Links Between Sustainability-related Awareness and Behavior: The Moderating Role of Engagement

By Gregory Cogut & Noah Webster, Ph.D

Abstract

Background: As universities work to increase pro-environmental behaviors on campus, such as waste prevention and use of sustainable transportation, understanding how engagement in sustainability-related activities can influence the relationship between awareness and pro-environmental behaviors is critical. To address this need this project examines two research questions: 1) Does awareness about sustainability result in an increase in sustainable behaviors? and 2) Is the link between awareness and behavior change conditioned by engagement in sustainability-related activities?

Methods: Using web-based survey data from 2012 and 2015 on student awareness, behaviors, and engagement, from the University of Michigan (UM) Sustainability Cultural Indicators Program, multiple regression analyses from a panel of undergraduate students who entered the University as freshmen in 2012 were conducted in SPSS.

Results: The association between waste prevention awareness and behavior was statistically significant (p<.01). Specifically, students reporting greater awareness of UM's efforts in waste prevention in 2015 were significantly more likely to report an increase in waste prevention behaviors from 2012 to 2015. In contrast, the association between awareness and sustainable transportation behavior was not significant. The findings also show that engagement does not condition the link between awareness and behavior for neither waste prevention nor sustainable transportation.

Conclusions: The results of this study show that awareness is linked to increases in sustainability-related behaviors. Prior literature highlights the significance of engagement in the adoption of sustainable human behaviors, however such findings were not supported by this study. Understanding how sustainable human behaviors are influenced by factors of awareness and engagement can help facilitate the allocation of resources aimed at increasing sustainability behaviors.

Background

Importance:
- By creating a university culture of sustainability, it is possible to encourage people to exhibit sustainable behaviors during and after college. [3]
- Understanding factors linked to increases in sustainable behaviors on campus, provides universities with the necessary information to strategically implement policy that will be most effective in doing so.

Factors Linked to Sustainability-Related Behavior Change:
- Sustainability awareness is broadly defined as understanding of the concept of sustainability and what is and is not sustainable in a given context.
- Engagement related to sustainability focuses on involvement in an activity that encompasses issues of sustainability, which may in turn influence an individual to exhibit sustainable behaviors.

Sustainability Awareness:
- Most students are not familiar with the concept of sustainability in a concrete sense. [2]
- One way to promote sustainability awareness is to provide individuals with information about new ideas and practices. [1]
- Failure to raise awareness makes it difficult for students to change their behaviors to be more sustainable. [1]
- Although knowledge is key to helping a community better understand sustainability, it alone has been found to have little impact on changing individuals' behaviors. [4]

Sustainability Engagement:
- Engagement opportunities allow students to interact with the knowledge gained through awareness in a tangible & active way. [4]
- By participating in sustainability related activities on campus individuals are able to evaluate the sustainability of their behaviors. [2]

Current Understanding:
- While it is believed that sustainability awareness and engagement both play a role in promoting sustainable behaviors, little research has been conducted on:
  - The moderating effect of engagement on the link between awareness and behavior.
  - How different types and levels of engagement may uniquely impact this process.
- By understanding how sustainable behaviors are influenced by the factors of awareness and engagement, it will be possible to determine how effective increasing awareness about sustainability is in changing behavior, and whether increasing engagement is a tangible way to further strengthen this link.

Methods

Data: This study's research questions were examined using web-based survey data on student awareness, behavior, and engagement collected as part of the University of Michigan's Sustainability Cultural Indicators Program (SCIP). Specifically, this study utilizes from a panel of undergraduate students who entered the university as freshmen in 2012 and graduated in 2015 (N=292).

Measures: Measures of sustainability awareness and behavior were divided into sections that represent specific aspects of sustainability. Based on the availability of data the two aspects chosen for this study are travel/transportation and waste prevention.

1) *Awareness*
- Travel and Transportation awareness was measured with four items, asking students about how much they know about the Ann Arbor bus system, U-M Busses, Biking, and Zipcar rental on a 4-point scale (1=not much/nothing; 4=a lot). Reponses were summed and converted to a 10-point (0-10) scale for comparability with other indices. Higher scores indicate a greater level of awareness.
- Waste Prevention awareness was measured similarly as travel/transportation, including five items asking students how much they know about recycling glass, plastic, paper, electrical waste, and property disposition on a 4-point scale (1=not much/nothing; 4=a lot).
- Coursework: 0= have not taken a course that addresses sustainability; 1= have taken a course.

2) *Behavior*
- Travel and Transportation Behavior was measured by an index reflecting the carbon impact of "Most often mode of travel to campus", for which walking/biking were given the highest scores and driving the lowest score. [7]
- Waste Prevention Behavior was measured by asking students "In the past year asking how often they" did activities such as printing double-sided on a 4-point scale (1=never; 4= always/most of the time). [7]

3) *Engagement Level*
- The measure of sustainability engagement is not area (e.g., travel, waste prevention) specific.
- A single measure was created and used in analyses 0= no engagement; 1= engagement in 1 or more of the following eight activities: RecycleMania, Kill-a-Watt, Planet Blue Ambassadors Program, A U-M organization dealing with sustainability, Earthfest, Zero Waste Events, e-Waste Recycling Event, and M Farmers Market.

Descriptive statistics for all study variables are presented in Table 1.
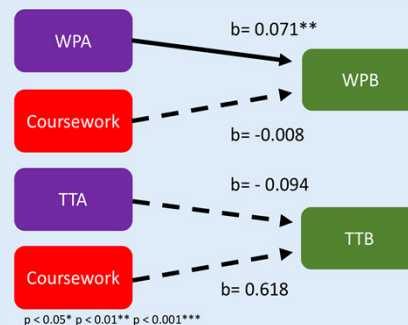
Analysis:
- To assess the first research question multiple linear regression analyses were conducted in SPSS predicting each of the two behaviors in 2015.
- The following independent variables were included in the analysis: (WPA, TTA, & Coursework)
- The following covariates were included in the models: corresponding behavior measured at 2012; gender (0=male; 1=female); degree program (engineering compared to LSA & Other compared to LSA) , engagement.
- To assess the second research question, a mean centered product term between awareness and engagement was created, which was then added into the model.

TABLE 1	%	Mean (SD)	Range
Gender			
Male	35		
Female	65		
Degree			
Engineering	26		
LSA	52		
Other	22		
Engagement Level (0-1)			
Some	27		
None	73		
Awareness			
Waste Prevention (WPA)		4.4 (2.3)	0.0-10.0
Travel Transportation (TTA)		4.6 (2.2)	0.0-10.0
Coursework (yes)	65		
Behavior (2012)			
Waste Prevention (WPB)		6.5 (1.4)	1.7-10.0
Travel Transportation (TTB)		4.0 (1.7)	0.0-9.2
Behavior (2015)			
Waste Prevention (WPB)		7.1 (1.0)	3.3-10.0
Travel Transportation (TTB)		8.1 (3.2)	0.0-10.0

Results

Research Question #1) Does awareness about sustainability result in an increase in sustainable behaviors?

WPA → WPB: b= 0.071**
Coursework → WPB: b= -0.008
TTA → TTB: b= - 0.094
Coursework → TTB: b= 0.618

p < 0.05* p < 0.01** p < 0.001***

Significant main effect: Those who reported more awareness about waste prevention (WPA) efforts on campus in 2015 reported a significant increase in sustainable waste prevention behaviors (WPB) over time from 2012 to 2015.

Non-significant findings: a) Awareness of sustainable travel and transportation options (TTA) was not associated with changes in travel/transportation behaviors (TTB) over time. b) Having taken a course that covered sustainability-related topics was not associated with either changes in WPB or TTB over time.
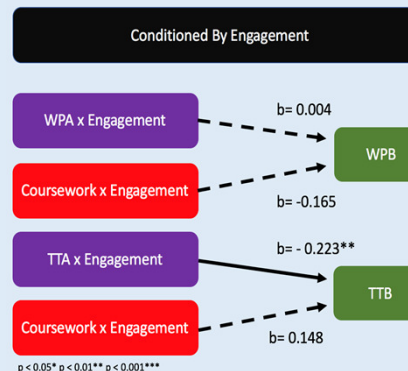
Key
WPA: Sustainable Waste Prevention Awareness
WPB: Sustainable Waste Prevention Behavior
TTA: Sustainable Travel/Transportation Awareness
TTB: Sustainable Travel/Transportation Behavior
Coursework: Having taken a course dealing with topics of sustainability

Research Question #2) Is the link between awareness and behavior change conditioned by engagement in sustainability-related activities?

Conditioned By Engagement

WPA x Engagement → WPB: b= 0.004
Coursework x Engagement → WPB: b= -0.165
TTA x Engagement → TTB: b= - 0.223**
Coursework x Engagement → TTB: b= 0.148

p < 0.05* p < 0.01** p < 0.001***

Significant interaction effect: The link between TTA and TTB was moderated by engagement level. To explore the interaction, the sample was divided into two groups, those who were engaged and those not engaged from 2012-2015. Among those who reported no engagement, greater TTA is associated with a slight (but non-significant) decline in TTB. In contrast among those who were engaged in one or more activities, TTA was associated with a slight (but non-significant) increase in TTB.

Non-significant findings: None of the engagement measures were found to moderate the association between WPA and WPB as well as the link between sustainability-related coursework and both TTB and WPB

Interaction Effect Between Travel Transportation Awareness & Engagement on Travel Transportation Behavior
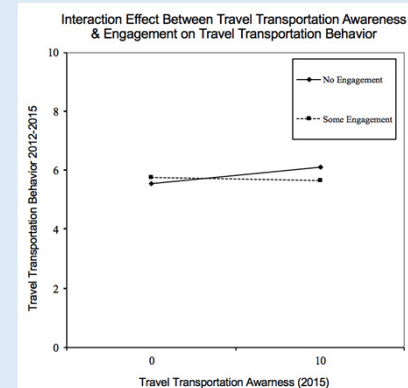
Conclusions

Research Question #1
- The way in which sustainability behaviors are influenced by awareness is dependent on the type of behavior.
- Allocating resources towards awareness will have a greater impact on waste prevention compared to travel/transportation behaviors.

Research Question #2
- While engagement is a viable conditioning factor of the link between awareness and behavior, its influence is dependent upon the relationship it is conditioning (e.g., only for TTA → TTB)

Discussion:
- While results for research question #2 show the conditioning effect of engagement on the link between TTA and TTB to be significant, further testing of the interaction indicates that among both those who were and were not engaged, TTA was not significantly related to TTB. However, the difference in the direction of the link between TTA and TTB by level of engagement suggests that this finding should be further explored in other SCIP populations and future studies.
- An interesting finding emerged between degree program and TTB. Students studying languages, sciences and the arts (LSA) reported more sustainable travel behaviors compared to students in the college of engineering (COE). The difference may be explained by the fact that COE students who live on central campus take the bus to North Campus for class, while most LSA students can walk to and from class. This demonstrates that awareness and behavior may be influenced by one's environment and necessity.

References

1. Emanuel, R., & Adams, J. N. (2011). College students' perceptions of campus sustainability. International Journal of Sustainability in Higher Education, 12(1), 79-92.
2. Jucker, R. (2002). "Sustainability? Never heard of it!" Some basics we shouldn't ignore when engaging in education for sustainability. International Journal of Sustainability in Higher Education, 3(1), 8-18.
3. Qian, W. (2013). Embracing the Paradox in Educational Change for Sustainable Development: A Case of Accounting. Journal of Education for Sustainable Development, 7(1), 75-93.
4. Too, L., & Bajracharya, B. (2015). Sustainable campus: engaging the community in sustainability. International Journal of Sustainability in Higher Education, 16(1), 57-71.
5. UROP UMICH [UROP UMICH Twitter Profile Image]. (n.d.). Retrieved March 20, 2017, from http://twitter.com/ uropumich
6. University of Michigan Institute for Social Research (ISR) [Facebook profile image of the University of Michigan Institute for Social Research (ISR)]. (n.d.). Retrieved March 20, 2017, from https://www.facebook.com/umisr/
7. Marans, R. W., & Callewaert, J. (2016). MONITORING THE CULTURE OF SUSTAINABILITY AT THE UNIVERSITY OF MICHIGAN: FALL 2015. Available at http://graham.umich.edu/campus/scip/materials