

Securing the grid or the planet? The impact of dynamic norms on electricity saving preferences

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Abstract

Dynamic social norms have recently emerged as a promising approach to promoting energy-saving behavior. While static norms emphasize prevalent behaviors, dynamic norms focus on behavioral change over time. However, existing studies predominantly examine behavioral outcomes, neglecting the processes and trade-offs underlying responses to norm information. Furthermore, the role of the factors driving dynamic norms remains unexplored. This study employs a discrete choice experiment (DCE) and a randomized control trial (RCT) to address these gaps, finding that dynamic norms driven by climate change enhance preferences for electricity savings, whereas those driven by energy supply security do not. Further analysis of effect heterogeneity highlights the pivotal role of individuals' ascription of responsibility.

Keywords Electricity saving preferences; Dynamic Norms; Energy supply security; Climate change; Discrete choice experiment; Latent Class Model; Mixed Logit Model

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1 Introduction

Residential electricity conservation is essential to promote sustainable energy use. Social norm interventions are widely recognized as effective tools for encouraging energy conservation (Goldstein et al., 2008). A recent meta-analysis confirms that social norms are effective in promoting behavioral changes that foster positive environmental outcomes or resource conservation (Farrow et al., 2017). However, the effectiveness differs for different social norm interventions and for different target groups (Abrahamse and Steg, 2013), raising questions about the processes and barriers to encouraging resource conservation (Cattaneo, 2019). Furthermore, social norms can sometimes produce unintended consequences, such as the boomerang effect, where individuals regress toward the mean in response to normative information (Byrne and Hart, 2009). Practically, the current limited social norms related to sustainability significantly constrained the effectiveness of norm-based interventions (Sparkman et al., 2021).

Consequently, there has been growing interest in exploring dynamic rather than static norm framings. Dynamic norms highlight how behaviors are changing over time, focusing on what people are beginning to do, rather than what most people currently do. Dynamic norms were shown to be effective in encouraging sustainable behavior, even when they are not yet widely adopted (Sparkman and Walton, 2017), and when the highlighted norms differed from the targeted behavior (Mortensen et al., 2019). Specifically, Sparkman and Walton (2019) show their influence in overcoming critical barriers to sustainable action, including self-efficacy, perceived injunctive norms, and alignment with social identity. Moreover, dynamic norms have been shown to outperform descriptive and injunctive norms in a field study (Loschelder et al., 2019). Nonetheless, their effectiveness can be attenuated by the source of the normative message (Boenke et al., 2022) and individuals' personal norms (De Groot et al., 2021).

This study contributes to the growing literature on dynamic norms by addressing two gaps. First, previous studies on social norms have focused primarily on behavioral outcomes, overlooking individuals' preferences that shape responses to norm information (Bicchieri, 2023). Therefore, we design a discrete choice experiment (DCE) to gain a more comprehensive understanding of the impact of dynamic norms on individuals' preferences. Instead of measuring effects on electricity savings, we model how dynamic norms influence individuals' relative perceptions and valuations of electricity-saving attributes, such as investment cost and effort. Moreover, this study is the first to investigate the effect of dynamic norms in the context of electricity conservation, whereas previous research has focused on water conservation, plastic reduction, or lower meat consumption.

Second, we use a randomized controlled trial (RCT) to assess how different framings of behavioral change influence responses to dynamic norms. Since dynamic norms convey a shift in behavior over time, they imply an underlying cause driving this change. Given the diverse motivations behind resource conservation, we hypothesize that different framings of these norms will lead to different responses. At the same time, we expect that dynamic norms highlighting growing engagement in electricity conservation will generally strengthen preferences for saving energy, regardless of the specific framing. To our knowledge, this is the first study to evaluate the impact of dynamic norms across different motivational framings. The two most commonly cited arguments to promote electricity conservation are securing the electricity supply and mitigating climate change by reducing global emissions. Recent work by Yilmaz et al. (2024) suggests that emphasizing grid stability may be more effective than environmentally-focused information in increasing support for electricity demand-side management (DSM) schemes. Securing electricity supply is perceived more widely as a national issue and therefore may be prioritized above climate change (Nyman, 2018). Conversely, environment-related framings may encourage stronger sustainable preferences as they are more evocative, bringing forth personal responsibility and connection to broader ecological goals (Trujillo et al., 2021).

Using random-coefficient logit models (MXL), our results indicate that the effectiveness of dynamic norms is framing dependent. When comparing the individuals in the control group with those exposed to dynamic norm information, we do not detect a significant overall effect. However, differentiating between dynamic norms that refer to climate change and energy security reveals important differences. Specifically, we find that emphasizing climate change has a significant positive effect on preferences for electricity savings, whereas emphasizing energy security does not.

To further explore these findings, we conduct additional analyses on the heterogeneity of treatment effects. Our results suggest that a lack of ascription of responsibility acts as a barrier, reducing the effectiveness of dynamic norms. In particular, respondents who received the normative message related to energy security but did not perceive personal responsibility for energy conservation were negatively affected by the message. This partially explains why the overall treatment effect is offset. Highlighting increasing concerns about energy supply security and rising participation in energy-saving initiatives does not overcome resistance to personal accountability.

The remainder of this paper is structured as follows. Section 2 describes the experimental framework and the identification strategy. Section 3 provides descriptive statistics. Section 4 presents the results. Section 5 discusses the results and the policy implications. Section 6 summarizes and concludes the

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