



Gender roles and domestic power in energy-saving home improvements

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ABSTRACT

The importance of considering gender aspects in studies on residential energy consumption has been acknowledged. However, an important topic is still ignored in gender and energy transitions research: domestic power for men and women differs depending on the type of couple to which they belong. According to Pierre Bourdieu, the chances of each spouse to exercise legitimate power in domestic affairs depend on their respective economic and symbolic capital. In other words, spouses-matching matters, and practices, gender domestic roles and social representations on energy-saving home improvements are influenced to a great extent by the type of union that matches both spouses' respective socio-economic characteristics into homo- or heterogamic unions. This mixed-method research is based on extensive data collected in multiple efforts over 18 years, comprising: (1) several sets of in-depth interviews with adults married or in union realised between 2006 and 2021; and (2) three large quantitative surveys realised in 2004, 2014 and 2016. Results indicate that traditional gender roles and male domestic power are mostly challenged in hypogamous unions both in considering and in carrying energy-saving home improvements.

PRACTICE RELEVANCE

A one-size-fits-all retrofit framing and energy policy does not work. In this case, it is not the technical conditions but rather a couple's power relationships in the home. The male territory of energy-saving home improvements is being eroded, especially by wives who are more educated than their husband. Domestic power is key to apprehend the marital dynamics around retrofit. Recognising these marital dynamics, a variety of values can be mobilised to support the execution of energy retrofits, including, for example, more feminine values such as equality, and care for children. Policy instruments and media messages should be designed accordingly, and not mainly as financial benefits. Practitioners would be well-advised to take a more gender-neutral attitude with less stereotyping of male and female potentials. This also means treating homeowners in couples as a team rather than interacting only with the male partner: gender-neutral interactions would better avoid causing or reinforcing embarrassing situations for one partner or for the couple itself in their marital struggle for domestic power in deciding on or executing energy-saving home improvements.

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1. INTRODUCTION

In his analysis of the contributions of the social sciences to energy research, Sovacool (2014) identifies 14 promising avenues of research, one of which is ‘Gender and identity’. Like Sovacool, Ryan (2014) and Mechlenborg & Gram-Hanssen (2020) argue that energy research should better integrate gender issues. Throughout this paper, gender is framed as a ‘doing’, ‘a routine, methodical, and recurring accomplishment’ (West & Zimmerman 1987: 126), that operates in social interactions ‘to produce and maintain power and inequality in social life’ (West & Fenstermaker 1995: 22).

Meanwhile, Sunikka-Blank *et al.* (2018) underline the value of harnessing both gender and social class for more effective energy policies. Social class and gender are articulated otherwise in the concept of ‘domestic power’, still ignored in gender and energy transitions research. Domestic power differs for husbands and wives, depending on their respective contributions in terms of economic and symbolic capitals to their couple, as introduced by Pierre Bourdieu (Bourdieu 1972) and explained below. Respective capitals are key in defining each spouse’s power and predominance, or their limitations, in domestic affairs, including energy-saving home improvements.

This paper aims to demonstrate the fruitfulness of the domestic power concept by showing how male or female domestic power reconfigure gender roles when considering (or not) or achieving energy-saving home improvements. Men and women have different roles. These gender roles are configured differently depending on the *respective* material and symbolic capitals of both spouses.

The research question is: How do energy-saving home improvements redefine gender roles according to the type of union, homogamic or not? Homogamy, as explained below, relates to the matching of both spouses’ socio-economic characteristics. The terms ‘union’ and ‘couples’ always refer here to heterosexual unions, whether consensual or formalised by marriage or otherwise, while ‘husband’, ‘wife’, ‘spouse’ and ‘married’ should be taken in their broadest meanings.

The cultural area referred to encompasses societies with a tradition of do-it-yourself (DIY) (*i.e.* domestic maintenance, repair or building work) such as Northern and Western European countries (less so in Eastern Europe, and much less so in Mediterranean countries as time-use surveys show; Aliaga 2006). The empirical material of this mixed-method research was gathered in Belgium over 18 years, including one set of five interviews after the dramatic increase of energy prices occurring since mid-2021.

The Belgian building stock is old: 72.4% of all buildings were built before 1981. It is even older in Wallonia (78.3%), where the qualitative interviews reported on here were realised (STATBEL 2021). This old building stock is poorly insulated. An estimated 99% of houses and 95% of apartments do not comply with 2050 energy norms (Recticel Insulation 2020). Therefore, the major energy-saving home improvements made by the interviewed homeowners are most often realised before the moving into an old house, such as installing a (new) heating system or changing windows and their frames. A rather frequent improvement that increases energy consumption is installing a French (glazed) door to the backyard. Attic insulation may be done thereafter if the top storey is unoccupied. Among large improvements, only the installation of photovoltaic panels is quick to achieve, maybe long after moving in. Three interviewees have installed solar thermal panels.

The remainder of the paper is structured as follows. First, the theoretical framework investigates how energy-saving improvements are constructed as a male domain and how gender roles are renegotiated according to the union’s homogamic character. The empirical material of this mixed-method research is then described. The empirical results follow with an analysis of the gendered territories of energy-saving home improvements for the three types of unions. The conclusion summarises the findings and discusses some possible further research directions. It also sketches implications for contractors and policymakers.

The conceptual framework of this research brings together two strands of the sociological literature: environmental sociology on one side, family sociology and demography on the other, with a common interest in gender from both sides. Environmental sociology, and other social sciences dealing with energy consumption and savings, have studied how gender is associated (or correlated in statistical terms) with ‘greener’ practices, including energy-saving home improvements. Most research on factors and processes involved in energy retrofit decided by householders have these householders as the unit of analysis, and the limits of an individualist approach are rightfully underlined (Moezzi & Janda 2014). Family sociology and demography can thus enrich the analysis by adding the comparison of *ego’s* socio-economic characteristics with those of *ego’s* spouse.

2.1 GENDER, ‘GREEN’ PRACTICES, ENERGY RETROFIT

A first dimension of this literature review deals with ‘greener’ practices, and gender. Indeed, in Belgium public subsidies and tax rebates for energy retrofitting dwellings have been implemented since 1999 within a climate policy framework. These benefits and the sensitisation campaigns thereon have contributed to framing energy retrofits as driven by environmental and/or economical concerns.

2.1.1 Gender and ‘greener’ practices

MacGregor analyses the increased gender differentiation in institutional and individual responses to climate change both as ‘a *masculinization* of environmentalism’ and what she calls ‘ecomaternalism’ (MacGregor 2010: 128, 136; original emphasis):

In so far as consumption is a private sphere activity, and women tend to be principally responsible for household consumption, it is likely that exhortations to ‘live green’ are directed at (and will be received primarily by) women. Men may hear them, but expect women to do the work.

(MacGregor 2010: 134)

Her examples are conserving energy, taking public transportation, recycling waste and avoiding flights.

Gilg *et al.* (2005) in the UK and Bartiaux & Reátegui Salmón (2012) in Belgium observe that women have more numerous ‘green’ practices than men. Men use more energy than women, namely, but not only, for their mobility practices (Räty & Carlsson-Kanyama 2010). When it comes to changing practices, Svensson (2012: 369) notes:

[t]he lifestyle changes were gender-biased, with the women as driving forces but also bearing most of the extra workload.

2.1.2 Gender roles and energy-saving home improvements

But what about energy-saving home improvements, such as DIY insulation work, which are usually considered a masculine task (Mechlenborg & Gram-Hanssen 2020; Strengers 2014; Sunikka-Blank *et al.* 2018; Tjørring 2016; Watson & Shove 2008)? Will men hear the message for saving energy, ‘but expect women to do the work’?

DIY and repairs are considered as masculine tasks. Yet should they be included in domestic work? This was indeed an important stake in feminist studies: by including men’s tasks into domestic tasks and:

viewing men as one of the terms of gender relationships, one begins to deconstruct (...) the content of the very basis of the feminist critique: domestic production.

(Welzer-Lang 2004: 231)

Eurostat (2004: 46) does include ‘Construction and repairs’ among domestic tasks, which are studied in time–use surveys. Unfortunately, this category mixes both repairs and decoration tasks, whose opposite gender dimensions are well documented (Offenberger & Nentwich 2010). Tjørring (2016) identifies a paradox: women are more concerned about the environment but less interested in retrofit than men because the latter is included in the category of house maintenance, typically situated in the male domain. In Belgium, both the 1999 and 2013 surveys indicate that the proportion of men involved in some repair work on an average day is close to the average among the European countries surveyed, whereas the women’s proportion is among the highest (Eurostat 2004: 62–63; 2021: 8). In 1999, married men devoted on average more time than unmarried men to home repairs, which suggests that wives have their say in these DIY projects—a result also found by Bartiaux (2003). In 2005, another time–use survey indicated that ‘men’s activities generally correspond to a behaviour more marked by gender stereotypes than women’s’ and also that ‘men, in the part they play in household work, reserve for themselves the most pleasant tasks’, such as gardening and DIY ‘whose content can be close to leisure activities’ (Glorieux & Vantienoven 2009: 27, 29).

Regarding the decision process, Stieß *et al.* (2009: 1826) report from their interviews with 44 private home owners in Germany that gender roles may be an obstacle to energy-efficient refurbishment:

[i]n most families or couples, smaller technical works in the house are carried out by men. In particular, among older couples mostly men decide about technical solutions using basically technical criteria whereas women would be more open for future oriented solutions.

In a synthesis of 26 studies on decision processes leading householders to invest in energy-saving improvements, Kastner & Stern (2015: 81) observe that:

[t]he decision maker’s gender was measured 18 times. Associations between (male) gender and energy-relevant investment decisions were found on four occasions, three times being positive, once being negative.

The stages of the decision process are not observed, which may explain this inconclusive result. Similarly, in Germany, both spouses agree to construct the decision about buying a new heating technology as a male competence rooted in practices and interactions, and associated with ‘technical control, expertise and abstract understandings of heat energy’ (Offenberger & Nentwich 2010: 15).

This also raises the question of the technicity of insulation materials and techniques, usually limited and not requiring the expertise of engineers and technicians, who are more often male. Therefore, one can wonder whether roof insulation is ‘sufficiently’ technical to stimulate male engagement? Indeed, research in Belgium showed that both men and women see DIY loft insulation as a male territory, but one in which women have two prerogatives: to suggest the project—with varying degrees of insistence—and to value the work realised by the husband. However, these two female roles are much less applicable for a roof-insulation project, since almost two out of five women find it normal that the man alone decides on this work, and the valorisation is very limited for such invisible work. Loft insulation could therefore not be prioritised, as it would be located in a no-man’s land, outside both male and female territories (Bartiaux 2015). A further paradox comes from the gendered spatial order of family homes: women’s spaces are at the centre of the dwelling whereas male-connoted areas are on the periphery (Offenberger & Nentwich 2010), but the latter areas (cellar, attic, garden cabana) are less valorised than the former (Gouhier 1999).

By focusing on the appropriation process of new electricity prosumers in the UK and Norway, Standal *et al.* (2020) point to the traditional stereotypes revived in this modern technology (photovoltaics—PV) as situated in the male domain and revealing women’s lack of competences and networks. However, these gendered divisions of work and responsibilities are not immutable

and may be renegotiated, sometimes depending on the technology itself. Offenberger & Nentwich (2010: 11) discuss several examples (LED lights, kitchen appliances and the daily use of a wood-fuelled boiler) for which:

the distinction between ‘technology’ and ‘aesthetics’ did not hold as they rather seem to be intertwined.

2.1.3 DIY practices and negotiations of domestic roles

These renegotiations are also seen in DIY practices and are often tacit. If they are DIY adepts:

[men] may trade hanging new wallpaper for cleaning the floors, and thus expand some of the masculine tasks within the household.

(Gullestadt 1992: 85)

More generally, any change in gender roles is ‘associated with a shift in patterns of exchange and interdependence’ (Bottero & Irwin 2003: 468). For Bourdieu (1994), in any exchange of services, potential costs and benefices are never fully stated: everything is occurring as if one agrees to avoid to explicitly agreeing on the relative value of the exchanged things. Empirically, research in social psychology indicates that in negotiations, women tend to underperform men, especially if the subject is on stereotypically feminine topics (Demoulin & Teixeira 2016).

These potentially new patterns of exchange and interdependence can be performed in domestic practices such as DIY or searching for or supervising contractors. For Miller, consumption in general is used to construct significant relationships and groups (families, couples) and is ‘channelled into the less threatening arena’ of ‘household projects such as the house itself (...) as against potential individual aggrandisement’ (Miller 1995: 284). In our societies, divorce or separations threaten couples and families; so, DIY activities and home energy-improvements may correspond to a female tactic to attach the husband to the family territory, both physically and emotionally, and men may wish to do so by limiting female paid work, especially in low-income groups, as found in traditional blue-collar settings in Northern France (Schwartz 1990).

2.2 COUPLES’ DYNAMICS AND DOMESTIC POWER

2.2.1 Three types of union: homogamy, hypergamy and hypogamy

Sociologists and demographers have long studied spouses’ matching. A pioneering French survey of 1959 showed that the majority of French couples were homogamous, *i.e.* had similar geographical and social origin, the latest being proxied by the socio-professional group of both fathers (Girard 1981). Later, and to this day, partners’ educational pairing is used to proxy the socio-professional groups of origin of both spouses or partners. There is little discussion, if any, of the value of using only a comparison of spouses’ diplomas to define homo- or heterogamy, but a few studies complement their diploma-based analysis with a comparison of partners’ income (Van Bavel & Klesment 2017).

Bourdieu notes that the terms employed to characterise heterogamous unions in colloquial French reflect male domination. This holds true for the scientific term of ‘hypogamy’ defining unions ‘between a man of lower rank and a woman of higher rank’, in Bourdieu’s (1972: 1118) terms, and for the opposite situation called ‘hypergamy’ (the social origin of the husband is above (*hyper*) the wife’s one).

In particular, educational hypogamous marriages (where the wives are more educated than their husband) have attracted attention. They have increased in many European countries, including Belgium (Bartiaux & Wattelar 2000; Erát 2021; Van Bavel & Klesment 2017), but not in Germany, Austria, Switzerland and Slovakia (Erát 2021). In Belgium, a detailed analysis of 1991 census data reveals that homogamous unions are no longer in the majority with a finer breakdown of education levels (Bartiaux & Wattelar 2000: 105).

2.2.2 Domestic power

For French sociologist de Singly (1976: 84–85):

[e]ach spouse defines herself or himself by the constellation of her/his possessions, in particular the material capital available to her/him, the wealth s/he derives from her/his professional work, the symbolic capital that s/he owns.

The level of education, he argues, is a good proxy of symbolic capital because it reflects ‘both the level reached in the cultural legitimacy and a differentiated habitus’. In couples, the respective material and symbolic capitals of each spouse combined with their gender define ‘the respective positions of the spouses in the struggle for the appropriation of authority’. Respective capitals are thus key in spouse-matching and in defining each spouse’s power and predominance, or their limitations, in domestic affairs.

According to de Singly (1976), Engels (1845/1960: 126) relates ‘domination’ to the spouse who is the breadwinner of the family (the wife if the husband is jobless). Engels would thus be the first to articulate the sexual and social orders by linking domestic power to spouse-matching.

This concept of ‘domestic power’ was already employed by Bourdieu (1972) in an ethnographic survey on the matrimonial practices of families in Béarn (south-eastern France). He showed that the chances of each spouse to exercise a legitimate power in domestic affairs are not independent of their respective economic and symbolic capital:

the position of the spouses in domestic power relations and, to speak as Max Weber, their chances of success in competition for family authority, *i.e.* for the monopoly of the legitimate exercise of power in domestic affairs, are never independent of the material and symbolic capital (the nature of which may vary according to time and society) that they have provided.

(Bourdieu 1972: 1120)

In hypogamous couples:

[h]usbands (...) might feel their gender identity as the main breadwinner or the household head to be threatened.

(Theunis *et al.* 2018: 664)

These couples show a lower marital satisfaction or subjective well-being (Domínguez *et al.* 2019; Zhao & Sun 2021), and more divorces are observed (for a review, see Schwartz & Han 2014). de Singly (1976) also hypothesises that conflicts will be exacerbated in couples where the spouses’ educational capitals are different. In a longitudinal survey in Switzerland, Widmer *et al.* (2006) observe that educational heterogamy (unfortunately coded in a sole category, which may affect their result) is significantly associated with more frequent quarrelling within the couple, a much lesser active conflict-resolution mode, and for men both higher conjugal dissatisfaction and incidence of symptoms of depression. The active conflict resolution mode is characterised by a:

high level of emotional restraint, communication, and information, low aggressiveness, and low avoidance. They try to negotiate their relations actively, and support each other when a problem arises. The woman is more active in this mode than the man.

(Widmer *et al.* 2006: 143)

In summary, these studies show that couples’ daily life is likely to be more conflictual with a less efficient coping mode in heterogamous unions, and especially so in hypogamous unions.

2.3 SYNTHESIS

The first part of this review has shown how gender is crucial in at least two dimensions: ‘green’ practices, including DIY and home repairs, and negotiations over domestic tasks. According to their gender, every man is likely to behave in such a way (and the same holds true for every woman). The second part has introduced the concept of domestic power, which differs according to the

homo- or heterogamic character of the union. The empirical analyses aim to study whether and how domestic power is associated and possibly redefined according to the dimensions identified in the first part.

3. DATA AND METHODS

This research is ‘mixed’ because it combines quantitative and qualitative data; it explores whether its conceptual framework has high heuristic value (Teddlie & Tashakkori 2009: 118). Most of these datasets were produced with the author’s supervision between 2004 and 2021. The year is indicated in the presentation of the results to check whether there are changes during this 17-year period. Changes are not striking, as discussed below. Table 1 summarises the data-collection efforts.

| INSTRUMENT | YEAR | RESPONSES (N) | TOPIC | DETAILS |
|------------|---------|---|--|---|
| Survey | 2004 | 1000 (698 in union) | Environmental knowledge and concern, energy-related practices | Phone survey |
| Interviews | 2006 | Six couples (three couples re an energy retrofit: six interviews) | Last do-it-yourself (DIY) project undertaken | Two spouses interviewed separately and successively |
| Interviews | 2009 | Four couples (one couple re an energy retrofit: two interviews) | | |
| Interviews | 2009–10 | 15 couples | Energy retrofits made by home-owners in their newly bought house | With one or both spouses |
| Interviews | 2011–12 | Six couples | Energy retrofits made by home-owners in their newly bought house | With one or both spouses |
| Survey | 2014 | 1215 (826 in union) | Consumption practices (food, mobility, energy) | Online survey |
| Interviews | 2016 | 11 | Energy retrofits made by home-owners | Both partners successively (four couples), or both partners together (three couples) |
| Survey | 2016 | 1766 (1036 in union) | Attitudes to climate change and energy policies | European Social Survey (ESS): face-to-face computer-assisted personal interviewing (CAPI) |
| Interviews | 2021 | 15 | Energy retrofits made by home-owners | Online interviews (10), face-to-face (four) and by phone (one) |

Table 1: Data collection efforts.

All survey respondents and interviewees gave an informed consent to participate in the endeavour, and were granted the right to withdraw and to have their anonymity secured throughout the research process.

3.1 QUANTITATIVE DATA

The first dataset comes from a phone survey conducted as part of the project Socio-technical factors influencing Residential Energy Consumption (SEREC). The survey was realised in 2004 among a representative sample of 1000 households (Bartiaux *et al.* 2006). The organisation of the survey, the three tests of the questionnaire and an assessment of the (very good) quality of the data are presented by Bartiaux *et al.* (2010). An unexpected result was that domestic power

was expressed even in picking up the phone and answering a survey on energy (the topic was announced by a letter): the proportion of female respondents was 60% for women in homogamous unions, 64.6% in hypogamous unions, but 35.4% in hypergamous unions.

An online survey on domestic consumption was realised in 2014 in Wallonia, the southern and French-speaking region of Belgium ($N = 1215$); it is presented by Anciaux (2020). Findings from this survey are used below in the section on hypergamous unions.

Round 8 of the 2016 European Social Survey (ESS) recorded respondents' opinions on a new module on climate and energy, whose conceptual framework was broadly based on Stern's (2000) Value-Belief-Norm model (ESS 2018: 3). This explains why there is only one variable on energy-related practices, and this variable is vague ('How often do you do things to reduce your energy use'). In Belgium, 1766 persons were surveyed. This ESS also poses a series of questions about 21 attitudes toward living, such as seeking fun and doing things that give pleasure, or the importance of being rich.

In the three surveys, only one person per household was surveyed, which means one person per couple. Statistical analyses are based on a six-category typology based on comparing the diplomas of the respondent and their spouse (using an International Standard Classification of Education): men in a homo-, hyper- or hypogamous union; and women in a homo-, hyper- or hypogamous union. Analyses of variance are performed, with Bonferroni tests for comparing each category's mean with each other category's mean, which makes 15 pairwise comparisons. The analysis is mainly focused on comparing men's and women's means within a same type of union. Statistical analyses were performed using SPSS26. Given space constraints, the results are presented narratively.

3.2 QUALITATIVE DATA

Several sets of in-depth interviews (Kaufmann 1996) conducted in Wallonia over 12 years are analysed (Table 1). The localities of residence and the socio-economic status of the interviewees were deliberately varied, with nearly all interviewees recruited via a different intermediary. Beginning with the 2009–10 set of interviews, the question guide was similar across all sets, and provided the interviewer with room for manoeuvre for numerous follow-up questions. Nearly all interviews took place at the interviewees' home, except in 2021 due to the Covid-19 pandemic and public health concerns. The interviews lasted about one hour, often more when the spouses were interviewed together. All 55 interviews were fully transcribed.

Two datasets were produced by students, duly trained in this technique, in 2006 and 2009; each student interviewed separately and successively the two spouses about the last DIY project undertaken. Six interviews on an energy-related project are included in this analysis, the other interviews serving as background (Bartiaux 2015). Similar in-depth interviews were realised in 2016 (both partners successively of four couples, plus three other couples with both spouses together).

In 2009–10, fifteen married homeowners having carried out work on their house were interviewed, of whom both spouses of six couples participated in the interview (Bartiaux *et al.* 2014). Six other in-depth interviews in 2012 completed this dataset (analysed by Hénaut 2012). In 2021, ten interviews with one spouse were realised by students, and five others by a researcher.

The topics of the content analysis were chosen to illustrate, complement and update wherever possible the findings of the statistical analyses performed on the quantitative databases.

4. RESULTS

To answer the research question 'How do energy-saving home improvements redefine gender roles according to the type of union, homogamic or not?', the results are presented by type of union, although other ways to present the results are possible. Traditional gender roles and a male domestic power are the least contested in hypergamous unions; they are at stake in homogamous unions that shed light on a paradox. In hypogamous unions energy-saving home improvements

clearly reflect the marital struggle for domestic power. Results are thus presented in that order. This order also reflects that hypergamous unions include older spouses and hypogamous ones, younger ones, while homogamous couples show an intermediary pattern.

4.1 HYPERGAMOUS COUPLES: ENERGY RETROFIT REFLECTING THE UNCONTESTED MALE DOMESTIC POWER

4.1.1 A male decision: postponing or realising energy retrofits

In the 2004 survey questionnaire, several reasons ‘that prevent some people from making more energy savings’ were proposed (‘energy savings’ in general, whether conservation actions or energy retrofit). Among these reasons, the answer ‘I don’t want to lose any comfort’ was found to fit their situation by nearly three out of five men in a hypergamous union. This is the highest proportion among men in a couple, while among married women those in a hypergamous union are proportionally the least likely to think so (23.5%). This means difference between men and women in hypergamous unions is statistically very significant (Bonferroni test: significant at $p = 0.003$). For one of the other answer options, ‘it would be a drop in the ocean’, the difference is nearly statistically significant (Bonferroni test: $p = 0.111$).

Several situations told during the interviews illustrate and reinforce this apparent male reluctance to undertake energy-saving home improvements. A homemaker, wife of a technology teacher (both in their 50s), insists that he was ‘obliged’ to install a new boiler because they had no more hot water (2006). A university professor in engineering lists his future work and insulation does not get priority (2009). More recently (2021), a retired female accountant (68) married with an administrative director (57) explains that they ‘postpone and postpone’ the roof insulation since years because ‘the attic is cluttered’, although she knows very well that a large proportion of the heat is lost through the roof.

This lower engagement in retrofit from men in a hypergamous union is confirmed by the 2014 survey: men in hypergamous unions are significantly less likely (79.5%) to have double-glazing everywhere in their dwelling than other married men, either in a hypogamous union (85.8%) or in a homogamous union (94.4%), this last comparison being very significant (Bonferroni test: $p = 0.026$). The same holds true for having roof insulation thicker than 10 cm (44.5%), a prevalence significantly less than for men in a homogamous union (49.2%, Bonferroni test: $p = 0.001$) and for men in a hypogamous union (50.6%, this comparison is not statistically significant). Roof insulation does not seem to be a topic of conversation as 38.9% of wives in a hypergamous union ignore its presence or its thickness compared with 17.9% among their male counterparts (Bonferroni test: $p = 0.02$).

Therefore, an interpretation of these results is that many husbands in hypergamous relationships seem to be concerned about their peace of mind—possibly because, in their wives’ eyes, their work situation is sufficiently rewarding. The discrepancies between the wives’ and husbands’ opinions on the reasons for not saving more energy suggest a tacit agreement not to discuss possible energy-saving home improvements to safeguard marital peace.

Other men in hypergamous unions, however, do undertake energy retrofits. These husbands take care of the whole process: deciding the energy retrofits to do and how to do them, working themselves on-site and/or finding and controlling contractors, and mastering the budget.

4.1.2 Female role: consolidating energy retrofits as a male territory

In hypergamous unions, women consolidate energy retrofits as a male territory by two modes: either delegation as a rather passive mode, or encouragement and confidence-building as a more active one. In the delegation mode, the wife is in the background, or even ‘doesn’t give a damn’, as stated by a male engineer who has undertaken multiple energy-saving works (his wife is a math teacher, BA diploma, both 50, 2021).

The more active female mode of consolidating the male territory of energy retrofits ranges from encouragement (sometimes with humour), which may be in line with the sluggishness mentioned above, to a much more active trust: both can be interpreted as a help so the husband plays his

masculine role. Two nurses illustrate these two situations. The first (27) has to encourage her husband, an engineer (30), and ‘push a little to have the work done’. The second (36) explains with hesitation how she had to put aside her own doubts about the technique her husband, a psychologist (39), used to insulate their attic:

When he told me what he was going to do, I thought: ‘Is this really professional or not?’ It’s true that I asked myself the question (laughs)! But I trusted him. (hesitation). (...) And, well, it seemed simple to me, and I, I don’t know if it was ... what was best for the house. Today I doubt it ... (hesitation), well, because of the moisture problems we have in the attic.’

(2016. The couple divorced several months after the interview)

4.1.3 Ends and values

According to the 2016 ESS, husbands and wives in a hypergamous union have significantly different financial aspirations: for the opinion ‘It is important to him to be rich. He wants to have a lot of money and expensive things’, men answer more ‘a little like me’ (mean score = 4.07) and women are closer to ‘not like me’ (mean = 4.54) (codes: 1: ‘Very much like me’ to 6: ‘Not like me at all’; Bonferroni test: $p = 0.011$). Possibly these wives feel themselves financially secure thanks to their more educated husbands.

4.1.4 Hypergamous unions: synthesis

When the husband is more educated (and probably has a higher salary) than his wife, his domestic power is more important too and uncontested. Energy retrofits are defined as a masculine territory by both spouses with traditional and quite differentiated gender roles: decision, supervision, sometimes practical realisation on the male side, and female consolidation of this male territory by delegation or confidence-building. These findings hold true for the whole period considered (2004–21).

4.2 HOMOGENEOUS COUPLES: ENERGY RETROFIT REFLECTING THE MARITAL STRUGGLE FOR MORE EQUALITY

4.2.1 A further paradox

In homogamous unions, partners have equal levels of diploma, *i.e.* a similar experience within the educational system for a comparable duration. This raises two considerations. First, social origins may be more relevant in these couples as a key to understanding their energy-retrofit practices. Second, *a priori*, domestic power should be a less important issue in these couples.

According to the 2016 ESS, wives in homogamous unions do ‘things to reduce energy use’ (mean = 4.48) significantly more often than their male counterparts (mean = 4.15) (codes: 1: ‘Never’ to 6: ‘Always’; Bonferroni test: $p = 0.023$). These men and women in homogamous unions represent the lowest and the highest scores, respectively, for this variable across the six categories of gender and union types. The survey question is not explicit, but these energy savings probably refer to daily conservation actions.

But contrary to these reported actions and as seen above, energy retrofits are still mainly situated in the male domain, and in many homogamous couples—especially those with young children—energy retrofits are carried out or supervised by the husbands while the wives take care of the children and household chores. Even in the most recent interviews, in 2021, ‘there is still this cliché that work is for men and cooking is for women’ (as put by a female agronomist) for many homogamous couples with different social origins and professions (a young couple running their own restaurant, two executives in large companies) or in the public sector (several couples of civil servants of different levels).

Therefore, the struggle for more equality in housework is paradoxically quite different for the two genders as energy-saving home improvements revive traditional gender roles. Even the 2004 survey revealed this quest for more equality: both partners of homogamous couples refer the

decision, totally or partially, to the other! Indeed, these wives are more likely to think that the man 'should decide to insulate the roof' (42%) than wives in heterogamous unions, while their male counterparts are more likely than other men in couples to think that it is incumbent on both spouses to do it together (59.3%). In the following, the male visions of this equality paradox are given first and are followed by the female point of view.

4.2.2 Recognising versus admitting the masculine predominance in energy improvements

All partners interviewed in homogamous unions recognise that the husband is the most involved in the work, checks contractors' work, usually daily, and has the final word in decisions, sometimes along with a man from the wife's family such as her father or grandfather. Many husbands interviewed use the 'we' to mention the improvements but pass to the 'I' when it comes to decisions:

We haven't done anything very, very heavy. We mainly changed the frames, so for the insulation. (...) For the [attic] insulation material, there are many opinions on the matter. Many opinions ... here I have more conflicting opinions than for the frames: glass wool, hemp, extruded polystyrene ... and so on. I haven't decided yet.

(human resources manager, civil servant, 29, and wife, 27, teacher, 2010)

The recognition of this masculine engagement may be expressed with some reluctance, as shown by 'admit' and 'rather' by a woman refusing 'being the little hand' (see below): for the ventilation system:

we were hesitating between a single flow and a double flow and then, I must admit that it was really rather David who analysed the matter.

(female, 38, bioengineer, with male, 38, engineer: both have an MA degree, 2021)

4.2.3 Glimpsing versus recognising and overcoming the equality paradox

Two husbands view the paradox with some dismay: they do not understand why their wives are so little concerned with the retrofits despite their support for the principle of energy saving. This is the case of an economist whose wife is a teacher, as well as of a PhD engineer whose wife has a PhD in another discipline. This engineer speaks about tensions brought about by his involvement in the retrofits:

Engineer: It's true that it sometimes generated little tensions in the family because I was trying to spend a fairly high number of hours to make progress with the work; during that time, there were no activities with the children, the household chores didn't necessarily progress as quickly as we'd have liked ...

(...)

I: And you and your wife were interested in the results of the [energy audit]?

Well, especially me, I'll say ...

I: She a little less?

A little less, everything technical in general interests her less. But it allows me to justify myself when I start to attack all the walls in the house.

(male, 35, engineer, PhD, 2010)

This is one usage of the energy performance certificate that its designers surely did not think of!

Some wives in homogamous unions also clearly recognise this equality paradox. One retired translator (61) whose husband is a teacher (59) opposes male and female gender roles: repetitive and invisible tasks for the women, one-time works that can be valued for men (2012).

A few other women in homogamous unions do participate in retrofit work. One affirms her participation and does not want to be reduced to a minor role:

What I don't like is being the little hand and so he gave me, well, he's more in charge of the operations, but he gives me whole parts to do and not, uh, 'Pass me the hammer!' (...). I like to work in my corner too and to think that I'm not only working under his orders, but that I'm also responsible for the project, you know. Like [drilling] all the cut-outs into the walls for example, I did them, he did something else, I did all the cut-outs! (female, 38, bioengineer, in a couple with male, 38, engineer: both with an MA degree, 2021)

Conversely, in this homogamous couple where both spouses have completed vocational training, the husband valorises his wife's work:

She did work too, eh! Every day! In fact, we did almost everything ourselves, didn't we? (male, 25, and female, 24, 2010)

4.2.4 Ends and values

The values sustaining energy retrofits are varied among homogamous couples and seem to be more related to the interviewees' social background than to their type of union: only financial reasons, as 'confessed' in 2021 by Nora (32) who has only reached the end of secondary school and runs their restaurant with her husband; and 'for comfort, for ecology and economy' as put by a civil servant, 37, whose wife is teacher, 36, both with an MA degree (2021). Further research would be necessary. According to the 2016 ESS, husbands and wives in a homogamous union differ in them wanting 'to help the people around him and to promote their well-being', the women recognising themselves more in this description (1.84) than their male counterparts (2.09; codes: 1 = 'Very much like me' to 6 = 'Not like me at all'; Bonferroni test: $p = 0.013$).

4.2.5 Homogamous unions: synthesis

In these couples with equally educated spouses, equality is precisely at stake with energy-saving home improvements because the latter revive traditional and differentiated gender roles. Therefore, husbands and wives experience differently what was called the equality paradox: men do not recognise it clearly but acknowledge rather willingly masculine supremacy during energy retrofits, whereas some women express their discomfort with this paradoxical revival of traditional gender roles. The quest for a better shared domestic power is thus challenged with energy-saving home improvements.

4.3 HYPOGAMOUS COUPLES: ENERGY RETROFIT REFLECTING THE MARITAL STRUGGLE FOR DOMESTIC POWER

4.3.1 A porous border between male and female territories

The 2004 survey showed that women in hypogamous unions do not conceive of themselves as being excluded from the decision to insulate the roof (62% answer 'both'), whereas men in this type of union are the most likely across the three types of unions to answer that this decision belongs to the man (46%), probably to assert their domestic power in this male territory. Similarly, these men are the most in favour of 'the man doing the DIY', and hypogamous wives are the most in favour of 'the woman telling her husband what work he should do in the house' compared with other women in other types of couples.

The situation of these hypogamous couples thus appears complicated: how to propose insulation work without threatening the fragile and precarious balance of domestic powers? Each partner seems to think that he/she has some responsibility for the proposal and the decision, rather with her husband for women, but rather alone for men. This is not easy unless, as in some young couples, the spouses carry out the work together, or with friends, which defuses domestic power.

In these hypogamous couples, the woman is in charge deciding on the works according to her priorities. The willingness of wives to engage practically is also shown by their participation in demolition projects, or in keeping and verifying the accounts. Contractors or experts may be surprised, as in the following situations:

The contractors, when they were there, they said: 'it's rare to see women on the site', but I didn't care, I was as dirty as they were! And I demolished everything, it was logical, it was going to be my house!

(female, 25, history teacher with an MA with male, 27,
graphic designer with a BA, no children, 2012)

And then the expert [checking the accounts for a public subsidy] came (...) so I had to again explain everything to him, but it was as if I remembered everything we had done for two years because we had bought hundreds of millions of things, it was not possible! (...) and since he was dealing with a young woman, he didn't give me any credit, and it was horrible!

(female, around 25, BA in marketing; no further information on her
hypogamous union to protect her anonymity, 2010)

Among all couples interviewed, controlling contractors' work is nearly always a masculine task, except in some hypogamous unions.

As pointed out by a female architect, one stake of women's participation in retrofits is the future implication of both partners in domestic chores after the work is complete:

I am much more assertive about the fact that I wanted to do it myself as well (...) And not just being the thinking head. (...) Now, it's not so easy to deal with the fact that during these times [she is working on the house], he takes over the housework.

(female, 51, architect, in a hypogamous union with male, 50, library employee, 2021)

4.3.2 Spouses' reactions to the marital struggle for domestic power

To ease this delicate situation, men in hypogamous unions insist that the decisions are made together:

It's always choices that we make together, these choices ... neither of us imposes their choices, we always discuss them often, my partner has good taste so ... I tend to say she chooses the colours and I do the work!

(male, 47, delivery driver, in a hypogamous union with female, 48,
with a BA, profession not recorded, 2021)

If the partners do not agree, the female opinion may prevail and this unusual supremacy can be embarrassing for the wife herself. A psychologist 'confesses' discussions and contradicts herself about these very discussions ('that was discussed' versus 'we didn't think about it') about underfloor heating, which was inappropriate for her husband's musical instruments:

we just hesitated (...) I liked the fact that there was diffuse heat everywhere. So that was discussed (...) I confess that underfloor heating quickly came up as a good solution (...) both by the architect and everyone else, everyone quickly said: 'that's good'. So, I confess that we didn't think about it.

(female, 29, with an MA in psychology, with a male, 31,
with a BA in sound engineering, 2021)

4.3.3 Ends and values

According to the 2016 ESS, husbands and wives in a hypogamous union differ on two values. First, and as in homogamous unions, their willingness 'to help the people around him and to promote their well-being' (Bonferroni test: $p = 0.008$). These results show that the representation associating care with femininity is still quite strong. The second difference between males and females in hypogamous unions is parallel to the one observed within hypergamous couples about their financial aspirations ('It is important to him to be rich'), although domestic powers are inversed (Bonferroni test: $p = 0.011$).

Still comparing hypo- and hypergamous unions, another difference in their agency concerning energy savings is worth mentioning: husbands and wives in hypogamous unions are more 'confident they could use less energy than now' than wives in hypergamous unions (Bonferroni tests: $p = 0.064$ and 0.108 , respectively).

In these hypogamous unions, an important end is to allow the husband to carry out the work himself, as if to let him express his masculine identity and compensate a lesser domestic power.

4.3.4 Hypogamous unions: synthesis

In hypogamous unions, energy retrofits reflect the marital struggle for domestic power as men's territory of home repairs is threatened by women's higher agency in this territory in terms of decision, budget management and even in some cases practical realisation and contractors' control.

5. CONCLUSIONS

Like other studies on heterosexual unions (Mechlenborg & Gram-Hanssen 2020; Strengers 2014; Sunikka-Blank *et al.* 2018; Tjørring 2016; Watson & Shove 2008), the present research has shown that energy retrofits are constructed as a male territory, though this affirmation must be qualified according to the union type. Gender domains are indeed contested and renegotiated, especially by wives more educated than their husband (hypogamous unions) and, to a lesser extent, by both spouses in homogamous unions. In hypogamous couples, proposing or implementing retrofit may indeed jeopardise the fragile balance of domestic power. On the contrary, in hypergamous unions, the male territory is not contested: couples seem to leave the initiative to the husband, who finds other sources of value in his profession vis-à-vis his wife and therefore does not seem to be particularly keen on energy-saving work. Therefore, men decide about retrofits, either to ignore them and safeguard their peace of mind (these couples having a non-active coping style to maintain domestic peace; Widmer *et al.* 2006), or to undertake them according to their own motivations, apparently mainly financial for the majority.

Numerous situations related in the in-depth interviews illustrated 'the marital struggle for domestic power' (to quote the title of de Singly's 1976 article). So did the terms used by the interviewees: 'his orders', 'he followed me' or, for decoration matters (located in the female domain; Offenberger & Nentwich 2010), 'he will surrender'. Domestic power, a concept designed by Bourdieu (1972), is really about power! A first power is attributing the locus of decision: in homogamous unions, both spouses generally refer the decision to the other spouse, rather completely (women) or partially (men), whereas in hypogamous unions, both intend to decide, either preferably alone (men) or as a couple (women).

Other situations where male supremacy is eroded in retrofits are budget control, supervision of contractors and wives' participation in heavy work (demolitions, drilling cut-outs into the walls)—all situations related by women in hypogamous unions, or less often in homogamous unions. In the marital struggle for domestic power, another challenge is the husband's time allocation. If he does the retrofit work himself, it is often at the expense of his participation in household tasks. This reinforces traditional gender roles, as seen in several families, particularly those with young children. Yet in negotiations women tend to underperform men, especially if the subject is on stereotypically feminine topics (Demoulin & Teixeira 2016). The wife may show some disapproval, as seen in the homogamous couple where the husband uses the energy-performance certificate to justify his involvement in retrofit. A further difficulty, as underscored by a wife in a hypogamous union, occurs after the husband's DIY project: will he take over some housework afterwards?

In addition, several paradoxes contribute to blurring the limits of the male domain when it comes to roof insulation. Female initiative or ideas, usual for non-energy-related home improvements, are unlikely for a male space on the margins of the home and for work seen as house maintenance, a traditional male task (Tjørring 2016). Female valorisation of her spouse's

work is nearly impossible for invisible projects (except during snowy weather) whereas other male DIY projects can be shown off and valorised, as observed by a wife in a homogamous union. Furthermore, as the technical aspects of insulation materials and installation are generally limited and do not require much expertise, roof insulation may not seem attractive enough to stimulate male involvement.

Despite this male-territory erosion, especially by wives in a hypogamous union and the paradoxes noted above, energy-saving home improvements are still often framed as a male domain, and men do not 'expect women to do the work' as they do for other energy-saving practices (MacGregor 2010: 134). There is no 'degendering' process thereof as observed by Daminger (2020) for housework among egalitarian young couples who deny that their non-egalitarian practices are framed by traditional gender roles.

Over the 15-year period during which these in-depth interviews were collected (2006–21), the main change in the social framing of energy retrofits is likely the increased urging from the media to save energy for financial or climate reasons, and more audibly in 2022, for strategic independence.

On the whole, the conceptual framework has shown high heuristic value in integrating gendered domestic powers with the definitions of gendered territories and the negotiations between spouses to better understand the framing and the realisation of energy-saving home improvements. Further developments that would be particularly interesting include developing a keener definition of homo-/heterogamy by comparing spouses' incomes and technical capitals (for engineers, architects, etc.) and an analysis of the types of coping.

In terms of energy policy, this research has shown, once again, that one-size-fits-all retrofit framing and policy do not work. In this case, it is not the technical conditions that create this texture, but rather couple's power relationships in the home. The male territory is being eroded, especially but not only by wives who are more educated than their husband. Domestic power is key to apprehend the marital dynamics around retrofit. Recognising the import of these marital dynamics, a variety of values can be mobilised to support energy retrofits, including, for example, more feminine values such as equality, and care for children. Policy instruments and media messages encouraging retrofits should be designed to speak to these values, rather than mainly as financial benefits, which has historically been the central emphasis. And as to actually conducting the retrofit projects, practitioners would be well-advised to take a more gender-neutral attitude with less stereotyping of male and female potentials.

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