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Antecedents of employee electricity saving behavior in organizations: an empirical study based on norm activation model

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Abstract

China is one of the major energy-consuming countries, and is under great pressure to promote energy saving and reduce domestic energy consumption. Employees constitute an important target group for energy saving. However, only a few research efforts have been paid to study what drives employee energy saving behavior in organizations. To fill this gap, drawing on norm activation model (NAM), we built a research model to study antecedents of employee electricity saving behavior in organizations. The model was empirically tested using survey data collected from office workers in Beijing, China. Results show that personal norm positively influences employee electricity saving behavior. Organizational electricity saving climate negatively moderates the effect of personal norm on electricity saving behavior. Awareness of consequences, ascription of responsibility, and organizational electricity saving climate positively influence personal norm. Furthermore, awareness of consequences positively influences ascription of responsibility. This paper contributes to the energy saving behavior literature by building a theoretical model of employee electricity saving behavior which is understudied in the current literature. Based on the empirical results, implications on how to promote employee electricity saving are discussed.

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1. Introduction

China is one of the major energy-consuming countries. In 2010, total energy consumption of China was 3249.39 Million tons of standard coal equivalent, while primary energy production was only 2969.16Million (NBSC, 2011). Energy consumption of China is also increasing along with fast economic development. Meanwhile, the country's overall energy efficacy is lower than that of developed countries (e.g., Japan). Thus, China is under great pressure to improve energy efficacy, promote energy saving, reduce energy consumption and alleviate energy crisis.

In China, service sector is developing rapidly. In 2009, the proportion of service sector outputs in GDP reaches 43.4%, and this proportion in Beijing city is as high as 75.5%. Service sector is also likely to grow in the near future. In many service industries (e.g., financial industry, software development, and consulting), companies usually do not engage in material production, and their employees' energy consumption in offices is themajor source of energy consumption. Thus, employees constitute an important target group for energy saving. Many companies also realize the importance of employee energy saving, and try to promote employees' participation. However, many companies face the problem thatemployees do not participate actively in energy saving(Scherbaum et al., 2008; Siero et al., 1996). Therefore, it is crucial to understand factors influencing employee energy saving behavior.

Careful review of energy saving literature shows that only a few research efforts have been paid to study what drives employee electricity saving behavior in organizations(Scherbaum et al., 2008; Siero et al., 1996). The most relevant literature is household energy saving literature, and many research works have been done to study ways to promote household energy saving (Abrahamse and Steg, 2009; Abrahamse et al., 2007; Banfi et al., 2008; Barr et al., 2005; Feng et al., 2010; Gyberg and Palm, 2009; Hansla et al., 2008; Kwak et al., 2010; Martinsson et al., 2011; Thøgersen and Grønhøj, 2010).These literature may provide some references for understanding employee energy saving behavior.

However, employee energy saving is different from household energy saving(Scherbaum et al., 2008). For example, employee's energy consumption in organizations is usually free of charge, as they do not need to pay for it. By contrast, households usually need to pay for their energy consumption in their home. Free supply of energy increases the chance of energy wasting in organizations. Meanwhile, employee's energy saving behavior should be influenced by the organizational environment based on organizational climate literature (Bock et al., 2005). Given these differences and crucial role of employee energy saving, it is necessary to study factors influencing employee energy saving behavior in organizations.

Electricity is the main form of office workers' energy consumption, thus we focused on employee electricity saving behavior. In order to enhance our understanding, we built a theoretical model of employee electricity saving behavior based on norm activation model (NAM). Furthermore, organizational literature has long recognized the importance of organizational climate on various employee behaviors (Bock et al., 2005). To explore its role, we integrated organization climate literature with NAM, and studied how organizational electricity saving climate could influence employee electricity saving behavior. The research model was tested using survey data collected from office workers in Beijing, China.

Beijing is the capital of China. Its energy resources are insufficiency and it needs other provinces' energy support. For example, the total final electricity consumption in 2010 is

78.122 billion kWh. However, its electricity production in 2010 is only 26.334 billion kWh (NBSC, 2011). In the same year, other provinces provided 56.564 billion kWh electricity for Beijing. As the capital, Beijing has priority over other provinces in energy use. Meanwhile, many provinces and cities experienced power shortage during peak hours in summer. So Beijing has the responsibility promote electricity saving in order to reduce other provinces' burden of electricity supply.

In the following section, we will describe the NAM, then formulate our research model and develop corresponding research hypotheses. After that, the research method is presented. The results will be given, followed by discussion of results, research and policy implications.

2. Theoretical background

NAM is widely applied to study various kinds of individual pro-social behavior (De Groot and Steg, 2009; Schwartz, 1977). Pro-social behavior refers to act that can benefit other persons, such as helping, sharing, and pro-environmental behavior (De Groot and Steg, 2009). Employee's electricity saving behavior in company can be viewed as one kind of pro-social behavior, as the behavior can benefit their company (e.g., reduce company's electricity cost). So NAM is a suitable theory to study employee electricity saving behavior. Similarly, previous researchers have studied different kinds of pro-environment behaviors using NAM, such as green phone purchasing (Nnorom et al., 2009), and the use of public transportation (Bamberg et al., 2007). There are three key variables in NAM: personal norm, awareness of consequences, and ascription of responsibility. Personal norm is defined as "moral obligation to perform or refrain from specific actions" (Schwartz and Howard, 1981, p 191). Awareness of consequences is descried as "whether someone is aware of the negative consequences for others or for other things one values when not acting prosocially" (De Groot and Steg, 2009, p 426). Ascription of responsibility refers to "feelings of responsibility for the negative consequences of not acting prosocially" (De Groot and Steg, 2009, p 426).

According to NAM, individual's pro-social behavior is positively influenced by one's personal norm. This means when one experiences a feeling a moral obligation to act pro-socially, one will be motivated to engage in these pro-social behaviors to align with one's value systems. One's personal norm is activated by one's ascription of responsibility and awareness of consequences. This means when one feels the negative consequences for not acting pro-socially and their own responsibility for not acting pro-socially, one will develop high personal norm. Furthermore, awareness of consequences can promote the development of ascription of responsibility. This is because only when people feel the negative consequences, and develop ascription of responsibility. Otherwise, if they don't feel the negative consequences, ascription of responsibility is not likely to be developed.

NAM is proposed to explain individual pro-social behaviors which are usually related with morality(De Groot and Steg, 2009). The underlying assumption of NAM is that individual morality consideration determinates individual pro-social behavior. Its key concepts focus on individual's inner moral considerations. It neglects the social environment where individuals live, which has important influence on individual perception and behavior. Specifically, employees are not alone, and they are involved in the organization which has strong effect on their perception and behavior. Prior organizational behavior studies also acknowledged the effect of organizational social context on employees by proposing the concept of organizational climate(Bock et al., 2005; Park and Rothwell, 2009). To better understand employee electricity saving behavior, it is necessary to consider both the inner individual factors and the outer organizational climate. In this study, we develop the concept of organizational electricity saving climate to capture this outer organizational climate, and examine how it can influence employee electricity saving behavior.

3. Research model and hypotheses

3.1. Research model

Figure 1 shows the research model. It is intended to explain employee electricity saving behavior in organizations. Personal norm and electricity saving climate are considered as the predictors of employee electricity saving behavior. Awareness of consequences, ascription of responsibility, and electricity saving climate are the assumed antecedents of personal norm. Demographic information variables (age, gender, income level, education level and work experience in current company) are included as control variables.



Fig. 1. Research model

3.2. Personal norm

In this paper, personal norm refers to employee's moral obligation to save electricity in one's company. When one employee develops personal norm, he/she has a moral obligation to save electricity, and this moral obligation serves as a motivating force that promotes one's saving behavior in the company. If one employee has no personal norm, he/she is not likely to engage in electricity saving in the company as there is not a moral obligation to guide his/her behavior. A number of previous studies have found that personal norm was an important factor affecting various pro-environment behaviors. For instance, Abrahamse and Steg(2009) found a positive relationship between households' personal norm and their total energy saving. In a study of household pro-environmental behaviors, Harland et al.(2007) found that personal norm had a positive influence on public transportation use and water saving behavior. Klöckner and Ohms (2009)'s study showed a positive influence of personal norm on organic milk purchasing. Abrahamseet al. (2009) studiedCanadian office workers' pro-environmental behavior, and reported that personal norm facilitated their intention to reduce car use. Taken together, we expect that personal norm positively influences electricity saving behavior, and develops the following hypothesis:

Hypothesis 1: Personal norm is positively related to electricity saving behavior in organizations.

3.3. Organizational electricity saving climate

Organizational climate is crucial in shaping employees' perceptions and behaviors. It refers to employee's perceptions about an organization's practices and procedures(De Clercq and Rius, 2007). Organizational climate captures the social context in an organization, and has been widely studied in the literature. Organizational climate has been examined both on the organizational level and employee level. When studying employee level issues,

researchers usually study organizational climate that is perceived by individual employee, which reflects individual beliefs about the organization. For example, Bock et al. (2005) studied how organizational climate influences individual intention to share knowledge in the organization, and found a positive relationship. In their paper, organizational climate was conceptualized on the individual employee level. In another research, Kaya et al. (2010) found a positive influence of organizational climate on employee's job satisfaction.

Some researchers argued organizational climate as multi-dimensional, and explored its dimensions (Patterson et al., 2005). Recently, more researchers began to study domain-specific organizational climate (i.e.,organizationalclimate in a specific domain), such as organizational learning climate (Park and Rothwell, 2009), and organizational innovation climate(Hsu and Fan, 2010). These papers focused on a specific aspect of organizational climate based on their research goal. As our goal in this paper is to study employee electricity saving behavior, we develop a concept of organizational electricity saving climate, and study how it can influence employee electricity saving behavior. In this paper, organizational electricity is encouraged and supported in the organization. This concept captures individual employee's perception about organization's practices on saving energy.

Organizations can promote employee's electricity saving behavior through formulating an electricity saving climate. Under an electricity saving climate, the organization puts much value on electricity saving and encourages employees to save electricity. When electricity saving climate exists in an organization, employees are more inclined to save electricity to meet the organizational expectations. Furthermore, when organizations possess a higher level of electricity saving climate, employees are more likely to have the external pressure to save electricity, as not saving electricity will violate the publicly accepted behavior patterns, which may bring them negative consequences, e.g., criticism. By contrast, when energy saving climate is relatively weak or even inexistent, employees will perceive a lower pressure to save electricity. Taken together, we can expect that electricity saving climate would provide a vital atmosphere for employee electricity saving:

H2: Organizational electricity saving climate is positively related to electricity saving behavior in organizations.

Organizational climate can exert important impact on employee attitude and belief (Bock et al., 2005). Electricity saving climate values and supports electricity saving activities. The existence of electricity saving climate can activate employee's personal norm. Employees tend to build their personal norm to align with this climate and organizational expectation. Otherwise, the violation of organizational climate can bring them sense of guilt, thus promoting them to form personal norm and avoid this violation. Meanwhile, they are more likely to believe that it is right and necessary to save electricity in organizations with electricity saving climate, which also promotes their personal normbuilding. Thus, we expect that organizational electricity saving climate positively influences personal norm.

H3: Organizational electricity saving climate is positively related to personal norm.

Besides the direct influence of organizational electricity saving climate, we posit that it may negatively moderate the effect of personal norm on employee electricity saving behavior. The effect of personal norm on employee behavior is based on the assumption that employee behavior is guided by inner moral obligation. However, when organization electricity saving climate is strong, the influence of inner moral obligation on electricity saving behavior can be weakened. Such a climate can crowd out the need for inner moral obligation because they may save electricity to meet the organizational expectations and comply with the external pressure. Conversely, when electricity saving climate is weak, inner moral obligation becomes strong factor influencing electricity saving behavior. Thus, we have the following hypothesis:

H4: Organizational electricity saving climate negatively moderates the effect of personal norm on electricity saving behavior in organizations.

3.4. Awareness of consequences

Consumption of electricity resource may lead to some negative consequences in the long run, e.g., exhaustion of electricity, ecological damage, and even global warming. If employees are aware of these negative consequences, they are likely to develop moral obligation of electricity saving. Conversely, if employees are not aware of the negative consequences of electricity use, they are not likely to develop personal norm of electricity saving. Prior research also reported significant effect of awareness of consequences on personal norm. For example, De Groot and Steg(2009) found personal norm was stronger when respondents were aware of the negative effect of energy use (i.e., awareness of consequences). Harland et al.(2007) found awareness of consequences positively influenced personal norm in the context of household pro-environmental behavior (public transportation use and water saving). Similarly, we expect that awareness of consequences positively influences personal norm in the context of employee electricity saving, and develop the following research hypothesis.

H5: Awareness of consequences is positively related to personal norm.

3.5. Ascription of responsibility

As mentioned earlier, electricity consumption may lead to some negative consequences, and some employees are aware of these consequences (i.e., have awareness of consequences). In this situation, they may develop ascription of responsibility, which refers to feelings of joint responsibility for the negative consequences of not saving electricity in the organization. Conversely, if employees are not aware of these negative consequences, they are not likely to develop ascription of responsibility. A number of previous studies have found that awareness of consequences positively influenced ascription of responsibility. For example, De Groot and Steg(2009) found a positive relationship between awareness of consequences and ascription of responsibility in the context of people's acceptance of some energy policies. Guagnano(2001) reported the positive influence of awareness of consequences on ascription of responsibility in the context of paying for recycled paper products. Similarly, we expect that awareness of consequences will positively influence ascription of responsibility in the context of people is acceptance of some sequences.

H6: Awareness of consequences is positively related to ascription of responsibility.

Once employees develop ascription of responsibility regarding their electricity use (i.e., feel responsibility of induced negative consequences), they are likely to develop personal norm of electricity saving in the company. It is nature for people to form moral obligation when they recognize their responsibility of their behavior's negative consequences. Conversely, if employee denial their responsibility of the induced negative consequences, there are not likely to develop personal norm. A number of previous studies have found that ascription of responsibility could positively influence personal norm. For example, De Groot and Steg(2009) found that ascription of responsibility contributed significantly to explanation of personal norm in the context of reduced car use. Klöckner and Ohms (2009) found a positive relationship between ascription of responsibility and personal norm when studying organic milk purchasing. Similarly, we expect that ascription of responsibility will positively

influence personal norm in the context of employee electricity saving, and develop the following research hypothesis.

H7: Ascription of responsibility is positively related to personal norm.

4. Research method

Survey method was used to collected data for model testing. We chose survey method as it is suitable for obtaining individual beliefs and perceptions (Kerlinger, 1973).

4.1. Measurement development

The main constructs in our research model are latent variables. Measurements of constructs were adapted from or developed based on prior research papers. Electricity saving behavior was measured by asking one's frequency of eight different electricity saving behaviors in the company. A five-point scale was used for electricity saving behavior, where 1 represents "never", 2 represent "rarely," 3 represents "regularly," 4 represents "often," and 5 represents "very often". The measurement of personal norm was adapted from Godin et al.(2005). Awareness of consequences measurement was also adapted from previous works (De Groot and Steg, 2009; Klöckner and Matthies, 2004). Ascription of responsibility measurement was adapted from De Groot and Steg(2009). Measurement of organizational electricity saving climate was developed based on Bock et al. (2005), Chen & Huang (2007). Some of the wordings were revised to fit the context of this study. For personal norm, ascription of responsibility, organizational electricity saving climate, awareness of consequences, respondents were asked to what extent that they agree or disagree with each statement, using seven-point Likert scale, where 1 represents strongly disagree, and 7 represents strongly agree. Appendix A shows the measurement items and their sources.

To verify and improve the adapted survey items, individual meetings were held with university colleagues and experts to discuss the items. Based on their feedbacks, a revised questionnaire was developed.

4.2. Data collection

The questionnaires were sent to employees working in Beijing to collect data. 104 printed questionnaires were distributed to working professionals who are attending a workshop held in a company. All of them participated and finished the questionnaire. Electronic version of questionnaire was sent to contact persons in companies, and they distributed the questionnaires 280 office workers. In total, 344 finished questionnaires were received. We reviewed the received questionnaires, and questionnaires with missing value on the main variables and those with the same answers on all different variables were removed. In total, there are 273 useable responses, resulting an overall effective response rate of 79%. They work in financial industry, software development, and consulting companies, and so on. We conducted T-test and chi-square test to examine whether there are differences between the two samples with respect to the main variables, and found no significant differences.

Nearly half of the respondents are female (53.1 percent). 63.7 % of them aged between 26 and 35. They are well-educated and 77.3% of them have final education experience of associate degree or bachelor degree. About 34.8% of them have monthly income of between 2000 RMB and 5000 RMB, and 41.8% of them have monthly income of between 5000 RMB and 10000 RMB.

4.3. Data analysis method

Partial least squares (PLS) structural equation analysis was conducted to analyze the collected survey data and examine research hypotheses. PLS is a powerful and widely used

method to examine models with latent variables (Chin et al., 2003). It is also very convenient to examine moderating effect. Bootstrapping method was used to test the significance level of path coefficients. The bootstrap samples are obtained by re-sampling with replacement using the original sample (Tenenhaus et al., 2005). 200 re-samples were used as it can lead to a reasonable estimate (Tenenhaus et al., 2005). Specifically, software of SmartPLS was used to conduct the data analysis (Ringle et al., 2005).

Two models are used in a PLS analysis: (1) measurement model that relates indicators to their corresponding latent construct; and (2) structural model that relates different latent constructs (Tenenhaus et al., 2005). A latent construct is an unobservable variable which can be measured by some observable variables which are named as indicators or measurementitems. Although measurement model and structural model are estimated together, the measurement and structural model are usually analyzed in two stages (Anderson and Gerbing, 1988). In the following part, we firstly assessed the validity of the measurement model, and then examined the structural model to examine research hypotheses.

5. Results

5.1. Electricity saving behavior

From Table 1, it can be observed that the most frequent electricity saving behavior of respondents is "Switch off all light when leaving a room as last person", followed by "Properly close the room when you use the air-conditioner". The least frequent behavior is "Turn off the lights when going out even for a short time" and "Reduce the use of the air conditioner by opening the windows etc."

Table 1

Electricity saving behaviors of respondents

Item	Mean	Standard deviation
Turn off the lights when going out even for a short time	3.7	1.15
Reduce the use of the air conditioner by opening the windows etc.	3.7	1.13
Set the temperature as high as possible even if you feel a little hot	4.0	1.04
Switch off the computer when it is not used	4.0	1.06
Shorten the duration that the refrigerator door is kept open	4.1	0.88
Turn off the lights when the sunshine is bright enough	4.2	0.95
Properly close the room when you use the air-conditioner.	4.3	0.86
Switch off all light when leaving a room as last person	4.5	0.74

5.2. Measurement model

Before testing the research hypothesis, we assessed the reliability, convergent validity and discriminant validity of measurement model. Following prior research (Thøgersen and Grønhøj, 2010), employee electricity saving behavior was conceptualized as a formative construct. Formative construct is a latent variable composed with multiple indicators that form or cause the latent variable (Chin, 1998). For formative construct, a change in its indicators causes change in itself. An important characteristic of formative construct is that a change in one indicator does not necessarily imply a change for other indicators (Chin, 1998). So the indicators of a formative construct may or may not covary with each other, andCronbach's alpha, which assesses internal consistency among measurement items, is not required. Reliability of other constructs was examined by Cronbach's alpha. As shown in Table 2, the lowest value of Cronbach's alpha is 0.83, which exceeds the recommended lowest value of 0.7, thus confirming their reliability.

Convergent validity was assessed using the average variance extracted (AVE) from the latent variables. The criterion is that AVE values should exceed 0.5. AVE values in Table 2 thus support the convergent validity. In Table 3, it can be observed that the square root of AVE for each latent construct is larger than the correlation with other constructs, thus supporting discriminant validity (Fornell and Larcker, 1981).

Table 2

Results of the confirmatory factor analysis

Construct	Mean, standard deviation	AVE	Cronbach's Alpha
Organizational electricity saving climate	5.55, 1.11	0.82	0.89
Awareness of consequences	4.89, 1.21	0.67	0.83
Personal norm	5.48, 1.06	0.71	0.90
Ascription of responsibility	4.32, 1.33	0.76	0.89

^aAVE: average variance extracted

Table 3

Correlation matrix

	ESB	OESC	AC	PN	AR
Electricity saving behavior	1				
Organizational electricity saving					
climate	0.29	0.91			
Awareness of consequences	0.13	0.04	0.82		
Personal norm	0.44	0.38	0.22	0.84	
Ascription of responsibility	0.12	0.14	0.47	0.25	0.87
•					

personal norm; AC: awareness of consequences; AR: ascription of responsibility; ESB: electricity saving behavior.

^b Values in the diagonal row are the square roots of the average variance extracted, and the others are the correlation between constructs.

5.3. Structural model

Figure 2 shows the results of structural model. The model explained 28.8 percentage of

the variance in employee electricity saving behavior and 20.2 percentage of the variance in

personal norm.



^a+p<0.1; *p<0.05; **p<0.01; ***p<0.001

Fig. 2. Results of PLS analysis

Hypothesis 1 posits that personal norm positively influences electricity saving behavior. From Figure 2, it can be observed that the path coefficient is 0.35 (p<0.01), thus supporting hypothesis 1. Hypothesis 2, which states that organizational electricity saving climate affects electricity saving behavior, is marginally supported (β =0.14, p<0.1). Hypothesis 3 posits that organizational electricity saving climate affects personal norm, and this hypothesis is supported (β =0.36, p<0.001). The negative moderating effect of organizational electricity saving climate on the relationship between personal norm and electricity saving behavior is also supported (β =-0.18, p<0.05), thereby confirming hypothesis 4. Furthermore, awareness of consequences positively influences personal norm (β =0.14, p<0.05) and ascription of responsibility (β =0.47, p<0.001), supporting hypothesis 5 and hypothesis 6. Ascription of responsibility positively influences personal norm (β =0.14, p<0.05), thus hypothesis 7 was also supported. Some of the control variables also have significant results. There are positive effects of gender (β =0.15, p<0.05) and income (β =0.19, p<0.05) on electricity saving behavior. The control variables of age, education and work experience in current company don't have significant impacts.

To test the moderating effect of organizational electricity saving climate, we followed the widely used "product-indicator" approach (Chin et al., 2003). First, the indicators of organizational electricity saving climate and personal norm were standardized. Second, the product indicators were calculated by multiplying each standardized indicator of organizational electricity saving climate and each standardized indicator of personal norm. The resulting 15 (3 multiply 5) product indicators reflect the latent interaction variable. This latent interaction variable was included in the data analysis.

To further advance our understanding, we tested the mediating role of ascription of responsibility and personal norm. Following prior research (Baron and Kenny, 1986; Zhang et al., 2010), three steps were taken to examine mediation effect. In step 1, independent variable should significantly impact dependent variable; In step2, independent variable should significantly impact the mediator; In step 3, both independent variable and the mediator are used to predict the dependent variable: (a) if the effect of mediator is significant and effect of independent variable is not significant, we can conclude that this mediator fully mediates the effect of independent variable on dependent variable; (b) if both effects of independent variable and mediator are significant, we can conclude that this mediator partially mediates the influence of independent variable on dependent variable. Table 4 shows the results of mediation test. We can observe that ascription of responsibility partially mediates the impact of organizational electricity saving climate on electricity saving behavior.

			Coefficient in Regressions				
IV M	DV			IV+M → DV		Mediating	
					IV	М	-
AC	AR	PN	0.23***	0.48^{***}	0.14^{*}	0.14^{*}	Partial
OESC	PN	ESB	0.34***	0.39***	0.14 +	0.35**	Partial

Results of Mediation Effect Analysis

^a+p<0.1; *p<0.05;**p<0.01; ***p<0.001.

^bIV: independent variable; M: mediator; DV: dependent variable; OESC: organizational electricity saving climate; PN: personal norm; AC: awareness of consequences; AR: ascription of responsibility; ESB: electricity saving behavior.

As the dependent variables and independent variables were self-reported by the same respondent, there may be the issue of common method bias(Podsakoff et al., 2003). Following prior literature(Podsakoff et al., 2003; Zhang et al., 2012), Harman's one-factor test was conducted by including all the measurement items into an exploratory factor analysis with unrotatedfactor solution. Common method bias will be evident if single factor emerges from the factor analysis which accounts for most of the variance. Multiple factors with eigenvalue >"1" were extracted and the first factor only accounts for 24.7% of the total variance, indicating that common method bias was unlikely to be a problem in this research.

6. Discussion and implications

This research helps to understand the role of personal norm and organizational electricity saving climate on employee electricity saving behavior. In summary, the results show that personal norm have a positive effect on employee electricity saving behavior. The impact of organizational electricity saving climate on electricity saving behavior is partially mediated by personal norm. Meanwhile, organizational electricity saving climate negatively moderates the effect of personal norm on employee electricity saving behavior. Organizational electricity saving climate, awareness of consequences, and ascription of responsibility positively influence personal norm. Furthermore, awareness of consequences positively influences ascription of responsibility. Based on these findings, when employees have high personal norm, they are more likely to save electricity in their organization. However, the existence of high organizational electricity saving climate can weaken the impact of personal norm on electricity saving behavior. When people perceive high level of awareness of consequences, ascription of responsibility, and organizational electricity saving climate, they are more likely to develop high personal norm. Furthermore, female participants and participants with high monthly income level are more willing to save electricity in their organization.

6.1. Researchimplication

This study contributes to energy conservation literature in several ways. First, we built a theoretical model to study antecedents of employee electricity saving behavior in China. Although many companies have difficulty in motivating employees' participation in energy saving, studies investigating how to promote their energy saving behavior arestill in the primary stage, with only a few research works been done(Lee et al., 1995; Scherbaum et al., 2008; Siero et al., 1996).By contrast, previous energy saving research mostly focused on country, region, cities, industrial, or household level. In addition, China is a major energy-consuming country. However, research investigating employee energy saving behavior in China mainland is rather limited. This research thus contributes to the literature by building a theoretical model of employee electricity saving behavior and empirically testing it in China.

Second, we found that organizational electricity saving climatenegatively moderated the influence of personal norm on electricity saving behavior: when organizational electricity saving climate was high, the impact of personal norm on employee electricity saving behavior was weakened. Previousresearch works neglect to study this moderating role in the relationship between personal norm and various pro-social behaviors (Abrahamse and Steg,

2009; Harland et al., 2007). This finding of moderating effect adds to our understanding of the boundary condition of when personal nom is important for electricity saving behavior. Furthermore, we found that organizational electricity saving climate positively influenced personal norm. This finding adds to our understanding by uncovering this new antecedent of personal norm in the context of employee electricity saving.

Third, we proposed the concept of organizational electricity saving climate, and studied its role in shaping employee electricity saving behavior and beliefs. We found that personal norm partially mediated the impact of organizational electricity saving climate on electricity saving behavior. This finding adds to our understanding of how organizational electricity saving climate influence employee electricity saving behavior. Although organizational climateliterature has long recognized the influence of organizational climate on employee behaviors (Bock et al., 2005; Kaya et al., 2010), its role in influencing employee energy saving behavior has not been studied. This research thus contributes to the energy saving literature by developing the concept of organizational electricity saving climate, and empirically examining the ways of how it influences employee electricity saving behavior.

6.2. Policy implication

Some policy implications are proposed according to the findings of this research. First, employees constitute an important target group of energy saving. Policy makers should realize the role of employees in energy saving and pay more efforts to foster employee energy saving. This is an important means to reduce energy consumption and promote energy saving in China. Second, the importance of personal norm on employee electricity saving behavior has been demonstrated. And personal norm is positively influenced by awareness of consequences and ascription of responsibility. Measures can be taken to promote personal norm, awareness of consequences and ascription of responsibility. The government should launch(or provide financial supports) publicity campaignstopropagandizemoral obligation of energy saving and the negative consequences of energy consumption (e.g., exhaustion of energy resources, global warming and local ecological damage) using various medias. It is also very important to let individuals realize their responsibility in inducing these negative consequences. This can be done by propagandizing how much energy they consume, and how much CO2and other pollutions their energy consumptions bring. Third, organizational electricity saving climate plays an important role. Thus, policies are needed to promote organizations' establishment of organizational climate which values and supports energy saving. Some measures can be taken, such as requiring organizations to build an energy saving climate. Best practices of organizational energy saving can also be propagandized to enhance organizations' knowledge and awareness on energy saving.

6.3. Limitation and future research

Some limitations of this research should be noted. First, we only studied office workers' electricity saving behavior. There are also other kinds of employees, such as production workers in industrial firms. There should be many differences between office workers and productions works (e.g., form of energy saving). Thus caution must be taken when trying to generalize the results of this research to other samples, especiallyproduction workers. Future research maystudy other types of employee's energy saving behavior (e.g., production worker). Second, the data were collected from Beijing, China. Given the difference between China and other countries, caution must be taken when trying to generalize the results to other sample, China is a country with high

collectivism and Western countries are more individualism. In this situation, the effect of personal norm (which is an individual moral factor) on individual employee behavior might be stronger in Western countries than its effect in China. Future research mayconduct similar research in Western countries in order to examine this research's cross-culture validity.

7. Conclusion

In this study, we developed and tested a theoretical model that explains employee electricity saving behavior based on norm activation model and organizational climate research. Survey data were collected from employees working in Beijing, China. PLS structural equation analysis was used to analyze the collected data and test the research hypothesis. We found that personal norm had a significant influence on employee electricity saving behavior, and organizational electricity saving climate negatively moderated this relationship. Awareness of consequences, ascription of responsibility, and organizational electricity saving climate positively influence personal norm. This research adds to our understanding of employee electricity saving behavior in organizations.

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Appendix A

Survey items

Construct	Items	Source
Awareness of	Electricity consumption causes exhaustion of	De Groot and
consequences	electricity.	Steg(2009);löckner
	Electricity consumption contributes to local ecological	and Ohms(2009)
	damage.	
	I am aware of the influence electricity consumption	
	has on global warming.	
	Overall, electricity consumption can cause some	
	negative consequences.	
Ascription of	I feel jointly responsible for the exhaustion of	De Groot and
responsibility	electricity.	Steg(2009)
	I feel joint responsibility for the contribution of	
	electricity consumption to global warming.	
	I feel joint responsibility for the contribution of	
	electricity consumption to local ecological damage.	
	I feel joint responsibility for the negative consequences	
D	of electricity consumption.	C = 1 = 1 (2005)
Personal norm	electricity in my company	Godin et al.(2005)
	Not saving electricity in my company would go against	
	my principles.	
	I have a moral obligation to save electricity in my	
	company.	
	I would feel guilty about not saving electricity in my	
	company.	
	I feel obliged to save electricity in my company.	
Organizational	My company encourages electricity saving.	Bock et al. (2005);
electricity	My company puts much value on electricity saving.	Chen and
saving climate	My company is actively committed on electricity	Huang(2007)
	saving.	