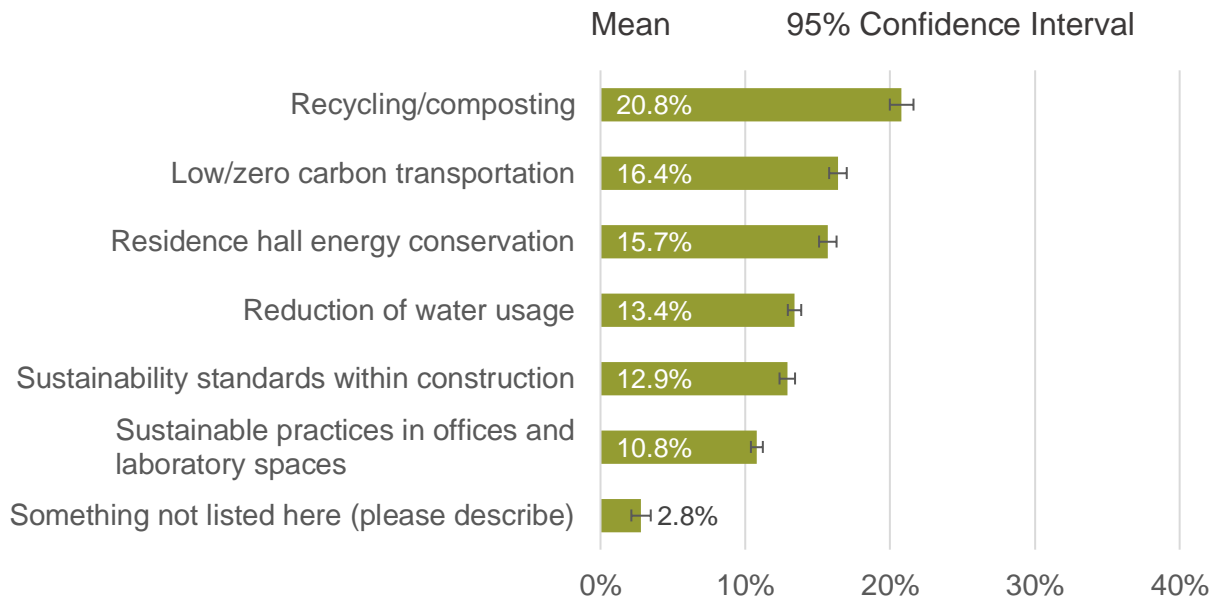
Utilizing a strongly agree to strongly disagree scale, students were then asked about their thoughts towards statements concerning barriers to recycling on campus (Figures 7.1, 7.2). **About half of respondents (56%) agreed that there were not enough recycling bins on campus and that they were unsure of which items could be recycled on campus (54%).** More than half of students **disagreed that labels are confusing** on campus (62%). About two in three students **disagreed** that they **did not know** where to recycle on campus (67%).

Figure 7.1: Recycling Barriers- "To what degree do you agree or disagree with the following statements about recycling on campus"? (N= 1188 to 1190)
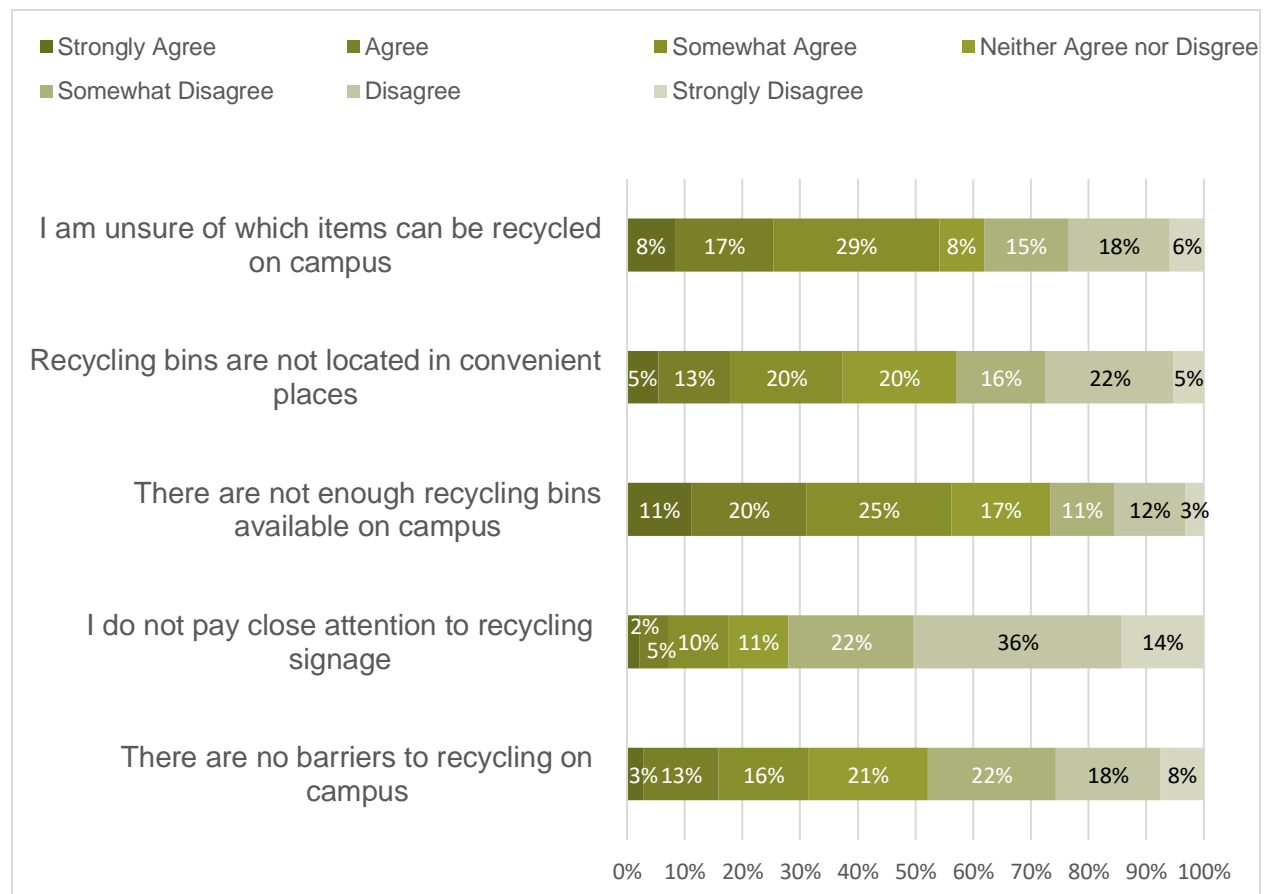
Figure 7.2. Recycling Barriers- "To what degree do you agree or disagree with the following statements about recycling on campus"? (N= 1188 to 1190)
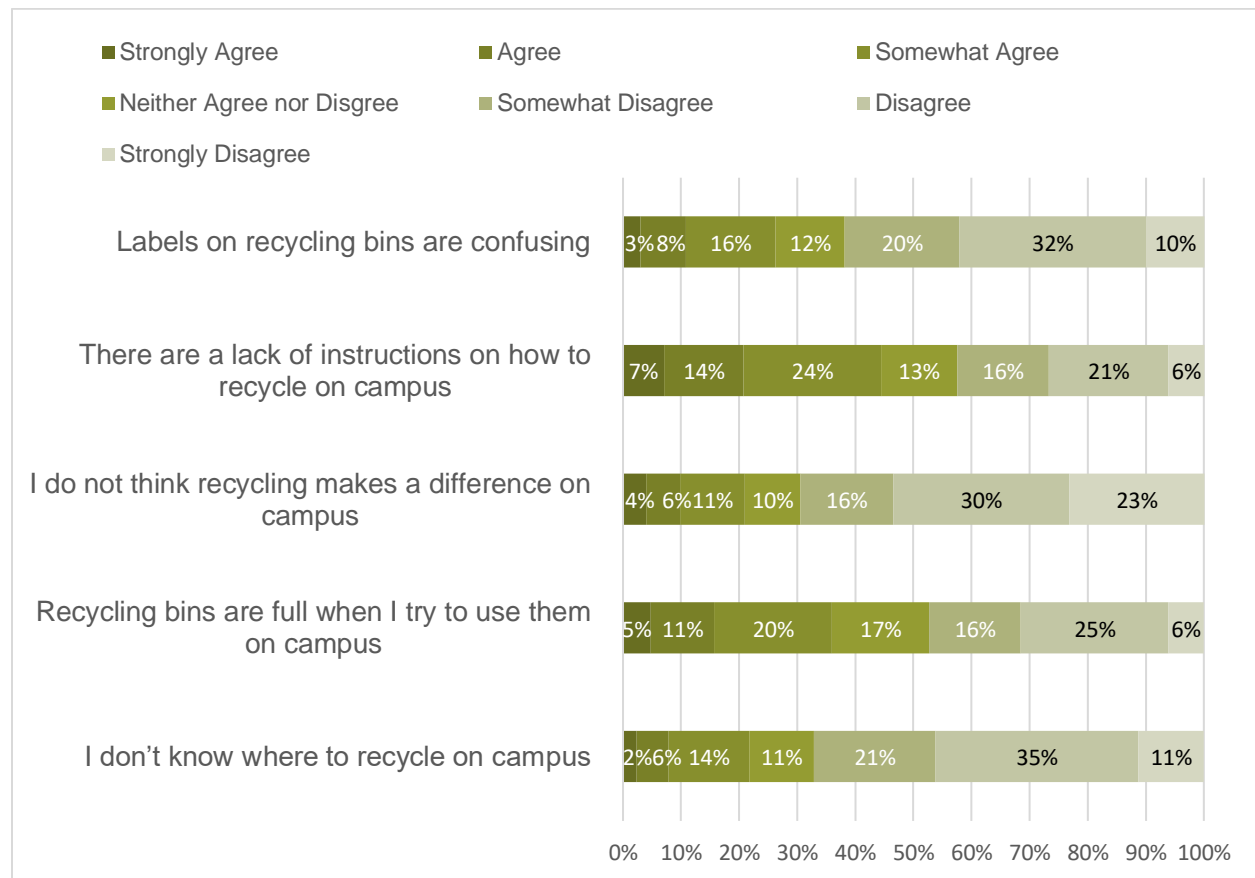
Section 3: Sustainability Curriculum Development

The survey also included items designed to inform sustainability curriculum development at Ohio State. These items included having students rate their interest in different kinds of sustainability courses and their current and desired involvement in sustainability-related learning opportunities. These items were largely self-generated, and we will review them section-by-section in the next pages.

To begin, students were asked: "How many courses have you taken with a focus on sustainability at OSU?" (N = 2,393; Figure 8). Similar to 2019, the most common responses to this question in 2020 was "None" (66.2%; 2019 = 64.2%) or "One or two" courses (25.9%; 2019 = 27.8%). **We also note an upward trend in taking three or four classes from 4% in 2019 to 11% in 2020, suggesting a potential cumulative effect among higher ranking cohorts as sustainability courses become more available across the curriculum.**

Figure 8. Number of courses taken with a focus on sustainability at OSU.
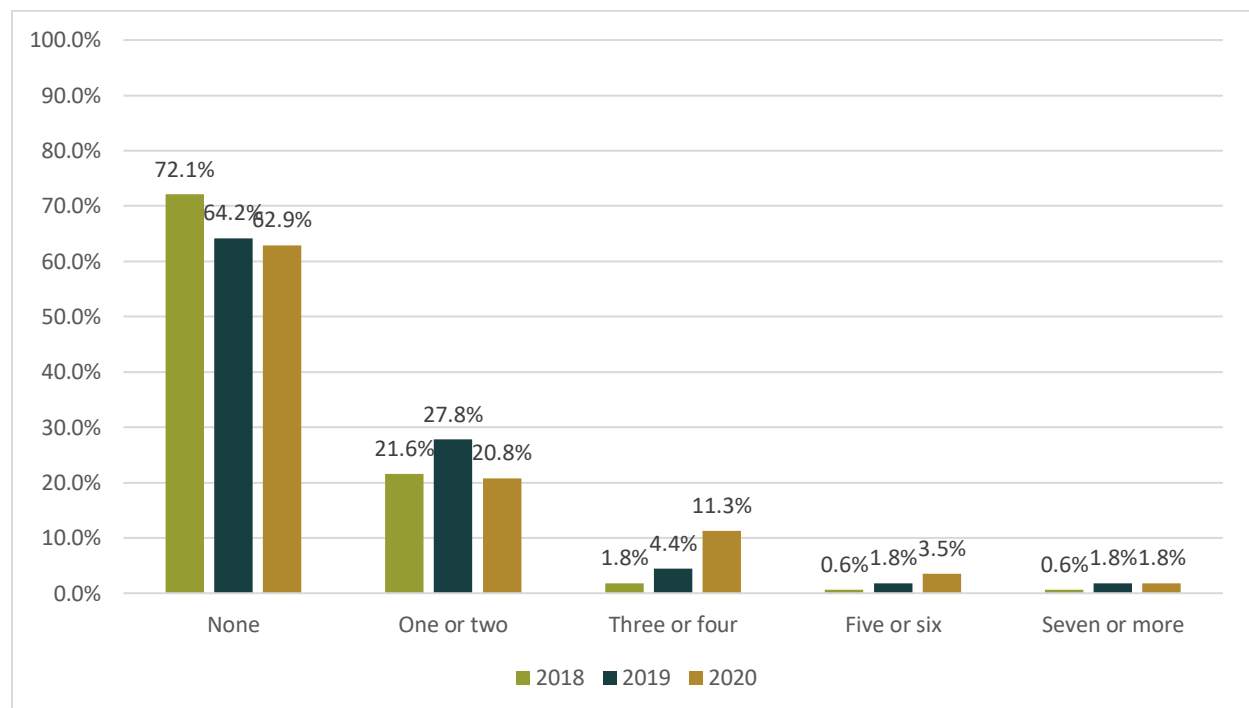
Students were then asked to rate their agreement with six different items related to sustainability education on a 1 – 5 "strongly disagree" to "strongly agree" scale (N = 1,428; Figure 9). Some notable trends in this data are how highly students agree that sustainability-related knowledge and skills are valued by potential employers, as well as their awareness of sustainability-related opportunities on campus. However, they generally do not actively seek sustainability-related courses to enroll in. **There seems to be a generally positive trend towards awareness of sustainability on campus and seeking of sustainability-related courses from 2018 to 2019, though this dipped slightly in 2020.**

Figure 9. Agreement with statements about beliefs and actions related to sustainability education.
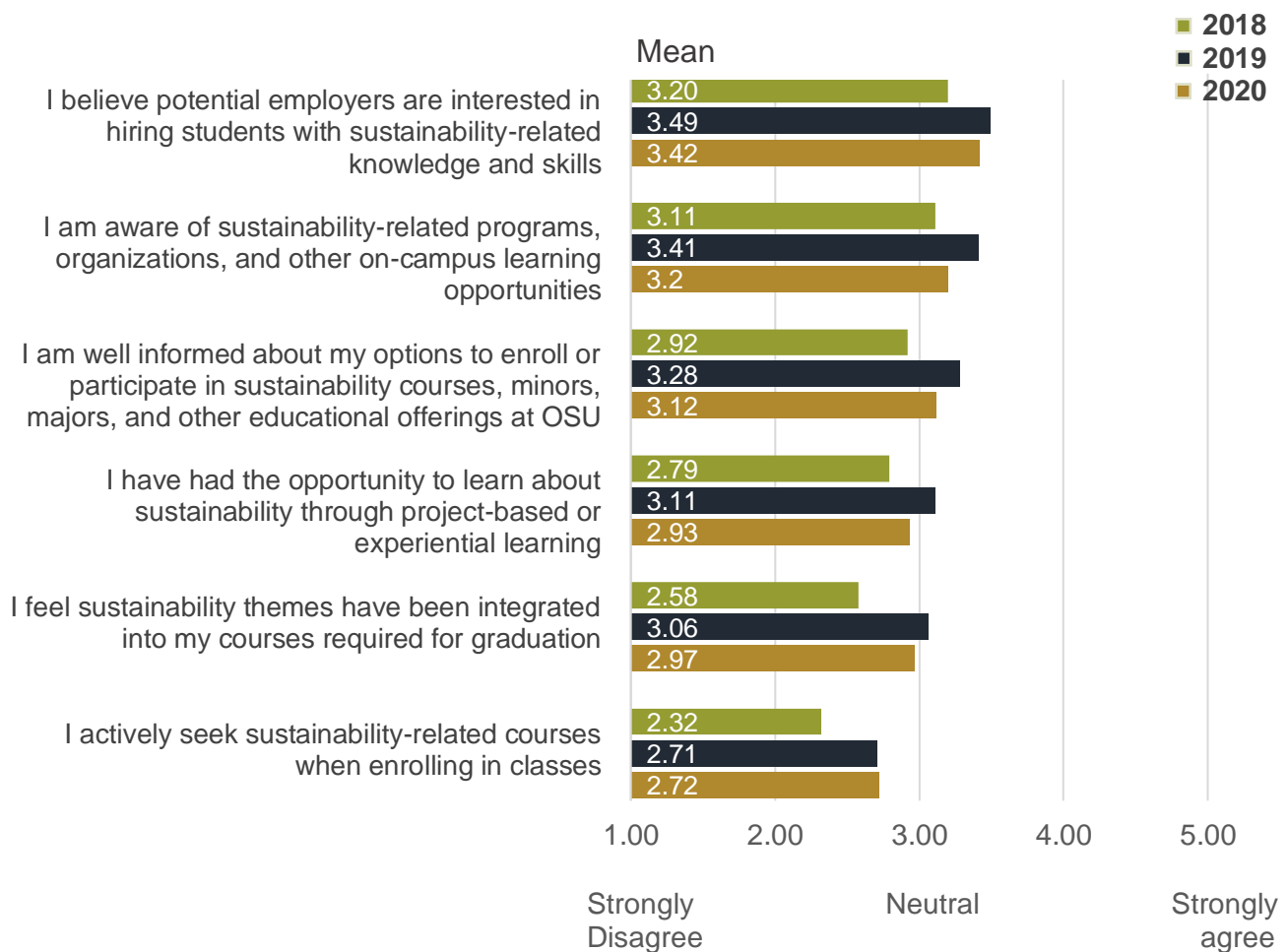
Next, students were asked to rate their interest with four different kinds of sustainability courses or content at Ohio State on a 1 – 5 "not at all interested" to "extremely interested" scale (N = 738 – 1,231; Figure 10). There seems to be a moderate amount of interest for general education courses and major-based courses overall, with a small trend of increasing interest in sustainability courses since 2018.

Figure 10. Average student interest in sustainability courses at OSU
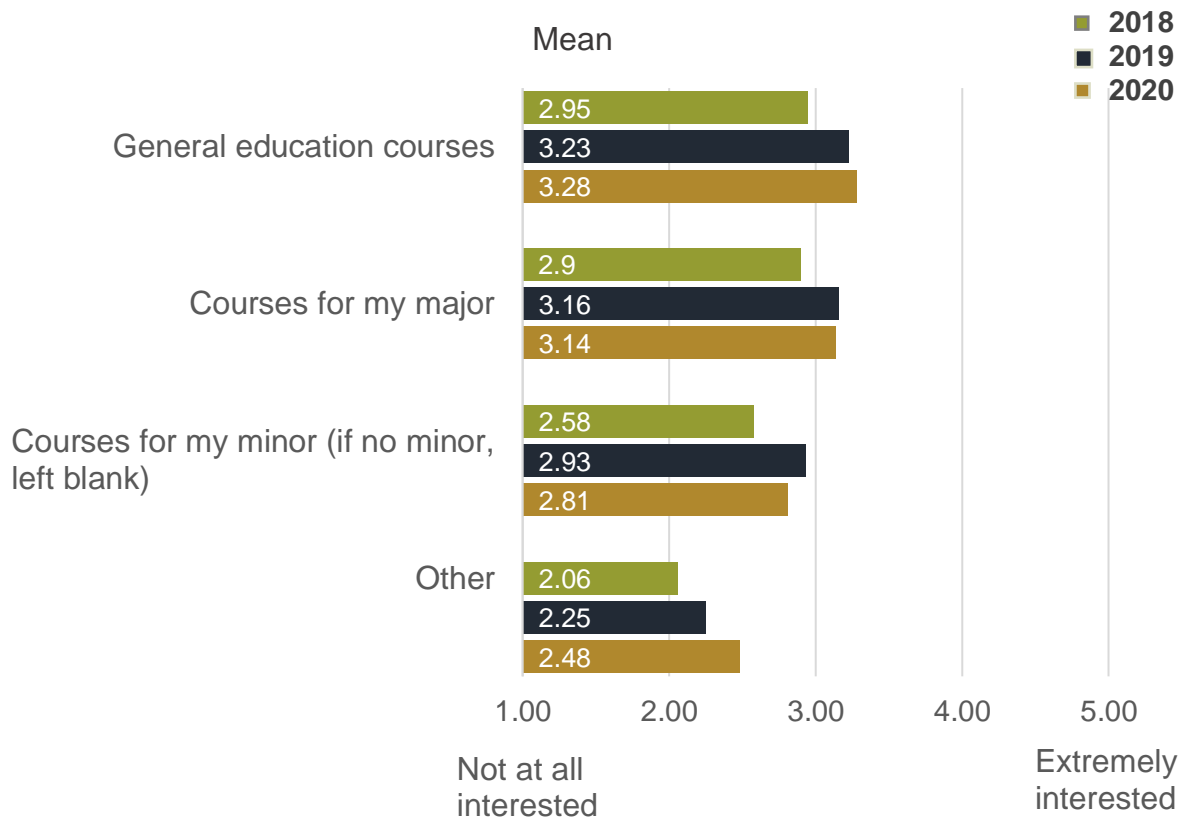
Additionally, students indicated their agreement with four items related to their amount of current and desired involvement in the academic (i.e. through taking sustainability courses and pursuing sustainability-related research opportunities) and professional sides of sustainability (i.e. pursuing sustainability-related internships, volunteer opportunities, and student organization involvement or leadership) on a 7-point scale of "strongly disagree" to "strongly agree" (N = 1,211; Figure 11).

Figure 11. Current and desired involvement in academic and professional aspects of sustainability.
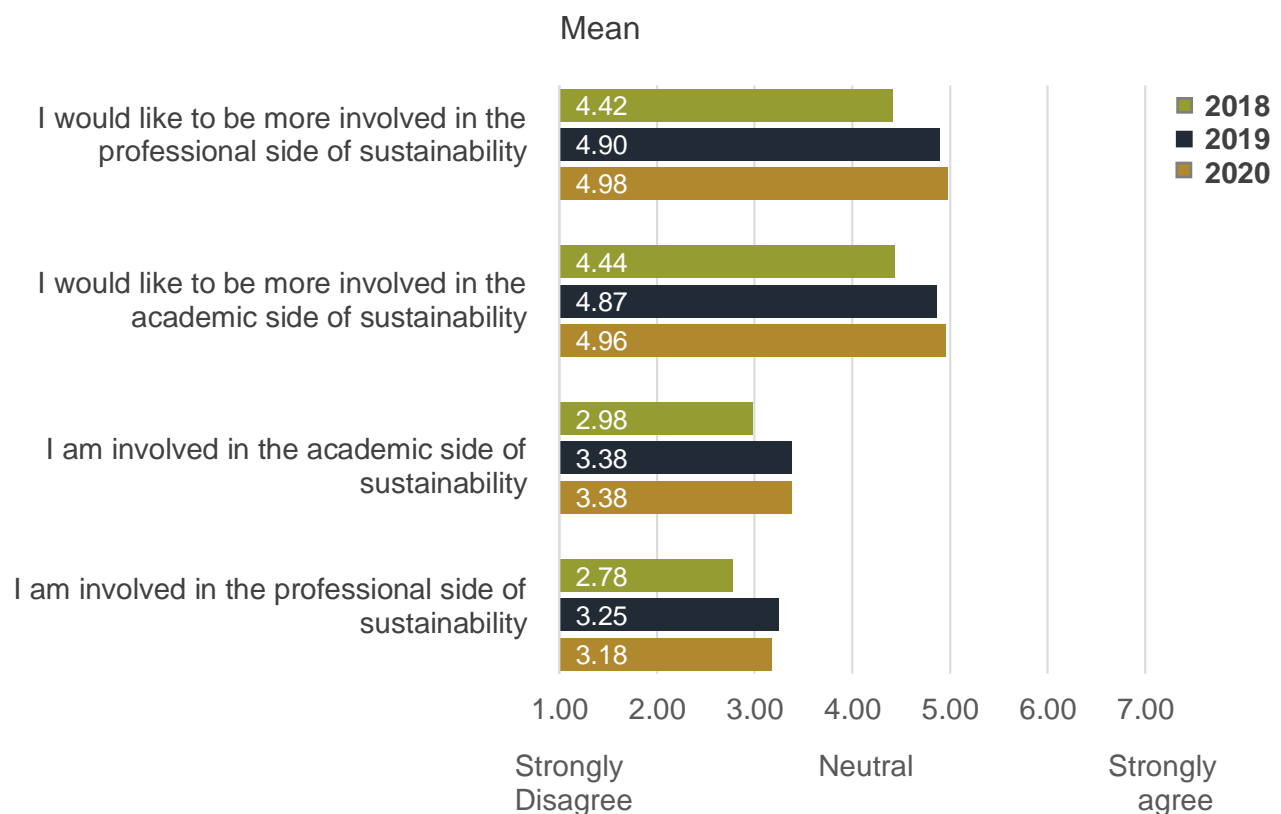

Overall, students seem to consistently agree with the statement that they would like to become more involved in the professional side of sustainability, and were equally as interested in becoming involved in the academic side of sustainability. Meanwhile, in 2020, **the majority of students continue to disagree that they are currently involved in academic or personally-related sustainability opportunities**, pointing to a potential gap and opportunity area.

Students were also asked to choose three topics they would like to learn more about through taking sustainability-related courses at Ohio State (N = 1,232). As seen in
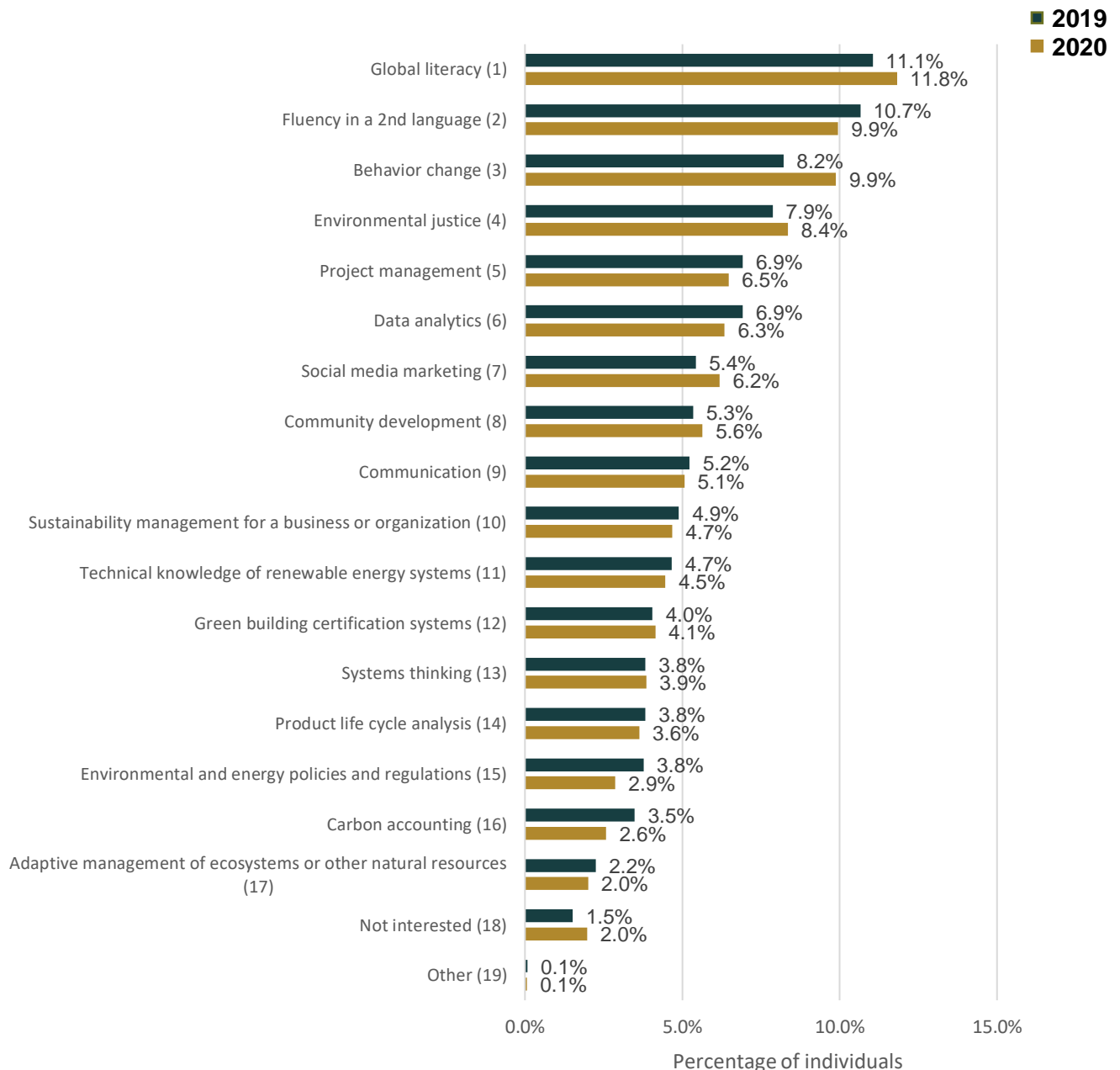
Figure 12, climate change, health & wellbeing, and clean & renewable energy are still the most popular topics overall, however environmental and social justice, and ecosystems and biodiversity gained some popularity from 2019 to 2020.

Figure 12. Percent of students that chose each preferred topic in sustainability related coursework. Rank order from 2019 in parentheses.
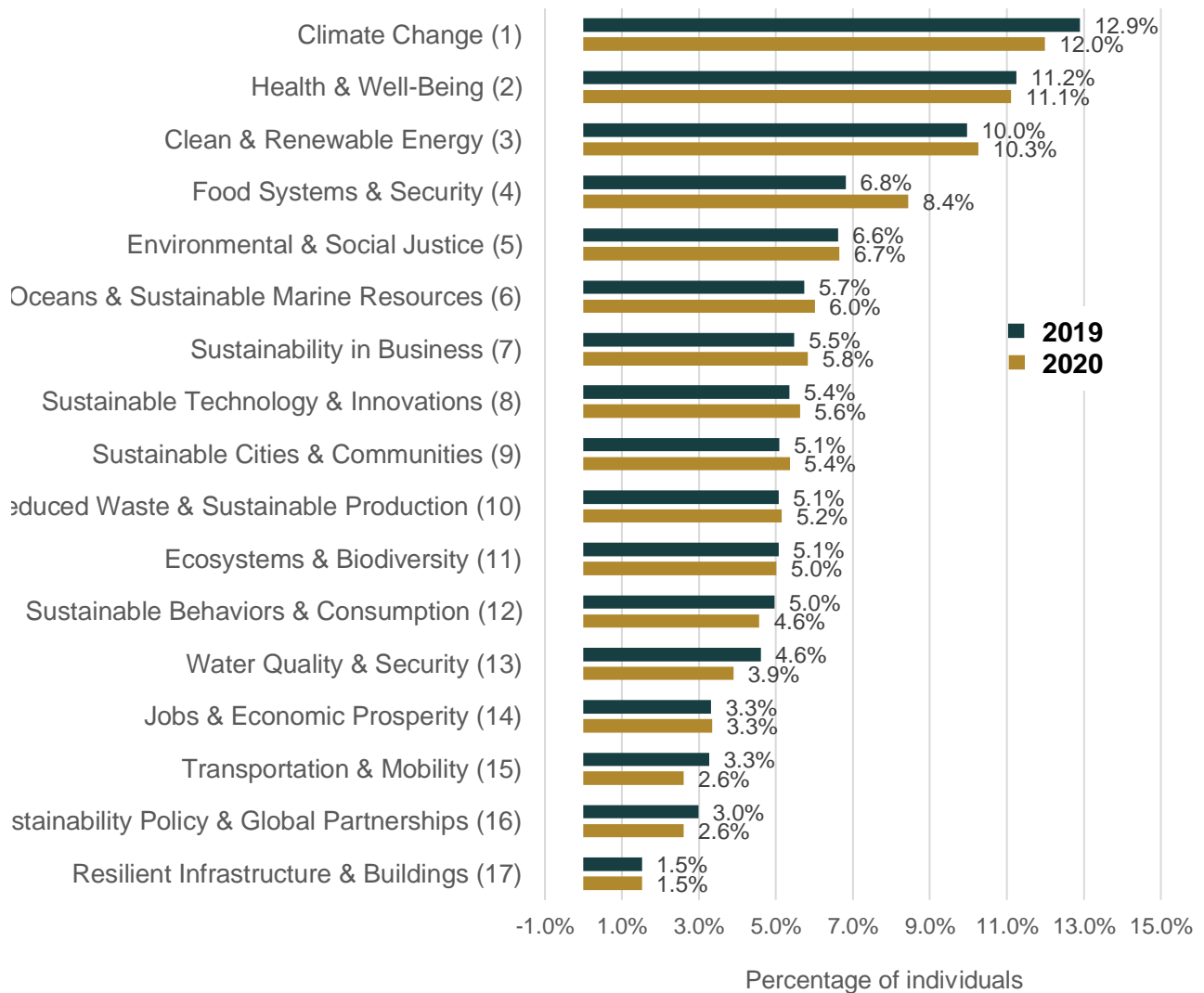
Lastly, students were asked about sustainability-related skills they would be most interested in gaining by the time they graduate as part of their professional development (N = 1,232; Figure 13). They could choose up to three topics or indicate they weren't interested in any of the topics. The majority of students remained interested in global literacy, fluency in a second language, and behavior change.

Figure 13. Percent of students that chose each preferred sustainability-related skill for professional development. Rank order from 2019 in parentheses.

Legend: ■ 2019 ■ 2020

Skill	2019	2020
Global literacy (1)	11.1%	11.8%
Fluency in a 2nd language (2)	10.7%	9.9%
Behavior change (3)	8.2%	9.9%
Environmental justice (4)	7.9%	8.4%
Project management (5)	6.9%	6.5%
Data analytics (6)	6.9%	6.3%
Social media marketing (7)	5.4%	6.2%
Community development (8)	5.3%	5.6%
Communication (9)	5.2%	5.1%
Sustainability management for a business or organization (10)	4.9%	4.7%
Technical knowledge of renewable energy systems (11)	4.7%	4.5%
Green building certification systems (12)	4.0%	4.1%
Systems thinking (13)	3.8%	3.9%
Product life cycle analysis (14)	3.8%	3.6%
Environmental and energy policies and regulations (15)	3.8%	2.9%
Carbon accounting (16)	3.5%	2.6%
Adaptive management of ecosystems or other natural resources (17)	2.2%	2.0%
Not interested (18)	1.5%	2.0%
Other (19)	0.1%	0.1%

Percentage of individuals

Section 4: Sustainability Knowledge Assessment

We assessed student knowledge of sustainability topics and issues using the 12-item "ASK" (Assessment of Sustainability Knowledge) scale developed by Zwickle and Jones (2018), which measures knowledge related to ecological, economic, and social aspects of sustainability. Students were asked to answer multiple-choice quiz questions to the best of their ability. (Note that we did not include a "do not know" option, so scores may be slightly inflated due to additional guessing. Questions that students viewed but skipped were still counted as 'incorrect', however).

Overall, **student knowledge of sustainability and environmentally-related topics was high**, with an average of 8.4 items correct out of 12 (SD = 2.38), or 70% correct. We observe that students were often correct on more technical questions such as the purpose of ozone (88.6% correct), the biggest global emitter of greenhouse gases (88.7% correct) and describing changes in the wealth gap in America (90.6% correct; Tables 3.1, 3.2). **However, some major misconceptions remain among students**, often in relation to **causes of pollution and environmentally degrading lifestyle behaviors**. For example, 42.6% of students incorrectly answered that pollution is the main cause of Atlantic fish stock depletion (only 31.2% gave the correct answer, overfishing). In addition, 26.0% of students thought that leaving a cell phone charger plugged in for 12 hours has a larger environmental impact than producing a hamburger, which is incorrect. These and other lower-score items could point to potential gaps in student understanding where education or interventions could be targeted in the future.

The percent of students answering correctly stayed the same or slightly decreased across all questions since 2019. **Slightly fewer students correctly identified that the most common cause of pollution in streams and rivers is surface runoff (2019: 44.4%; 2020: 41.1%), with more students incorrectly believing that waste from factories was the most common cause of pollution.** It is also possible to estimate changes in sustainability knowledge by comparing answers between the 2014 and 2020 versions of this survey. The average student score in 2014 was 6.93 out of 12 items (SD = 3.05), or 58% correct. Taking into consideration some scale changes, this result suggests that **students in 2020 are, on average, getting the correct answer on 1.2 more questions than students in 2014.**

Table 3.1. Responses to ASK items in 2018, 2019, and 2020.

ASK Question	Correct Answer	% Correct (2020) N = 2478	% Correct (2019) N = 3276	% Correct (2018) N = 2872
	Most Common Incorrect Answer	**% Incorrect (2020)**	**% Incorrect (2019)**	**% Incorrect (2018)**
1) What is the most common cause of pollution of streams and rivers?	"Surface water running off yards, city streets, paved lots, and farm fields"	41.1%	44.4%	50.8%
	"Waste dumped by factories"	39.0%	36.3%	24.1%
2) Ozone forms a protective layer in the earth's upper atmosphere. What does ozone protect us from?	"Harmful UV rays"	88.6%	90.5%	87.3%
	"Climate change"	5.2%	4.2%	5.4%
3) Which of the following is an example of sustainable forest management?	"Never harvesting more than what the forest produces in new growth"	77.2%	78.0%	76.1%
	"Setting aside forests to be off limits to the public"	15.3%	16.5%	15.1%
4) Of the following, which would be considered living in the most environmentally sustainable way?	"Reducing consumption of all products"	68.3%	70.9%	65.6%
	"Recycling all recyclable packaging"	20.1%	19.2%	20.8%
5) Which of the following is the most commonly used definition of sustainable development?	"Meeting the needs of the present without compromising the ability of future generations to meet their own needs"	81.3%	84.5%	80.7%
	"Setting aside resources for preservation, never to be used"	7.4%	6.6%	8.0%
6) Over the past 3 decades, what has happened to the difference between the wealth of the richest and poorest Americans?	"The difference has increased"	90.6%	89.5%	85.0%
	"The difference has stayed about the same"	5.3%	7.5%	9.9%

Table 3.2. Responses to ASK items in 2018, 2019, and 2020.

7) Many economists argue that electricity prices in the U.S. are too low because	"They do not reflect the costs of pollution from generating the electricity"	69.3%	69.9%	68.1%
	"Electric companies have a monopoly in their service area"	20.4%	21.3%	19.9%
8) Which of the following is the most commonly used definition of economic sustainability?	"Long term profitability"	58.9%	57.3%	56.6%
	"When costs equal revenue"	26.9%	28.2%	26.9%
9) Which of the following countries passed the U.S. to become the largest emitter of the greenhouse gas carbon dioxide?	"China"	88.7%	89.8%	86.5%
	"Japan"	4.2%	3.9%	5.2%
10) Which of the following is a leading cause of the depletion of fish stocks in the Atlantic Ocean?	"Fishermen seeking to maximize their catch"	31.2%	31.3%	29.0%
	"Ocean pollution"	42.6%	43.1%	45.1%
11) Which of the following is the best example of environmental justice?	"All stakeholders from an indigenous community are involved in setting a quota for the amount of wood they can take from a protected forest next to their village"	81.8%	81.7%	75.2%
	"The government dams a river, flooding Native American tribal lands to create hydro-power for large cities"	6.5%	7.5%	9.6%
12) Put the following list in order of the activities with the largest environmental impact to those with the smallest environmental impact:	"Flying in a commercial airplane from Washington D.C. to China" > "Producing one McDonald's quarter-pound hamburger" > "Producing one McDonald's chicken sandwich" > "Keeping a cell phone charger plugged into an electrical outlet for 12 hours"	58.1%	57.7%	45.2%
	"Flying in a commercial airplane from Washington D.C. to China" > "Keeping a cell phone charger plugged into an electrical outlet for 12 hours" > "Producing one McDonald's quarter-pound hamburger" > "Producing one McDonald's chicken sandwich"	26.0%	26.9%	33.0%

Section 5: Sustainability Attitudes and Values

We measured student sustainability values and attitudes using the 11-item "SAS" (Sustainable Attitudes) scale developed by Zwickle and Jones (2018). Students were asked to respond with how much they agreed or disagreed with a number of pro-environmental attitudes and values such as "Biological diversity in itself is good", and "I am willing to put forth a little more effort in my daily life to reduce my environmental impact" on a scale of 1 – 7 ("strongly disagree" to "strongly agree"). Individuals' scores on this scale were calculated by averaging all responses together.

Overall, **scores on this scale were fairly high**, with the average score being a 6.16 out of 7 (SD = 0.74; Figure 14). Compared to 5.90 out of 7 in 2018, scores are up 4.4%.

Figure 14. Averaged scores for Sustainable Attitudes Scale (SAS)
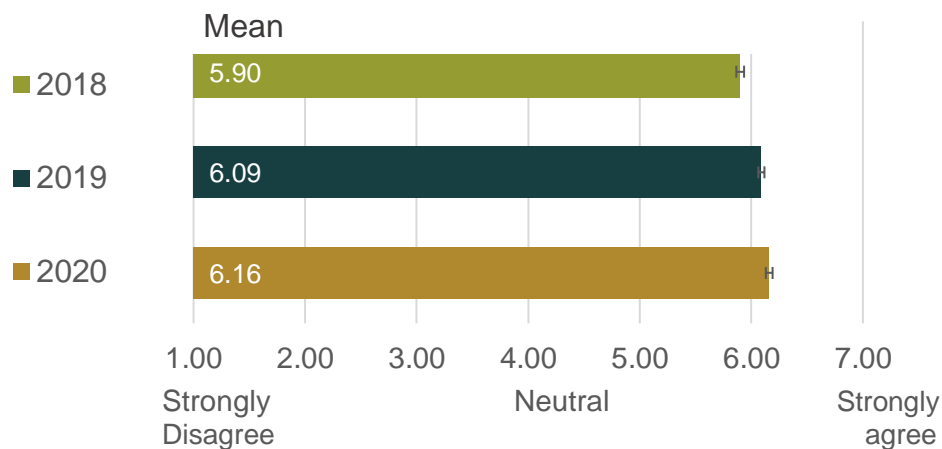
Section 6: Next Steps and Acknowledgements

Next steps: Currently plans are in place to repeat the campus sustainability survey in 2021. We plan to again replicate longitudinal items with a panel sample of Undergraduate students and adapt new sections for Faculty research and campus partner objectives.

The Environmental and Social Sustainability Lab continues to work with diverse campus partners to inform progress towards sustainability goals, and assess the results of related efforts on campus. Our goal is that this survey will continue to provide high-quality social scientific data of use to both academic researchers and the broader campus sustainability community for years to come.

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Contact us: If you are interested in becoming involved in this effort at Ohio State, or are interested in using our data for educational or research purposes please contact us at ESSL@osu.edu. A report on these findings can be found on our website: https://ess.osu.edu/campus-sustainability-survey/reports.

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