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Green cities and ivory towers: how do higher education sustainability initiatives shape millennials' consumption practices?

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Abstract College-educated millennials, motivated by a preference for vibrant, walkable neighborhoods with access to good public transportation, are helping to drive an economic resurgence in many American cities. At the same time, institutions of higher education (IHEs) are seeking to contribute to sustainable societies by encouraging students to incorporate principles of environmental responsibility into personal consumption practices. Popular writing on the urban migration of millennials—the generation born after 1982—has frequently celebrated the presumed environmental benefits of cities not designed around the automobile. Yet, little research has examined how, if at all, IHE efforts to shape student consumption practices may impact the sustainability of urban areas where many millennials are choosing to live and work. In this paper, we use survey and qualitative data on undergraduates at a large, public university to compare millennials' commitment to different forms of sustainable consumption to their preference for particular urban forms. We find that student commitment to practicing sustainable consumption in their adult lives is weakest in an area crucial to the global ecological footprint of urban areas: how food is produced and consumed. We also find that evidence for IHE impact on student attitudes and practices related to any form of sustainable consumption is surprisingly lacking. We conclude by suggesting that IHEs have not yet realized their full potential to prepare millennials to be environmentally responsible citizens of sustainable cities, particularly where participation in food systems is concerned.

Keywords Sustainable consumption · Millennials · Higher education · Cities · Sustainability

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Introduction

College-educated millennials, motivated by a preference for vibrant, walkable neighborhoods with access to good public transportation, are helping to drive an economic resurgence in many American cities (e.g., American Public Transportation 2014). At the same time, institutions of higher education (IHEs) are seeking to contribute to sustainable societies by encouraging students to incorporate principles of environmental responsibility into personal consumption practices (Davies et al. 2003; Emanuel and Adams 2011; Kagawa 2007). Popular writing on the urban migration of millennials—the generation born after 1982—has frequently celebrated the presumed environmental benefits of cities not designed around the automobile (e.g., Cassie 2014; Hendee 2014). Yet, little research has examined how, if at all, IHE efforts to shape student consumption practices may impact the sustainability of urban areas where many millennials are choosing to live and work.

In this paper, we use survey and qualitative data on undergraduates at a large, public university to compare millennials' commitment to different forms of sustainable consumption to their preference for particular urban forms. We find that

student commitment to practicing sustainable consumption in their adult lives is weakest in an area crucial to the global ecological footprint of urban areas: how food is produced and consumed. We also find that evidence for IHE impact on student attitudes and practices related to any form of sustainable consumption is surprisingly lacking. We conclude by suggesting that IHEs have not yet realized their full potential to prepare millennials to be environmentally responsible citizens of sustainable cities, particularly where participation in food systems is concerned.

Millennials, higher education, and consumption

First articulated in the Bruntland Commission's report on sustainable development (World Commission on Environment and Development 1987), the concept of sustainability describes actions by governments, organizations, and individuals that improve people's lives, respect ecological constraints, and advance social justice. Building on this foundation, research into sustainable cities has often focused on the environmental implications of urban form and transportation systems. It has been argued that compact cities with robust public transportation systems produce fewer pollutants and consume land relatively frugally (Bannister, Watson, and Wood 1997; Camagni, Gibelli, and Rigamonti 2002; Muñiz and Galindo 2005).

Alongside examinations of urban form and transportation, theories of sustainable cities have also sought to account for how cities impact their "hinterlands": areas that provide cities with material resources and eventually receive waste (Alberti 1999; Doughty and Hammond 2004; Newman 2006; Zeev, Meidad, and Avinoam 2014). As entities defined by administrative borders, no city, on its own, can be sustainable (W. Rees and Wackernagel 1996) because no city can be self-sufficient (Berger 2014). Throughout the twentieth century, technological advances in transportation and storage, among other forces of globalization, enabled cities to obtain resources and export waste far beyond their local region—first domestically and then globally (Alberti 1996; Grimm et al. 2008). Motivated by the need to incorporate impacts on increasingly widespread hinterlands into evaluations of urban sustainability, researchers have recently devoted significant attention to household consumption practices. In many cases, studies have concluded that the "ecological footprint" of cities owes as much if not more to household consumption—with respect to food, energy, water, and waste—as to urban form (Castellani and Sala 2013; Echenique et al. 2012; Haraldsson, Ranhagen, and Sverdrup 2001; Satterthwaite 2008; McGranahan and Satterthwaite 2003; W. Rees and Wackernagel 1996; Wu 2010). In sum, even compact cities with high-quality public transportation cannot be considered sustainable, if residents consume resources in ways that impose huge burdens on areas outside a city's formal jurisdiction.

As the role of household consumption in sustainable cities has drawn increasing attention from researchers, powerful trends in urban demography and higher education have widely been characterized as positive developments for human society and the environment. Most importantly, millennials are exhibiting a preference for compact, mixed-use urban environments and a distaste for automobile ownership (Burnstein and Gallagher 2014; Flint 2014; Neilson 2014; Rockefeller Foundation 2014). In a strengthening of the historically greater likelihood for college-educated adults to live in urban areas (Compton and Pollak 2007; Costa and Kahn 2000; Peri 2002; Sander 2006), in recent years, the proportion of college graduates in cities such as Philadelphia, St. Louis, Pittsburg, and Baltimore, relative to that of their home states, has dramatically increased (Mallach 2014).

Moreover, the influx of millennials to urban areas has coincided with increased emphasis on sustainability and environmental issues at IHEs where college-educated millennials are spending significant time before starting their adult lives. Over the past 20 years, IHEs have invested millions of dollars in sustainability initiatives aimed at operations, teaching, and research (Clarke 2006; Sharp 2009; van Weenen 2000). During this time, it has been argued that the potential of IHEs to contribute to sustainable societies stems especially from their educational mission (Davies et al. 2003; Orr 1991; University Leaders for a Sustainable Future 1990). The question of whether IHE sustainability initiatives are impacting students has motivated two groups of studies. One stream of research has examined the effectiveness of different curricula and pedagogical techniques in classroom settings (Barth et al. 2007; Carew and Mitchell 2002; Habron 2012; McMillan, Wright, and Beazley 2004; Zsóka et al. 2013). A second stream has focused on the impacts of programs meant to change student attitudes and on-campus behaviors regarding such things as recycling and energy and water conservation (Dickerson et al. 1992; Hansen, Bucki, and Lee 2011; Marans and Edelstein 2010; Pike et al. 2003; Press, Caires, and Patton 2010). Studies in both groups suggest that students are graduating with deeper knowledge of basic principles of ecology and sustainability, as well as adopting, at least while obtaining their degree, environmentally responsible consumption practices (Earl and Lawrence 2003; Emanuel and Adams 2011; Kagawa 2007).

The topic of this paper lies at the intersection of these three developments: increasing emphasis on household consumption in how cities' sustainability is evaluated, the influx of millennials to American cities, and greater emphasis on sustainability at IHEs. It has frequently been assumed that millennials' preference for compact urban areas and public transportation will be a net plus for the environment (e.g., Shelby, Tregoning, and Ways 2014). As the broader literature points

out, however, urban form is only part of the picture for sustainable cities. Just as important is the city's relationship to its hinterlands as indicated by how resources like energy, food, and water are produced and "metabolized" (Newman 1999) and how waste by-products are managed. Millennials have been broadly described as drawn to products that claim to have beneficial social or environmental impacts (Neilson 2014). Yet, no research has sought to systematically compare millennials' practices related to different forms of sustainable consumption with those related to urban form and transportation systems.

With the importance to sustainable cities of millennials' consumption practices in mind, the findings of research on IHE sustainability initiatives might be taken as encouraging. It is possible, however, that existing studies paint an overly optimistic picture of the impact of IHE sustainability initiatives on consumption-related attitudes and behaviors. Colleges and universities, particularly 4-year institutions, represent an unusual social context—colloquially referred to as the "campus bubble." For several years, students have a high degree of personal freedom, a built-in community of like-minded individuals, robust institutional support for ideas, and—in many cases—few outside responsibilities. On the other hand, the phrase "the real world" is often employed to describe life post-graduation: when the focus on self-cultivation and exploring new ideas gives way to the need to find a job, make money, and perhaps start a family. Recent studies on IHEs and sustainability largely use surveys to take a snapshot of students at one point in time during their education. But habits observed in the campus bubble will not necessarily stick with students when their surroundings and responsibilities shift to those more characteristic of the "real world."

In the rest of this paper, we address two questions motivated by the need to better understand how IHE sustainability initiatives, through their role in shaping millennials' consumption practices, might impact the efforts of cities to become more sustainable. First, what is the nature of the commitment of millennials to different forms of sustainable consumption, relative to their preference for compact urban forms and public transportation? Second, are IHEs succeeding in their efforts to encourage millennial students to adopt sustainable consumption practices not just while on campus but also, for many, as they move to urban areas to begin their adult lives?

Data and methods

Data sources

The research questions for this study required data that could illuminate the attitudes, behaviors, and future plans of millennials related, first, to transportation and particular urban forms and, second, to the personal consumption of energy, water, food, and material goods. In addition, it was necessary to use data that could simultaneously speak to the role of IHEs in shaping these attitudes, behaviors, and plans.

We elected to use a relatively new and, in terms of the range of aspects of sustainability examined, unusually comprehensive pair of datasets that recently emerged from the Sustainability Cultural Indicators Program (SCIP) of the Graham Sustainability Institute at the University of Michigan (U-M). Launched in 2011, SCIP is a multi-year effort to understand how IHE sustainability initiatives shape the knowledge, dispositions, and behaviors of people embedded in campus life. The centerpiece of SCIP is a longitudinal survey of students, faculty, and staff at U-M, the first wave of which took place in October 2012. Prior to the first survey wave, focus groups were conducted with students and staff in order to facilitate a baseline understanding of campus culture around issues of sustainability and the environment and ultimately to inform the design of the main survey instrument.[1]

U-M was an ideal source of data for this study, for two reasons. First, sustainability initiatives are an increasingly prominent part of the undergraduate experience. Recent examples have included ongoing physical improvements, new academic programs, the creation of university-wide guiding principles and actionable goals on energy, food, and waste, and multi-platform communication about these and other efforts. U-M's "Planet Blue" brand covers everything from recycling bins to light switch stickers and is recognized by 80 % of students. Second, large majorities of recent U-M graduating classes have indeed moved to major urban areas to begin their adult lives (Woodhouse 2013). Thus, U-M embodies key trends discussed above: undergraduates encounter sustainability initiatives while in college and generally prefer an urban lifestyle after graduation.

In addressing the research questions for this study, we drew on data from both the 2012 wave of the SCIP survey and the 2012 focus groups. The survey data afforded systematic analyses of the characteristics of a representative sample of the campus population. The focus group data both lent narrative depth to the survey results and provided a qualitative window onto how IHE sustainability initiatives influence—or why they fail to influence—students in particular ways. As our questions concerned the possible environmental impacts of millennials' migration to cities, we confined our analyses to survey and focus group data on U-M undergraduates born on or after January 1, 1982 (hereafter referred to as "students").

The SCIP survey was designed to produce data on multiple, overlapping aspects of sustainable societies. The survey consisted of six substantive modules: transportation and travel, conservation and waste prevention, food, climate change,

[1] All research discussed in this paper was approved by the U-M Institutional Review Board.

opinions about sustainability in general, and awareness and evaluation of sustainability at U-M. Demographic questions were asked at the beginning and end of the survey. A sample of potential student respondents was randomly selected by the Office of the Registrar to receive email invitations that contained a link to the survey online. Approximately 40 % of potential respondents who received an invitation completed the survey, leading to a sample size of 3,578 undergraduates. Sample weights were created for gender and class year so that statistics reported from survey data would accurately reflect the student population at U-M (Table 1).[2]

Focus groups were conducted using a discussion guide centered on three questions:

1. What does the word "sustainability" mean to you, and what experiences prior to U-M helped to shape your ideas?
2. How has being a student at U-M affected your views on the environment and sustainability?
3. Do your views about sustainability affect choices that you make, or plan to make, in your life both on and off campus?

Each of these topics received 20–30 min of discussion time during each 60–90-min focus group session. Nine focus groups with undergraduates were conducted: two with students from each class (freshmen, sophomores, juniors, seniors) and one with student athletes of all years. Most focus group participants were recruited through an email sent to a random sample of students; student athletes were recruited through snowball sampling. Of the 3,750 students who received a recruitment email, 231 proceeded to take an online screening survey; 87 agreed to participate in a focus group; and 55 actually attended a session. Though the sample of students who participated in the focus groups was small (63, including student athletes), it was diverse with respect to concern for the environmental issues, sex, and academic focus (Table 2).

Survey variables

In order to gain a multi-dimensional perspective on student attitudes, behaviors, and future plans regarding both urban form and transportation systems and different kinds of personal consumption, we analyzed data from five groups of survey items. Specifically, we used survey items that measured:

1. Current student behaviors related to transportation, conservation, and food
2. Student concern for the environmental impacts of practices related to transportation, conservation, and food
3. Whether students expected that practices related to transportation, conservation, and food would be future lifestyle priorities
4. Student attitudes regarding the importance of adopting practices related to transportation, conservation, and food, even if these practices were inconvenient or costly
5. How often students encouraged friends to adopt practices related to transportation, conservation, and food

These items were constructed to use mainly parallel wording across different survey modules, with the only difference being the aspect of sustainability that was the specific focus of the question.

The survey module on food contained two kinds of questions. Some questions asked about specific kinds of

Table 1 Survey descriptive statistics

	Frequency	Percent
Age (*N*=3,538)		
25 or younger	3,488	99.6
Between 26 and 30	24	0.7
Between 31 and 35	8	0.2
Greater than 35	18	0.5
Sex (*N*=3,557)		
Female	1,977	55.6
Male	1,546	43.5
Transgender	4	0.1
Choose not to respond	30	0.8
Current residence (*N*=3,578)		
U-M residence hall	1,486	41.5
U-M community apartments	216	6.0
Off-campus apartment or house	1,710	47.8
Parents' house	80	2.2
Other	86	2.4
Class year according to registrar (*N*=3,578)		
Freshman	916	25.6
Sophomore	903	25.2
Junior	906	25.3
Senior	853	23.8
Area of academic interest (*N*=2,219)		
Humanities	291	13.1
Natural sciences	629	28.4
Social sciences	691	31.4
Other	75	3.9
Undecided/NA	533	24.0
Do you have a car at your current residence? (*N*=3,557)		
Yes	1,131	31.8
No	2,426	68.2

[2] A full description of survey methodology is available on the SCIP website: http://graham.umich.edu/leadership/scip

Table 2 Focus group descriptive statistics

	Frequency	Percent
Sex (*N*=63)		
Female	42	66.7
Male	21	33.3
Focus group class year (*N*=63)		
Freshman	16	25.4
Sophomore	15	23.8
Junior	11	17.5
Senior	13	20.6
Athletes (all years)	8	12.7
Area of academic interest (*N*=63)		
Humanities	14	22.2
Natural sciences	15	23.8
Social sciences	19	30.2
Other	11	17.5
Undecided/NA	4	6.3
How concerned are you about the environment? (*N*=55)		
Not at all concerned	0	0.0
A little concerned	6	9.5
Somewhat concerned	23	36.5
Very concerned	24	38.1
Extremely concerned	2	3.2

food, such organic or locally sourced. Other questions asked about "sustainable food" in general. Questions in the second category, when viewed by survey respondents, were accompanied by the following note: "'*Sustainable food*' can be defined as one or more of the following: locally-sourced, organic, from humanely-treated animals, antibiotic- and hormone-free, grass-fed, from sustainable fisheries, or fair trade food."[3]

We also examined whether time spent at U-M is associated with greater concern about and commitment to sustainability. We used the Office of the Registrar's data on class standing (freshmen, sophomores, juniors, or seniors) which is based on credit hours achieved.

Qualitative data

All focus groups were recorded and coded using HyperResearch. Coding of subjects included self-reported participant characteristics such as gender and class year. The "Report" function of HyperResearch was used both to generate quantitative counts of how often specific attitudes and practices were discussed and to organize participant statements along thematic lines.

[3] This definition of "sustainable food" was adopted from U-M procurement guidelines.

Discussion of findings

Millennials and sustainable consumption

We report the results of our analyses of survey data first as one-way tabulations of response frequencies. All results were generated using the appropriate sample weight.

Overall, survey results echoed a major conclusion of previous studies: urban form and transportation matter a great deal to how millennials envision their future life. Among U-M students, however, a sizeable majority of whom "walk, bike, or take the bus" to and from daily activities (Table 3), preferences in this area appear to have less to do with concern about the environment than the desire for a certain lifestyle. Only 20.6 % of students were "very concerned" about the impact of people's transportation choices on the environment (Table 4). But over half said they were "very likely" to make access to transportation options associated with compact, densely populated cities a priority in their future lives (Table 5). The high priority accorded an urban lifestyle suggests that student attitudes regarding the importance of convenience to public transportation use (Table 6) ought to be interpreted in a particular way. Specifically, U-M undergraduates, like many millennials, simply want to live places where public transportation, biking, and walking are in fact convenient parts of everyday life.

Student support was also generally high for what are popularly known as the "three Rs" of sustainable consumption: reduce, reuse, and recycle. But there were important differences among these three kinds of behaviors, with reducing consumption attracting less support than recycling and reusing material things. For instance, 40.7 % of students were "very concerned" about "people producing too much waste," and 45.8 % viewed themselves as "very likely" to make "reducing waste, reusing things, and recycling" a future priority. But only 19.2 % "strongly agreed" that people should "buy fewer things" if doing so were less convenient, compared with 42.9 % for "recycle" and 25.7 % for "reuse things." Similarly, large majorities reported "sometimes" or "frequently" encouraging friends, when the opportunity arose over the past year, to conserve water and electricity and to "reuse or recycle containers and bags" (Table 7). But 60.6 % students "never" or "rarely" encouraged friends to "buy fewer things."

Student attitudes and future plans were least supportive, and current behaviors were most infrequent, in the area of personal consumption of sustainable food. A majority of students—69.2 %—were "somewhat" or "very concerned" about "whether food is grown or produced in a way that is good for the environment." But less than a fifth of students who shopped for and cooked their own food bought food that was locally sourced, organic, or fair trade "always or most of the time" (Table 3). Moreover, 58.7 % of students did not agree that people should buy sustainable food, if doing so were less convenient or more costly, and 62.9 % "rarely" or

Table 3 What are the current behaviors of students?

	During the past year, how often did you do [specified behavior]?					
	Walk, bike, or take the bus for shopping, recreation, visiting friends, etc. (n=3,495)	Recycle bottles, containers, and paper products (n=3,516)	Recycle electronic waste (i.e., computers, cell phones) (n=2,708)	Buy locally grown or processed food (n=1,580)[a]	Buy organic food (n=1,688)[a]	Buy fair trade food (n=1,218)[a]
Never	4.0 %	1.4 %	33.8 %	6.3 %	8.5 %	17.3 %
Rarely	7.1 %	4.8 %	29.5 %	22.2 %	24.0 %	31.3 %
Sometimes	32.8 %	25.9 %	21.0 %	57.9 %	50.0 %	41.6 %
Always/most of the time	56.1 %	68.4 %	15.7 %	13.6 %	17.6 %	9.8 %

[a] Respondents who ate most of their meals in a campus dining facility did not receive the survey items about buying food

Table 4 How concerned are students about different aspects of sustainability?

	How concerned are you about [specified phenomenon]?		
	The impact that people's travel—by car and plane—has on the environment (n=3,540)	People producing too much waste (n=3,538)	Whether food is grown and produced in a way that is good for the environment (n=3,533)
Not at all concerned	4.9 %	2.8 %	5.4 %
Not that concerned	21.5 %	12.0 %	25.5 %
Somewhat concerned	53.1 %	44.5 %	48.2 %
Very concerned	20.6 %	40.7 %	21.0 %

Table 5 Which aspects of sustainability will be future priorities?

	Think about what you would like your life to be in the future. How likely is it that [specified behavior] will be a priority for you, at some point in the future?		
	Being able to walk, bike, or take the bus from where you live (n=3,548)	Conserving natural resources by reducing waste, reusing things, and recycling (n=3,540)	Buying sustainable food (n=3,542)
Not at all likely	2.3 %	2.6 %	6.0 %
Not very likely	11.0 %	10.2 %	23.0 %
Somewhat likely	33.4 %	41.4 %	41.3 %
Very likely	53.3 %	45.8 %	29.8 %

Table 6 When do students think that inconvenience is a valid reason not to act?

	To what extent do you agree or disagree with the following statements? In general, people should [specified behavior] even if it is less convenient.[a]						
	Take public transportation, like buses or trains (*n*=3,551)	Walk or bike to places (*n*=3.547)	Conserve water and electricity (*n*=3,549)	Recycle (*n*=3,545)	Reuse things (*n*=3,532)	Buy fewer things (*n*=3,537)	Buy sustainable food (*n*=3,548)
Strongly disagree	3.1 %	2.2 %	1.1 %	.8 %	.7 %	1.8 %	2.7 %
Disagree	19.5 %	16.3 %	3.7 %	1.6 %	3.9 %	11.3 %	13.3 %
Neither agree nor disagree	35.6 %	30.6 %	13.1 %	6.8 %	15.9 %	29.4 %	42.7 %
Agree	34.9 %	38.9 %	58.0 %	48.0 %	53.8 %	38.4 %	33.7 %
Strongly agree	7.0 %	12.0 %	24.2 %	42.9 %	25.7 %	19.2 %	7.6 %

[a] The item on buying sustainable food reads: "even if it is less convenient or more costly."

"never" encouraged friends to buy sustainable food. Finally, the proportion of students who professed to be "very likely" to make buying sustainable food a future priority was the smallest for any aspect of sustainability examined, at 29.8 %.

Qualitative data from the focus groups largely supported the survey results. In talking about what it means to live sustainably in the context of their current and future lives, students overwhelmingly focused on two kinds of behavior: (1) recycling and reusing paper, containers, and other material goods and (2) reducing personal use of energy and water (Table 8).[4] Indeed, notions of sustainability that involved recycling, reusing, and energy and water conservation appeared in every or nearly every focus group. As one student said:

> **Jake (F)[5]:** I'd say here at U of M it's, like, a lot easier to be sustainable because there's always recycling bins everywhere, and different places you can, you know, make decisions to recycle or do something such as that. Because where I'm from—I'm from a small town and so we didn't have recycling … But in our rooms and the dorms it makes it easy to try and do things like that.

Opportunities to recycle and reduce waste were especially memorable when it was possible for students to know exactly how much their efforts were benefiting the environment. Water bottle refilling stations and dorm-based conservation competitions came up in nearly every focus group. Discussions of future plans followed a similar trajectory, with themes of recycling and reusing goods continuing to dominate conversation.

> **Moderator:** So, thinking about your lives moving forward, how you want to raise your families, what kinds of lives you want to lead: Are there any areas where you think you would like to take sustainability into account?
> **Luke (A):** Living in the big city um, like the per capita environmental footprint is much less for those who live in the big cities… So no cars, only using public transportation.
> **Jessica:** I'll continue to recycle, I think, because we do that [at my parents' house]. Like when I like own my own place and all that, like I'll definitely keep using it. Yeah, I mean it's just so simple to, you know, turn the light off and recycle. So I'll obviously keep using it and promote it to my family.
> **Pam:** Yeah. At some point in my life I'm going to be an elementary school teacher, so I think having like a recycling bin in a room is a pretty easy fix, and hopefully it'll kind of keep me accountable for recycling. I mean, teaching the kids to do it.

Statements like Jake's, and exchanges that like that between Jessica and Pam, happened repeatedly in nearly every focus group. Time and time again, students conceptualized acting sustainably in terms of recycling and reusing material things and minimizing one's personal use of energy and water and were quick to credit the university for facilitating a lifestyle not previously available to them.

In contrast, students rarely discussed aspects of sustainability beyond energy and water conservation and, with respect to

[4] Measuring whether different conceptions of sustainability emerged at all during each focus group session was deemed the most useful quantitative representation of the qualitative data. Alternative statistics, such as how often different conceptions were mentioned, were potentially misleading, as unusually talkative individual participants can quickly "run up the count" of how often their preferred conception is mentioned during a single session.

[5] Parenthetical letters next to the first student speaker in each passage denote the student year for the focus group: F = freshmen; So = sophomores; J = juniors; Se = seniors; and A = athletes (all years).

Table 7 How often did students encourage friends to act sustainably?

	During the past year, how often have you encouraged your friends to [specified behavior]?					
	Walk, bike, or take the bus rather than drive (*n*=3,429)	Conserve water (*n*=3,452)	Conserve electricity (*n*=3,464)	Reuse or recycle containers or bags (*n*=3,459)	Buy fewer things (*n*=3,419)	Buy locally sourced or sustainable food (*n*=3,369)
Never	22.8 %	20.2 %	13.9 %	17.0 %	32.9 %	39.4 %
Rarely	17.5 %	18.2 %	13.6 %	14.3 %	27.7 %	23.5 %
Sometimes	35.0 %	35.3 %	34.9 %	31.5 %	26.4 %	25.5 %
Frequently	24.8 %	26.3 %	37.6 %	37.2 %	13.1 %	11.6 %

material goods, the second two—reuse and recycle—of the "three Rs." In particular, the idea of taking into account the environmental and social impacts of how food is grown and produced, as opposed to how food waste is managed, was brought up in fewer than half of the focus groups (Table 8). When comments on sustainable food did crop up, they stayed isolated to the student that first raised them and did not spark dialogue in the group in the way that discussions of recycling bins, double-sided printing, and waste in dining halls were able to do.

> **Moderator:** So now I'm going to open it to you. Are there any questions that we should have asked or talked about?
> **Larissa (So):** Um, maybe mentioning other forms of sustainability besides recycling. Because I know, like, it's a big thing here, but um, one thing that we talked about a few times was food waste, so maybe talking more about indirect food waste. Because yes you ate a hamburger, but what all, what did all the process go into that? So maybe um, making people more, ah, making them think more about things besides recycling.
> **Amber:** Um, I don't know if it's because we just don't know about a lot of the efforts on campus, but finding out what students, what like sustainability efforts students know about on campus, and then, like, telling them about some of the big ones that we don't know about … Like, I at least learned that some battery recycling is available in some of the dorms.

Larissa had not brought up the issue of food origins before, but at the close of the session, she wished there had been more talk about this and other issues "besides recycling." Amber, however, immediately steered the conversation back to opportunities to recycle things on campus, such as batteries. In a different group, the concept of sustainable food received an early exposition but was then dropped when it failed to catch on:

> **Dylan (J):** When I first think of sustainability I think of actually food [laughter] because I took a class called "Food, Energy and the Environment" and that's what stuck with me the most, 'cause that's, you know what I'm most directly involved with. You know, I don't, I can't see the pollution and things like that. However, yeah, I just think a lot about how we raise our food such as you know like the big cattle farms and all that type of stuff versus like an organic pasture. So I mean, I guess, "flow through sustainability": grass is eaten and then fertilizes the soil and all that stuff.
> **Moderator:** Gotcha. So can we come up with possibly a group definition of sustainability? We can have more

Table 8 Sessions in which conceptions of sustainability were mentioned

Conception of sustainability	Number and percent of sessions (out of 9) in which conception was discussed
Conservation of open space, farmland, and wilderness	2 (22 %)
Food produced in a way that is good for the environment	4 (44 %)
Recycling and reusing material things	9 (100 %)
Conserving energy and water	8 (88 %)
Promoting social justice through an equitable distribution of resources	3 (33 %)
Using public transportation, biking, and walking	2 (22 %)

than one definition or we can come to a consensus, however you guys want to do it. But um… [over talking].
Abby: Recycle or reuse.
Kimberly: Reduce, reuse, recycle.
Anthony: Reduce, reuse, there you go. [laughs]
Dylan: I like that, that's good.

Immediately following Dylan's attempt to broaden the group's discussion of sustainability to include the environmental dimensions of different food systems, three other students boiled sustainability down to "reduce, reuse, recycle." Faced with this compact and familiar definition of a complex idea, Dylan acquiesced.

Many other areas where principles of sustainability might be applied were not discussed or were touched on only briefly. For instance, open space and wilderness preservation received only two mentions, and while one elicited a brief recollection related to sustainable farming, the topic was quickly dropped.

Moderator: Any other experiences anyone wants to share?
Mary (F): Mine's not directly related to sustainability—
Moderator: That's okay.
Mary: But when I was in middle school, we lived in rural Ohio and across the street from my house was a big, like, hundred acre soybean farm, and they were selling it and it was gonna get turned into a development and that made me really sad, that the land was not gonna be how it used to be—like, openness … and I've hated that neighborhood since then. But that's just me, so.
Olivia: That reminds me of this sustainability thing—it's like when you have crops that rotate because then you're not wearing out the soil, like your low compost thing and stuff. And also, like, electric cars and that whole movement thing. But I don't really have any personal examples to share.

Mary felt the need to preface her mention of a jarring subdivision near her house as "not directly related to sustainability," and although Olivia piggybacked on Mary's memory to comment on crop rotation, it was not something that she felt she could speak on with any confidence. After touching on how crops are grown, Olivia quickly transitioned back to the safer territory of "electric cars." This exchange is again indicative of how moments to expand the discussion of sustainability beyond recycling and energy and water conservation, and in particular to incorporate food-related practices, generally proceeded: a hesitant mention that did not resonate with the larger group.

Are colleges and universities influencing millennials?

What effects, if any, is the U-M experience having on student sustainability-related attitudes, behaviors, and future plans? In order to address the second research question, we used survey data to test a simple hypothesis: that the more time students spend at U-M, the more concerned they become about sustainability and committed to expressing this concern through personal consumption practices. Thus, we now report the results of simple bivariate regression[6] of the above survey items on student class year (i.e., freshman through senior) (Table 9).

In no case did class year have a positive and significant effect on a dependent variable; in fact, the only significant effects were negative. In other words, there is no evidence that, as students move through U-M, they become more concerned about various aspects of sustainability or more committed to acting in environmentally responsible ways, either in the present moment or in their adult lives.

Qualitative analyses of focus group data supported the quantitative findings, by suggesting that relatively high rates of student participation in campus sustainability initiatives may be due to how convenient the university had made it to "be green" and not to increasing levels of concern that might carry over into post-college life. As illustrated so far, students expressed near-universal appreciation for U-M recycling, conservation, and transportation programs and often spoke about how these programs had led them to adopt better habits on campus, compared to life at home with their parents. This enthusiasm for sustainability initiatives, however, had a flip side. Many focus group participants appeared to expect that opportunities to adopt environmentally responsible practices should be highly convenient and that, absent such convenience, people could not be expected to go out of their way.

Stephanie: Okay, seeing how easy it is to recycle, like, if I'm walking somewhere and if I have something to throw away or it should be recycled, but there's not a recycling bin there, I'm not gonna just, like, hold onto it for however far I have to walk. Like, I'll throw it away, but I'll feel guilty about it. And so, like, I don't know, I have that kind of haunting me—like I know what's right and what's wrong when it comes to that [laughs].
Moderator: What do you mean by "guilty"?
Stephanie: I don't know. If I throw, like, a flyer in the Diag [the center of campus] that I get, if I throw it in the garbage can, I'm like, well, I could've held onto it and threw it away once I found a recycling bin. It's just, again, convenience.
Haley: So maybe if they have, like, more recycling sort of things outside, especially in heavily traveled areas like the Diag…

[6] Other tests of the relationship between two variables, such as Pearson's correlation, would not have supported the use of sample weights.

Table 9 Effect of class year on sustainability-related attitudes, behaviors, and plans

Survey item (dependent variable)		Effect of class year (independent variable)		
		Bivariate regression coefficient	Standard error	*N*
During the past year, how often did you do [specified behavior]?	Walk, bike, or take the bus for shopping, recreation, visiting friends, etc.	−0.0064	0.0125	3,496
	Recycle bottles, containers, and paper products	−0.0056	0.0099	3,517
	Recycle electronic waste (i.e., computers, cell phones)	0.0228	0.0186	2,709
	Buy locally grown or processed food	−0.0236	0.0223	1,581
	Buy organic food	−0.008	0.0246	1,689
	Buy fair trade food	0.0189	0.0312	1,219
How concerned are you about [specified phenomenon]?	The impact that people's travel—by car and plane—has on the environment	−0.008	0.012	3,541
	People producing too much waste	0.0006	0.012	3,539
	Whether food is grown and produced in a way that is good for the environment	0.0151	0.0125	3,534
How likely is it that [specified behavior] will be a priority for you, at some point in the future?	Being able to walk, bike, or take the bus from where you live	0.021*	0.0117	3,549
	Conserving natural resources by reducing waste, reusing things, and recycling	−0.0034	0.0118	3,541
	Buying sustainable food	0.0051	0.0133	3,543
To what extent do you agree or disagree with the following statements? In general, people should [specified behavior] even if it is less convenient.	Take public transportation, like buses or trains	−0.0012	0.0146	3,552
	Walk or bike to places	0.0079	0.0149	3,548
	Conserve water and electricity	−0.0201	0.0124	3,550
	Recycle	−0.0098	0.0114	3,546
	Reuse things	−0.0176	0.0122	3,533
	Buy fewer things	0.0201	0.0149	3,538
	Buy sustainable food	−0.023*	0.0136	3,548
During the past year, how often have you encouraged your friends to [specified behavior]?	Walk, bike, or take the bus rather than drive	−0.02	0.0169	3,430
	Conserve water	−0.0341**	0.0166	3,453
	Conserve electricity	0.0235	0.0161	3,465
	Reuse or recycle containers or bags	−0.0357**	0.017	3,460
	Buy fewer things	−0.0443***	0.016	3,420
	Buy locally sourced or sustainable food	−0.0113	0.0163	3,370

*$p<0.1$; **$p<0.05$; ***$p<0.01$

> **Stephanie:** I mean I know they do, like, most of the time in places that are populated, if there's a garbage can there's also a recycling bin. But that's not the case everywhere.
> **Shawn:** I agree, that the outdoor areas don't seem to have as many recycling bins … Like, going down the Diag, maybe there are. But in other places, almost never.
> **(male):** Yeah.
> **Stephanie:** Maybe eventually it'll transition into where, like, no matter what, wherever there's a garbage can there is also a recycling bin … But we're not at that point yet, so I don't know if there's something they could do.

Stephanie's frank comments were echoed by other people: throwing away things that could be recycled feels wrong, but students cannot be expected to keep waste paper and containers with them. Rather, the solution is for the university to ensure that there are recycling bins wherever there are trash bins, including outside. It is notable that no one in Stephanie's group pushed back, even slightly, against her readily acknowledged complacency, which Stephanie herself found humorous. Similar exchanges occurred in other groups:

> **Brooke:** Yeah, I, it's not that I'm not environmentally friendly. I mean it's always interested me … and I went on Alternative Spring Break, and I took a week and we planted trees and so yeah, you can give back that way. But I, it's hard for me to find in my daily life things that I'm consciously being, like, oh the environment, I'll do this. So, um things that are already systematically in place, sure I'll participate in, but like, you know what I mean?
> **Helen:** When they expanded the number of recycling bins, I recycle more [people laugh].
> **Brooke:** Right. Exactly.

> **Helen:** You know 'cause it's right there and when you had to spend 20 min and look in every closet in the damn building, I was less likely to do it. I wasn't really thinking about, like, gotta go find a recycling bin, but I don't have time to spend 20 min every time I want to toss a bottle or a piece of paper. But at the same time there's, like, turning out the lights, which doesn't like take any additional time, and stuff like that.

Talk about the importance of convenience often seemed to be a kind of self-fulfilling prophecy. Many students bemoaned America's culture of consumerism, ease, and disregard for the environment while simultaneously—and truthfully—acknowledging their acquiescence and participation in this culture. For these students, the contradiction was apparent, but the solution was hard to see.

> **Amber:** [At our sorority house] we don't cook our own food because we have chefs, so we don't have a choice over, like, what foods are purchased, even in our pantry. Like, our snacks in our pantry are purchased for us, so we don't have any say over—we can't, we haven't tried to tell them, like, "Oh could you please buy local sort of things" because we buy in bulk for our house. And then because, I guess, recycling's outside of our room. Like when I lived in the dorm last year, we had a recycle bin in our room, so that may or may not have influenced my roommate…
> **Moderator:** So what are some reasons why sustainability isn't something you generally take into account?
> **Amber:** Because we're in a consumer society. Um, we, just America in general is very into convenience for themselves and a lot of Americans are, um, either unaware or just don't really care about other nations' situations where they don't have, like, the freedom of choice we do … A lot of Americans take convenience over what may be better for future generations or for the world.

Talking about her sorority, Amber shifted somewhat awkwardly between saying "we don't have any say over" what food is bought in bulk to saying that she and her housemates haven't made an effort to change their food-buying practices. When pressed on this by the moderator, she brought up the fact that Americans in general—and by extension, herself—are just "very into convenience."

By showcasing students' ruminations on convenience and their frequent reluctance to make sustainability a priority in their lives, we do not mean to suggest that things should be *inconvenient* for students or that U-M students are insincere in their concern for the environment. As Brooke noted, student life is complex, and being environmentally responsible can easily get crowded out. But students' discussions of convenience arguably reveal something important: that we cannot expect the "culture of sustainability" at U-M, to the extent that one exists, to easily be perpetuated after students have graduated, when the lives of people like Brooke will only be getting more complicated.

Conclusion

In their early publications establishing the concept of an "ecological footprint," Rees (1992) and Rees and Wackernagel (1996) note that the demographic phenomenon of urban expansion in the 1800s can also be seen as a profound ecological transformation. As urban populations and economic output expanded geometrically, cities placed increasing stress on their environmental "hinterlands." The contemporary migration of millennials to urban areas and their eagerness for vibrant neighborhoods and transportation options will also have consequences for the environment, as cities expand to accommodate new residents and develop in response to their preferences. In order to begin to understand what these consequences might be, our research has been motivated by the idea that the personal consumption of city residents may matter as much if not more than whether a given urban area is compact or sprawling and whether people travel mainly by car, light rail, or on foot.

We find, first, that millennials currently enrolled at a major public university, while broadly supportive of public transportation, recycling, and conserving energy and water, are much less interested in incorporating environmental concerns into decisions about food and in actively *reducing* their consumption of material things. Second, despite the sizable investments of U-M in sustainability initiatives and environmental programs, there is little evidence that undergraduate students are becoming more committed to sustainability as a result of their time on campus. In fact, student willingness to recycle and conserve natural resources may be highly dependent on the institutional conveniences of campus life, and it was not clear that students would continue such practices once these conveniences had disappeared.

If the city of the next half century is shaped in part by millennials like those examined in this study, then our research strongly suggests that resurgent urban areas, even if more compact, will continue to spur global hinterlands to grow food and manufacture material things in ways that harm the environment and fail to redress social injustices. We would therefore conclude by asking: what should be the role of higher education in helping to build sustainable cities? Leith Sharp, founding director of the Green Campus Initiative at Harvard University, recently called for a "third wave" of the campus sustainability movement that would use a "systems-thinking perspective" to achieve "significant reductions" in how IHEs *directly* impact the environment through their own use of natural resources (2009). Our finding that student tenure at U-M is not associated with increased commitment to

sustainability, while sobering, can also be interpreted as a call to action. Specifically, we would argue that Sharp's third wave should include renewed attention to the *indirect* environmental impacts of IHEs, in terms of their role in shaping the character and norms of students whose college years are a rite of passage leading to adulthood. In particular, students would benefit greatly from opportunities to learn about and encounter sustainable food and alternative food systems, both inside and outside the classroom. As at U-M, institutional goals for buying local, organic, and humanely produced foods are increasingly widespread at IHEs. These efforts should be maximally visible to students and woven into the campus dining experience, so that they become vehicles for education as well as ways to reduce the ecological footprint of the organization itself. Moreover, everpresent campus recycling bins, while crucial, should not be allowed to convince students that the most important personal consumption question to consider is what happens to something after you throw it away. If millennials were as committed to sustainable food and "downshifting" or "voluntary simplicity" as they appear to be to finding alternatives to the suburban lifestyle of their parents' generation, the implications for cities could be profound.

Finally, it is not enough for IHEs to construct a "campus bubble" where environmentally responsible behaviors are fun and relatively easy. In the long run, the campus bubble effect may even create a counterproductive association between sustainable consumption and convenience. In their capacity as centers of pedagogy, IHEs must find ways to awaken students to the importance of adopting such behaviors even—and perhaps especially—when the institutional and social context is not supportive and may even present significant obstacles to sustainability as a lifestyle priority.

The conclusions of this paper, if provocative, must be considered provisional until tested in future research. Most importantly, the sampling frame for the SCIP survey ought to be expanded beyond undergraduates at a single, relatively elite public university, in order to determine whether the findings for U-M undergraduates broadly hold for millennials in general. The SCIP survey instrument is publicly available and was designed to be adopted for student bodies at other IHEs. Replication of the survey would illuminate how examined phenomena vary by university size and student body socioeconomic composition, as well as by the type of sustainability initiatives to which students are exposed. Current findings of the survey and focus groups in the U-M context will also be tested and expanded when data from later waves of the SCIP survey become available.

Sustainability and environmental responsibility have become central to campus life at many colleges and universities—so much so that it is easy to lose track of what, we believe, must be a central question for IHEs. Namely, how will sustainability initiatives affect students once they leave the "campus bubble"? This question takes on added significance, given that college is often the last stop before adulthood for a generation that is vital to the future of US cities. Strengthening IHE sustainability initiatives in sustainable food and consuming *less* would particularly further the cause of sustainable cities—and help Sharp's "third wave" to reach far outside the campus bubble.

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