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# Target-Oriented Promotion of the Intention for Sustainable Behavior with Social Norms

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**Abstract:** To date, measures to promote sustainable behavior by influencing attitudes have often not had the expected success. Past research indicates that using social norms to promote sustainable behavior in people with low involvement in environmental protection offers a promising basis to address this problem. In this study, this insight was transferred to the context of two environmental measures at an early stage of development by investigating the effects of social norms on the intention for sustainable behavior in people with a low intention to be involved in environmental protection. Study 1 was conducted in the context of a university project on energy-saving behavior with 606 university members, and Study 2 was carried out in the context of a project on the acceptance of an innovative, sustainable technology with 101 consumers. In both studies, social norms had stronger effects on people with a low intention to be involved in environmental protection. Therefore, using social norms to promote the intention for sustainable behavior among people with a low intention to be involved offers a promising basis for further research and could serve as an approach for designing target-group-specific strategies at early stages in the development of sustainability measures.

**Keywords:** intentions; sustainable behavior; social norms; involvement

## 1. Introduction

In a recent report, the United Nations evaluated the climate protection measures of the G20 members and deemed them to be insufficient to achieve the emission targets for 2030 (Program United Nations Environment, 2019). A reason for this result could be the lack of attitude–behavior consistency, also known as the attitude-behavior gap, in the area of environmental behavior: people often report a positive attitude towards sustainable behavior but do not act on it [1,2]. According to [3], this is one of the most significant challenges for policymakers to promote sustainable behavior. In this regard, involvement could be an important factor to distinguish different target groups. [4] define involvement as a specific type of motivation, which is activated when a person perceives a product, service, or promotion as critical to meeting important needs. Measures to initiate behavioral change should target people who do not base their decision to behave in an environmentally friendly manner on their attitude as much as others; involvement could be of great importance in this group. The elaboration likelihood model by [5] states that people with low involvement in a topic form their decisions based on simple deductions about peripheral cues in the field of consumer research. Similar patterns to those in the elaboration likelihood model have been demonstrated by [6] in the formation of purchase intentions for portable multimedia players: the number of simple reviews (subjective and emotional) had a higher positive influence on the intention to purchase portable multimedia players than the number of detailed reviews (objective and concrete) in people with low involvement. Moreover, [7] argue in their heuristic–systematic model that people with a low motivation base their decisions on heuristics

(i.e., simple decision rules) to quickly form a judgment. In addition, [8] demonstrated effects related to those in the heuristic–systematic model in their study about the formation of attitudes towards brands in people with low involvement in the field of consumer research. Advertisements describing merely how the majority of customers rated a product had a positive influence on the attitude towards the brand associated with it in people with low involvement. At the same time, no influence on their attitude towards a brand was found by advertisements pointing out a products' advantages on three attributes compared to competitor products. In the context of sustainable behavior, a social norm—that is, a person's perception of what behavior is typically performed in their social environment or approved by people who are important to them [9]—could be such a peripheral cue or heuristic. (We applied to the psychological definition of social norms, which refers to perceptions of a person about the prevalence of a behavior [10]. This deviates from the sociological definition, which refers to the actual prevalence of a behavior [10]. Social norms could, therefore, contribute to influencing behavior, especially in people with low involvement. [11] investigated this based on self-reports on energy-saving behavior. Social norms here displayed greater effects on people with low involvement than those with high involvement in the field of sustainability.

This paper transfers the basic research results of [11] into practice. The effects are investigated within the contexts of two different projects aimed at the development of sustainability measures. In both projects, the sustainability measures were at an early stage of development. Considering user needs at this stage of development of such measures is important in various types of projects, such as in real-world labs [12] or in technology development [13], since doing so can help to promote the developed measures more effectively among the target group [12,13]. In both contexts, the measures were not implemented yet, and their further pursuit was to be evaluated. Individuals' intention to be involved and intention to behave sustainably were thus investigated instead of their actual involvement and behavior. [14] define intention to be involved as the receptive attitude of organizational members to be involved in a knowledge management process. This was transferred to the contexts of the two projects. In the first context, all university members (staff and students) were integrated into the process of developing sustainability measures at a university. The second context integrated a population-representative sample of households in France in the development of an innovative, sustainable technology. The purpose was to investigate whether social norms can help to promote the intention for sustainable behavior among people with a low intention to be involved. Furthermore, the research questions were investigated using the theory of planned behavior (TPB) by [15] to learn about their effects on the prediction of behavior within an established framework. In both contexts, stronger effects of social norms were found on people with a low intention to be involved in environmental protection.

The first part of this paper explains the allocation of social norms in the TPB. Then, the structure and previous findings on the application of the TPB in the context of environmentally friendly behavior are presented. The main subject of the article, namely, social norms, is subsequently explained, along with its effects on sustainable behavior and moderation effects with involvement. Lastly, the paper discusses two studies in which the presumed moderating effect of social norms on the relationship between the intention to be involved and the intention for sustainable behavior was investigated.

## 2. Theory

### 2.1. Theory of Planned Behavior

The TPB by [15] draws on three variables to explain human behavior: attitude, social norms, and perceived behavioral control (PBC). These three constructs influence behavioral intention, which is the best predictor of behavior. Figure 1 depicts the overall model used in the two studies. Expectations about the impact that the implementation of a certain behavior will have [15] influence one's attitude, and users' assessments of how easy or difficult it is to perform the behavior in question lie in the PBC [15]. Two aspects influence social norms: the descriptive and the injunctive norm. The former

regards a person's perception of what behavior is typically performed in their social environment, while the latter includes a person's perception of what behavior is approved by others who are important to them. Social norms are addressed in more detail in the next chapter.

Many studies have applied the TPB to different contexts of environmentally friendly behavior, for example, sustainable tourism [16], recycling [17], or the acceptance of sharing systems with electric vehicles [18]. [19] reported an average variance explained of $R^2 = 0.27$ in their meta-analysis of various environmentally friendly behaviors. In comparison to the results of an average variance explained of $R^2 = 0.71$ in the meta-analysis by [15] on different behaviors (not only environmentally friendly behavior), the potential of improving the prediction of environmentally friendly behavior seems high. Even considering the meta-analysis by [20] on the prediction of different behaviors across cultures, the TPB exhibits average values of $R^2 = 0.51$ for different behaviors.
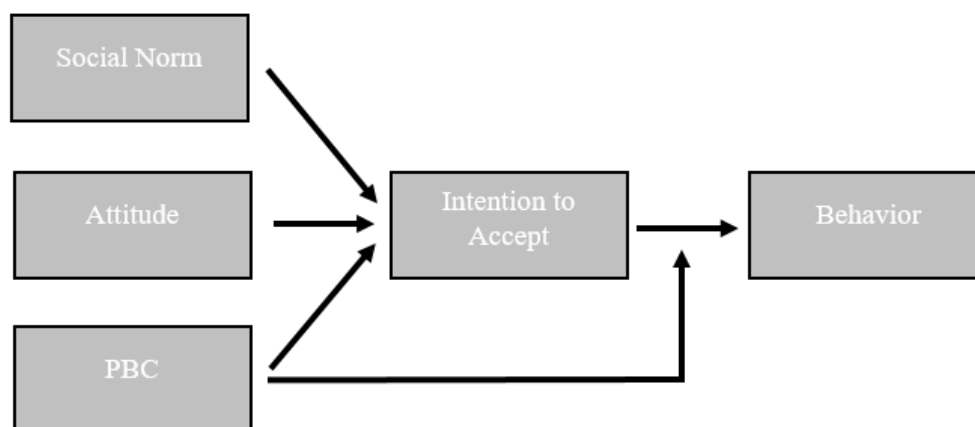


**Figure 1.** Depiction of the theory of planned behavior (TPB) on [15]. PBC—perceived behavioral control.

Previous studies suggest that research on the topic of environmentally friendly behavior should expand the TPB [1,2]. Moreover, its low determination coefficient seems to indicate that, especially in the area of environmentally friendly behavior, the attitude–behavior gap plays a significant role. One component of the TPB, namely, social norms, could be a promising starting point for target-group-specific approaches due to their high impact on the area of environmentally friendly behavior and interactions with involvement.

## 2.2. The Literature on Social Norms

Social norms are an effective way to influence environmentally friendly behavior [21]. A study on hotel choice [22] and another on saving energy [23] demonstrate the effects of the variable on different sustainable behaviors. In both studies, more sustainable behavior was reported after the information on social norms was highlighted.

Furthermore, [24] found in their study that messages with descriptive norms could reinforce energy-saving behavior. They placed door tags on the doors of private households with information about the energy consumption of neighbors. They, thus, increased the visibility of the behavior, and this strengthened the relationship between social norms and the intention to conserve energy [24]. [22] reported similar effects in the recycling of towels in hotels. Door tags with information about descriptive norms, such as, "The majority of guests use their towels several times", were also issued to hotel guests, which increased their frequency of reusing towels. In addition, [23] revealed another way in which to increase the visibility of behavior and hence the visibility of (descriptive) norms: a monthly email report on the amount of energy private households had saved in percentage terms compared to their neighbors increased self-reported energy-saving behavior. Then, in a diary study by [25], fictitious information was handed out to university members about the mobility behavior of others on campus, and doing so increased the frequency of use of sustainable means of transport. In the application of

descriptive norms, however, "boomerang effects" have already been discovered [26,27]. Boomerang effects refer to incidents where, under certain circumstances, messages with descriptive norms can backfire and reduce instead of increase environmentally friendly behavior. The explanation used here was that the target group of the measures had not read the entire message. [27], for example, created messages with descriptive norms on buying sustainable fish in a supermarket; the purchase of conventional fish consequently increased, while the purchase of sustainable fish decreased. It was suspected that customers had only perceived the part of the message regarding the purchase of fish. To prevent this from occurring, [26] suggest the use of a combination of descriptive and injunctive norms. Communicating whether relevant people in the social environment are in favor of the environmentally friendly behavior in question (injunctive norm) eliminated boomerang effects in their study. Based on these results, it is important to either apply both aspects of social norms or carefully choose the aspect that best fits the research context.

The effectiveness of social norms could depend on, among other things, the involvement of individuals as a moderating variable. In their article on the consumption of sustainable food, [4] define involvement as a specific type of motivation, which is activated when a person perceives a product, service, or promotion as critical to meeting important needs. In the elaboration–likelihood model, [5] explain that people with a high level of involvement base their decisions on conscious criteria: they weigh up the advantages and disadvantages of a specific topic or object in a reflective way. In contrast, people with low involvement base their decisions on inferences from (partly unconsciously perceived) peripheral cues. [6] demonstrated this in their study regarding the purchase of portable multimedia players: on the one hand, the number of simple customer ratings with a purchase recommendation for customers with low involvement was more closely related to the purchase intention than detailed ratings concerning the characteristics of the multimedia players. In the case of customers with a high level of involvement, on the other hand, the correlation between the purchase intention and the number of detailed customer ratings was stronger than with the number of simple customer ratings. A similar pattern of decision processes is described in the heuristic–systematic model by [7]. They differentiate between two ways in which information is processed by people when making a decision: systematic and heuristic processing. When processing information systematically, people are motivated to a high degree, apply high cognitive effort, and weigh up detailed arguments on the subject matter. When processing information heuristically, people are motivated to a low degree and use simple decision rules called heuristics, which allow them to quickly form a judgment. [8] observed this pattern in their study about the effect of advertisements on brand attitudes. In people with low involvement, advertisements communicating how the majority of customers rated a product had a positive influence on their attitude towards the brand associated with it, whereas advertisements comparing the product on three attributes to a competitor product had no influence on that attitude. In contrast, among people with high involvement, the advertisements providing a detailed comparison with a competitor product had a higher positive influence on their attitude towards the associated brand than advertisements showing the product's rating by the majority of customers. In the context of promoting sustainable behavior, a change in attitudes by communicating facts to people with a high level of involvement seems promising. If, however, people have a low level of involvement, peripheral cues or heuristics such as social norms could be promising to promote the intention for sustainable behavior. Managing to promote this intention to this group is especially promising, as its members are difficult to reach through commonly used sustainability measures such as information campaigns. This has already been demonstrated in a study by [11] on energy-saving behavior: descriptive social norms had a greater impact on the energy-saving behavior of people with low involvement than those with high involvement.

It is hypothesized that social norms have stronger effects on the intention of people with a low intention to be involved than those with a high intention to be involved. In this study, this was investigated in two different applied contexts of projects with sustainability measures at an early stage of development: in the context of energy-saving behavior at a university (Study 1) and the acceptance

(and therefore usage) of specific environmentally friendly technology, namely, demand response (DR) systems (Study 2).

## 3. Study 1

The first study used data from a project in which university staff and students were involved in the development of energy-saving measures at a university. This context was chosen as universities have a role model function in society. Since they educate students, who are future energy consumers, a large impact on future energy consumption worldwide was anticipated in this context. Approximately 900 staff members and 4000 students received an invitation to participate in the online survey via e-mail. The participants were asked about their energy-saving behavior at the university. It was expected that social norms have a stronger impact on the intention to save energy among university members with a low intention to be involved than among those with a high intention to be involved in sustainability.

### 3.1. Sample

A dataset from the online survey carried out in winter 2016 with 606 university members (students, staff, and professors) was reanalyzed to test the hypothesis. The average age across all groups surveyed was 20.76 years (SD = 18.05). In total, 364 female (60.1%) and 241 male (39.9%) university members took part in the survey. Furthermore, 471 students (77.7%) and 135 university employees (22.3%) were surveyed.

### 3.2. Instruments

An overview of the instruments used is provided in Appendix A, Table A1. All items were self-constructed. The central variables of the TPB were assessed in the form of Likert scales, ranging from 1—"do not agree at all" to 6—"completely agree". The intention for sustainable behavior was formed with two items: "I intend to behave in a more energy-saving/resource-saving manner at the university in the future" and the intention for involvement was measured with the dichotomous item "I would like to become involved in the future research project *climate neutral campus*". The answering options were 0—"no", 1—"yes". Furthermore, the social norms were recorded separately for the groups of university employees and students; an example item was: "The majority of my fellow students/colleagues behave in an energy-conscious manner at the university". The attitude was formed from three different items; an example was: "I am interested in the topic of energy saving at the university." Moreover, two items were used to measure the variable "perceived behavioral control"—one of them was "I have enough possibilities to influence the energy consumption of the university." A schematic representation of the model is presented in Figure 2. All scales showed Cronbach's alpha values above $\alpha = 0.7$.
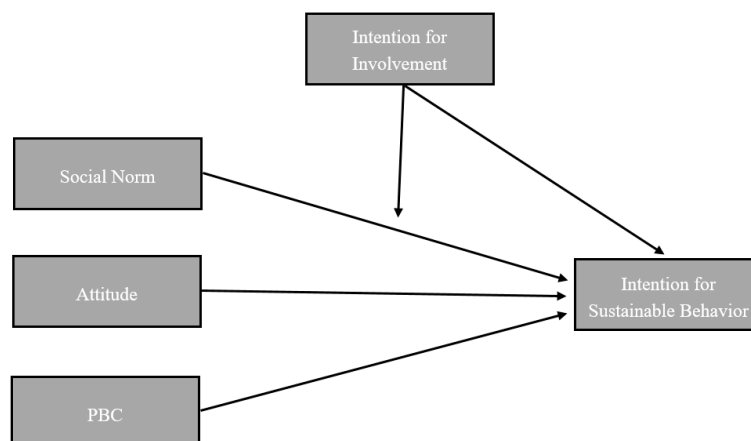


**Figure 2.** Schematic representation of the model from Study 1.

### 3.3. Results from Study 1

Model 1 (the linear regression model) included the following independent variables: attitude, social norms, PBC, and intention for involvement. The dependent variable was the intention for sustainable behavior. Model 2 (the moderation model) additionally included the moderation effect of the intention to be involved on the relationship between social norms and the intention for sustainable behavior. According to [28], the standardized regression coefficient beta can be interpreted as a measure of effect size. Values from 0.5 upwards can be interpreted as strong effects, values of 0.3 and above as medium effects, and values of 0.1 and above as weak effects. The analysis of the regression coefficients in the two models only revealed minor differences. The predictor social norm showed weak regression coefficients for Model 1 (beta = 0.118; $p$ = 0.002) and for Model 2 (beta = 0.120; $p$ = 0.002). The intention to be involved also revealed weak regression coefficients, which were identical in both models, with values of beta = 0.111 and $p$ = 0.005. Attitude displayed medium regression coefficients in both models: beta = 0.300 and $p$ < 0.0001. Furthermore, the perceived behavior control showed weak regression coefficients in Model 1 (beta = 0.170; $p$ < 0.0001) as well as in Model 2 (beta = 0.161; $p$ < 0.0001), and a weak regression coefficient of beta = −118 and $p$ = 0.002 in Model 2 resulted from the moderation effect of the intention to be involved on the relationship between social norms and the intention for sustainable behavior. The descriptive statistics of the key variables used in Study 1 are provided in Table 1, and Table 2 summarizes the results of the moderation model from Study 1. (The stability of the models was also tested with the control variables age, gender, and function at the university. No significant differences were found.)

**Table 1.** Descriptive statistics and correlations from Study 1.

| Variable | $n$ | Mean | SD | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|
| 1. Intention for sustainable behavior (scale: 1 low to 6 high) | 593 | 5.13 | 1.10 | - | | | | |
| 2. Intention to be involved (scale: 0 no; 1 yes) | 604 | 51% | - | 0.22 ** | - | | | |
| 3. Social norm (scale: 1 low to 6 high) | 547 | 3.61 | 1.04 | 0.21 ** | 0.11 * | - | | |
| 4. Attitude (scale: 1 low to 6 high) | 604 | 4.10 | 1.21 | 0.42 ** | 0.33 ** | 0.17 ** | - | |
| 5. PBC (scale: 1 low to 6 high) | 584 | 3.70 | 1.26 | 0.29 ** | 0.13 ** | 0.20 ** | 0.23 ** | - |

Note: Number of subjects ($n$), standard deviation (SD), * $p$ < 0.05, ** $p$ < 0.01.

**Table 2.** Results from Study 1.

| Intention for Sustainable Behavior | Model 1 | Model 2 |
|---|---|---|
| Social norm | 0.118 *** | 0.120 *** |
| Intention to be involved | 0.111 *** | 0.111 *** |
| Perceived behavioral control | 0.170 *** | 0.161 *** |
| Attitude | 0.300 *** | 0.300 *** |
| Social norm x intention to be involved | - | −0.118 *** |
| Constant | 0.006 | 0.019 |
| Observations | 521 | 521 |
| $R^2$ | 0.22 | 0.24 |
| Conditional effect—no intention to be involved | - | 0.320 *** |
| Conditional effect—intention to be involved | - | 0.050 |

Note: Sig: * $p$ < 0.1, ** $p$ < 0.05, *** $p$ < 0.01. Dependent variable: intention for sustainable behavior.

The value delta $R^2$ was used to test the difference in the variance explained between Model 1 (excluding the moderation effect) and Model 2 (including the moderation effect). The comparison

yielded a value of delta $R^2$ = 0.02. According to [29], a test for moderation should also include an analysis of the simple slopes. This refers to the procedure in which a significance test of the contingent slopes is performed at all levels of a nominal mediator or at one standard deviation above, below, and at the mean of a continuous mediator (Aiken & West, 1991). The simple slopes analysis (cf. Figure 3) revealed that social norms only have an effect on people with a low intention to be involved (intention to be involved no; $\hat{y}$low = 4.93 + 0.32 ×; $p$ < 0.0001). There was no significant effect on people with an intention to be involved (intention to be involved yes; $\hat{y}$high = 5.4 + 0.05 ×; $p$ = 0.998). In addition, we conducted a post hoc power analysis using $F^2$ = 0.02 and $\alpha$ = 0.05. This approach was chosen according to the suggested procedure by [28] for power analysis in multiple regression models. Our achieved power was 0.94, suggesting that the sample size was adequate for the effect of interest. However, since we reanalyzed a given data set, we could not plan the sample size a priori.
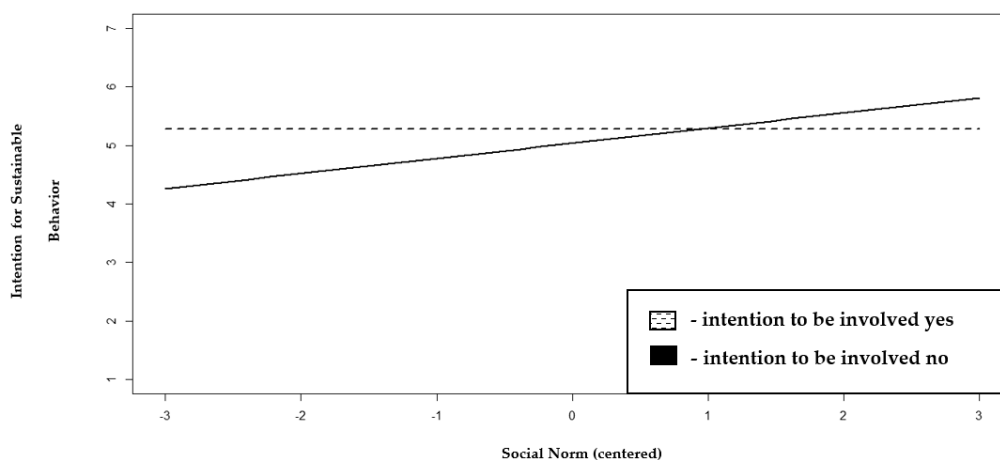


**Figure 3.** Simple slopes of the moderation effect of social norms x intention to be involved from Study 1.

### 3.4. Discussion of Study 1

With regard to the hypothesis that social norms have a stronger effect on people with a low intention to be involved than on people with a high intention to be involved, this was confirmed for the context of Study 1. This supports the assumption that the results of [11] can be transferred to sustainability measures at the early stages of development. The results could be a starting point for designing strategies for people with low intention to be involved. To test whether the effect can be replicated in a different context, the moderation was also examined in a second study on the acceptance of a DR system.

## 4. Study 2

The second dataset in which the hypothesis was tested originates from a project on the acceptance of new technology, namely, DR systems.

### 4.1. Sample

A survey of DR systems in private households in France (conducted in 2018) was used to check whether social norms could also be used to promote the intention for sustainable behavior among people with a low intention to be involved. A DR system is an innovative sustainable technology that provides feedback to single households on when energy use is the cheapest in order to avoid energy-demand peaks in the supply systems. In total, 2020 consumers matching the French population regarding their distribution in gender, age, income, education, and region were recruited to participate in the online survey via a research panel. The focus of the analysis was on people who had already used DR systems in the past or are currently using them. This was done because it was expected that only people with experience could fully imagine the use of the complex technology of DR systems.

The sample consisted of 101 participants: 52 female (51%) and 49 male (49%) subjects. The average age was 43.41 years (SD = 13.9).

*4.2. Instruments*

An overview of the instruments used is provided in Appendix A, Table A2. All items were self-constructed. First, the intention for sustainable behavior was measured with the item "How high do you estimate the probability that you would use a DR system in the future?" on a scale from 1—"very low probability" to 10—"very high probability". Second, the intention for involvement was recorded with five items, such as, "With regard to a DR system, how important are the following aspects to you?—To have the possibility to save energy costs by shifting my energy use to times when there is a lot of energy available," on a scale from 1—"not important at all" to 5—"very important". It was assumed that people who intended to manually adjust the settings of a DR system, instead of automatically running it, would have an intention to be involved in this technology. Third, to measure social norms, six items were used (e.g., "People around me think that I should use a DR system.") on a scale from 1—"strongly disagree" to 5—"strongly agree". Fourth, attitude was captured by the item "How do you rate the general idea of a DR system?" on a scale from 1—"very negative" to 5—"very positive". Fifth, to measure the PBC, the following question was asked: "How high do you estimate the probability that you would be able to use the service of a DR system if it was offered on a smartphone, smart TV, tablet, personal computer, or control unit (as used in air conditioning)". Answers were given on a scale from 1—"very low probability" to 5—"very high probability".

*4.3. Results from Study 2*

As in Study 1, Model 1 (the regression model) included the following independent variables: attitude, social norms, PBC, and intention for involvement. The dependent variable was the intention for sustainable behavior. Model 2 (the moderation model) additionally included the moderation effect of the intention to be involved on the relationship between social norms and the intention for sustainable behavior. No significant regression coefficients were found in both models for social norms and the intention to be involved. However, the PBC showed a medium regression coefficient in Model 1 (beta = 0.287; $p$ = 0.012) and Model 2 (beta = 0.259; $p$ = 0.021). Medium regression coefficients in Model 1 (beta = 0.443; $p$ < 0.0001) and Model 2 (beta = 0.440; $p$ < 0.0001) were also found with the variable attitude. Furthermore, a weak regression coefficient (beta = −0.203; $p$ = 0.025) resulted from the moderation effect of the intention to be involved on the relationship between social norms and the intention for sustainable behavior. The descriptive statistics of the key variables used in Study 2 are provided in Table 3, and Table 4 summarizes the results of the moderation model from Study 2. (The stability of the models was also tested with the control variables age, gender, and function at the university. No significant differences were found.)

**Table 3.** Descriptive statistics and correlations from Study 2.

| Variable | *n* | Mean | SD | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|
| 1. Intention for sustainable behavior (scale: 1 low to 10 high) | 593 | 7.12 | 2.15 | - | | | | |
| 2. Intention to be involved (scale: 1 low to 5 high) | 604 | 3.91 | 0.75 | 0.42 ** | - | | | |
| 3. Social norm (scale: 1 low to 5 high) | 547 | 2.99 | 1.11 | 0.31 ** | 0.02 | - | | |
| 4. Attitude (scale: 1 low to 5 high) | 604 | 3.83 | 0.85 | 0.66 ** | 0.52 ** | 0.34 ** | - | |
| 5. PBC (scale: 1 low to 5 high) | 584 | 3.57 | 0.91 | 0.57 ** | 0.45 ** | 0.50 ** | 0.63 ** | - |

Note: Number of subjects (*n*), standard deviation (SD), * $p < 0.05$, ** $p < 0.01$.

**Table 4.** Results from Study 2.

| Intention for Sustainable Behavior | Model 1 | Model 2 |
|---|---|---|
| Social norm | −0.001 | 0.046 |
| Intention to be involved | 0.072 | 0.022 |
| Perceived behavioral control | 0.287 ** | 0.259 ** |
| Attitude | 0.443 *** | 0.440 *** |
| Social norm x intention to be involved | - | −0.203 ** |
| Constant | −0.043 | 0.045 |
| Observations | 95 | 95 |
| $R^2$ | 0.48 | 0.51 |
| Conditional effect—low intention to be involved | - | 1.170 * |
| Conditional effect—medium intention to be involved | - | 0.690 |
| Conditional effect—high intention to be involved | - | 0.230 |

Note: Sig: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Dependent variable: intention for sustainable behavior.

As in Study 1, the value delta $R^2$ was used to test the difference in the variance explained between Model 1 (excluding the moderation effect) and Model 2 (including the moderation effect). The comparison yielded a value of delta $R^2 = 0.030$. An examination of the simple slopes (see Figure 4) revealed that social norms only have an effect on people with a low intention to be involved—the effect was marginally significant ($-1$ SD; $ŷ_{low} = 6.34 + 1.17 \times$; $p = 0.089$). In contrast, for people with medium intention to be involved, a non-significant simple slopes effect was found (0 SD; $ŷ_{med} = 7.13 + 0.69 \times$; $p = 0.586$). Even though, by assessing Figure 4, a boomerang effect could be assumed, the simple slopes analysis also revealed no significant effect on people with a high intention to be involved ($+1$ SD; $ŷ_{high} = 7.92 + 0.23 \times$; $p = 0.168$). As in Study 1, we conducted a post hoc power analysis using $F^2 = 0.03$ and $\alpha = 0.05$. Again, this approach was chosen according to the suggested procedure by [28] for power analysis in multiple regression models. Our achieved power was 0.42, suggesting that the sample size was not adequate. However, since we reanalyzed a given data set, we could not plan the sample size a priori.

*4.4. Discussion of Study 2*

In the second study, which investigated the intention for sustainable behavior in a different context, the results also revealed the same pattern as in the first study. With regard to the intention to use DR systems, social norms had a stronger effect on people with a low intention to be involved than on people with a high intention to be involved.
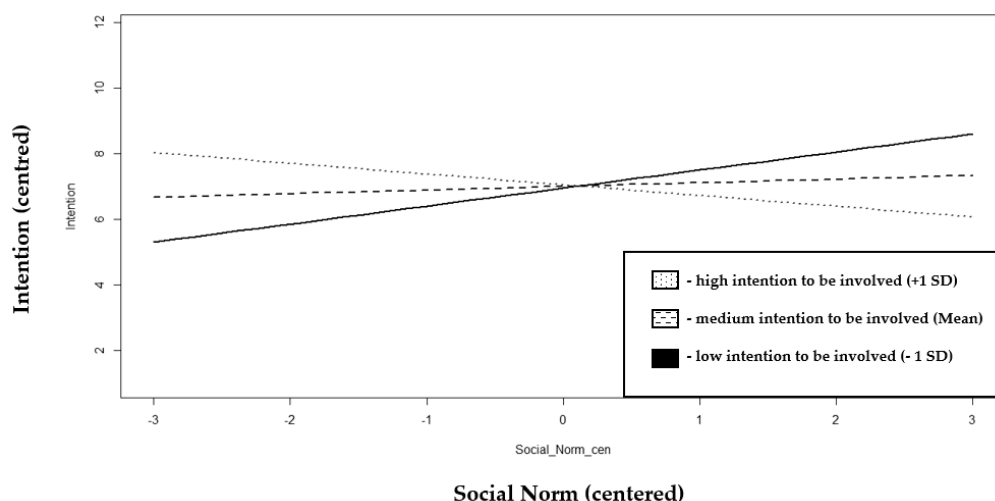
**Figure 4.** Simple slopes of the moderation effect of social norm x intention to be involved from Study 2.

## 5. General Discussion

In this research paper, the impact of social norms on people with a low intention to be involved was investigated in two different contexts. The first research context was a university project in which students and staff were involved in the development of energy-saving measures at a university. Our assumption that social norms have a stronger impact on the intention to save energy among university members with a low intention to be involved than among those with a high intention to be involved was confirmed. The second context was a research project regarding the acceptance of the innovative technology DR systems in French private households. Here, it was assumed that social norms would have a greater impact on the intention to use the new technology, namely, DR systems, for people with a low intention to be involved than for those with a high intention to be involved. The assumption in this context was also confirmed. These results extend the work of [11] by transferring their results to two projects with sustainability measures at an early stage of development. This is important because considering user needs during a measure's early stage of development can help to promote it among the target group [12,13].

Therefore, carrying out further research here would be worthwhile. In the search for reference points to influence sustainable behavior, the assumption that a change is complex can already be deduced from the set of upstream influencing factors in the setting. This is confirmed by the small effects of measures aimed at changing attitudes in this area [30]. It is unlikely that a universal measure to promote sustainable behavior will be found, as even effective measures to promote sustainable behavior have other limitations. For example, hard regulations (such as taxes for unsustainable consumption) are an effective way in which to motivate different types of people to behave more sustainably; however, as resources to verify compliance with hard regulations are limited, and, for some matters, resistance against regulations can be expected, alternative measures to supplement these are urgently needed. The results reported here should be seen as a starting point for conducting further research on target-group-specific approaches. A combination of different measures targeting the needs of diverse groups should eventually be constructed on this basis to effectively promote sustainable behavior. To achieve significant results with the derived measures, studies investigating the promotion of sustainable behavior among people with high involvement in environmental protection are needed in addition to the proposed effect. More variables, such as involvement and separating different target groups, should also be investigated, and sustainability measures considering their needs should be developed.

A major limitation of the study at hand is that a post hoc power test revealed that the proposed moderation effect was underpowered in Study 2. Nevertheless, the effect was found in two contexts with different sustainable behaviors. In addition, [31] claim that post hoc power tests are fundamentally

flawed. Therefore, testing the proposed effect in the context of demand response systems in a study with the required sample size of 151 based on an a priori power test using the effect size of $F^2 = 0.14$ and $\alpha = 0.05$ from [11] seems worthwhile. It should also be noted that the simple slope for low involvement in the context of DR systems was only marginally significant. One reason for this could be the aforementioned small sample size compared to the context of energy saving at a university. Since DR systems are a new technology, people who have experience with it are a minority. At the same time, social norms likely only exist for people who already have experience with them. Accordingly, further research with larger samples of people who have experience with this technology should be carried out as soon as the technology has spread more widely among the population.

The observed effect on people with a high intention to be involved in sustainability is also difficult to explain with the research design used in this study. As the level of the intention for sustainable behavior in this group was already high, the lower impact of social norms could be due to a ceiling effect. Future studies should, thus, analyze whether people with a high intention to be involved in sustainability can be motivated by measures targeting their attitude.

Furthermore, the study at hand did not consider actual involvement and behavior, as it was considered more important to regard user needs at an early development stage of measures to promote sustainable behavior. Further research on the topic should investigate whether the reported effects also apply to actual involvement and behavior at later stages of development.

Moreover, in Study 1 and Study 2, the injunctive norm and the descriptive norm, respectively, were neglected. In the first case, this was done because the research context was a university. This context presents a high visibility of sustainable behaviors, and the descriptive norm was thus expected to have a much larger influence than the injunctive norm. In Study 2, the context was participants' homes. Here, the visibility of different sustainable behaviors was expected to be rather low, and accordingly, the injunctive norm was used. Therefore, future studies should investigate whether the moderation effect persists if both aspects of social norms are applied.

The items used to measure the TPB were initially self-constructed to measure issues that are important in the respective project contexts. One could question whether they fully fit the constructs of the TPB and involvement in terms of content. Moreover, with some of the items, it is questionable whether they display internal consistency. Future studies on the proposed effects should thus apply items closer to the ones from the studies in which the models were developed. Doing so could fully ensure that the items accurately measure the targeted constructs.

Sniehotta [32] declared the TPB to be outdated and insufficient to explain behavior. According to them, the theory makes an unfounded claim to explain all human behavior rather than declaring a range of intended applications. One of the theories suggested as a substitute is a dual process theory, which future research should focus on more extensively instead of the TPB.

Another promising reference point for further work on this topic could be to strengthen the effects of social norms by providing information on descriptive norms. Several former studies have demonstrated that the influence of social norms on environmentally friendly behavior can be increased as a result [23–26]. Areas with highly visible behaviors could be particularly promising here. According to [33], the visibility of behavior plays an important role in the impact of social norms on environmentally friendly behavior. Even stronger moderation effects might be found, for example, in sustainable mobility, where social norms themselves have medium effects [18]. Their effect in this field can be further enhanced by hints about the behavior of others [25].

In summary, our research indicates that for organizations to reach their sustainability targets, they must determine how they can establish strong social norms regarding sustainable behavior in their organizations. The resulting measures need to be specifically tailored to people with a low intention to be involved. On this basis, measures that help to overcome the intention–behavior gap can be deduced.

## 6. Conclusions

Stronger effects of social norms on people with low involvement have been found in two different contexts of sustainability measures at an early stage of development. Even though the two studies at hand had several limitations, carrying out future research on the proposed effects is still worthwhile. Bearing in mind the complexity of promoting sustainable behavior, this seems especially evident. Furthermore, should the effects be found in broader contexts with larger samples, the results of this paper could be a promising starting point for the conception of target-group-specific strategies, and they could also motivate people who have little motivation to behave sustainably to adjust their behavior. To fully use the potential of the proposed effect on environmental protection, further studies investigating target-group-specific needs must be conducted. Most likely, only a mix of measures considering the needs of different target groups can produce significant effects on sustainable behavior.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

**Table A1.** Measures used in Study 1.

| Variable | Item | Scale |
|---|---|---|
| Intention for sustainable behavior | I intend to behave in a more energy-saving manner at the university in the future. | 1—do not agree at all to 6—completely agree |
| Intention for sustainable behavior | I intend to behave in a more resource-saving manner at the university in the future. | 1—do not agree at all to 6—completely agree |
| Intention for involvement | I would like to become involved in the future research project climate neutral campus. | 1—yes; 2—no |
| Social norm (students) | The majority of my fellow students behave in an energy-conscious manner at the university. | 1—do not agree at all to 6—completely agree |
| Social norm (students) | Environmental protection is important to the majority of my fellow students at the university. | 1—do not agree at all to 6—completely agree |
| Social norm (university employees) | The majority of my fellow colleagues behave in an energy-conscious manner at the university. | 1—do not agree at all to 6—completely agree |
| Social norm (university employees) | Environmental protection is important to the majority of my colleagues at the university. | 1—do not agree at all to 6—completely agree |
| Attitude | I am interested in the topic of energy saving at the university. | 1—do not agree at all to 6—completely agree |
| Attitude | I am interested in the topic of environmental protection at the university. | 1—do not agree at all to 6—completely agree |
| Attitude | I am interested in the topic of resource consumption at the university. | 1—do not agree at all to 6—completely agree |
| Perceived behavioral control | I have enough possibilities to influence the energy consumption of the university. | 1—do not agree at all to 6—completely agree |
| Perceived behavioral control | I have enough possibilities to influence the resource consumption of the university. | 1—do not agree at all to 6—completely agree |

**Table A2.** Measures used in Study 2.

| Variable | Item | Scale |
|---|---|---|
| Intention for sustainable behavior | How high do you estimate the probability that you would use a DR system in the future? | 1—very low probability to 10—very high probability |
| Intention to be involved | With regard to a DR system, how important are the following aspects to you?—To get information about time shifting possibilities and estimated costs. | 1—not important at all to 5—very important |
| Intention for involvement | With regard to a DR system, how important are the following aspects to you?—To be informed about energy consumption of certain tasks (e.g., cooking, opening the fridge, heat up after opening the window). | 1—not important at all to 5—very important |
| Intention for involvement | With regard to a DR system, how important are the following aspects to you?—To have the possibility to save energy costs by shifting my energy use to times when there is a lot of energy available. | 1—not important at all to 5—very important |
| Intention for involvement | With regard to a DR system, how important are the following aspects to you?—To know about everything that is going on regarding energy in my household. | 1—not important at all to 5—very important |
| Intention for involvement | With regard to a DR system, how important are the following aspects to you?—Even if my energy provider can change settings, I want to remain in control. | 1—not important at all to 5—very important |
| Social norm | People around me think that I should use a DR-system. | 1—strongly disagree to 7—strongly agree |
| Social norm | My family wants me to use a DR-system. | 1—strongly disagree to 7—strongly agree |
| Social norm | My friends want me to use a DR-system. | 1—strongly disagree to 7—strongly agree |
| Social norm | I know many people around me who use DR-systems. | 1—strongly disagree to 7—strongly agree |
| Social Norm | I know many family members using DR-systems. | 1—strongly disagree to 7—strongly agree |
| Social Norm | I know many friends using DR-systems. | 1—strongly disagree to 7—strongly agree |
| Attitude | How do you rate the general idea of a DR system? | 1—very negative to 5—very positive |
| Perceived behavioral control | How high do you estimate the probability, that you would be able to use the service of a DR system if it was offered on a Smartphone? | 1—very low probability to 5—very high probability |
| Perceived behavioral control | How high do you estimate the probability, that you would be able to use the service of a DR system if it was offered on a Smart TV? | 1—very low probability to 5—very high probability |
| Perceived behavioral control | How high do you estimate the probability, that you would be able to use the service of a DR system if it was offered on a Tablet? | 1—very low probability to 5—very high probability |
| Perceived behavioral control | How high do you estimate the probability, that you would be able to use the service of a DR system if it was offered on a Personal Computer? | 1—very low probability to 5—very high probability |
| Perceived behavioral control | How high do you estimate the probability, that you would be able to use the service of a DR system if it was offered on a Control unit? (as used in air conditioning) | 1—very low probability to 5—very high probability |

DR—demand response.

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