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Explaining Renewable Energy Consumption Among Students: The Role of Academic Discipline and Energy Awareness**

This paper analyzes differences across three academic programs (business, cultural studies, and environmental studies) in terms of students' energy consumption. The study provides an analysis of how students' awareness concerning sustainable energy behaviors (energy awareness) and the antecedents of this awareness influence whether students purchase energy from renewable resources or not. Drawing on insights from career studies and environmental psychology, the role of academic disciplines in predicting attitudes and behaviors is discussed and psychological antecedents of energy awareness are identified. The study finds evidence for significant disciplinary differences concerning students' levels of energy awareness, the influence of this awareness on renewable energy consumption, and the share of students purchasing renewable energy in the three disciplines. Implications for future research and practice are discussed.

Key words: **Renewable energy, sustainable consumption, academic discipline, awareness**
(JEL: M310, Q420, Q550)

1. Introduction

In light of the depletion of fossil energy sources and of the negative impact of the burning of these resources on the natural environment, there is a strong need for a greater awareness concerning these developments and for sustainable energy behavior. This kind of behavior may involve avoiding or reducing energy consumption (eco-sufficiency), paying attention to energy characteristics of products (efficiency), or purchasing or producing energy from renewable resources (substitution). While the relationship between these kinds of behavior and awareness of environmental issues has been examined (e.g. Lillemo, 2014; Arlt *et al.*, 2011; Yue *et al.*, 2013), few studies have considered the academic disciplines of the surveyed participants when analyzing student samples (e.g. Schluchter & Kunze, 2009; Synodinos, 1990; Kaiser & Frick, 2002) and its relation to what I will refer to as energy awareness.

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Energy awareness can be defined as individuals' awareness concerning sustainable energy behaviors and is regarded as one important sub-dimension of environmental awareness. This paper contributes to the debate on attitudinal and behavioral differences across academic disciplines. It addresses the questions of whether and why students enrolled in various academic programs (business, cultural studies, and environmental studies) differ with regard to renewable energy consumption. By doing so, this article unites perspectives on effects owing to group affiliation (academic program) and individual psychological factors. In particular, the study explores the mediating role of energy awareness in the relationship between renewable energy consumption and its psychological antecedents. It examines the relationship between antecedents related to the environment as a general category (e.g. environmental attitudes) and energy awareness as a domain-specific mediator. To achieve its goals, the paper draws on insights from environmental and social psychology as well as interdisciplinary fields such as career studies. By synthesizing the insights, it seeks to offer a more nuanced perspective on the link between energy awareness and energy consumption among students in higher education.

The remainder of this paper is structured as follows: The next section first outlines the context of this study and introduces the research model, and then depicts the theoretical foundations of the study, develops hypotheses and grounds them in the literature. Section 3 describes the methodological approach, and Section 4 presents results, followed by a discussion in Section 5 which includes implications for future research and practice. Finally, conclusions are drawn (Section 6).

2. Background and theoretical foundations

2.1. Research context and model

Partly in response to the nuclear catastrophe at the Fukushima Daiichi nuclear power plant in Japan, Germany is currently aiming toward what has been referred to as energy transition (*Energiewende*). Among other goals and initiatives, this transition includes the phase out of nuclear power by 2022.

Students who are currently enrolled in an academic program at a university or a similar institution of higher learning are likely to play an important role in transition processes toward a more sustainable society in general and in Germany in particular. Besides the fact that they may have to contribute to this transition in their future professional roles, today's students will have to become more sustainable consumers and may act as role models for other members of society. For example, Borgstedt *et al.* (2011) found that compared to other young people, students with high levels of education, especially those enrolled at institutions of higher learning, tended to be more emotionally involved when it came to environmental issues. In addition, their study revealed that young people with lower levels of education tended not to have a nuanced understanding of the political dimensions of climate

change and environmental protection. Therefore, today's students are more likely to shape public opinion and function as role models in terms of sustainable behaviors.

From a firm perspective, future university graduates represent a potentially attractive market segment for renewable energy suppliers. With regard to students as energy consumers, Gossling *et al.* (2005) suggested a "target group-specific approach to 'green' power retailing" and reported highly positive attitudes toward renewable energy sources among them. Schlegelmilch *et al.* (1996, p. 35) pointed to the importance of identifying and targeting "the 'greener' consumer segments." Since the authors highlighted the limited usefulness of typical socio-demographic indicators for establishing a suitable segmentation for green products, the present study argues that academic discipline as a segmentation criterion could contribute to identifying these greener segments more easily. From a financial perspective, individuals with university degrees are likely to earn more than other members of society. For this reason, today's students will be a rather economically affluent target group for businesses in the future.

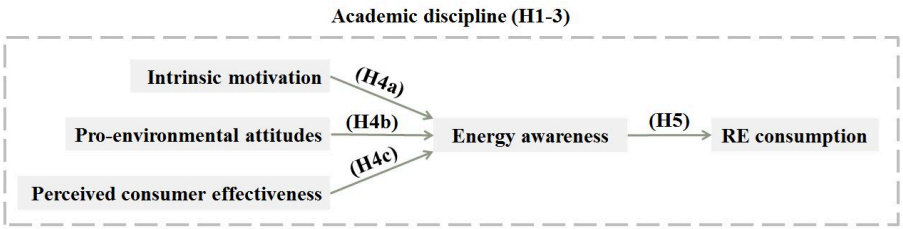
Given their importance, it is surprising that while researchers have investigated the attitudes and behaviors of students in higher education in terms of specific issues such as renewable energy (e.g. Halder *et al.*, 2012; Gossling *et al.*, 2005) or energy-saving behaviors (e.g. Testa *et al.*, 2016; Meyer, 2016), only some of these studies have, to the best of the author's knowledge, addressed differences among these students in terms of disciplinary background. However, as other studies have shown, the academic discipline of students needs to be taken into account since students enrolled in different programs were found to differ considerably, for instance, in terms of attitudes toward social issues (Haley & Sidanius, 2005) and worldviews (Kemmelmeier *et al.*, 2005). Reid *et al.* (2009) also showed that students have different conceptions of sustainability, and Christie *et al.* (2015) revealed discipline-specific differences in terms of teaching professionals' attitudes toward education for sustainability. In line with these findings, researchers identified differences in pro-environmental attitudes and awareness across different faculties at a German university (Schluchter & Kunze, 2009) and disciplinary differences in terms of environmental knowledge (Kaiser & Frick, 2002) as well as environmental commitment, affect and knowledge (Synodinos, 1990).

To understand the antecedents of renewable energy consumption, it is necessary to bring together insights from two fields of research: career studies (Section 2.2.) and environmental psychology (Section 2.3.). Concerning career and study choice, the emphasis in this paper is on how self-selection (choosing a particular academic program) and socialization effects (studying in a particular program) might lead to discipline-specific patterns of attitudes and behaviors. Section 2.3., in which the individual elements of the research model and their interplay will be discussed in more detail, is based on environmental psychology literature, where several antecedents of pro-environmental behaviors have been identified. Among others, the influence of

motivational and attitudinal aspects has been examined. This includes the role of awareness as well as attitudes and beliefs. For instance, individuals' belief to be able to actually contribute to a better environment (perceived consumer effectiveness) has been found to have an influence on people's decisions to engage in some form of pro-environmental behavior or not. Based on previous research, the influence of awareness (e.g. Lillemo, 2014), an intrinsic motivation for pro-environmental behavior (e.g. Pelletier *et al.*, 1998), environmental attitudes (e.g. Milfont & Duckitt, 2004, 2010), and perceived consumer effectiveness (e.g. Vermeir & Verbeke, 2008) on pro-environmental behavior, in our case renewable energy consumption, is discussed in Section 2.3.

Methodologically, the influence of general concepts such as environmental attitudes on pro-environmental behavior and the influence of situational factors and domain-specific concepts on specific forms of behavior have received scholarly attention (cf. Schultz *et al.*, 1995; Hines *et al.*, 1987; Bamberg & Möser, 2007; Bamberg, 2003). The interplay of these general and specific factors in particular is important if one is to explain behavior. Building on findings by Fishbein (1973) and Heberlein (1981), Schlegelmilch *et al.* (1996, p. 49) remarked that "scores on general measures should not be expected to predict isolated acts." Thus, while Bamberg and Möser (2007) showed that general problem awareness/ knowledge is an indirect antecedent of pro-environmental behavior, it can be argued that domain-specific forms of awareness, in our case energy awareness, are more likely to be a direct predictor of renewable energy consumption. In line with this assumption, the author of this article assumes the effect of domain-general antecedents on renewable energy consumption to be mediated by the domain-specific construct of energy awareness. Figure 1 represents a summary of the hypothesized relationships in the model. The numbers in parentheses refer to the respective hypotheses which are based on a literature review (see Section 2.2. and 2.3.). Hypotheses 1 to 3 refer to differences across academic disciplines concerning the examined variables and their interplay (see Section 2.2.). Hypotheses 4 and 5 aim at examining the general suitability of the model and the proposed relationships (see Section 2.3.). Renewable energy consumption, the dependent variable in this model, refers to purchasing electricity from renewable energy carriers for domestic use.

Figure 1: Overview of proposed hypotheses.
All of the proposed relationships are expected to be positive. RE stands for "renewable energy".



2.2. Career studies: Academic discipline and its role in analyzing attitudes and behaviors

Studies on person-environment congruence have shown that people tend to choose working environments that match their worldviews, values, and attitudes (Holland, 1959; Nauta, 2010). Not surprisingly, person-environment congruence has also been observed when it comes to students' choice of academic disciplines at German universities (Windolf, 1995). Kemmelmeier *et al.* (2005) revealed significant differences in political attitudes across disciplines and related these to academic success. Haley and Sidanius (2005) distinguished between hierarchy-enhancing and hierarchy-attenuating environments. Hierarchy-enhancing institutions are believed to reinforce hierarchies between social actors and groups (e.g. legal systems, corporate firms), while hierarchy-attenuating institutions seem to promote a more egalitarian view of society by taking actions to improve the position of underprivileged social groups (e.g. civil rights movements, welfare organizations). In an academic context, programs such as business and law have been described as primarily hierarchy-enhancing majors and social science programs as hierarchy-attenuating majors (Haley & Sidanius, 2005). The authors demonstrated that the students enrolled in hierarchy-enhancing majors tended to attribute less importance to social equality than their fellow students in the social sciences.

Having a more egalitarian mindset is not limited to equality between present groups and generations, but it can also include the idea of equality between present and future generations, which is at the heart of the concept of sustainability. To meet the needs of future generations, natural resources have to be preserved. Egalitarian perspectives can thus include concern for non-human entities/ nature, and this ethical regard also has implications for the use and preservation of natural resources. In contrast, a more hierarchical understanding of humankind and nature is commonly linked to a conception of nature as a resource for human purposes (utilization of natural resources; cf. Milfont & Duckitt, 2004, 2010). In line with these ideas, Pratto *et al.* (1994) found people's degree of preference for inequality (in their research among social groups) to be positively correlated with attitudes toward law

and order policies and negatively correlated with attitudes toward social programs and environmental policies.

The three academic programs examined in this study are of particular interest. More specifically, both students from cultural studies (a more social sciences-oriented program) and environmental studies (a program that focuses on human-nature interactions) can be expected to have more egalitarian mindsets and a less hierarchical understanding of the relationship between humankind and nature than their fellow students enrolled in business. However, students enrolled in environmental studies are likely to have a stronger educational and emotional link to the topic of environmental protection in general and specific topics like renewable energy than their colleagues enrolled in cultural studies. Therefore, concerning their nature-related and energy-related motivations, attitudes, beliefs, and behaviors, students enrolled in cultural studies are expected to show lower values than their colleagues enrolled in environmental studies, but higher values than their fellow students from the business program. Based on these thoughts, the following hypotheses can be derived:

H1: Compared to their fellow students in cultural studies and business, students enrolled in environmental studies show the

- *strongest intrinsic motivation for pro-environmental behavior (**H1a**),*
- *strongest pro-environmental attitudes (**H1b**),*
- *highest perceived consumer effectiveness (**H1c**),*
- *and greatest energy awareness (**H1d**).*

In turn, business students show the lowest values in these respects.

While students are likely to choose a program that matches their mindsets and worldviews (self-selection), enrolling in a particular program also entails being influenced by a specific cultural context (Becher & Trowler, 2001), e.g. by fellow students, lecturers, curricula etc. These influences stem from the process of socialization within a particular discipline. Different perceptions, preferences and attitudes (e.g. Chung *et al.*, 2002; Weisenfeld & Ott, 2011), established practices (e.g. Gardiner *et al.*, 2006), and potentially different expectations of fellow students in an academic program are likely to influence the behavior of individual students. The idea that perceived social influence, e.g. through norms and expectations, plays a key role in determining behavior is integrated in influential theories such as Ajzen's (1985, 1991) theory of planned behavior. Among other propositions, this theory posits that "people intend to perform a behavior when they evaluate it positively and when they believe that important others think they should perform it" (Ajzen, 1985, p. 12). It refers to this influence as "subjective norm".

The theory of planned behavior centers on how individuals perceive and behave in accordance with social norms and expectations. Groups, such as cohorts of students

in a particular program, however, are not likely to exert normative influence over all kinds of behavior. Among others, the question whether a particular behavior reflects the group's core values should determine if this behavior is subject to normative control or not (Feldman, 1984), and polarization in groups was found to lead to mutual intragroup influence only in the case of shared identification with a group (Turner *et al.*, 1989). In the context of this study, these observations especially apply to those students enrolled in environmental studies. Since environmental protection is likely to be regarded as a core value by their fellow students, pro-environmental action is probably under stronger normative control than in other academic programs.

Owing to higher levels of energy awareness and the potential influence of their social surrounding in their academic program, students from environmental studies and also cultural studies are more likely to engage in behaviors that lead to collectively preferable outcomes such as protecting the environment through sustainable energy behavior.

H2: The share of students purchasing energy from renewable resources is highest among students enrolled in the environmental studies program and lowest among business students.

The described influence from students' social surrounding, however, might not only affect the share of students consuming renewable energy, but also the impact of the antecedents of these behaviors. For instance, a supportive social environment may facilitate the step from being aware of something to taking action. This effect is expected to be particularly strong in the environmental studies program, which leads to the hypothesis that

H3: The relationship between energy awareness and renewable energy consumption, as described by the model proposed here, is stronger among students enrolled in the environmental studies program compared to the business and cultural studies program.

2.3. Environmental psychology: Antecedents of pro-environmental behaviors

According to self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000), different motivational types ranging from **intrinsic motivation** over various facets of extrinsic motivation to amotivation can be distinguished. Based on these thoughts, Pelletier *et al.* (1998, p. 441) defined intrinsic motivation as "the innate tendency to engage in an activity for the sole pleasure and satisfaction derived from its practice." Intrinsic motivation has been identified as an important antecedent of behavior in various areas such as developmental psychology (e.g. Woolger & Power, 2000; Lemos & Veríssimo, 2014; Pavalache-Ilie & Tîrdia, 2015), consumer behavior (e.g. Shang *et al.*, 2005), and environmental psychology (Pelletier *et al.*, 1998).

Based on insights from a large consumer study in the European Union, Cecere *et al.* (2014) concluded that food waste prevention can largely be explained by individuals' intrinsic motivation, without economic incentives or social pressure having a significant influence. Since sustainable energy behavior can also be understood as a form of pro-environmental action, whether a person takes into account sustainability issues when consuming energy may be related to his or her intrinsic motivation to contribute to a better environment.

While every human being is born with some intrinsic motivational tendencies, surrounding conditions can actually make a big difference to whether particular intrinsic motivational tendencies develop further or not. Ryan and Deci (2000, p. 68) noted that "social contexts catalyze both within- and between-person differences in motivation and personal growth, resulting in people being more self-motivated, energized, and integrated in some situations, domains, and cultures than in others." This finding highlights the importance of socialization processes before and during a person's (higher) education and makes intrinsic motivation an even more interesting construct to examine in the context of this study.

In addition to intrinsic motivation, there is a multiplicity of conceptual frameworks as well as instruments to explore the role of **environmental attitudes** in explaining behavior. An attitude represents "a summary evaluation of a psychological object captured in such attribute dimensions as good-bad, harmful-beneficial…" (Ajzen, 2001, p. 28). Attitudes build on an informational basis that includes cognitive, affective, and conative elements (Crites *et al.*, 1994). Environmental attitudes can thus be understood as "a psychological tendency expressed by evaluating the natural environment with some degree of favour or disfavour" (Milfont & Duckitt, 2010, p. 80).

In their attempt to integrate various approaches and to investigate the content and structure of environmental attitudes, Milfont and Duckitt (2004, 2010) identified twelve different facets/ sub-dimensions of environmental attitudes. Most of the major theories that seek to explain behavioral intentions and behavior attribute high importance to the influence of attitudinal variables, e.g. Ajzen's (1985, 1991) theory of planned behavior or Stern's (2000) value-belief-norm theory. The importance of attitudes along with other factors for explaining pro-environmental behavioral intentions and ultimately behavior has found empirical support (Bamberg & Möser, 2007). While the empirical evidence for the influence of (general) environmental attitudes on energy behavior is rather mixed (cf. Bamberg, 2003), one of the most recent studies detected a significant impact. Analyzing the electricity use of 612 US-households, Sapci and Considine (2014) found households with stronger pro-environmental attitudes to be more conservative in terms of their energy use. Therefore, there is still a need to further investigate the influence of environmental attitudes on specific forms of pro-environmental behavior. Following the line of argumentation

in this paper, the author suggests that the influence of pro-environmental attitudes on renewable energy consumption is mediated by energy awareness.

Motivation and attitudes, however, are not the only antecedents of behavior. Ajzen's theory of planned behavior also stresses the importance of perceived behavioral control. In this regard, an essential differentiation must be made between perceived control over actions and perceived control over outcomes (cf. Ajzen, 2002, p. 668). The question whether a person believes to be able to make a contribution to a better environment or to the German energy transition toward renewable energy (*Energiewende*) is linked to the idea of outcome expectations.

Building on the theory of planned behavior, Vermeir and Verbeke (2008) analyzed sustainable food consumption among students in Belgium. The authors amended the model by introducing, among others, the concept of **perceived consumer effectiveness** (Ellen *et al.*, 1991; Antil, 1984), "the extent to which the consumer believes that his personal efforts can contribute to the solution of a problem" (Vermeir & Verbeke, 2008, p. 544). The authors found that "consumers … who believe that their own behaviour has a positive impact on, for example, the environment, are more inclined to buy sustainable products" (p. 548). Lending support to these results, Kang *et al.* (2013) reported perceived consumer effectiveness to have a significant influence on students' intentions toward purchasing sustainable textiles and apparel. Roberts (1996) identified perceived consumer effectiveness as the best predictor of ecologically conscious consumer behavior. In line with these findings, Arlt *et al.* (2011) found perceived influence to predict investments in energy-efficient household equipment. Thus, believing that one can make a difference (even though it might not be a big one) is likely to encourage people to pay attention to energy issues. Based on the theoretical ideas and empirical evidence discussed above, the following hypothesis is put forth:

H4: Intrinsic motivation for pro-environmental action (H4a), pro-environmental attitudes (H4b), and perceived consumer effectiveness (H4c) are positively related to energy awareness.

While the aforementioned antecedents are expected to increase an individual's energy awareness and are considered indirect antecedents of renewable energy consumption, this study also investigates the effect of **energy awareness**, as a direct and domain-specific antecedent, on renewable energy consumption. In general, being aware of a problem or threat and willing to consider practices that can contribute to a solution of the problem has been identified as an important prerequisite for actually engaging in such practices. This also holds true for environmental issues.

For instance, awareness has proved to matter in terms of mobility and transportation issues (e.g. Nordlund & Garvill, 2003; Eriksson *et al.*, 2006) and concerning sustainable energy behavior. Some authors explored its effect on purchasing more energy-efficient household equipment (Arlt *et al.*, 2011), others identified "a posi-

tive relationship between environmental awareness and engaging in everyday energy-saving activities such as reducing the indoor temperature" (Lillemo, 2014, p. 249). However, situational factors were found to have a moderating influence on the relationship between awareness and action (Yue *et al.*, 2013). The described evidence for the link between awareness and sustainable energy behavior leads to the hypothesis that

H5: Energy awareness is positively related to purchasing energy from renewable resources.

3. Methodology

3.1. Sample

A self-administered paper-pencil survey was issued to three hundred bachelor students at a German university in June 2013. Since 17 questionnaires were too incomplete to be considered, the sample included a total of 283 participants. The participants were mainly enrolled in three academic programs: business (n = 88), cultural studies (n = 65), and environmental studies (n = 103). 27 individuals studied in a program other than these or did not indicate their major. The sample consisted of 105 males and 169 females. Nine participants did not report their gender. 89.7% of the respondents were aged between 19 and 24, 8.5% were older than 24, and 1.8% younger than 19. 80.1% of the respondents were in their second semester, 13.1% in their fourth, 5.7% in a higher semester, and 1.1% in their first semester.

3.2. Questionnaire design

The constructs were operationalized by short scales comprising items from established scales and new items. 7-point Likert scales were used. The scales were shortened based on theoretical considerations in a way that the core ideas of the constructs were covered by the short scales. **Intrinsic motivation for pro-environmental action (IM)** (M = 4.94, SD = 1.38, Cronbach's α = .743) was measured based on two items taken from Pelletier *et al.*'s (1998) Motivation Toward the Environment Scale. **Pro-environmental attitudes (PEA)** (M = 5.35, SD = 0.88, α = .731) were measured based on six items from the Environmental Attitudes Inventory (Milfont & Duckitt, 2010), more specifically from two dimensions of "support for interventionist conservation policies" and "human utilization of nature" (reverse-coded). **Perceived consumer effectiveness (PCE)** (M = 4.58, SD = 1.51, α = .785) was operationalized by two items asking the respondents whether they believe that they can make a personal and valuable contribution, first, to the *Energiewende* and, second, to an improvement of the environmental conditions in general. Moreover, a short scale designed to measure **energy awareness (EAW)** (M = 4.32, SD = 1.39, α = .794) was used. The scale conceptualized energy awareness as the importance attributed to the following four dimensions: (1) knowledge of one's source of electric-

ity supply, (2) the ecological impact of products, (3) the energy efficiency of products, and (4) the energy consumption of people in one's social environment. **Renewable energy consumption (REC)** was measured by asking the participants to report whether they purchase electricity from renewable energy carriers in their households or not, including a "don't know" category.

3.3. Data analysis

To identify significant differences across academic disciplines, that is, to test Hypotheses 1a-d, Kruskal-Wallis tests and Mann-Whitney tests were conducted taking into account Bender and Lange's (2001, p. 345) recommendation for multiple tests including three groups. To compare the numbers of students purchasing renewable energy (H2), a Chi-square test was used. These statistical analyses were conducted using SPSS 23. To test Hypotheses 4 and 5, the PROCESS macro for SPSS (Hayes, 2013; see also Preacher & Hayes, 2008) was used. Significance of indirect effects was tested using 20,000 bootstrap samples in order to calculate bias-corrected 95%-confidence intervals (cf. Efron & Tibshirani, 1993). Bootstrapping is a resampling technique with replacement where observations in the original sample are resampled thousands of times to calculate the statistic of interest (Hayes, 2013, p. 106). It is a powerful alternative to conventional procedures, especially when analyzing small to medium-sized samples (Shrout & Bolger, 2002). An indirect effect can be considered statistically significant at a level of .05 if zero is not included in the respective interval. In addition to the calculation of confidence intervals, the macro provides results of a Sobel (1982) test (see also MacKinnon *et al.*, 1995) to analyze indirect effects.

Academic discipline was included in the models predicting the mediator (energy awareness) and the outcome (renewable energy consumption) in order to identify whether academic discipline has an influence on these variables in addition to potential effects stemming from previously analyzed differences in intrinsic motivation, environmental attitudes, and perceived consumer effectiveness. To do so, dummies for environmental studies (ENV) and cultural studies (CUL) have been used. The students from the business program serve as reference category for the interpretation of the identified effects (cf. Cohen *et. al*, 2003). Gender was included as a control variable (FEM = female). Even though the independent variables were correlated (see Table 3 in the appendix), variance inflation factors (between 1.23 and 2.46) did not indicate problems of multicollinearity. Further, a Durbin Watson test did not show any evidence for autocorrelation of the residuals (d = 1.95). Cases were excluded listwise. To test Hypothesis 3, which proposes a particularly strong effect of energy awareness on renewable energy consumption among students enrolled in the environmental studies program, a model including all previously analyzed effects and an additional interaction effect between environmental studies and energy awareness was run (products were mean centered). Moreover, the relation-

ship between energy awareness and renewable energy consumption was analyzed for each discipline separately.

4. Results

4.1. Group comparisons: Differences across disciplines

Respondents enrolled in environmental studies scored highest on the dimensions of intrinsic motivation, pro-environmental attitudes, and perceived consumer effectiveness, and they also showed the highest levels of energy awareness. Business students showed the lowest values on all dimensions, and students in the cultural studies program ranged between their fellow students from business and environmental studies (see Table 1). In an overall comparison (Kruskal-Wallis test), statistically significant differences between the three groups were found for all variables ($p < .001$ for all comparisons, see Appendix, Table 4). All sub-hypotheses of Hypothesis 1 were confirmed. In a pairwise comparison (Mann-Whitney test), significant differences were found for all pairs of disciplines concerning their intrinsic motivation, pro-environmental attitudes, and energy awareness. For perceived consumer effectiveness the differences between environmental studies and cultural studies and environmental studies and business studies were significant (for detailed information, see Table 5 in the appendix).

Table 1: Mean values and medians across disciplines

	Business			**Cultural studies**			**Environmental studies**		
	M *(SD)*	*Mdn*	*n*	***M*** *(SD)*	*Mdn*	*n*	***M*** *(SD)*	*Mdn*	*n*
IM	**4.25** (1.37)	4.50	87	**4.87** (1.16)	5.00	65	**5.83** (0.96)	6.00	101
PEA	**4.87** (0.84)	4.83	84	**5.36** (0.71)	5.42	64	**5.90** (0.69)	6.00	97
PCE	**4.01** (1.52)	4.00	87	**4.39** (1.44)	4.50	64	**5.30** (1.27)	5.50	102
EAW	**3.59** (1.27)	3.75	87	**4.17** (1.24)	4.25	64	**5.17** (1.17)	5.25	103

The numbers of respondents purchasing energy from renewable resources were found to differ significantly across academic discipline (χ^2 (4, n = 253) = 26.9, $p < .001$). While 20.9% of the business students reported purchasing renewable energy, the numbers were higher for their fellow students from cultural studies (38.5%) and environmental studies (56.9%) (Table 2). Thus, Hypothesis 2 was confirmed.

Table 2: Renewable energy consumption across disciplines

		Renewable energy consumption			
Academic discipline		**yes**	**no**	**don't know**	**Total**
Business	Count (%*)	**18** (20.9%)	**38** (44.2%)	**30** (34.9%)	**86**
Cult. studies		**25** (38.5%)	**24** (36.9%)	**16** (24.6%)	**65**
Environm. studies		**58** (56.9%)	**20** (19.6%)	**24** (23.5%)	**102**

Note: * Percentages within academic disciplines.

4.2. Regression analysis

Analyzing the effects of the proposed antecedents on energy awareness (see Table 6 in the appendix), a significant influence of intrinsic motivation (b = .309, SE = .088, p = .001) and perceived consumer effectiveness (b = .311, SE = .065, p < .001) was found (Hypotheses 4a and 4c supported). A marginally significant effect of being enrolled in the environmental studies program on energy awareness was identified (b = .438, SE = .266, p = .055). An influence of pro-environmental attitudes was not found (Hypothesis 4b rejected). The logistic regression to determine the influence of energy awareness on renewable energy consumption showed a significant influence of the former on the latter (b = .473, SE = .179, p = .008, Hypothesis 5 supported) controlling for intrinsic motivation, pro-environmental attitudes, and perceived consumer effectiveness (all non-significant). The indirect effects of intrinsic motivation (b = .146, SE = .083, CI = .026 to .341, p_{Sobel} = .040) and perceived consumer effectiveness (b = .147, SE = .069, CI = .037 to .304, p_{Sobel} = .023) via energy awareness were both significant. Moreover, being enrolled in the environmental studies program had a positive direct effect on renewable energy consumption (b = 1.54, SE = .511, p = .003, see Table 7 in the appendix).

The interaction term between environmental studies and energy awareness was significant (b = .693, SE = .311, p = .026), indicating a stronger impact of energy awareness on renewable energy consumption among those students enrolled in the environmental studies program. Analyzing this relationship for each discipline separately, it turned out that only among students from the environmental studies program higher levels of energy awareness translated into higher levels of renewable energy consumption (b = .936, SE = .312, p = .003). The results thus provided support for Hypotheses 3 and 5.

5. Discussion

5.1. Findings

The findings concerning differences across disciplines in terms of students' levels of energy awareness and its antecedents (H1) are in line with previous studies, for instance, by Schluchter and Kunze (2009) who found students from the faculty of en-

vironmental studies to hold more positive attitudes toward the use of renewable energy than other students from the natural sciences (also including mathematics and informatics), architecture, and engineering. The present study adds to this finding by showing that disciplinary differences also matter in terms of energy awareness and energy behavior. Lower levels of awareness and renewable energy consumption among business students support results by Synodinos (1990) who identified a low degree of commitment for pro-environmental action in this group. The findings of the present study also add to this research by including a social science-oriented study program in the comparison, i.e., cultural studies. The result that students enrolled in cultural studies are characterized by higher values for all dimensions than their fellow students from the business program can be linked to previous studies from other fields that showed students from social science-oriented programs to have more egalitarian mindsets than students from majors such as business or law (Kemmelmeier *et al.*, 2005) and anti-egalitarian mindsets to be negatively correlated with support for environmental policies (Pratto *et al.*, 1994). The finding that the share of students purchasing renewable energy was highest among students in environmental studies contributes to results that showed that students enrolled in this program were more likely to engage in eco-friendly behaviors than their fellow students from other programs (Kaiser & Frick, 2002; Schluchter & Kunze, 2009).

The direct effect of being enrolled in the environmental studies program on renewable energy consumption, controlling for energy awareness, could be a hint at further potential explanatory variables which might matter among these students, but which are not captured by the research model applied in this study. For instance, based on their stronger intrinsic motivation, pro-environmental attitudes and perceived consumer effectiveness, students enrolled in the environmental studies program might also have a higher willingness-to-pay for renewable energy than students in other programs.

The substantial gap between verbal and actual commitment for pro-environmental action among business students reported by Synodinos (1990) was also found in the present study. Even though students enrolled in cultural studies showed higher energy awareness than their colleagues from the business program, this awareness did not turn into behavior among these students either. Potential explanations could be linked to the students' social surrounding in their academic program, which may be less supportive of pro-environmental behavior than in the environmental studies program, or to psychological dispositions such as a lower degree of action orientation among students enrolled in the cultural studies program (Kaiser & Frick, 2002; Schluchter & Kunze, 2009).

To sum up, the results illustrate that considering self-selection and socialization effects in the context of higher education can help to explain students' motivations, attitudes, perceived consumer effectiveness, awareness, and behaviors. In some cases, however, the empirical differentiation of the effects of self-selection and socializa-

tion is not clear-cut. For students mainly enrolled in their second semester, differences in the levels of the antecedents of renewable energy consumption are more likely to stem from effects of self-selection. However, this study also provides some hints at the importance of social influences for explaining energy-related behaviors among students. More specifically, the positive interaction effect of environmental studies and energy awareness and the fact that awareness only turned into behavior among students enrolled in environmental studies might stem from a more supportive social environment. Hence, the study represents an interesting starting point for further investigation into the influence of students' academic surrounding and their socialization in a particular discipline on sustainable consumption behaviors. In Section 5.2., different approaches to the problem of differentiating between self-selection and socialization effects are presented.

The findings concerning the impact of intrinsic motivation for pro-environmental action (H4a) and perceived consumer effectiveness (H4c) support earlier studies that have shown that intrinsic motivation (e.g. Pelletier *et al.*, 1998) and perceived consumer effectiveness (e.g. Roberts, 1996; Arlt *et al.*, 2011) can explain, to some extent, pro-environmental behaviors. The results are also in line with the findings of previous studies that showed the relevance of awareness (e.g. Lillemo, 2014). In pointing to the relevance of energy awareness as a domain-specific mediator when explaining a specific kind of energy behavior, i.e., renewable energy consumption, the analysis lends support to Bamberg's (2003) conclusion that general attitudes and concern are unlikely to determine specific behaviors.

5.2. Limitations

While this study provides novel insights, analyzing students as consumers of renewable energy also faces some limitations, for instance owing to students' housing situation. More specifically, it is possible that not all participants were free to choose their electricity supplier, for example because they lived in a shared flat or a student residence. Moreover, it would have been more reliable to analyze observed instead of reported behavior, among others to reduce common method bias and the potential effects of socially desirable response behavior. In previous studies, the influence of social desirability on the reporting of environmental attitudes and motivation for pro-environmental behaviors was, however, found to be small (Milfont, 2009; Pelletier *et al.*, 1998).

As discussed in the section on questionnaire design, this study used short scales, and some of these scales were composed of established and others of new items. The goal was to maintain the core idea of the respective constructs. However, it is possible that the short scales did not cover all facets of the examined constructs to the same extent the full scales would have done. Future studies might therefore use scales including more items to further improve the operationalization of the different constructs. The role of self-selection and socialization effects in explaining atti-

tudes and behaviors in different academic disciplines has been addressed in Section 2.2. and 5.1. This cross-sectional study, however, primarily allows for an analysis of self-selection effects, especially because of the fact that most students in the sample were in their second semester and that the first semester at the university examined here is jointly taken by all students. Longitudinal data would help to analyze cause-effect relationships. For instance, longitudinal data (intra-personal differences) or cross-sectional data including students from different semesters (inter-personal differences) would be needed to clearly determine potential socialization effects. In addition, a sample that includes other disciplines would be helpful to extend the findings of this study. Furthermore, it seems worth noticing that this study only allows for conclusions about the consumption of renewable energy. However, testing the proposed model's ability to predict other forms of energy-related behaviors would be interesting too.

5.3. Implications

Since the link between awareness and behavior was only found to be significant for students enrolled in environmental studies, there is a need for further research on other determinants of renewable energy consumption in general and this relationship in particular. The absence of this relationship among students enrolled in cultural studies or business is further evidence for the often observed gap between environmental knowledge, awareness and pro-environmental behavior about which Kollmuss and Agyeman (2002, p. 240) remarked that "[a]lthough many hundreds of studies have been done, no definitive answers have been found."

Future studies should explicitly include the consideration of potential moderating effects. The importance of moderating effects in the relation between awareness and behavior has been highlighted by several researchers. For example, Yue *et al.* (2013) pointed to the moderating role of situational factors in the relationship between energy awareness and energy-saving behavior. Situation-specific cognitions, for instance, might play an important role and may be shaped by environmental concern (Bamberg, 2003). Corraliza and Berenguer (2000) found the situational decision environment to have a significant influence on whether personal variables eventually turn into behavior. In the light of these findings, more research on how the social environment in communities, such as institutions of higher education, facilitates or inhibits certain forms of behavior is needed. Besides potential moderators, the existence of further predictors of energy awareness and renewable energy consumption might be explored in future research. For instance, the role of values in the formation of energy-related attitudes, motivations, and behaviors would be worth receiving more scholarly attention.

Besides these theoretical and methodological implications, the results of this study can also be important for practitioners. From a marketing perspective, for example, the findings showed that academic discipline can be a useful criterion to segment

young potential consumers. In line with Schlegelmilch *et al.* (1996), the results can help to identify people who are more likely to change from fossil to renewable energy than others. The study identified intrinsic motivation as an important antecedent of energy awareness, and Pelletier *et al.* (1998) pointed to the fact that there are ways to promote intrinsic motivation. Highlighting the role of a person's social environment, the authors stated that "[p]rovided that the characteristics of the interpersonal environment are favorable, soon the process of internalization [of environmentally conscious activities] will take over and people will accept as their own motives that were originally foreign" (p. 462).

The finding that perceived consumer effectiveness had a great direct impact on students' energy awareness and also had an indirect effect on renewable energy consumption has implications for different actors. First, companies marketing renewable energy could try to increase their potential clients' perceived consumer effectiveness by means of communication. This is likely to increase the probability of them switching from conventional to renewable energy suppliers. Second, sustainability initiatives in higher education could try to promote sustainable energy behaviors by enhancing individuals' perceived consumer effectiveness and energy awareness.

6. Conclusion

This study contributes to the debate on attitudinal and behavioral differences across academic disciplines in terms of renewable energy. It identifies psychological antecedents of renewable energy consumption and highlights the importance of energy awareness as a domain-specific mediator. The study combines these insights with an analysis of influences related to the affiliation to a specific academic program. It reveals significant differences between academic disciplines in terms of students' levels of energy awareness, its antecedents, and the effect of energy awareness on renewable energy consumption. As the study shows, the differences between these disciplines need to be considered when investigating environmental and energy issues among students.

Appendix

Table 3: Correlations (Pearson's *r*)

		IM	PEA	PCE	EAW
IM	*r*	1			
	n	280			
PEA	*r*	.619**	1		
	n	267	270		
PCE	*r*	.602**	.410**	1	
	n	277	267	280	
EAW	*r*	.645**	.514**	.570**	1
	n	278	268	278	281
BUS	*r*	-.425**	-.450**	-.295**	-.405**
	n	253	245	253	254
CUL	*r*	-.074	-.029	-.091	-.086
	n	253	245	253	254
ENV	*r*	.478**	.463**	.367**	.467**
	n	253	245	253	254
FEM	*r*	.194**	.156*	.064	.098
	n	271	261	271	272

Note: ** $p < .01$; * $p < .05$.

Table 4: Overall group comparison (Kruskal-Wallis H-tests)

	IM	PEA	PCE	EAW
χ	67.0	63.8	34.4	63.7
p	.000	.000	.000	.000
n	253	245	253	254

Note: For all comparisons: df = 2.

Table 5: Pairwise group comparisons (Mann-Whitney U-tests)

	IM	PEA	PCE	EAW
		Business / environmental studies		
U	1511.0	1412.0	2352.5	1614.5
p	.000	.000	.000	.000
n	188	181	189	190
		Cultural studies / environmental studies		
U	1718.5	1849.5	2116.0	1819.0
p	.000	.000	.000	.000
n	166	161	166	167
		Business / cultural studies		
U	2148.5	1683.0	2395.0	2016.0
p	.011	.000	.140	.004
n	152	148	151	151

Table 6: Regression results (Dependent variable: energy awareness)

IV	*b*	β	*SE*	*t*	*p*	LLCI	ULCI
Constant	.306	-	.525	.582	.561	-.732	1.34
IM	.309	.292	.088	3.50	.001	.134	.483
PEA	.189	.120	.115	1.65	.102	-.038	.416
PCE	.311	.342	.065	4.77	.000	.182	.440
ENV	.438	.153	.226	1.94	.055	-.009	.885
CUL	.200	.063	.228	.874	.383	-.251	.650
FEM	-.158	-.054	.178	-.887	.377	-.510	.194

R^2 = .519; MSE = 1.00; F = 28.39; df1 = 6; df2 = 158; p < .001; n = 165.
Note: LLCI = Lower limit of the confidence interval, ULCI = Upper limit of the CI.

Table 7: Regression results (Dependent variable: renewable energy consumption)

IV	*b*	*SE*	*Z*	*p*	Exp(B)	LLCI	ULCI
Constant	-2.41	1.21	-2.00	.045	.090	-4.77	-.050
EAW	.473	.179	2.64	.008	1.61	.122	.824
IM	-.375	.214	-1.75	.080	.688	-.794	.045
PEA	.456	.270	1.69	.091	1.58	-.073	.985
PCE	-.121	.155	-.778	.437	.886	-.425	.183
ENV	1.54	.511	3.02	.003	4.66	.539	2.54
CUL	.821	.501	1.64	.101	2.27	-.160	1.80
FEM	-.557	.420	-1.33	.185	.573	-1.38	.267

Pseudo R^2: McFadden = .147; Cox & Snell = .183; Nagelkerke = .245; $p < .001$; $n = 165$.
Note: LLCI = Lower limit of the confidence interval, ULCI = Upper limit of the CI.

References

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control* (pp. 11–39). Berlin, Heidelberg: Springer.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179–211.

Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology*, *52*, 27–58.

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, *32*(4), 665–683.

Antil, J. H. (1984). Socially responsible consumers: Profile and implications for public policy. *Journal of Macromarketing*, *4*(2), 18–39.

Arlt, D., Hoppe, I., & Wolling, J. (2011). Climate change and media usage: Effects on problem awareness and behavioural intentions. *International Communication Gazette*, *73*(1-2), 45–63.

Bamberg, S. (2003). How does environmental concern influence specific environmentally related behaviors? A new answer to an old question. *Journal of Environmental Psychology*, *23*(1), 21–32.

Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, *27*(1), 14–25.

Becher, T., & Trowler, P. R. (2001). *Academic tribes and territories: Intellectual enquiry and the cultures of disciplines* (2nd ed.). Buckingham and Philadelphia: SRHE and Open University Press.

Bender, R., & Lange, S. (2001). Adjusting for multiple testing—when and how? *Journal of Clinical Epidemiology*, *54*(4), 343–349.

Borgstedt, S., Calmbach, M., Christ, T., & Reusswig, F. (2011). *Umweltbewusstsein in Deutschland 2010. Ergebnisse einer repräsentativen Bevölkerungsumfrage: Vertiefungsbericht 3: Umweltbewusstsein und Umweltverhalten junger Erwachsener*. Dessau-Roßlau. Retrieved from http://www.umweltdaten.de/publikationen/fpdf-l/4236.pdf

Cecere, G., Mancinelli, S., & Mazzanti, M. (2014). Waste prevention and social preferences: The role of intrinsic and extrinsic motivations. *Ecological Economics*, *107*, 163–176.

Christie, B. A., Miller, K. K., Cooke, R., & White, J. G. (2015). Environmental sustainability in higher education: What do academics think? *Environmental Education Research*, *21*(5), 655–686.

Chung, S. H., Schwager, P. H., & Turner, D. E. (2002). An empirical study of students' computer self-efficacy: Differences among four academic disciplines at a large university. *Journal of Computer Information Systems*, *42*(4), 1–6.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/ correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Erlbaum.

Corraliza, J. A., & Berenguer, J. (2000). Environmental values, beliefs, and actions: A situational approach. *Environment and Behavior*, *32*(6), 832–848.

Crites, S. L., Fabrigar, L. R., & Petty, R. E. (1994). Measuring the affective and cognitive properties of attitudes: Conceptual and methodological issues. *Personality and Social Psychology Bulletin*, *20*(6), 619–634.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Efron, B., & Tibshirani, R. (1993). *An introduction to the bootstrap*. New York: Chapman & Hall/ CRC.

Ellen, P. S., Wiener, J. L., & Cobb-Walgren, C. (1991). The role of perceived consumer effectiveness in motivating environmentally conscious behaviors. *Journal of Public Policy & Marketing*, *10*(2), 102–117.

Eriksson, L., Garvill, J., & Nordlund, A. M. (2006). Acceptability of travel demand management measures: The importance of problem awareness, personal norm, freedom, and fairness. *Journal of Environmental Psychology*, *26*(1), 15–26.

Feldman, D. C. (1984). The development and enforcement of group norms. *The Academy of Management Review*, *9*(1), 47–53.

Fishbein, M. (1973). The prediction of behaviours from attitudinal variables. In C. D. Mortenson & K. K. Sereno (Eds.), *Advances in Communication Research* (pp. 3–31). New York: Harper & Row.

Gardiner, D., McMenemy, D., & Chowdhury, G. (2006). A snapshot of information use patterns of academics in British universities. *Online Information Review*, *30*(4), 341–359.

Gossling, S., Kunkel, T., Schumacher, K., Heck, N., Birkemeyer, J., Froese, J., (2005). A target group-specific approach to "green" power retailing: students as consumers of renewable energy. *Renewable and Sustainable Energy Reviews*, *9*(1), 69–83.

Halder, P., Prokop, P., Chang, C.-Y., Usak, M., Pietarinen, J., Havu-Nuutinen, S., (2012). International survey on bioenergy knowledge, perceptions, and attitudes among young citizens. *BioEnergy Research*, *5*(1), 247–261.

Haley, H., & Sidanius, J. (2005). Person-organization congruence and the maintenance of group-based social hierarchy: A social dominance perspective. *Group Processes & Intergroup Relations*, *8*(2), 187–203.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. Methodology in the social sciences*. New York: Guilford Press.

Heberlein, T. A. (1981). Environmental attitudes. *Zeitschrift für Umweltpolitik & Umweltrecht*, *4*(2), 241–270.

Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *The Journal of Environmental Education*, *18*(2), 1–8.

Holland, J. L. (1959). A theory of vocational choice. *Journal of Counseling Psychology*, *6*(1), 35–45.

Kaiser, F. G., & Frick, J. (2002). Entwicklung eines Messinstrumentes zur Erfassung von Umweltwissen auf der Basis des MRCML-Modells. *Diagnostica*, *48*(4), 181–189.

Kang, J., Liu, C., & Kim, S.-H. (2013). Environmentally sustainable textile and apparel consumption: The role of consumer knowledge, perceived consumer effectiveness and perceived personal relevance. *International Journal of Consumer Studies*, *37*(4), 442–452.

Kemmelmeier, M., Danielson, C., & Basten, J. (2005). What's in a grade? Academic success and political orientation. *Personality and Social Psychology Bulletin*, *31*(10), 1386–1399.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239–260.

Lemos, M. S., & Veríssimo, L. (2014). The relationships between intrinsic motivation, extrinsic motivation, and achievement, along elementary school. *Procedia - Social and Behavioral Sciences*, *112*, 930–938.

Lillemo, S. C. (2014). Measuring the effect of procrastination and environmental awareness on households' energy-saving behaviours: An empirical approach. *Energy Policy*, *66*, 249–256.

MacKinnon, D. P., Warsi, G., & Dwyer, J. H. (1995). A simulation study of mediated effect measures. *Multivariate Behavioral Research*, *30*(1), 41–62.

Meyer, A. (2016). Heterogeneity in the preferences and pro-environmental behavior of college students: The effects of years on campus, demographics, and external factors. *Journal of Cleaner Production*, *112*, 3451–3463.

Milfont, T. L. (2009). The effects of social desirability on self-reported environmental attitudes and ecological behaviour. *The Environmentalist*, *29*(3), 263–269.

Milfont, T. L., & Duckitt, J. (2004). The structure of environmental attitudes: A first- and second-order confirmatory factor analysis. *Journal of Environmental Psychology*, *24*(3), 289–303.

Milfont, T. L., & Duckitt, J. (2010). The environmental attitudes inventory: A valid and reliable measure to assess the structure of environmental attitudes. *Journal of Environmental Psychology*, *30*(1), 80–94.

Nauta, M. M. (2010). The development, evolution, and status of Holland's theory of vocational personalities: Reflections and future directions for counseling psychology. *Journal of Counseling Psychology*, *57*(1), 11–22.

Nordlund, A. M., & Garvill, J. (2003). Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *Journal of Environmental Psychology*, *23*(4), 339–347.

Pavalache-Ilie, M., & Ţîrdia, F.-A. (2015). Parental involvement and intrinsic motivation with primary school students. *Procedia - Social and Behavioral Sciences*, *187*, 607–612.

Pelletier, L. G., Tuson, K. M., Green-Demers, I., Noels, K., & Beaton, A. M. (1998). Why are you doing things for the environment? The motivation toward the environment scale (MTES). *Journal of Applied Social Psychology*, *28*(5), 437–468.

Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social dominance orientation: A personality variable predicting social and political attitudes. *Journal of Personality and Social Psychology*, *67*(4), 741–763.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891.

Reid, A., Petocz, P., & Taylor, P. (2009). Business students' conceptions of sustainability. *Sustainability*, *1*(3), 662–673.

Roberts, J. A. (1996). Green consumers in the 1990s: Profile and implications for advertising. *Journal of Business Research*, *36*(3), 217–231.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78.

Sapci, O., & Considine, T. (2014). The link between environmental attitudes and energy consumption behavior. *Journal of Behavioral and Experimental Economics*, *52*, 29–34.

Schlegelmilch, B. B., Bohlen, G. M., & Diamantopoulos, A. (1996). The link between green purchasing decisions and measures of environmental consciousness. *European Journal of Marketing*, *30*(5), 35–55.

Schluchter, W. & Kunze, C. (2009). *Umweltbewusstsein an der BTU Cottbus 2009: Ergebnisse einer repräsentativen Umfrage im Rahmen des EMAS Prozesses*. Cottbus. Retrieved from www.sozum.tu-cottbus.de/umweltbewusstsein2009

Schultz, P., Oskamp, S., & Mainieri, T. (1995). Who recycles and when?: A review of personal and situational factors. *Journal of Environmental Psychology*, *15*(2), 105–121.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods, 7*(4), 422–445.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, *13*, 290–312.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, *56*(3), 407–424.

Synodinos, N. E. (1990). Environmental attitudes and knowledge: A comparison of marketing and business students with other groups. *Journal of Business Research*, *20*(2), 161–170.

Testa, F., Cosic, A., & Iraldo, F. (2016). Determining factors of curtailment and purchasing energy related behaviours. *Journal of Cleaner Production*, *112*, 3810–3819.

Turner, J. C., Wetherell, M. S., & Hogg, M. A. (1989). Referent informational influence and group polarization. *British Journal of Social Psychology*, *28*(2), 135–147.

Vermeir, I., & Verbeke, W. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of confidence and values. *Ecological Economics*, *64*(3), 542–553.

Weisenfeld, U., & Ott, I. (2011). Academic discipline and risk perception of technologies: An empirical study. *Research Policy*, *40*(3), 487–499.

Windolf, P. (1995). Selection and self-selection at German mass universities. *Oxford Review of Education*, *21*(2), 207–231.

Woolger, C., & Power, T. G. (2000). Parenting and children's intrinsic motivation in age group swimming. *Journal of Applied Developmental Psychology*, *21*(6), 595–607.

Yue, T., Long, R., & Chen, H. (2013). Factors influencing energy-saving behavior of urban households in Jiangsu Province. *Energy Policy*, *62*, 665–675.