



What Do Female and Male College Students from Saudi Arabia Think of a Green Economy?

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Abstract

The present research surveys the views of a green economy held by Saudi Arabian college students. The economy of their country is in the process of being restructured from one largely based on fossil fuels and their byproducts to one that is knowledge- and service-based. Thus, students are likely to experience cognitive dissonance between resisting change, which would preserve the known benefits of the fossil fuel economy, and embracing change, which is associated with desirable but uncertain economic outcomes. The participants were a convenience sample of 390 undergraduate students of Saudi Arabian descent. During the post-pandemic period, students completed an online survey on their behaviors and attitudes toward a green economy. Students' responses illustrated cognitive dissonance. Furthermore, favorable views of a green economy remained superficial. Most importantly, views (including attitudes and beliefs) were not good predictors of actions consistent with such views. Students' contradictory answers stimulated faculty members in the College of Sciences and Human Studies to develop a plan to counteract cognitive dissonance and thus promote in students behaviors consistent with their overall favorable attitudes and beliefs toward a green economy.

Keywords: green economy, female college students, fossil fuel economy

1. Introduction

A green economy is defined as an economy that improves the quality of life without damage to the environment, thereby promoting sustainable consumption and production (including low carbon emission and resource efficiency), as well as social progress (Lee et al., 2022; Muposhi, 2019). Saudi Arabia is in the process of converting its entire economy from one largely based on fossil fuels and its byproducts to one that is knowledge- and service-based (Al-Sarihi, 2019; Khorsheed, 2015). The plan, named Vision 2030, has an overarching goal, which is to create a diversified and sustainable economic system that relies on renewable energy sources and materials (Megwai et al., 2016). That is, a pillar of the plan is a green economy (Chaaben et al., 2022).

The practical realization of the plan heavily relies on a skilled workforce of young men and women with a college education or advanced degrees. How is the transition toward a sustainable ecosystem viewed by the very people who are expected to make the plan a reality? In our study, we survey college students, that is, one important segment of the future workforce of the country. Two contrasting predictions regarding such students are formulated. On the one hand, if the Vision 2030 plan has been interiorized by the likely members of the future workforce of the country, cognitions (i.e., attitudes and beliefs) regarding sustainability will be consistent with everyday behaviors. That is, cognitions will predict behaviors in daily life, such as recycling, conserving energy, relying on reusable materials, etc. On the other hand, if the Vision 2030 plan creates cognitive dissonance, cognitions regarding sustainability will not predict the everyday behaviors that embody it. Namely, there will be a chiasm between actions in daily life and self-reported beliefs and attitudes that recognize climate change as a problem and renewable energy sources as the solution.

The participants are students of Saudi Arabian descent who reside in the Eastern Region of Saudi Arabia. The area is deemed the industrial heartland of the country for oil and gas production and transport. The population of its densely inhabited urban centers serves as the workforce for the world's leading oil and gas producer (i.e., Saudi Aramco), the Middle East's main petrochemical manufacturer (i.e., Sabic), and Dammam's giant commercial port. Because the participants reside at the heart of the industrial complex that presently defines the economy of Saudi Arabia, they represent a sample of individuals who are most likely to experience a conflict (i.e., cognitive dissonance; Harmon-Jones & Mills, 2019) between cognitions favoring change and habitual behaviors that preserve the status quo. On one side, the sustainable economy codified by the 2030 Vision would allow the country to survive the impending depletion of natural resources and thrive through a diversified economy. It is therefore a socially desirable outcome. On the other side, it entails changing habits and, more broadly, ways of living often in direct opposition to a green economy (e.g., reducing the use of plastic containers, using public transportation, purchasing solar panels, etc.). Cognitive dissonance is a negative state of mind that people will attempt to eliminate (Cooper, 2019), for instance, by weakening the relationship between cognition and behavior. That is, we predict that if participants experience cognitive dissonance, their views of sustainability will not predict their behavior toward it. Whether there are gender differences is a matter to be investigated as the extant literature emerging from Saudi Arabia is meager and its findings ambiguous (Alsaati et al., 2020; Pilotti et al., 2022).

2. Method

2.1 Participants

The participants were a convenience sample of 390 undergraduate students of Saudi Arabian descent. To ensure the sampling of students across all majors, all potential participants were enrolled in general education courses offered on campus during the third semester of the post-pandemic period. The sample included 101 males and 71 females in Science, Technology, Engineering, and Mathematics (STEM) majors (e.g., computer science, engineering, and architecture). The sample also included 91 males and 127 females in non-STEM majors (e.g., business and law). All were commuters whose primary residence was in the Eastern Region of Saudi Arabia. Their ages ranged from 18 to 25 years.

2.2 Procedure and Materials

A questionnaire was developed that covered 3 conceptual domains: (A) awareness of environmental changes and their presumed sources; (B) attitude toward change; and (C) actions supporting a sustainable environment. In Section A of the survey, students were asked whether they believed that the climate of the earth was changing. If they confirmed believing in climate change, they were asked about its sources. Students' awareness of environmental changes was assessed through a 5-point scale ranging from strongly disagree (-2) to strongly agree (+2). On this scale, 0 was the neutral point. Concerning sources, students were invited to identify a culprit that they deemed to be the principally responsible agent of climate change.

In Section B of the survey, students were to report the extent to which they supported replacing fossil fuels with renewable energy. Attitudes towards change were measured on the same 5-point scale described above, which ranged from strongly disagree to strongly agree.

In Section C of the survey, students were asked about the frequency of specific behaviors that support a sustainable environment (recycling, turning off the water while brushing their teeth, using reusable containers, turning off the lights when leaving a room, and tuning off equipment when not using it). The frequency of students' actions supporting a sustainable environment was assessed on a 5-point scale from never (0) to always (4).

Students who were taking general education courses were asked to complete the survey on their attitudes and behaviors towards environmental issues. Before completing the survey, students provided informed consent and answered some demographic questions (i.e., age, major, and gender). After the survey data collection was completed, focus groups were carried out to better understand students' answers. The study was approved by the Deanship of Research of the institution in which students were enrolled as conforming to the ethical standards of the OHPR of the U.S. Department of Health and Human Services.

3. Results

The results of the survey were organized by the answers they provided to each domain of interest. The outcomes of inferential statistics were considered significant at the 0.05 level.

3.1 Awareness of environmental changes and their sources

Most students (79.49%) agreed or strongly agreed with the notion that the earth's climate is changing. However, 4.36% disagreed or strongly disagreed, and 16.15% did not have an opinion. Of those who believed in climate change, 46.77% attributed it to human causes, whereas 14.20% saw it as a byproduct of naturally occurring processes. A considerable percentage of students viewed climate change as caused by both human activities and naturally occurring processes (37.42%). A small minority claimed not to know (1.61%). A one-way between-subjects ANOVA was used to determine whether there were gender differences in students' awareness of environmental changes. No gender differences were found [$F = 1.28$, ns].

3.2 Attitude toward change

A large number of students (74.36%) agreed or strongly agreed with the idea that fossil fuels should be replaced with renewable energy sources, while 5.90% disagreed or strongly disagreed. Several students (19.74%), however, declared neutrality. Table 1 displays the descriptive statistics of students' responses based on a 5-point scale ranging from -2 to +2.

The support, as measured by the scale, was on average moderate. No gender differences were uncovered [$F = 3.67$, *ns*].

Table 1. *Students' support for the idea of replacing fossil fuels with renewable energy sources*

Support for renewable energy	Mean	Standard Deviation
Males	+0.98	1.01
Females	+1.17	0.97

3.3 Behaviors supportive of a sustainable ecosystem

The results collected from the measures of consensus (A and B sections) offered a window into the attitudes and beliefs of a sample of young people. They suggested that most of them were aware of climate change, saw it as induced (at least in part) by human action, and were favorable to switching to renewable energy sources. The key question was whether any of these desirable attitudes and beliefs translated into actions supporting a sustainable ecosystem. Table 2 displays the frequency of self-reported actions that support such an ecosystem.

Table 2. *Actions supporting a sustainable ecosystem as a function of the frequency with which they are performed*

Sustainability-related actions	Never or Rarely	Sometimes	Often or Always
Frequency of recycling	28.46%	0%	71.54%
Turning off the water while brushing	12.82%	16.41%	70.77%
Relying on reusable containers	26.67%	32.05%	41.28%
Turning off the lights when leaving a room	5.64%	13.33%	81.03%
Turning off equipment when not in use	11.54%	21.28%	67.18%

The image that we gathered from the descriptive statistics of Sections A, B, and C was that students' attitudes and actions were largely favorable toward a green economy. Yet, did internal dispositions (as measured by attitudes and beliefs) predict self-reported behavior? To answer this question, an index of sustainability-related behaviors was computed by adding all the responses to the five questions displayed in Table 2. The composite measure of sustainability-related behaviors could range from 0 to 20. A Pearson correlation analysis indicated that the composite measure was correlated with the answer that students gave to whether they believed in climate change [$r = + 0.151$, $n = 390$, $p = .003$]. The same composite measure was correlated with the answer to the question of whether students supported replacing fossil fuels with renewable sources of energy [$r = + 0.191$, $n = 390$, $p < .001$]. However, either attitudes or beliefs accounted for very little in sustainability-related behaviors: 2.28% and 3.65%, respectively.

4. Discussion

The country of Saudi Arabia is moving forward with a plan to restructure the economy. Reliance on renewable energy sources goes hand in hand with a diversification of the economy and the inclusion of both men and women in the workforce (Haykel et al., 2015; Pilotti et al., 2021; Shehri et al., 2023). The very people who are entrusted to make the plan a reality, such as young people of college age, are expected to make changes in their everyday lives. The evidence from a convenience sample of college students suggests that substantial changes are yet to be forthcoming. Evidence is also visible on campuses where, for instance, receptacles for recycling are available at every corner, but plastic is still used in food and liquid containers and utensils at cafeterias.

The most visible sign of the cognitive dissonance that Saudi Arabian students might be experiencing about sustainability-driven change in their country was encapsulated in the weak relationship between internal dispositions (represented by either beliefs or attitudes) and routine behaviors in daily life. Indeed, dispositions predicted very little of students' self-reported behaviors fostering a sustainable ecosystem. One might argue that students were merely providing answers that were socially desirable without any genuine conviction. However, if students' responses had been driven by social desirability motives, attitudes as well as beliefs would have been good predictors of behaviors consistent with such cognitions.

Undeniably, behavioral habits are difficult to change (Harmon-Jones & Harmon-Jones, 2007). Festinger (1957) theorized that people are motivated by the unpleasant state of dissonant cognitions to work to reduce inconsistencies. Interestingly, a person may ignore the inconsistency between cognitions held and behaviors expressed by simply considering such behaviors unimportant in the broad scheme of things (Harmon-Jones & Harmon-Jones, 2007). It is a strategy that allows one to minimize the experience of cognitive dissonance, and thus preserve a positive image of oneself, even though actions say otherwise. Indeed, when we asked students to explain their behaviors in focus groups, most of them minimized the importance of everyday actions that contradicted their pro-green-economy attitudes, such as frequently buying bottles of water instead of relying on reusable water jugs. Furthermore, the strategy of discounting inconsistent behaviors was made easier by students' rather shallow knowledge of sustainability (see also Alsaati et al., 2020).

Data collection and analysis motivated particular faculty members of the College of Sciences and Human Studies to conduct action research (see Pilotti et al., 2023) over time. It was recognized that although the current findings replicated an earlier study on Saudi college students (Al-Zohbi & Pilotti, 2023), they might become obsolete as the implementation of the Vision 2030 agenda becomes more visible in the quotidian life of Saudi Arabian citizens. Faculty members were interested in understanding students' dispositions and actions to optimize teaching and learning (Baum et al., 2006; Micangeli et al., 2014) in the context of a changing society. Not surprisingly, the findings of the present study were topics of discussion among faculty members interested in how the notion of a green economy could become a motivator for changes in students' quotidian behavior. They all agreed that ensuring information dissemination in the student population was key (Bettinghaus, 1986; Davidson et al., 1985). Indeed, one property of an attitude or belief that makes it a good predictor of behavior is its accessibility, which mostly depends on rehearsal (Descheemaeker et al., 2017). Thus, one of the targets of discussion was the curriculum of different academic majors to foster a deeper and broader understanding of suitability and its practical implications. Changes promoting students' understanding of sustainability were made to the curriculum of some majors, such as engineering (Ashraf & Alanezi, 2020). Similar changes were discussed for the general education curriculum to ensure that knowledge about sustainability would reach students at the very start of their academic journey. Another target of discussion was to acquire a more in-depth understanding of how the beliefs and attitudes of a larger number of students were related to their actions inside and outside the classroom. Discussions were intended to result in consensus on how to make impactful changes in the curriculum and instruction of the university across all educational levels.

One of the limitations of our study is that we focused on one institution. Thus, untested features of the student population from which participants were selected might limit the ecological validity of the study. For instance, although students were commuters, most of them traveled by car, rather than by bus, to and from the university. When traveling by car, they rarely relied on carpooling. At other universities in the region, students might make different travel arrangements that could be related more strongly to their attitudes and beliefs. Although

we found no gender differences in students' answers, a longitudinal study sampling attitudes and behaviors in the same students over time (Domalewska, 2021) might offer a window into how students deal with change in their country. Furthermore, whether there are gender or academic major (STEM versus non-STEM) differences might depend on male and female students' views of science (Pilotti et al., 2022), which have not been assessed in the present study.

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