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Original research article

Why do people turn down the heat? Applying behavioural theories to assess reductions in space heating and energy consumption in Europe

Peter Conradie [a,b], Stephanie Van Hove [a,c], Sabine Pelka [d,e,*], Merkouris Karaliopoulos [f], Filippos Anagnostopoulos [g], Heike Brugger [e], Koen Ponnet [a,c]

[a] imec-mict-UGent, Miriam Makebaplein 1, 9000 Ghent, Belgium
[b] Department of Industrial Systems Engineering and Product Design, Faculty of Engineering and Architecture, Ghent University, Campus Kortrijk, Graaf Karel de Goedelaan 5, 8500 Kortrijk, Belgium
[c] Department of Communication Studies, Faculty of Political and Social Sciences, Ghent University, Korte Meer 11, 9000 Ghent, Belgium
[d] Energy and Industry Group, Faculty of Technology Policy and Management, Delft University of Technology, Jaffalaan 5, 2628 BX Delft, the Netherlands
[e] Fraunhofer Institute for Systems and Innovation Research, Breslauer Str. 48, 76139 Karlsruhe, Germany
[f] Department of Informatics, Athens University of Economics and Business, Athens, Greece
[g] Institute for European Energy and Climate Policy (IEECP) Sloterdijk Teleport Towers, Kingsfordweg 151, Amsterdam 1043GR, the Netherlands

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ABSTRACT

Reducing heating-related energy consumption is vital in Europe, where it accounts for a significant portion of domestic energy usage. We studied the factors that influence reduced heating-related consumption by using three theoretical frameworks: the Theory of Planned Behaviour, the Value Belief Norm theory, and the Prototype Willingness Model. Our sample consisted of 3098 people from 29 European countries. We conducted a confirmatory factor analysis to verify whether our observed variables measure our latent factors, followed by a structural equation model that incorporated these three behavioural models. We find that perceived behavioural control, subjective norms and attitudes (as part of the Theory of Planned Behaviour) are significant predictors of intent to reduce consumption. However, perceived behavioural control was not statistically significantly associated with behaviour. Environmental concern had a more significant influence on attitudes towards energy reduction than bill consciousness. Attitude was additionally significantly associated with fear of losing comfort and energy knowledge. Moreover, personal moral norms (as part of Value Belief Norm Theory) and willingness (as part of the Prototype Willingness Model) contributed to explaining the intent to reduce consumption, while willingness was also associated with behaviour.

1. Introduction

In Europe, most household energy is used for space heating. On average, it's 63 % in the EU. Malta uses the least at 18 %, while Luxembourg uses the most at 82 % [1]. Similarly, in China, Zheng et al. [2] estimated that 54 % of energy consumption relates to space heating. In the United States (US), space heating also amounts to the largest relative category of energy use at 43 % [3], while the second biggest category - "all other" - which includes household appliances, comprises another 21 %. Households as a whole also constitute a significant proportion of greenhouse gas (GHG) emissions, with Goldstein et al. [4] estimating that in the US, households are responsible for 20 % of GHG emissions, while in the EU this share rises to 25 % [5]. Moreover, Costa et al. [6] estimated that residential and commercial buildings contribute >30 % to CO_2 emissions, which includes all energy consumption: space heating, air conditioning or energy consumed by appliances.

One strategy to reduce households GHG emissions is through a decrease in the overall energy consumption [7]. While renovating homes or buying more energy efficient appliances present one way of reducing consumption, changing occupant behaviour (for example, lowering the heating) also presents significant reduction potential [8].

It is known that, after local climate, the second most important factor determining energy demand is the behaviour of household occupants, most notably heating and cooling. Surprisingly, this behaviour turns out

* Corresponding author at: Energy and Industry Group, Faculty of Technology Policy and Management, Delft University of Technology, Jaffalaan 5, 2628 BX Delft, the Netherlands.
E-mail addresses: peter.conradie@ugent.be (P. Conradie), stephanie.vanhove@ugent.be (S. Van Hove), s.pelka@tudelft.nl (S. Pelka), mkaralio@aueb.gr (M. Karaliopoulos), filippos@ieecp.org (F. Anagnostopoulos), heike.brugger@isi.fraunhofer.de (H. Brugger), koen.ponnet@ugent.be (K. Ponnet).

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to be more significant than the characteristics of the buildings [9]. Given Europe's ambitions to reduce GHG emissions through a decrease in global energy consumption [10], it becomes essential to understand in more depth the impact of heating-related behaviour on the energy consumption [11,12]. A meta review by Harputlugil & de Wilde [13] concludes that limited understanding of household occupants' behaviour is preventing efforts to constraint buildings' energy consumption. To this end, it is important to have a better understanding of social-psychological factors that can be associated with a decrease in energy consumption. One robust theoretical framework to do so is Ajzen's [14] Theory of Planned Behaviour (TPB). The TPB has been applied in a variety of sustainability-related domains, including food consumption [15], recycling [16], and sustainable consumption [17]. It has also been used specifically to study reduction in energy consumption [18–21]. In brief, the TPB argues that someone's intent to engage in a certain behaviour can be predicted by their attitude towards that behaviour, subjective norms (SN) associated with the behaviour and finally their perceived behavioural control (PBC) over it. Attitudes refer to people's evaluations or appraisals of the target behaviour. SN is defined as a person's perception of the approval of this behaviour by significant others, like one's partner or close friends. PBC refers to the perceived ease or difficulty of performing a behaviour [14].

Despite the apparent wealth of research in this domain, Sarkis [22] remarked that additional studies are required to increase the explanatory power of the TPB in the domain of energy conservation specifically, a view also shared by Gao et al. [23]. More recently, Whitmarsh et al. [24] claimed that models like the TPB focused too much on deliberate or rational actions. In reviewing studies on pro-environmental behaviour using the TPB, Yuriev et al. [25] also concluded that extensions of the TPB model improve its predictive power. As a result, there is general interest in the evaluation of behaviour models that can further increase our understanding of sustainable behaviour in general, and heating-consumption, in particular.

Our study extends the current literature by combining the TPB [14] with the Value Belief Norm (VBN) theory [26,27] and Prototype Willingness Model (PWM) [28] in a single model. In doing so, our model captures (a) the rational, deliberate process of decision making through the TBP, while also taking into consideration (b) the social reactive path as measured by the PWM, and (c) assesses the moral reactive path towards pro-environmental behaviour through VBN theory. While we discuss our use of these three behavioural models in more depth below, meta-analysis of these three frameworks [29–31] have highlighted their efficacy, albeit not necessary within the domain of sustainability in the case of the PWM.

To this end, in this article we explore the intent and behaviour of people to reduce heating related consumption in the winter period by lowering their home temperature setting. As discussed earlier, heating related energy consumption forms a significant share of energy use in Europe and secondly, despite its diverse geography and climate, heating related energy consumption forms a significant share of final consumption across Europe, even in countries with a majority Mediterranean hot-summer climate such as Malta (18 %), Portugal (27 %) or Cyprus (37 %) [1]. This points to a significant potential in energy savings.

Our study is based on a survey performed across 29 countries in Europe and offers a holistic view on the social-psychological factors that impact energy-saving behaviour. Below, we expand on the theoretical model underlying this study and formulate several research hypotheses, supported by related work and findings in literature.

2. Conceptual framework and research hypothesis

2.1. Theory of planned behaviour

The TPB centrally relies on three motivational factors to predict a person's behaviour [14]: the *attitude* towards a particular behaviour, the *subjective norms* (SN) related to that behaviour and finally, the *perceived behavioural control* (PBC) over engaging in that behaviour. More specifically, attitude can be framed as someone's general assessment of the behaviour in question, while SN is, in turn, based on one's beliefs about what other important people in one's life think of the specific behaviour. For the purposes of this study, we frame PBC as the practical ability to reduce heating related energy use, i.e.: being personally able to lower the temperature setting. Attitude, SN and PBC are all predictive of intent, while PBC and intent are both predicative of behaviour [14].

Recent applications of the TPB in the energy consumption domain include work by Nie et al. [32] who studied residential energy saving behaviour in Changchun, Northeast China. The authors found that attitude, SN and PBC all contribute to intention to save energy, with SN acting as the strongest predictor. Similarly, other studies in China found SN to be a strong predictor of energy-saving intentions in comparison to attitude and PBC [33,34]. According to Wang et al. [33], this might be explained by the more significant role social norms play in household energy-saving in the Chinese context.

By contrast, Liu et al. [19] conducted a study in northwest China to predict household energy saving behaviour, finding no statistically significant relationship between SN and behavioural intentions. The authors remark that a possible explanation for this is that higher educated people are more likely to act sustainably due to environmental concern, as opposed to doing so out of a concern for some else's opinion of that behaviour [35], with the sample in their study containing significantly more persons with a higher education than the underlying population.

Other work outside China further cements the importance of the TPB. In a study among low-income households in the United States, Chen et al. [36] found both attitude and PBC to be significantly associated with the intent to reduce household energy consumption, but like Liu et al. [19] fail to find an effect for SN. Chen et al. [36] refrained from discussing why SN fails to impact intent. Another example application of the TPB includes work by Ansu-Mensah & Bein [18] in Northern Cyprus on the intent to conserve household electricity use. They reported strong effects for PBC and attitude, whereas subjective norm has a smaller but negative effect on electricity-saving intentions, with the authors proposing that electricity saving is a private activity and thus not visible to others, and as a result has no association with intent.

Drawing on these findings, we formulate the following five hypotheses:

Positive attitudes (**H1**), SN (**H2**) and PBC (**H3**) are positively related to the intent to reduce energy consumption by lowering the temperature in winter.

PBC (**H4**) and intention to reduce energy consumption by lowering the temperature in winter (**H5**) is in turn related to having lowered the temperature in the past.

2.2. Antecedents of attitude

While the TPB by itself has proven to be a robust model to provide valuable insights into intent (and actual behaviour), extending the model with additional domain-related predictors can offer a more in-depth view of how intent is influenced within the context of energy conservation [22,25,37]. To this end, we introduce the following series of antecedents in our model, specifically related to attitude.

2.2.1. Bill consciousness

Financial aspects, such as energy pricing [38] and knowledge of energy costs [39] have been shown to impact residential energy use. Moreover, monetary rewards also impact energy saving rates [40]. More recent work by Chen et al. [36] supports this notion, with the authors finding that bill consciousness is a positive predictor of intent to reduce energy consumption. These results are echoed by Kleinschafer et al. [41] who also found sensitivity to energy cost to be associated with reduced electricity use.

H6. Bill consciousness is positively associated with the attitude towards reducing the temperature to conserve energy in winter.

2.2.2. Loss of comfort

As noted by Kleinschafer et al. [41], a tension exists between comfort-seeking and energy-efficiency, with persons aiming to maximize their comfort being less inclined to reduce their energy consumption. For example, turning down the heating implies less personal comfort at home. This idea is supported by Karlin et al. [42], noting that curtailing energy use asks people to give up some personal comfort. Work by Wang et al. [43] also showed how discomfort as a result of energy saving has a negative association with reductions in energy use, results also found by Yoo et al. [44].

H7. Loss of comfort is negatively associated with the attitude towards reducing the temperature to conserve energy in winter.

2.2.3. Self-perceived energy knowledge

Energy knowledge is considered 'the knowledge of energy costs, energy conservation behaviours, and the energy consequences of these behaviours' [39]. People with a high degree of self-perceived knowledge about energy and its use will be more likely to have a positive attitude towards reducing their energy consumption [33,39,43,44]. People who consider that they have more knowledge about their energy consumption and energy issues, also have a higher sense of responsibility and are more aware of the perceived importance of saving energy [44,45].

H8. Self-perceived energy knowledge is positively associated with the attitude towards reducing energy consumption by lowering the temperature in winter.

2.2.4. Environmental concern

Environmental concern is defined as the awareness of environmental issues and the perceived human impact on the environment [17,42,44,46,47]. Persons with higher environmental concern will be more likely to have positive attitudes towards reducing their energy consumption [17,42,47].

H9. Environmental concern is positively associated with the attitude towards reducing energy consumption by lowering the temperature in winter.

2.3. Value belief norm theory

Although the TPB has been widely applied, it has also been criticized because of its narrow focus on self-interest, while neglecting collective outcomes [23]. Additionally, Whitmarsh et al. [24] remarked that the TPB places too much emphasis on deliberate or rational action.

Extending our model with VBN theory addresses these concerns and focuses on the moral reactive path towards pro-environmental behaviour. According to Stern and colleagues, performing sustainable activities stems from a sense of moral obligation to act sustainably, i.e.: personal moral norms predict sustainable behaviours [26,48]. Stern subsequently defined four different types of sustainable behaviours that can be predicted by VBN. These are: environmental activism (taking part in public demonstration to draw attention to climate change); non-activist behaviour in the public sphere (support for environmental regulation); private-sphere environmentalism (sustainable use of resources, purchase of recycled products) and finally, organisational behaviour (i.e. more sustainable production techniques) [48].

As theorized by Schwartz [49], these personal moral norms are activated by two antecedents: *awareness of consequences* and *ascription of responsibility*. VBN conceptualises this as a causal chain that stems from an awareness of the consequences that is in turn responsible for an ascription of responsibility of this behaviour which in turn activates personal norms [27].

In sum, first, a person needs to be aware of the negative consequence of their behaviour on the environment. Second, a person needs to feel responsible for these environmental problems. Indeed, experimental studies have found a causal relationship between awareness of consequences and ascription of responsibility [27].

VBN theory has seen wide application to predict sustainable behaviour. For example, Fornara et al. [50] found personal moral norms to be predictive of the intention to use renewable energy, with both awareness of consequences and ascription of responsibility having a statistically significant association with moral norms. Wang et al. [51] also found personal norms to be associated with energy saving. Research by Steg et al. [52] noted that support for energy policies that aim to reduce CO_2 emissions by households can be predicted by VBN theory, with the authors finding a causal chain where *awareness of consequences* is associated with *ascription of responsibility* which in turn can be associated with *pro-environmental personal norms* and finally support for CO_2 reduction policies.

This result was also corroborated by Chen [20] who studied VBN theory in Taiwan on the range of sustainable behaviours identified by Stern [48] (environmental activism, private-sphere environmentalism, etc.). The author found strong and significant associations between *ascription of responsibility*, *awareness of consequences* and *pro-environmental personal norms* on the various pro-environmental behaviours assessed in the study.

H10. Awareness of consequences is positively associated with ascription of responsibility.

H11. Ascription of responsibility is positively associated with pro-environmental personal norms.

H12. Pro-environmental personal norms are positively associated with intent to reduce energy consumption by lowering the temperature.

2.4. Prototype willingness model

Our final theoretical model is the Prototype Willingness Model (PWM) [28]. Alongside the TPB which addresses the rational, deliberate process of decision making, VBN theory which focusses on the moral reactive path, the PWM explores the social reactive path towards sustainable behaviour.

The PWM was first conceptualised to assess health risk behaviour in adolescents. The PWM differs from the TPB by arguing that behaviour isn't necessarily planned but rather occurs spontaneously, being the result of *conducive social situations* [53]. Of special interest for research into sustainability, the PWM proposes that people have images (or prototypes) that they associate with certain behaviour.

Concretely, two variables are considered, namely *prototype favourability*, or how favourable people perceive a person who engages in an activity, and *prototype similarity*, how similar they anticipate themselves to be to the person engaging in that activity. Together, prototype favourability and prototype similarity influence someone's *willingness* to engage in said behaviour. *Willingness* can in turn be associated with both intent and behaviour.

Although the PWM is often used to assess risky adolescent behaviour [54], Gerrard et al. [28] remark that the model should also be applicable in adulthood. Additionally, it has been applied to predict positive health-related behaviour such as exercising [55] or cycling [56].

Of special interest is its implementation to understand sustainable behaviour, with Ratliff et al. [57] applying the PWM to predict environmentally friendly behaviour. The authors support the hypothesis that holding *positive implicit prototypes* influences both self-reported environmentally friendly behaviour, and donation to an environmental charity [57]. These results are mirrored in a study by Zhao et al. [58], finding that holding positive peer images can be associated with the intent to purchase sustainable clothing. Finally, of special relevance is the combined used of the PWM and the TPB to measure behaviour and behavioural intent, with Rivis et al. [55] finding, on average, 5 %

increased explained variance across six studies where both the PWM and the TPB was applied. Beyond the domain of sustainability, Van Gool et al. [59] found willingness, as part of the PWM, to be a strong predictor of intent and behaviour in their study on sharing personal information online.

H13. Prototype favourability is positively associated with the willingness to reduce energy consumption behaviour by lowering the temperature in winter.

H14. Prototype similarity is positively associated with the willingness to reduce energy consumption behaviour by lowering the temperature in winter.

H15. Willingness is positively associated with the intention to reduce energy consumption behaviour by lowering the temperature in winter.

H16. Willingness is positively associated with behaviour.

2.5. Demographic variables

Finally, as part of our analysis, we perform preliminary assessment on several demographic variables and their impact on intent. This includes age [60], level of education [32] and gender [61].

3. Method

3.1. Sample and procedure

Our online survey was distributed in the period between February 2021 and July 2021. Our survey was initially created in English, where we operationalised the three main behavioural theories applied in this study, including any additional antecedents. Our survey was subsequently translated into the following languages: Dutch, French, Italian, Portuguese, Croatian, Greek, German, Lithuanian, Latvian, Romanian, Slovenian, Slovak, Spanish, and Bulgarian.

For all translations, we applied a back-translation approach, where items were translated from English into their respective languages by native speakers and subsequently translated back into English to assess for discrepancies [62]. In case of discrepancies, some minor revisions were made by native speakers in collaboration with the researchers, with extreme care being taken to ensure the integrity of the original English scales. We were aided in our translation by consumer organisations throughout Europe, who also supported the dissemination of the survey. This translation process followed several iterations, until we were satisfied with the translation.

Once this process was concluded, we proceeded to distribute the survey. This broadly happened through two channels. First, we again relied on the above-mentioned network of consumer organisations in Europe who requested that their members complete the online survey. A list of organisations can be found in the acknowledgments. This cohort comprised most of our respondents, languages and countries.

Second, we recruited +1000 Flemish respondents through an existing research panel from survey company Bilendi. In both channels, respondents were limited to persons aged 18 and older and residing in Europe.

In total across both distributions, the survey was opened by 7098 persons. Of these, 954 (13.46 %) dropped out after reading the introduction, while 536 (7.56 %) left the survey after reading the privacy statement. A further 493 (6.95 %) dropped out before reaching the final questions. We included two quality control questions to identify inattentive respondents [63], resulting in the removal of 689 (9.72 %) participants. For the Flemish survey we additionally applied a recruitment criterion based on age, gender and education. As a result, 1304 (18.39 %) Flemish participants started the survey when their respective quotas were already filled and were thus not able to continue. A further 15 (0.21 %) people who lived outside Europe (India, South Africa, Kuwait, etc.) were also removed.

This left a final sample of $n = 3098$. Table 1 contains an overview of participants per language, including more demographic details. Our final sample thus contains 1510 (48.74 %) females, 1572 (50.74 %) males, and 16 (0.52 %) people who indicated "other" when asked for their gender. Our average age was 50.6 (SD = 16.0). Our sample comprised of 261 (8.24 %) people with lower level of education, and 898 (28.99 %) with upper secondary. A further 817 (26.37 %) have a Bachelor, while 877 (28.31 %) have a Master. Finally, 245 (7.91 %) of our participants have a doctoral degree.

3.2. Ethics

This study was conducted in accordance with the ethical standards of the American Psychological Association. The study protocol was approved by the Ethics Committee of the University of Ghent.

3.3. Measures

Below we discuss in more detail the scales and measures used in the survey. Unless stated otherwise, we applied a five-point Likert scale ranging from *strongly disagree* (1) *to strongly agree* (5). Scale reliability was good throughout. All items, including Cronbach alpha's can be found in Table 3.

3.3.1. Age and gender

Participants were questioned about their gender as indicated on their national ID (*male*, *female*, and *other*). We additionally asked participants to provide their date of birth.

3.3.2. Theory of planned behaviour constructs

All items as part of the TPB were derived from Ajzen [14] and made in accordance to related studies that also applied the TPB [21,36,64] and adapted.

3.3.2.1. Behaviour. Energy saving behaviour was measured by asking "In the last winter, how often did you save energy by lowering the temperature setting?" Participants were provided with the following options: "never, a few times, a number of times, but less than half the

Table 1
Demographic characteristics of our sample.

Characteristic	N = 3098
Gender	
Female	1510 (48.74 %)
Male	1572 (50.74 %)
Other	16 (0.52 %)
Average age	51 (min = 18, max = 91)
Degree	
Lower	261 (8.42 %)
Upper secondary	898 (28.99 %)
Bachelor	817 (26.37 %)
Master	877 (28.31 %)
Doctor	245 (7.91 %)
User language	
Bulgarian	21 (0.68 %)
Dutch	1377 (44.45 %)
English	121 (3.91 %)
French	45 (1.45 %)
German	139 (4.49 %)
Greek	218 (7.04 %)
Croatian	176 (5.68 %)
Italian	213 (6.88 %)
Latvian	101 (3.26 %)
Lithuanian	35 (1.13 %)
Portuguese	151 (4.87 %)
Romanian	118 (3.81 %)
Slovakian	75 (2.42 %)
Slovenian	273 (8.81 %)
Spanish	35 (1.13 %)

days, on about half the days, most days, almost every day, every day." Given that this item is ordinal, we are unable to calculate a mean score. However, the item was subsequently recoded into a binary variable, with *never* denoting 0 and all other options denoting 1.

3.3.2.2. Intent. To measure intent to reduce energy consumption, we used three items. A sample item includes "I intend to save energy by lowering the temperature in winter".

3.3.2.3. SN. Four items were used to assess SN, with a sample item being "People who are important to me expect that I save energy by lowering the temperature in winter".

3.3.2.4. Attitude. Our final construct as part of the TPB is attitude and was measured using a seven point (1–7) semantic differential scale. Participants were presented with the statement "For me, saving energy by lowering the temperature setting in winter is…", followed by five items pairs ranging from Useless - Useful; Disadvantageous - Advantageous; Foolish - Wise; Ineffective - Effective; Dull – Interesting.

3.3.3. Constructs extending the theory of planned behaviour

3.3.3.1. Bill consciousness. This scale measures how aware participants are of their energy bill, uses three items, and was derived from Chen et al. [36]. A sample item is: "I pay attention to energy-saving tips to reduce my electricity bills".

3.3.3.2. Loss of comfort. To assess whether participants think that reducing their energy consumption will impact how comfortable they live, we used a three-item scale derived from Wang et al. [33]. A sample item includes "Energy conservation means I have to live less comfortably".

3.3.3.3. Perceived energy knowledge. We questioned participants on how well they perceive their own knowledge about energy saving methods using three items derived from Wang et al. [33]. A sample items includes "I know energy saving methods well".

3.3.3.4. Environmental concern. Our final antecedent of attitude is environmental concern, where we questioned participants about how concerned they feel about the environment. We used three items derived from Kilbourne & Pickett [46]. A sample item includes "I am very concerned about the environment".

3.3.4. Value belief norm theory constructs

The items for personal moral norms, awareness of consequences and ascription of responsibility were all derived from Abrahamse & Steg [65].

3.3.4.1. Personal moral norms. This construct used three items and measures the extent to which people feel that they have a moral obligation to reduce their consumption of energy. A sample item is "I feel morally obliged to reduce my energy use, regardless of what other people do".

3.3.4.2. Awareness of consequences. We asked participants to assess how aware they are of the consequences of energy use through three items. A sample item includes: "Energy conservation contributes to a reduction of global warming".

3.3.4.3. Ascription of responsibility. Our final construct within VBN theory questions how personally responsible respondents feel for the dwindling of resources and accompanying ecological problems. It consists of three items. A sample item is "I take joint responsibility for the depletion of energy resources".

3.3.5. Prototype willingness model constructs

All items used as part of the PWM were derived in first instance from Gerrard et al. [28] and subsequently adapted in accordance with other implementations of the PWM [56,59].

3.3.5.1. Prototype favourability. This construct captures how favourable people view themselves to people who lowers the temperature. To do so, we asked people to think about someone who saves energy by lowering the temperature setting in winter. We emphasised that they do not consider someone in particular. Following this, we presented participants with a selection of five characteristics (conscious, progressive, smart, green, responsible), asking them to indicate whether they think this prototype has any of these characteristics, ranging from *Not at all* (1) to *Totally* (5).

3.3.5.2. Prototype similarity. To assess how similar people feel to a prototypical person who saves energy in the winter, we asked them "Do you resemble the typical person who saves energy by lowering the temperature setting in winter?". This was followed by five options: no (1); rather no (2); neither yes nor no (3); rather yes (4), yes (5).

3.3.5.3. Willingness. This construct measures how likely people assess their willingness to engage in a particular behaviour and includes four items. A sample item includes "You keep the doors closed to prevent heat loss", with options ranging from extremely unlikely (1) to extremely likely (5).

3.4. Analytic strategy

As seen in Fig. 1, our model contains the following exogenous variables: bill consciousness, loss of comfort, energy knowledge, environmental concern, SN, PBC, awareness of consequences, prototype favourability and prototype similarity. Attitude, ascription of responsibility, personal moral norms, willingness, intent and behaviour are all endogenous variables.

To analyse our data, we used a combination of statistical methods. For our descriptive statistics we used Pearson correlations, while performing some preliminary analysis using one-way analysis of variance (ANOVA). To asses our behavioural model, we used Structural Equation Modeling (SEM) given its ability to allow multiple dependent and independent variables in the same model [66]. As proposed by Anderson & Gerbing [67], we follow a two-step process. This involves first building a measurement model where we assess whether the observed variables reliably reflect the hypothesized latent variables in the research model. A priori we decided that items with factor loadings below 0.4 would be removed, and error covariance between similarly phrased items were allowed. To perform our analysis, we used LAVAAN for R [68,69].

To assess our model fit, we use a combination of indices. We report χ^2, which tests the hypothesis that the predicted model, as proposed in both our CFA and SEM, does not differ when compared to the actual data. Given this, non-significant results indicate good fit. However, we stress that for large samples, χ^2, becomes overly stringent, i.e.: tends to generally reach statistical significance which indicates bad model fit [70]. Alternative approaches such as normed χ^2 are also discouraged, with Kline emphasising that there is *little statistical or logical foundation* for it [71].

We also report the comparative fit index (CFI), root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). The CFI has a range between 0 and 1.00, with values higher than 0.95 indicating good fit and values higher than 0.9 indicate adequate fit [72,73]. For both RMSEA and SRMR, values below 0.05 indicate a good model fit, and values from 0.06 to 0.08 indicate an adequate fit. Given our large sample size, we set our level of statistical significance at $p < 0.01$.

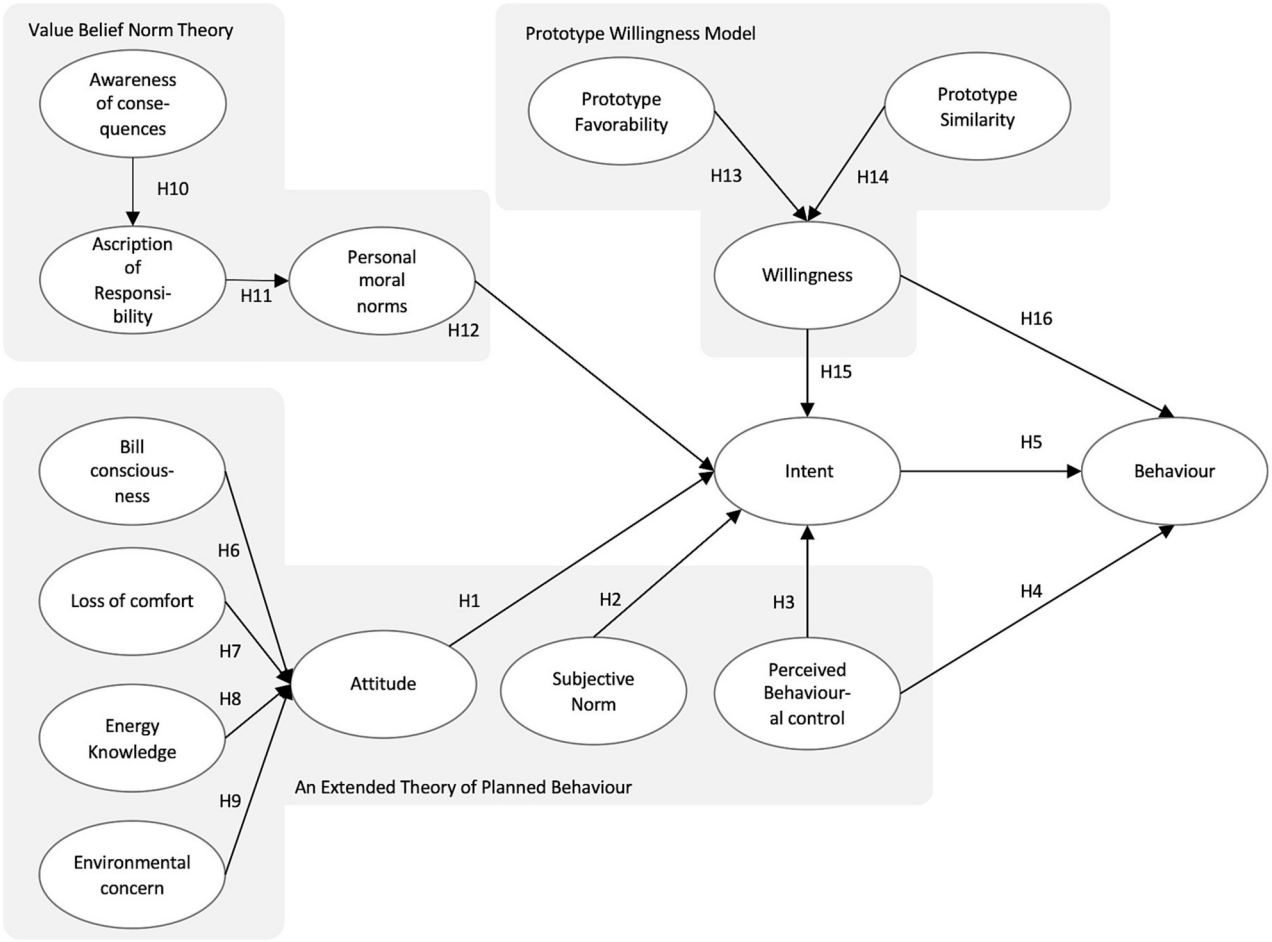

Fig. 1. Conceptual model to predict intent to reduce consumption by lowering the temperature setting in winter.

4. Results

4.1. Preliminary analysis

The average measured intent to reduce energy consumption by lowering the temperature setting in winter within our sample is 3.35 (SD = 1.02). Regarding the actual lowering of the heating, 642 (20 %) respondents mention that they have not tried to save energy by lowering the temperature in the past winter.

We also performed Pearson correlation analyses between our study variables, by creating mean scores for each construct. As seen in Table 2, we find a statistically significant positive correlation between behaviour

Table 2
Pearson correlation matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 - Behaviour														
2 - Intent	0.49*													
3 - Attitude	0.36*	0.54*												
4 - Perceived behavioural control	0.34*	0.65*	0.39*											
5 - Subjective norm	0.32*	0.57*	0.47*	0.41*										
6 - Prototype favourability	0.31*	0.51*	0.55*	0.40*	0.43*									
7 - Prototype similarity	0.45*	0.63*	0.56*	0.40*	0.51*	0.56*								
8 - Willingness	0.37*	0.32*	0.37*	0.26*	0.22*	0.29*	0.34*							
9 - Environmental concern	0.17*	0.35*	0.32*	0.25*	0.28*	0.42*	0.38*	0.16*						
10 - Bill consciousness	0.18*	0.31*	0.30*	0.18*	0.22*	0.29*	0.36*	0.24*	0.41*					
11 - Energy knowledge	0.12*	0.20*	0.27*	0.17*	0.18*	0.22*	0.32*	0.15*	0.33*	0.49*				
12 - Loss of comfort	−0.14*	−0.32*	−0.28*	−0.15*	−0.21*	−0.24*	−0.33*	−0.14*	−0.35*	−0.26*	−0.18*			
13 - Awareness of consequences	0.14*	0.29*	0.29*	0.21*	0.22*	0.37*	0.30*	0.16*	0.57*	0.32*	0.25*	−0.20*		
14 - Ascription of responsibility	0.13*	0.27*	0.24*	0.21*	0.21*	0.32*	0.28*	0.07*	0.55*	0.24*	0.24*	−0.20*	0.49*	
15 - Personal moral norms	0.24*	0.42*	0.36*	0.29*	0.32*	0.43*	0.44*	0.18*	0.61*	0.44*	0.33*	−0.33*	0.51*	0.59*

* $p < 0.001$.

and intent ($r = 0.49$, $p < 0.001$). PBC ($r = 0.34$, $p < 0.001$) and willingness ($r = 0.37$, $p < 0.001$) are also statistically significantly positively correlated with behaviour. We also find that attitude ($r = 0.54$, $p < 0.001$), SN ($r = 0.57$, $p < 0.01$) and PBC ($r = 0.65$, $p < 0.001$), willingness ($r = 0.37$, $p < 0.001$) and personal moral norms ($r = 0.24$, $p < 0.001$) are all statistically significantly positively correlated with intent. No significant gender differences were found for intent (one-way ANOVA, $F = 2.90$, $p = 0.06$) or behaviour (one-way ANOVA, $F = 0.45$, $p = 0.64$). However, we emphasize caution with interpreting the results given the unequal group sizes.

Our analysis of variance test between level of education and intent finds a statistically significant difference (one-way ANOVA, $F = 3.39$, $p < 0.01$). However, a Tukey post hoc test to examine which pairs of education levels differ shows no significant result, which can be attributed to Tukey being a more statistically conservative test [74].

Finally, age is negatively correlated with intent ($\rho = 0.08$, $p < 0.01$), but fails to reach a statistically significant correlation with behaviour ($\rho = -0.02$, $p = 0.17$). We reflect more on the impact of our sociodemographic variables later.

4.2. Measurement model

Our first fitted model is our confirmatory factor analysis. Our fit indices were generally adequate (RMSEA = 0.039, SRMR = 0.039, CFI

Table 3
Observed variables, latent constructs, factor loadings, Cronbach's alpha and items.

Observed variable	Latent construct	Factor loadings	Cronbach's alpha	Item
Ascription of responsibility	ASCR_RESP_1	0.873	0.93	I take joint responsibility for the depletion of energy resources.
	ASCR_RESP_2	0.912		I feel jointly responsible for the greenhouse effect.
	ASCR_RESP_3	0.922		I take joint responsibility for environmental problems.
Attitude	ATT_1	0.858	0.91	Useless - useful
	ATT_2	0.780		Disadvantageous - advantageous
	ATT_3	0.872		Foolish – wise
	ATT_4	0.859		Ineffective – effective
	ATT_5	0.742		Dull – interesting
Awareness of consequences	CONSEQ_AWARE_1	0.772	0.78	Energy conservation contributes to a reduction of global warming.
	CONSEQ_AWARE_2	0.805		The increasing energy demand is a serious problem for our society.
	CONSEQ_AWARE_3	0.620		The increasing shortage of energy sources is a serious problem for our society.
Energy knowledge	ENERGY_KNOW_1	0.902	0.94	I know energy-saving methods well.
	ENERGY_KNOW_2	0.927		I know much about the energy-saving tips of daily life.
	ENERGY_KNOW_3	0.902		I feel knowledgeable about saving energy.
Environmental concern	ENV_CONCERN_1	0.810	0.82	I am very concerned about the environment.
	ENV_CONCERN_2	0.649		I would be willing to reduce my energy consumption to help protect the environment.
	ENV_CONCERN_3	0.869		Major political change is necessary to protect the natural environment.
Bill consciousness	BILL_CON_1	0.763	0.79	I pay attention to energy-saving tips to reduce my electricity bills.
	BILL_CON_2	0.693		I keep track of my (monthly) electricity bills,
	BILL_CON_3	0.785		I am motivated to keep my (monthly) electricity costs under a reasonable amount.
Intent	INT_1	0.937	0.90	I intend to save energy by lowering the temperature setting in winter.
	INT_2	0.924		I want to save energy by lowering the temperature setting in winter.
	INT_3	0.748		There is a chance that I save energy by lowering the temperature setting in winter.
Loss of comfort	LOSS_COMF_1	0.834	0.90	Energy conservation means I have to live less comfortably.
	LOSS_COMF_2	0.942		My quality of life will decrease when I reduce my energy use.
	LOSS_COMF_3	0.820		To me, energy-saving behaviour entails losses of comfort that are too high.
Perceived behavioural control	PBC_1	0.818	0.81	I have the capabilities to save energy by lowering the temperature setting in winter.
	PBC_2	0.783		If I would want it, I could save energy by lowering the temperature setting in winter.
	PBC_3	0.722		If it were entirely up to me, I am confident that I could save energy by lowering the temperature setting in winter.
Personal norms	PERS_NORM_1	0.867	0.79	I feel morally obliged to reduce my energy use, regardless of what other people do.
	PERS_NORM_2	0.680		I feel guilty when I use a lot of energy.
	PERS_NORM_3	0.685		I feel good about myself when I do not use a lot of energy.
Prototype favourability	PROT_FAV_1	0.809	0.91	Conscious.
	PROT_FAV_2	0.833		Progressive
	PROT_FAV_3	0.848		Smart
	PROT_FAV_4	0.754		Green
	PROT_FAV_5	0.885		Responsible
Prototype similarity	PROT_SIM_1	0.898	0.95	Do you resemble the typical person who saves energy by lowering the temperature setting in winter?
	PROT_SIM_2	0.911		How similar or different are you to the type of person who saves energy by lowering the temperature setting in winter?
	PROT_SIM_3	0.915		I am comparable to the typical person who saves energy by lowering the temperature setting in winter.
	PROT_SIM_4	0.898		To what extent are you like the typical person who saves energy by lowering the temperature setting in winter?
Subjective norms	SN_1	0.840	0.83	Most people who are important in my life would approve that I save energy by lowering the temperature setting in winter.
	SN_2	0.821		People who are important to me expect that I save energy by lowering the temperature setting in winter.
	SN_3	0.565		I think most people who are important in my life would not mind that I save energy by lowering the temperature setting in winter.
	SN_4	0.746		Most people who are important in my life save energy by lowering the temperature setting in winter.
Willingness	WILL_1	0.669	0.76	You lower the temperature setting in all unused rooms when you are at home all day.
	WILL_2	0.747		You lower the temperature setting when you leave home.
	WILL_3	0.502		You keep the doors closed to prevent heat loss.
	WILL_4	0.751		You go to sleep and you lower the temperature setting.

= 0.955, TLI = 0.949, χ^2 = 9694.411, $p < 0.001$), apart from χ^2. However, as noted, for samples of this size, χ^2 values tend to be significant and as such we continue with our model. As seen in Table 3, all factor loadings are above 0.5. In turn, our Cronbach alpha values are also satisfactory and above the recommended level of 0.7, with our lowest Cronbach alpha value for Willingness at 0.77. Given that our CFA achieves generally adequate fit, we continue with our SEM without applying modification indices.

4.3. Structural equation model

Before introducing and discussing our SEM model in full, we first evaluate and reflect on the inclusion of sociodemographic variables in our model (gender, level of education, and age). For gender, we first performed a SEM analysis with removal of our 16 (0.52 %) participants who indicated "other" (n = 3082). This result shows that gender has no statistically significant impact on intent (p = 0.08), or behaviour (p = 0.33) and is thus in line with our analysis of variance test. As a precautionary measure we also tested a model with the inclusion of educational level as predictor. Concurrent with our earlier findings, we see that education level does not impact our results, with no level of education significantly associated with intent or behaviour. In sum, our modeling shows that, except for age, our demographic variables fail to have an impact on our results. Following this preliminary analysis, we thus proceed with our SEM analysis using only age as demographic predictor.

Fit indices for our structural equation model were acceptable (RMSEA = 0.048, SRMR = 0.094, CFI = 0.921, TLI = 0.914, χ^2 = 9694.411, $p < 0.001$), except for RMSEA. Given this, we continue with our analysis. Attitude (β = 0.197, $p < 0.001$); SN (β = 0.342, p < 0.001) and PBC (β = 0.416, p < 0.001) are all statistically significant predictors of intent, thus supporting H1, H2 and H3. PBC (β = 0.053, $p < 0.03$) is not significantly related to behaviour, resulting in rejection of H4, while intent (β = 0.339, p < 0.001) is statistically significant which supports H5.

All four antecedents of attitude reach statistical significance: bill consciousness (β = 0.159, p < 0.001), loss of comfort (β = −0.129, p < 0.001), energy knowledge (β = 0.069, p < 0.001) and environmental concern (β = 0.274, p < 0.001), supporting H6, H7, H8 and H9.

Within VBN theory, H10, H11, H12 were also supported, with awareness of consequences (β = 0.688, $p < 0.001$) having a significant association with ascription of responsibility. Ascription of responsibility in turn is significantly associated with personal moral norms (β = 0.719, $p < 0.001$). Personal moral norms are significantly associated with intent (β = 0.130, p < 0.001).

We also find within the PWM that H13, H14, H15 and H16 can be supported. Both prototype favourability (β = 0.137, $p < 0.001$) and prototype similarity (β = 0.330, $p < 0.001$) can be significantly associated with willingness, and willingness in turn is significantly associated with intent (β = 0.098, p < 0.001) and behaviour (β = 0.274, p < 0.001). Age is negatively associated with intent (β = −0.007, p < 0.001).

5. Discussion

5.1. Findings

In this study we assessed the determinants of intent and behaviour to reduce heating related energy consumption in winter. Our approach

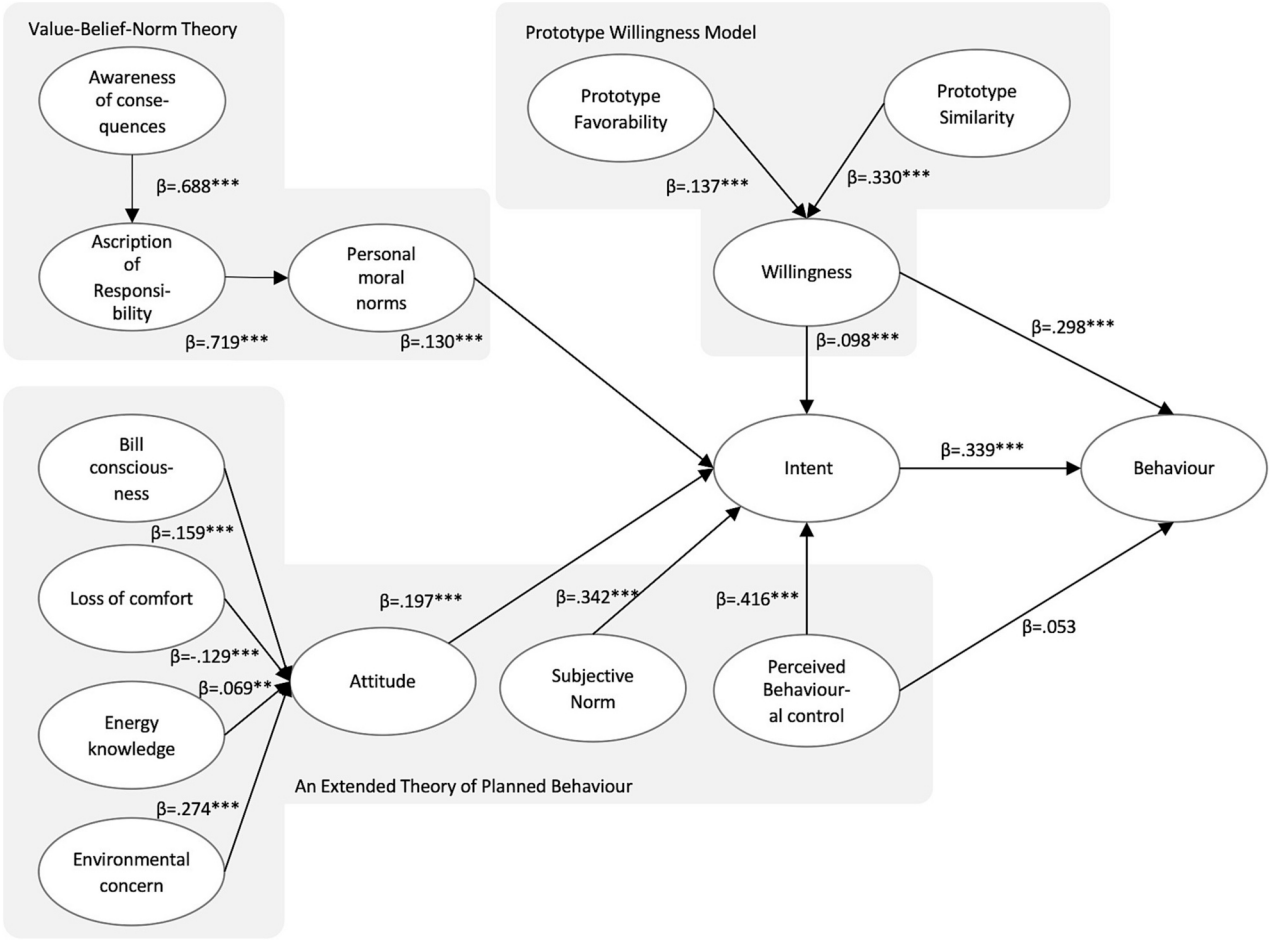

Fig. 2. Results from our structural equation model. RMSEA = 0.048, SRMR = 0.094, CFI = 0.921, TLI = 0.914, χ^2 = 9694.411, $p < 0.001$, $p < 0.001$ = ***.

focused on the deliberate, rational path towards decision making through the TPB, the social reactive path through PWM and the moral path through VBN theory.

Our model explains 64 % variance of intent and 30 % variance of behaviour. Additionally, 24 % variance of attitude was explained. As seen in Fig. 2, we only fail to support H4 (PBC's association with behaviour). Looking specifically at our predictors for intent, we see that PBC, along with SN, are together the strongest predictors of intent. They are followed by attitude, personal moral norms (as part of VBN theory) and willingness (as part of PWM), showing that all three paths contribute to decision making with the deliberate, rational path having the strongest impact. Given the differences in analytic strategy, exact phrasing of outcome variables and geographic differences, there are limits to how closely we can compare our results with previous studies in this domain. Nonetheless, some patterns emerge, which we discuss below.

Looking first at the deliberate, rational path as measured through the TPB, of notable interest is our rejection of H4, the association between PBC and behaviour, despite PBC's association with intent. The inclusion of behaviour as part of the overall behavioural model to predict reduction in energy use is comparatively rare. By extension, limited examples exist of relationships between PBC and behaviour being investigated within the domain of energy reduction. This makes it hard to compare our results with related work. However, there are several possible explanations for our rejection of H4.

First, our measure for behaviour focussed on past behaviour, which is not uncommon in the application of the TPB [59]. Our items for PBC, by contrast, questioned participants about their perceived ability to reduce energy consumption, implying their ability to do so in the future. Given this, our instrument highlights a mismatch between someone's current perceived ability to reduce their consumption and having done so in the past. Furthermore, given our large sample size, we selected a more restrictive statistical significance threshold of $p < 0.01$, in contrast to the more prevalent cut-off of $p < 0.05$ found in related work [21,32,34,50]. With $\beta = 0.053$ at $p = 0.03$ the relationship between PBC thus fails to reach the statistical significance of $p < 0.01$ defined in this study, while being denoted statistically significant using the more conventional threshold of $p < 0.05$.

Finally, a further possible explanation is that in practice, while people do have the intent to turn down the heat, and their perceived ability to do so is strongly associated with this intent, they are not always themselves in charge of the temperature setting; someone else in the household may be performing this task.

Examining our results more broadly, our findings concur with earlier results, with some exceptions. Most notably, our study finds support for the impact of SN on individuals' intent to decrease heating related consumption in winter. While in line with previous results [32,34,50], it can be contrasted with research from Liu [19], and Ansu-Mensah and Bein [18], where no positive statistically significant relationships are found. Our results thus strengthen the idea that others' approval of our own sustainable behaviour is important. We furthermore see a comparatively strong relationship between PBC and intent, despite the absence of significant association between PBC and behaviour.

Our results on the association between attitude and intent are broadly mirrored in literature, with support found for H1 [32,34,50]. Of additional interest, we find environmental concern, loss of comfort and energy related knowledge to all be predictors of attitude. Environmental concern appears to be the strongest predictor of attitude, as also found by Karlin et al. [42]. Bill consciousness is more than twice as important as energy-related knowledge in predicting attitude. Moreover, loss of comfort is the only predictor having a negative association with attitude, suggesting that there is a trade-off between losing personal comfort and positive attitudes towards reducing consumption.

The social reactive path, as operationalised through the PWM, has seen comparatively little application in studies of environmental behaviour. Nonetheless, we find broad agreement with other results [57,58], as clearly illustrated through the associations between willingness and intent (H15), and between willingness and behaviour (H16). These associations highlight the potential of the PWM to explain behaviour beyond the domain of healthcare. However, compared to the TPB variables, the effects are smaller. One possible explanation is that the PWM originally considers spontaneous behaviour, often in social settings (i.e.: smoking). While turning down the heat setting might occur spontaneously, it is less likely to occur under peer pressure.

Examining the personal moral path towards energy reduction through VBN theory, we find support for Steg & Groot's relationship between awareness of consequences and ascription of responsibility, followed by personal moral norm's association with intent [27], results also found by Fornara et al. [50]. While Shi et al. [75] fail to find support for personal norms' impact on energy conservation, the authors also note that the sample in question, students living collectively at a university in Beijing, could have impacted the results, given the lack of individual economic pressure. In any event, while certainly not negligible, VBN theory has a subdued impact on intent. This is concurrent with findings from Abrahamse & Steg [65] that VBN in particular performs worse when measuring behaviour with high personal costs (i.e., decreased comfort due to lower energy use) compared to behaviour where personal costs are lower (i.e.: support for a flight tax when not flying).

Reflecting on the combined results, we do see that the study variables derived from the TPB, the PWM and VBN theory frameworks are able to collectively predict the intent to reduce heating-related consumption, with 64 % of variance explained. Finally, while work in this domain often collects sociodemographic data, it is seldom included as co-variate within behaviour models [18,19,34,50]. We performed an exploratory analysis to assess the impact of our sociodemographic variables (age, gender, education) on intent. In our SEM analysis, we only found a modest impact of age on intent. This stands in contrast to research by Estiri & Zagheni, who find age to significantly contribute to energy consumption [60], and closer to Nie et al. [32], who fail to find a significant association between age and energy saving behaviour. One possible explanation for this discrepancy is that while we, along with Nie et al. [32], focussed on future intent to reduce consumption, Estiri & Agheni [60], look into existing residential household consumption.

Finally, it is worth reflecting on the overall efficacy our behavioural model, notably the so-called intent-behaviour gap. Specifically, for the TPB, a meta-analysis of meta-analysis points out that intent explains, on average, 28 % of future behaviour, within a range of 67 % to 16 % [76]. This points to the general effectiveness of the framework, even if large shares of future behaviour remain unexplained.

5.2. Limitations and future work

Although our analyses are based on a large cross-national sample, our sample is not representative of Europe, much less of any single country within the sample. This is especially true for our participants from northern and eastern Europe. We thus emphasize that caution must be taken when generalising results since there may be statistically significant country-specific differences that we are unable to detect given the small group sizes for some countries. Hence, we refrain from making any claims about the absolute intent across Europe to reduce heating related consumption.

Reflecting on our modeling approach, the combination of inputs from the TPB, the PWM and VBN theories, makes the assessment of its broader accuracy a challenging task. While previous meta-analysis of the three theoretical frameworks points to their efficacy in isolation [29–31], our study is the first – to our knowledge – that combines all three of them in a single model, in general and for the purposes of sustainable behaviour, in particular. Future efforts could attempt to explore how these socially reactive, moral or rational paths contribute to decision making in the domain of sustainability.

Furthermore, as pointed out by Williams et al. [77], at least with

their study among high income neighbourhoods in South Africa, wasteful habits appear to be common. While we included bill consciousness in our study, it is also possible that income plays a role in energy saving behaviour. Moreover, this study took place prior to the 2022 invasion of Ukraine by Russia and the subsequent rise in energy costs [78], which has had an additional impact on consumers' behaviour that is not reflected in our results.

In relation to the sharp rises in energy costs across Europe, the European Council proposed a 15 % reduction in natural gas demand [79], with subsequent impact on national legislation. This points to possible interesting avenues of future work, where the recent rises in energy costs, the levels of income and ongoing legislative efforts to curb consumption can be jointly studied to see how they collectively impact saving behaviour.

Moreover, in our study we do not make a distinction between types of heating. It is, for example, possible that persons who rely on heating sources such as heat pumps, possibly powered by a solar panel installation, will differ significantly in their attitudes towards heating conservation than people who heat their homes using gas. Future work could explore the impact of these factors.

6. Conclusion and policy implications

We conclude our article with some policy implications derived from our results. As discussed earlier, within the TPB we find attitude, SN and PBC to be statistically significantly associated with intent, while attitude and SN can predict behaviour as well. The VBN theory and the PWM also contribute to explaining intent, with willingness, as part of the PWM, being additionally associated with behaviour.

An important consideration is providing ownership and access to personal consumption data where possible. This way customers can make more informed decisions about their consumption, so that their PBC increases, but they also become more knowledgeable about energy matters. Bill conscious consumers my particularly benefit from this data. Moreover, through smart meters and digital energy monitors, consumers can see the impact of any saving measures directly, even if smart meters do not necessarily display the exact source of consumption. Although this presents a challenge in cases where residents rely on district heating, smart heating meters offer the possibility to measure individual household consumption.

Policies should thus alter the status of information requirements, which currently allows reporting consumption data as rarely as on a yearly basis and provide an important information source for customers. Based on this data provision, customers can be better informed about their energy consumption behaviour and utilities can provide their customers with timely and targeted energy saving tips, better social comparisons with other households, in-depth information and visualisation of household consumption and the ability to automate certain energy saving procedures, as also proposed by Nachreiner et al. [80], addressing bill conscious consumers and improving energy related knowledge.

To further increase citizens' general energy knowledge and awareness of consumption, EU-level and national activities should promote best practice examples and peer-to-peer learning on topics such as the energy transition. The emphasis on practical factors is valuable, given the importance of habit formation in facilitating behaviour change [81].

Moreover, in some instances the European and national level is too far away from customers to have major leverage. Therefore, it is important to address intermediary actors such as energy service companies (ESCOs) and, where feasible, hold them accountable. ESCOs have the most direct access to their customers and can thus provide tailored and in-person recommendations, which are likely to have a higher impact due to SNs.

One important way of addressing intermediary actors is through the Energy Efficiency Obligation Schemes foreseen in the Energy Efficiency Directive by the European Parliament of the European Union [82]. These schemes mandate certain parties (e.g., ESCOs) to reach energy savings across their customers. Once the intermediary actors can be held accountable, there are various ways to pursue the reduction of energy demand among their customers, for example by providing more in-depth information about consumption and tailored in-person recommendations, which are likely to have a higher impact. The intermediary actors could also team-up with e.g., chimney sweepers or other craftsmen who visit the houses on a regular basis, as is the case in Germany, for example. Nonetheless, subjective and moral norms are typically applicable to groups and as such, national campaigns to reduce energy consumption remain an important tool to alert people about their energy use.

In sync with national policies, intermediaries could push the smart meter roll-out across their customer portfolio, leading to a higher accessibility of data for the intermediaries and for the customers alike. In turn, this effort might result in customers being able to take more informed decisions, because of their data ownership.

The strong impact of SN argues for emphasising the saving behaviour of others when attempting to reduce individual consumption. This can be further strengthened through campaigns to save realistic, but measurable amounts of energy, both among consumers and industry. In relation, as evidenced from both prototype favourability and prototype similarity, having positive images of energy conscious persons contributes to willingness and subsequently the intent to reduce consumption. Currently, there is a window of opportunity to link energy saving behaviour strongly with "doing one's own part" in decreasing Europe's energy dependency. Our research indicates that by giving insight into the large proportion of people who think that saving energy right now is important, actual saving behaviour can be leveraged.

Examining attitude more closely, our results point towards strategies to positively influence attitudes related to energy consumption reduction. Notably, given that normative aspects such as environmental concern appear to have a strong impact on attitudes, more so than bill consciousness, there is additional reason to emphasize these aspects. This is further supported by the strong association between SN and intent, suggesting that financial aspects alone are not enough to curb energy, even if bill consciousness also appear to contribute to attitude.

Nonetheless, care must be taken to allay fears of losing comfort. Any reductions in consumption should not impede comfort as much as possible. While beyond the scope of this work, efforts to improve insulation, for example, point to strategies of reducing consumption without loss of comfort, or systems that prevent unnecessary heating through automated control.

To conclude, our study shows that to predict intent to reduce heating related consumption, PBC, along with SN are both important factors to consider. Attitude, along with personal moral norms (as part of VBN theory) and willingness, part of the PWM and predicted by prototype favourability and prototype similarity also contribute to intent, albeit to a lesser degree.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Annex 1

Activity	Name & country of the beneficiary
Support for dissemination activities at the local/national level (February–May 2021)	CEIP-CENTAR ZA EDUKACIJU I INFORMIRANJE POTROŠAČA/CENTER FOR EDUCATION AND CONSUMER INFORMATION (Croatia)
Support for dissemination activities at the local/national level (February–May 2021)	HUZP-HRVATSKA UDRUGA ZA ZAŠTITU POTROŠAČA/CROATIAN ASSOCIATION FOR CONSUMER PROTECTION (Croatia)
Support for dissemination activities at the local/national level (February–May 2021)	IFOK (Germany)
Support for dissemination activities at the local/national level (February–May 2021)	ΕΕΚΕ-ΈΝΩΣΗ ΕΡΓΑΖΟΜΈΝΩΝ ΚΑΤΑΝΑΛΩΤΏΝ ΕΛΛΆΔΟΣ/UNION OF WORKING CONSUMERS (Greece)
Translation in native language & support for dissemination activities at the local/national level (February–May 2021)	TALENTED BORDERS (Latvia)
Support for dissemination activities at the local/national level (February–May 2021)	ASOCIACIJA VARTOTOJŲ TEISIŲ GYNIMO CENTRAS/LITHUANIAN CONSUMER ASSOCIATION (Lithuania)
Translation in native language & support for dissemination activities at the local/national level (February–May 2021)	INFOCONS – PROTECȚIA CONSUMATORILOR (Romania)
Translation in native language & support for dissemination activities at the local/national level (February–May 2021)	ASOCIÁCIA SPOTREBITEĽSKÝCH SUBJEKTOV SLOVENSKA/ASSOCIATION OF CONSUMER ORGANIZATION IN SLOVAKIA (Slovakia)
Translation in native language & support for dissemination activities at the local/national level (February–May 2021)	ZPS-ZVEZA POTROŠNIKOV SLOVENIJE/SLOVENE CONSUMERS' ASSOCIATION (Slovenia)
Support for dissemination activities at the EU level (February–May 2021)	ECU-EUROPEAN CONSUMER UNION (EU umbrella organization)
Translation in native language if needed & support for dissemination activities at the local/national level (February–May 2021)	INDECOSA-INFORMATION ET DÉFENSE DES CONSOMMATEURS SALARIÉS (France)
Support for dissemination activities at the local/national level (February–May 2021)	GHAQDA TAL-KONSUMATURI/CONSUMERS' ASSOCIATION OF MALTA (Malta)

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