Original research article

Saving energy at the workplace: The salience of behavioral antecedents and sense of community

Graham N. Dixon [a],[*], Mary Beth Deline [b], Katherine McComas [c], Lauren Chambliss [b], Michael Hoffmann [d]

[a] The Edward R. Murrow College of Communication, Washington State University, Murrow East 106a, United States
[b] Cornell University, Department of Communication, 336 Kennedy Hall, Ithaca, NY 14853, United States
[c] Cornell University, Department of Communication, 313 Kennedy Hall, Ithaca, NY 14853, United States
[d] Cornell University, Department of Entomology, Ithaca, NY 14853, United States

ARTICLE INFO

ABSTRACT

Research on employees' perspectives and decision making about energy conservation within organizational contexts is limited, constraining appropriate and effective policy and planning. In addition, work considering the socio-psychological influences of such organizational contexts on individual energy decisions is also limited. To help fill these gaps, this study used the Theory of Planned Behavior to develop a survey on attitudes, subjective norms and behavioral intentions toward energy conservation behavior among faculty, staff and graduate students working at a large U.S. university ($n = 2919$). Results showed the influence of subjective norms (injunctive and descriptive), attitudes, and perceived behavioral control on behavioral intentions to engage in energy conservation behaviors at work. Sense of community also positively predicted behavioral intentions and self-reported behavior. Theoretically, this calls for more work on how sense of community influences energy behaviors, while practically it suggests that energy conservation interventions should consider sense of community as a potential factor in program uptake.

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1. Introduction

With energy conservation considered a top policy issue within the United States, the commercial sector, made up of organizations, is increasingly recognized as an integral player for any meaningful energy conservation goals to be met [1,2]. Organizations consume much of America's energy and contribute to increasing greenhouse gas emission levels. Yet, as a result of their scope, organizations also offer large opportunities for change [3,4]. For example, the Intergovernmental Panel on Climate Change (IPCC) states the commercial sector signifies one with the highest potential to reduce emissions by 2020 [5], meaning that strategies to reduce energy use such as energy conservation initiatives within organizations are needed.

Fulfilling the goals of organizational energy conservation will require attention to a variety factors. Structural changes are important starting points, such as retrofitting buildings with energy efficient features [6,7], using energy efficient materials on new construction [8], and changing workflow procedures and product use for greater productivity and efficiency [9,10]. However, individual behavior is also key to energy consumption levels [11,12]. As such, understanding occupants' energy behaviors is critical for organization-wide energy reduction (see [2,13]). However, research lags in this area [14,15,16], and while there is a growing repository of research into such decision making at the residential level [17], differences between contexts such as lack of direct payment of energy costs in organizational settings or uncertainty about responsibilities means the transfer of these findings are not necessarily applicable [9,18]. Therefore, for meaningful policy actions to be taken regarding commercial sector energy conservation, it is critical to better understand occupants' perceptions of energy and possible predictors of workplace energy conservation [16,19,20].

Among such predictors are subjective norms, including descriptive and injunctive norms, which refer to people's perception of what others are doing (i.e., descriptive norms) as well as perceptions of (dis)approval of others (i.e., injunctive norms) [21]. Together with attitudes and perceived behavioral control, subjective norms act as behavioral antecedents in the Theory of Planned Behavior [22]. Research has observed a diversity of

* Corresponding author. Tel.: +1 5093356547.
E-mail address: graham.dixon@wsu.edu (G.N. Dixon).

results regarding the influence of subjective norms on behavioral intentions. In some studies, subjective norms have a powerful effect on behavior [23,24,25,26], even in the context of energy conservation [21]. However, subjective norms have also been reported as weak predictors of intentions due to the variation in how norms are measured [27]. Environmental studies, for instance, have reported subjective norms to be weak predictors of environmental intentions [28,29,30]. In addition, previous research has reported that subjective norms are highly predictive of intentions only when a person's environmental concern is low [31] or group identification is strong [32,33,34]. However, such research has not specifically explored the moderated effects of subjective norms on pro-environmental intentions/behavior within an organizational context. Given these findings of subjective norms and their effect on pro-environmental intentions and behavior, it is important to consider whether certain conditions must exist under which subjective norms can influence energy conservation behaviors.

To that end, we offer a formative study of workplace energy conservation attitudes, subjective norms, perceived behavioral control, and behavioral intentions. Building on existing research, we explore more precisely *when* subjective norms are likely to be the strongest predictors of behavioral intentions. To do so, we identify and explore whether individuals' sense of community within a work organization acts as a moderator of subjective norms and behavioral intentions to conserve workplace energy. We define sense of community as feeling an affiliation with a collective within the organization [35]. This is important, as understanding the relationship between subjective norms, perceptual factors such as people's sense of community, and energy reduction intentions can aid policy makers and campaign designers in tailoring effective intervention campaigns within organizational contexts.

1.1. Theory of Planned Behavior, subjective norms, and energy conservation

Developed as an extension to Azjen's Theory of Reasoned Action (1991), the Theory of Planned Behavior incorporates individual-level variables as predictors of behavior. As a behavioral prediction model, the Theory of Planned Behavior posits that three individual determinants act as important predictors for behavior change, which include attitudes, perceived behavioral control, and subjective norms (injunctive and descriptive) [22,36]. Together, these variables predict behavioral intentions, which in turn predict actual behavior.

While the Theory of Planned Behavior's parsimony and practical utility within the social sciences has made it a popular model for pro-environmental behavior change research, it is important to critically examine the degree to which its variables predict behavioral intentions. In general, research has found strong support for the Theory of Planned Behavior's predictive power [15]. However, while the Theory of Planned Behavior variables together explain a large amount of the variance in predicting behavioral intentions, each individual determinant is not equally weighted. For instance Lo et al. [15] recently reviewed empirical articles to determine the degree to which attitudes, perceived behavioral control, and social norms predict pro-environmental behaviors within organizations. Overall, the review reveals differences in the predictive power of each variable.

First, individuals' attitudes, which refer to an evaluation (i.e., good vs. bad) of a set of behaviors [37], have been found to be moderately correlated to respective pro-environmental behavioral intentions but weakly correlated to *actual* behavior. Scholars [38,39], for instance, found that attitudes toward energy conservation and paper recycling were moderately associated with their

respective behavioral intentions. More recent research, however, has found that attitudes toward workplace energy conservation among populations of supervisors and lower-level employees were not strong predictors of more specific behaviors [39,40]. Furthermore, comparative feedback interventions, in which ones' energy conservation behaviors are compared to another's, have found positive changes in behavior without changes in attitudes [41,42].

In addition to attitudes, an individual's perceived behavioral control, which refers to whether individuals perceive they have the ability (i.e., the necessary resources and skills) to perform a certain behavior [22], has also been measured in the context of energy conservation. In an organizational context, perceived behavioral control measures have ranged in predictive power, from weak correlations [43] to strong ones [44]. In general, for behavior change campaigns to be effective, attention should be paid to whether or not participants have the ability to perform the targeted behavior.

Finally, subjective norms, which can be divided into injunctive and descriptive norms, have also been examined. Injunctive norms involve people's perceptions of what others want them to do (or not do), whereas descriptive norms refer to ones' perception of what others do [21]. Research has observed inconsistent findings regarding the predictive power of subjective norms on behavioral intentions. On the one hand, research has shown that subjective norms have a powerful effect on behavioral intentions, either from direct observation of others' behavior (see review by [25]) or through indirect means, such as communication about a descriptive norm [45,46]. For instance, studies have found that normative messages about others' energy conservation behaviors significantly increased recycling [47] and hotel towel reuse [48]. Additionally, campaigns that use comparative feedback showing the energy savings of others can spur competitive feelings and increase conservation behaviors at both the residential [49] and organizational levels [41,42]. More recently Nolan et al. [21] found that in a survey of California residents descriptive norms were the strongest predictor of energy conservation, despite the fact that respondents rated descriptive norms as being the least important factor in making energy conservation decisions. Furthermore, the scholars found in a follow up field experiment that descriptive norms produced the greatest change in energy conservation behaviors relative to informational campaigns highlighting other reasons to conserve. Participants, like those in the survey, paradoxically rated descriptive norms as being the least influential factor in their behavior decision-making despite evidence to the contrary. Interestingly, the two factors rated by participants as most influential in persuading them to conserve energy – environmental reasons and social responsibility – did not succeed in reducing energy conservation in the field study. Nolan et al. [21] surmise this disconnect is due to individuals' naïve conception of their own behavior and mental processes, in which "individuals place greater weight on introspective thoughts and beliefs related to their decision to conform than to behavioral evidence of their conformity" (p. 914). What is troubling is that when individuals are made aware of normative influence on their behavior, they may react by decreasing such behavior and correct for any biasing effect [50]. Therefore, campaigns that strive to improve people's awareness of what their referent groups do should be careful that blatant normative manipulation is not detected by participants.

Despite the above findings, others have reported subjective norms to be rather weak predictors of environmental intentions [28,29,30]. This inconsistency could be due to the variation in how subjective norms are operationalized and measured [27]. Another reason is that the effect of subjective norms (both descriptive and injunctive) on behavioral intentions/behavior is dependent on