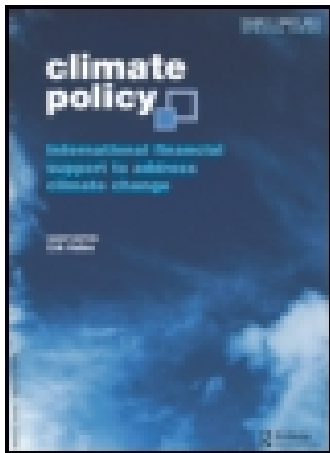


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What explains public support for climate policies? A review of empirical and experimental studies

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■ synthesis article

What explains public support for climate policies? A review of empirical and experimental studies

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The lack of broad public support prevents the implementation of effective climate policies. This article aims to examine why citizens support or reject climate policies. For this purpose, we provide a cross-disciplinary overview of empirical and experimental research on public attitudes and preferences that has emerged in the last few years. The various factors influencing policy support are divided into three general categories: (1) social-psychological factors and climate change perception, such as the positive influences of left-wing political orientation, egalitarian worldviews, environmental and self-transcendent values, climate change knowledge, risk perception, or emotions like interest and hope; (2) the perception of climate policy and its design, which includes, among others, the preference of pull over push measures, the positive role of perceived policy effectiveness, the level of policy costs, as well as the positive effect of perceived policy fairness and the recycling of potential policy revenues; (3) contextual factors, such as the positive influence of social trust, norms and participation, wider economic, political and geographical aspects, or the different effects of specific media events and communications. Finally, we discuss the findings and provide suggestions for future research.

Policy relevance

Public opinion is a significant determinant of policy change in democratic countries. Policy makers may be reluctant to implement climate policies if they expect public opposition. This article seeks to provide a better understanding of the various factors influencing public responses to climate policy proposals. Most of the studied factors include perceptions about climate change, policy and its attributes, all of which are amenable to intervention. The acquired insights can thus assist in improving policy design and communication with the overarching objective to garner more public support for effective climate policy.

Keywords: climate policy; policy acceptance; policy support; public attitudes; public opinion; public preferences

1. Introduction

Environmentally significant behaviour can be classified into four types (Stern, 2000): environmental activism (e.g. participation in social movements), non-activist behaviours in the public sphere (e.g. accept or support public policies), private sphere environmentalism (e.g. actions in the household), and other environmentally significant behaviours (e.g. actions in the workplace). It is the second

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category – non-activist behaviour in the public sphere – that is central to this article. This may include, for example, stating approval of environmental policies and the willingness to incur subsequent financial costs, such as paying higher prices or taxes, or behavioural costs, such as effort or inconvenience.

This review article aims to shed light on the question of why people support or oppose public policies in the context of climate change mitigation. In the last ten to fifteen years, a substantial body of empirical literature has emerged that approaches the subject from different angles. Yet, to our knowledge, there is no study summarizing these cross-disciplinary findings. This is what we attempt to do here.

Understanding public support for climate policies is important for several reasons. In general, public opinion is a key determinant of policy change in democratic countries (Burstein, 2003; Page & Shapiro, 1983). More specifically, when comparing countries, citizens' concern about climate change is associated with lower GHG emissions, suggesting that public attitudes translate into policy action (Tjernström & Tietenberg, 2008). Others have identified the lack of broad public support as a major barrier to realizing a transition to a low-carbon economy (Geels, 2013; Wiseman, Edwards, & Luckins, 2013). Knowledge about public attitudes further helps to anticipate public responses in a later stage of the policy cycle, which can contribute to the design and implementation of effective policies.

For the purposes of this article, we searched the Web of Science using combinations of 'climate change' and 'global warming' with the following keywords: 'public support', 'policy support', 'public acceptance', 'policy acceptance', 'public acceptability', 'policy preferences', 'public preferences', 'policy preferences', 'public attitudes', and 'policy attitudes'. We retrieved 355 papers and decided to include or exclude these on the basis of the criteria described below.

Most of the identified studies use the concept of attitude, which is 'a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor' (Eagly & Chaiken, 1993). We also included some economic studies that report a willingness-to-pay (WTP) value.¹ There is evidence to suggest that economic preferences expressed as WTP and psychological attitudes have much in common (Kahneman, Ritov, Schkade, Sherman, & Varian, 2000; Ryan & Spash, 2011). Studies reporting a WTP can make a meaningful addition to the findings in the psychological literature, because they provide clear information on the costs of policy, which is often missing in other studies on public opinion. To limit the scope of the investigation, we do not consider typical socio-demographic factors such as income, age, or gender. This review further excludes studies that focus solely on renewable or other energy technologies (e.g. carbon capture and storage (CCS), nuclear, and fracking), often without an explicit climate change or climate policy context.² Neither do we cover general studies on public support for environmental protection (e.g. Inglehart, 1995). More specifically, the empirical and experimental studies reviewed here examine attitudes and preferences regarding various policies by using a range of methods and measures. Using the search criteria just outlined, we ended up with 46 articles. These were then checked for relevant backward and forward citations, giving a further 49 papers.

The remainder of the article is organized as follows. Section 2 addresses the public perception of climate change and related social-psychological variables, including beliefs, knowledge, emotions, values, and worldviews. Section 3 examines perceptions of climate policy and its attributes, such as benefits, costs, effectiveness, fairness, and potential revenues. Section 4 highlights the contextual factors of policy support, such as social trust, norms and participation, economic and political aspects, geography and weather, media coverage, and framing. Section 5 discusses the main findings, draws conclusions and offers suggestions for future research.

2. Social-psychological factors and climate change perception

Much has been written about the public perception of, and disagreement on, climate change (Hulme, 2009). It involves a complex interplay of forces. The purpose of this section is not to review climate change perception, but to briefly highlight those constructs that seem to have a particular relevance for policy preferences.

2.1. General personal orientations

Before discussing variables that relate specifically to climate change, we consider people's more general orientations towards life, such as political ideology, values, worldviews, and religiosity. Left-wing political orientation relates to more favourable attitudes towards climate policies in Switzerland (Tobler, Visschers, & Siegrist, 2012) and Sweden (Hammar & Jagers, 2007; Harring & Jagers, 2013). Left and green political ideology were clearly associated with favourable votes in referenda on energy taxes in Switzerland (Bornstein & Lanz, 2008; Thalmann, 2004). Evidence from the US, which includes some large-scale surveys, reveals that Democratic party affiliation and left-wing political orientation are strongly associated with more policy support (e.g. Leiserowitz, 2006; McCright, 2008; McCright et al., 2013a, 2013b; Park & Vedlitz, 2013; Zhao, Leiserowitz, Maibach, & Roser-Renouf, 2011), although a few studies (with notably smaller samples) report insignificant effects for these variables (Attari et al., 2009; Shwom, Bidwell, Dan, & Dietz, 2010). In addition, WTP for climate change mitigation is found to be higher for Democrats than for Republicans (Kotchen, Boyle, & Leiserowitz, 2013).

It should be noted, however, that political orientation may not directly influence policy support, but instead may do so via factors like values and worldviews (e.g. Dietz, Dan, & Shwom, 2007). Research from the US, drawing on the cultural theory of risk, finds that egalitarian worldviews strongly predict support for costly climate policies, while individualistic and hierarchical values are associated with opposition to climate policy (Leiserowitz, 2006; Smith & Leiserowitz, 2013b).

Research shows that values matter in understanding policy support, with environmental and self-transcendent values (e.g. social justice) probably affecting public acceptance of policies more strongly than so-called self-enhancement values (e.g. wealth) are affecting public opposition (Harring & Jagers, 2013; Nilsson & Biel, 2008; Nilsson, von Borgstede, & Biel, 2004). Another widely used scale in social psychology is the so-called 'New Environmental Paradigm', which measures general beliefs about the human–nature relationship. Much evidence suggests that this scale is positively correlated with the degree of support for climate policy in the US and other countries (Attari et al., 2009; Dietz et al., 2007; Harring & Jagers, 2013; Lubell, Zahran, & Vedlitz, 2007; Shwom et al., 2010). The value–belief–norm (VBN) theory of environmentalism developed by Stern, Dietz, Abel, Guagnano, and Kalof (1999) combines personal values, general environmental beliefs, and personal norms in a causal chain to explain pro-environmental behaviour. This model has been shown to predict public acceptability for a number of policies aimed at reducing CO₂ emissions (e.g. Steg, Dreijerink, & Abrahamse, 2005).

A different value-based explanation is Inglehart's (1995) often cited 'Postmaterialist Values Thesis'. As basic needs are increasingly met with rising income in industrialized countries, societies are said to experience a shift of values from material towards more abstract ones like quality of life or environmental protection. However, the limited empirical evidence for the effect of post-materialist values

on public support for climate policy does not support the hypothesis (Dietz et al., 2007). Religiosity involves another belief system that could be relevant but has scarcely been studied in relation to policy support. One exception is a recent paper by Smith and Leiserowitz (2013a), who find that American evangelicals are less likely to support climate policies than non-evangelicals. Another paper finds that US adherents of 'Christian end-times theology' express lower support for government action in general (Barker & Bearce, 2013).

2.2. Climate change perception

There are several key beliefs about the phenomenon of climate change that matter for public support. First and foremost, there is the belief that climate change is happening, which has been shown to be a determinant of favourable policy attitudes (Sibley & Kurz, 2013). This belief, and the certainty about it, came out as strong explanatory factors of WTP for climate policy in countries such as the US, China, and Sweden (Carlsson et al., 2012; Kotchen et al., 2013). Apart from that, human responsibility for climate change in a general sense (Krosnick, Holbrook, Lowe, & Visser, 2006), as well as a feeling of personal responsibility (Brouwer, Brander, & Van Beukering, 2008), have been found to favourably influence policy attitudes. The attribution to natural or human causation of climate change, however, may vary depending on whether one perceives one's own or another country as more responsible (Jang, 2013). Next, there is the belief in the negative consequences of climate change. This is measured as concern or risk perception for oneself and society at large³, which is undoubtedly a crucial factor in explaining public support (DeBono, Vincenti, & Calleja, 2012; McCright, 2008; O'Connor, Bord, & Fisher, 1999; Zahran, Brody, Grover, & Vedlitz, 2006) as well as WTP for policies (Brouwer et al., 2008; Hersch & Viscusi, 2006; Viscusi & Zeckhauser, 2006). On the other side of the coin, climate change scepticism with regard to these different facets of climate change perception – e.g. its existence, human contribution, degree and timing of risks – has become a research topic of growing interest. Scepticism can account for some of the observed public resistance to climate policies in the US (Leiserowitz, 2006). At present, this type of scepticism may still be more pronounced in the US than elsewhere. Indeed, Akter, Bennett, and Ward (2012) find little scepticism in Australia about climate change in general, but much scepticism about successful mitigation, which has negatively influenced policy support.

Whether individuals hold such beliefs with certainty depends a lot on their knowledge about climate change (Krosnick et al., 2006). It has been pointed out that it is necessary to distinguish between a person's self-reported and objectively assessed knowledge about climate change (Stoutenborough & Vedlitz, 2013). Many studies (e.g. Adaman et al., 2011; Bord, O'Connor, & Fisher, 2000; Park & Vedlitz, 2013; Zahran et al., 2006) find higher assessed knowledge to be correlated with greater policy support, while McCright (2008) observes no link between higher self-reported knowledge and policy support. However, when personal knowledge is insufficient, people may rely on heuristics; for instance, perceived scientific disagreement on climate change may weaken various beliefs about climate change and consequently support for climate policy (Ding, Maibach, Zhao, Roser-Renouf, & Leiserowitz, 2011; McCright et al., 2013a).

Going beyond these rather cognitive explanations, some researchers stress the role of experience-based perception. In a US study, Leiserowitz (2006) illustrated that policy preferences are partly explained by negative imagery and affect, that is, 'a person's good or bad, positive or negative feelings

about specific objects, ideas or images' (p. 48), in this case about climate change. In a more recent and extended study, Smith and Leiserowitz (2013b) find that discrete emotions explained up to 50% of the variance in their model of policy preferences: worry, which is not to be confused with fear, turned out to be the most significant negative emotion, while interest and hope emerged as the most significant positive emotions. Recent evidence for Sweden underpins the importance of worry in predicting policy support (Sundblad, Biel, & Gärling, 2014).

Finally, some approaches explain policy support by integrating many of the above-mentioned variables. One of these is the 'Risk Information Seeking and Processing' (RISP) model. This involves components such as environmental values, knowledge, need for information, negative affect, and subjective informational norms. It suggests that systematic and effortful information processing regarding climate change predicts policy support, whereas heuristic and automatic processing do not (Yang, Rickard, Harrison, & Seo, 2014). Another line of research from the US and Australia has intended to identify different segments of people based on a set of similar characteristics regarding beliefs, behaviours, preferences, and so on: the 'alarmed', 'concerned', 'cautious', 'disengaged', 'doubtful', and 'dismissive' (Maibach, Leiserowitz, Roser-Renouf, & Mertz, 2011; Morrison, Duncan, & Parton, 2013). Not too surprisingly, policy support is found to be highest for the 'alarmed' and lowest for the 'dismissive'.

3. Perception of climate policy and its design

When it comes to public perception, uncertainty about the solutions to climate change might actually be greater and more problematic than uncertainty about the characteristics of climate change itself (Patt & Weber, 2013). There are various policy instruments, such as information provision, economic incentives, and command-and-control, and these can evoke specific public responses. We aim here to provide insights into how public attitudes are affected by objective and perceived characteristics of policy instruments.

3.1. Pull versus push measures

One way of characterizing the various types of policies is in terms of their (perceived) degree of coercion. In other words, policies can be differentiated by rather coercive 'push' measures (e.g. regulations, taxes) and less or non-coercive 'pull' measures (e.g. subsidies, moral suasion), which aim to either discourage or encourage certain behaviours (Steg, Dreijerink, & Abrahamse, 2006). Overall, it seems reasonable to suggest that people prefer non-coercive climate policies over more coercive policies. The preference for non-coercive policies may be explained by the lower perceived financial and behavioural costs to the individual. This builds on the so-called 'low-cost hypothesis', which predicts that environmental concern translates into low-cost pro-environmental behaviours, but only to a smaller extent into high-cost behaviours (Diekmann & Preisendörfer, 2003). A case in point is a Swiss study that found that people approved of climate policies such as various subsidies (for sustainable buildings, electricity generation from renewable energies, technology research, and alternative heating systems) or expansion of public transportation. To a significantly lesser degree they supported two types of CO₂ taxation (Tobler et al., 2012). Moreover, it should be noted that there is an interplay between a policy's level of coerciveness and its targeted behaviour: coercive

measures do not appear attractive in general, but acceptance is even lower if the policy targets a high-cost behaviour such as driving compared to a low-cost behaviour such as recycling (De Groot & Schuitema, 2012).

In a similar vein, a US survey experiment investigated policy preferences with respect to transport and energy (Attari et al., 2009). For transport behaviour, study participants preferred voluntary changes, followed by soft regulations (e.g. economic incentives or changes in default options), and, finally, hard regulations (e.g. bans). For green energy use, voluntary changes and soft regulations were equally preferred over hard regulations. The majority of people opposed to hard regulations stated the perceived loss of 'personal freedom' and the 'need for choice' as the main reasons for their preferences (see also Cherry, Kallbekken, & Kroll, 2012). Costly policies might be perceived as more acceptable if alternatives to the targeted behaviours are offered. For example, improved public transport can reduce some public opposition to gasoline (petrol) taxes (Kallbekken & Aasen, 2010).

The insight that 'hard' regulations are always the least favoured is not clear-cut. Kotchen et al. (2013), for example, find practically no difference in WTP for emission reduction between the instruments 'cap-and-trade' 'carbon tax', and (hard) 'GHG regulations'. In a qualitative study, Fischer, Peters, Vávra, Neebe, and Megyesi (2011) explore 'folk psychology' to further understand how the way laypersons conceptualize human behaviour affects their views of different measures of climate and energy policy. By and large, people revealed images of human beings as inherently selfish, ruled by habit and comfort, myopic, and motivated mainly by money. Interviewees then used these mental constructs of other people as arguments working in favour of top-down governmental policies such as regulations, increased prices, or educational campaigns to stimulate pro-environmental behaviour. Simply relying on voluntary behavioural changes was widely regarded as insufficient.

3.2. Perceived benefits and effectiveness of policy

People wonder whether a policy can reach its desired goals. For instance, Kallbekken and Sælen (2011) show that individuals in their Norwegian sample were more likely to support a fuel tax if they believed the tax was going to reduce driving and exert a positive effect on climate change (see also Schuitema, Steg, & Rothengatter, 2010). Other studies, from various countries, find a similarly important role of perceived 'climate benefits' in explaining support for particular policies (Brouwer et al., 2008; Lam, 2014; Tobler et al., 2012).

A related aspect is that perceived effectiveness can quickly change once people start to experience the effects of a policy. Useful lessons can be drawn from the field of transportation.⁴ One major reason why past referenda on congestion charges in the UK have failed to win a majority of votes was that people were uncertain about the effectiveness of the proposals (Hensher & Li, 2013). Or take the congestion charge in Stockholm; Eliasson and Jonsson (2011) conclude that, besides environmental concerns, the perceived effectiveness of the charge played the most decisive role in its acceptance. Initially, less than 30% of the population supported the charge, but the number rose to about 70% after implementation. Thus, it is important to distinguish between pre- and post-implementation phases and to acknowledge the role of adaptation to policies. This also suggests that gradual implementation and policy experimentation may build more public support.

Nevertheless, it is not entirely clear how people arrive at their judgements of policy effectiveness. Bostrom et al. (2012) conducted an international survey of public support for general environmental, carbon, and geoengineering policies. Overall, general 'cheap' environmental policies were favoured over costly carbon policies, and geoengineering proposals received the least support. Perceived effectiveness best predicted people's policy choices. In other words, someone who had a preference for an environmental policy like reforestation also perceived this policy as more effective to tackle climate change than a carbon tax or a geoengineering measure. Aside from (incorrect) beliefs about the causes of climate change, one of the explanations the authors give is that 'wishful thinking' may be at work: when an individual refuses to face the unpleasant reality that some, more effective, policies have higher financial or behavioural costs than others, she or he may change their beliefs about the policy's effectiveness (see also Rosentrater et al., 2013). Perceived effectiveness might explain some of the variance in support for push and pull measures, with the former being seen as rather ineffective and the latter being perceived as rather effective (Eriksson, Garvill, & Nordlund, 2008), regardless of whether this is really the case. Finally, it should be noted that perceived environmental effectiveness is not always associated with policy support. People's ethical concerns, here in particular a deontological orientation, can cause public resistance to certain policies such as a cap-and-trade programme, despite its perceived benefits (Sacchi, Riva, Brambilla, & Grasso, 2014).

3.3. Perceived costs of policy

As already suggested above, it is evident that the costs of policies influence public preferences. Several aspects matter here: the actual versus perceived costs, the distributive fairness, and the use of revenues in the case of revenue-generating policies. Some studies investigating public opinion on climate policies do not explicitly state the personal costs of a policy, which may result in a bias towards overly favourable responses. It thus makes sense to distinguish between studies that present concrete estimations of personal costs due to policy implementation, and other studies that only communicate possible uncertain, or no cost increases at all. Generally speaking, policies implying more direct monetary costs (e.g. raising electricity prices) tend to be less supported (e.g. Lam, 2014). Not surprisingly, when different levels of monthly financial costs of a policy are explicitly described, public support for domestic (Brannlund & Persson, 2012) as well as global climate policy (Bechtel & Scheve, 2013) goes down for higher levels of costs. Note, further, that in some surveys, people may overestimate the costs of taxes and underestimate the 'hidden' costs of alternative policies, such as subsidies or investments in public transport (Jagers & Hammar, 2009). All this is not to say, however, that people do not want to incur any costs. On the contrary, research using the WTP approach indicates a substantial WTP for climate policies. For example, Krosnick and MacInnis (2013) estimate WTP by the US public for an emission reduction of more than 80% by 2050 that corresponds with actual cost calculations of the US Environmental Protection Agency.

Shwom et al. (2010) explore US public support for national climate policies. After voting for specific policies, people were asked to give reasons for their decisions. The authors identified four rationales from the statements: economic, political, technological, and moral. Of the respondents, 58% mentioned costs in general, to themselves or their family, as the reason for their decision, in either direction. Going somewhat beyond personal financial concerns, a common belief and public narrative is that environmental and climate policies will have adverse effects on the economy and employment.

Research shows that people use this rationale when considering climate policy (Shwom et al., 2010) and that it predicts lower policy support (O'Connor, Bord, Yarnal, & Wiefek, 2002), although the overall effect on policy support is suggested to be moderate.

Personal costs are surely important, but, depending on the (study) context, other considerations matter: Kallbekken and Sælen (2011) demonstrate in a Norwegian study that the consequences of a fuel tax to oneself – in terms of reduced income or less mobility – has little explanatory power relative to other factors like perceived effectiveness and distributional concerns. It is the latter aspect that we turn to now.

3.4. Perceived fairness of policy

The distribution of costs from climate policy is a contested issue, regardless of whether it relates to domestic or international climate policy. Concerning domestic climate policy, evidence from different countries suggests that climate policy receives more support if the distribution of costs is progressive, or in other words, if richer members of society pay a larger share and potential revenues are redistributed to poorer or more vulnerable members of society (Brannlund & Persson, 2012; Carson, Louviere, & Wei, 2010; Dreyer & Walker, 2013).

A Swedish study by Hammar and Jagers (2007) examined how public attitudes towards fuel taxation are related to three fairness principles: 'equity' (who emits most should reduce most), 'equality' (everyone reduces equally), and 'need' (the more one needs to emit, the less one should reduce). In general, individuals' support for the fairness principles 'equality' and 'need' was found to have a strongly positive impact on tax support. The authors further distinguished between frequent and non-frequent car users: the 'equity' principle predicted support only for non-frequent car users, while the 'need' principle predicted support only for car users; the 'equality' principle was associated with support in both groups (see also Jagers & Hammar, 2009).

The distribution of costs is a crucial concern in international climate policy. A qualitative study in Canada explored justice perceptions of laypersons in the context of international climate change mitigation and adaptation actions (Klinsky, Dowlatbadi, & McDaniels, 2012). Participants mentioned a range of justice arguments in assigning a countries' responsibility for mitigation, with the most frequent ones being causality of emissions, ability and need, equal burden, and merit/deservingness. Similarly, Gampfer (2014) shows experimentally the relevance of fairness principles such as ability-to-pay, vulnerability, and historical responsibility for burden-sharing preferences. Furthermore, Bechtel and Scheve (2013) investigate public support for a global climate agreement by conducting a choice experiment with subjects from the US, UK, Germany, and France. This demonstrates that a highly skewed distribution of costs, in which only rich countries pay, significantly decreases support compared to other distributive principles. There is further evidence for the US and Canada that indicates that stated WTP values are higher when the costs of mitigation are shared internationally (Cai, Cameron, & Gerdes, 2010; Lee & Cameron, 2008).

Policy support also depends on the stakeholder or agent to whom people assign responsibility to act: government, industry, energy producers, consumers, taxpayers, etc. WTP for climate change mitigation can decrease if general taxpayers are assigned great responsibility, but it can increase if industry and energy users are targeted (Cai et al., 2010). The focus here and in the literature is on distributional fairness, but it should be mentioned that other types of fairness (e.g. procedural) can have an effect on policy support (e.g. Kim, Schmöcker, Fujii, & Noland, 2013).

3.5. Perceived use of revenues

As for taxation as an instrument of climate policy, it appears to be crucial for policy support how revenues are managed. For example, a choice experiment for the UK finds that acceptability of a carbon tax can vary between 68% and 48% depending on whether revenues are earmarked for specific purposes or go directly to the general tax budget (Bristow, Wardman, Zanni, & Chintakayala, 2010).⁵ In a study for Canada, Hsu, Walters, and Purgas (2008) explore several factors of policy design that may explain Canadian citizens' resistance to higher gasoline taxation. Revenue recycling, that is, channelling the tax proceeds back to taxpayers, made a marked difference: both suggestions – reducing VAT or income tax – increased policy support, with a stronger effect for the latter option. Additionally, earmarking tax revenues for environmental purposes, such as financing technological research, elicited more favourable attitudes towards gasoline taxation. In a similar vein, Sælen and Kallbekken (2011) show in a choice experiment that a majority of Norwegians would support a rise in fossil fuel taxes if revenues are earmarked for environmental purposes, whereas without earmarking a majority prefers a decrease of such taxes. Kallbekken and Aasen (2010) use a focus group to study preferences of Norwegian citizens towards environmental taxation. They find rather low opposition to environmental taxes as well as strong preferences to earmark revenues for environmental projects. While the majority of participants generally understood the mechanism of how environmental taxes are supposed to influence behaviour, they still asked for more information to further their knowledge. Moreover, people were sceptical towards the idea of shifting taxation from incomes to environmental externalities, which is known as the 'ecological tax reform'.

In 2006, the journal *Energy Policy* published a special issue on social and political responses to the ecological tax reform (Dresner, Dunne, Clinch, & Beuermann, 2006). In short, people demonstrated relatively low awareness of this policy in general, and modest understanding of revenue recycling, the incentive mechanism of the tax, and the double-dividend argument. Other issues arose, such as a lack of trust in government, the low visibility of benefits, the need for better communication of the policy, and concerns about the level and regressivity of taxation. The green tax reform also constituted one of the proposals in the aforementioned Swiss referendum, but it was criticized for being unfair as it would have only rewarded people active in the labour market (Thalmann, 2004). Recent US opinion polls show that a (non-negligible) minority of 43–45% of citizens supports a revenue-neutral carbon tax (Leiserowitz et al., 2013). Given that one-third of respondents chose 'don't know' as their answer, we can safely surmise that opinions on this issue may easily change. A different, comparative public opinion study from the US and Canada shows that most people would like the revenues of carbon pricing policies to be spent on R&D for renewable energy (43% of Americans and 51% of Canadians), followed by a smaller share of people preferring tax rebates, deficit reductions, or payroll tax cuts (Lachapelle, Borick, & Rabe, 2012).

4. Contextual factors

This section highlights a host of social, economic, institutional, and communicative factors, which go beyond the individual level and the question of policy design, and shape public attitudes and policy preferences.

4.1. Social trust, norms, and participation

Several studies have looked at the role of trust, which is often seen as a key element of social capital, in explaining policy support. Trust may be further distinguished into trust in government and politicians, science, industry, non-governmental groups, and generally other people. There is considerable evidence to suggest that policy support requires trust in government and politicians, as exemplified by the case of carbon taxation in Sweden and Norway (Hammar & Jagers, 2006; Harring & Jagers, 2013; Kallbekken & Sælen, 2011). Trust in government also matters for public approval of various other climate policies in the US (O'Connor et al., 1999; Zahran et al., 2006). In a US study by Dietz et al. (2007), trust in environmental scientists and environmental organizations are positively and trust in industry negatively associated with greater policy support. A lack of trust in the institutional body – whether a national or international one – that is supposed to implement climate policy has been reported to be negatively related to WTP values for emissions reduction in Turkey (Adaman et al., 2011). In addition, some researchers have examined the influence of social norms on public support (Adaman et al., 2011; De Groot & Schuitema, 2012). For example, an experiment by Bolsen, Leeper, and Shapiro (2013) shows how support for a carbon tax falls when people receive information that only a minority of other citizens support the proposed tax. However, social norms might play a more important role in engagement in environmental activism or other pro-environmental behaviours than in policy support (Lubell et al., 2007).

Creating more participatory policy processes and civic-mindedness might build public support (Stoll-Kleemann, O'Riordan, & Jaeger, 2001). For example, Bernauer and Gampfer (2013) explore how public support is affected by civil society involvement in the making of global climate policy. Conducting three survey experiments, they note that people favour the presence of civil society actors in international climate negotiations, and that including or excluding these actors from national delegations may increase or decrease public support, respectively. A study by Lo, Alexander, Proctor, and Ryan (2013) investigates the effect of public deliberation on preferences regarding national climate policy in Australia. Besides generally promoting a consensus, a majority of participants favoured a carbon tax after deliberation. Deliberation provides insights into public preferences by allowing people to consider a greater number of motives for their stated policy preferences (Dietz, Stern, & Dan, 2009).

4.2. Economic and political aspects

It is obvious that economic and political aspects can affect public attitudes towards climate policy. The evidence, however, is scarce if we look at policy support in the narrower sense as defined in this article. A recent US study finds that public support for climate policy has decreased considerably between 2007 and 2013, which indicates the impact of the economic downturn on public opinion starting in 2008 (Stoutenborough, Liu, & Vedlitz, 2014). On the other hand, poll data from the midst of the economic recession in 2010 demonstrates that only 20% of Americans thought that taking action on climate change would 'hurt the economy' (Krosnick & MacInnis, 2013). Given the importance of these questions, one can consider the evidence for concern about environmental problems and policy in general. Broadly speaking, this research shows for various countries that economic conditions associated with higher economic growth and employment tend to be linked with higher environmental concern and support for environmental protection (Franzen & Vogl, 2013; Gelissen, 2007; Halbheer, Niggli, &

Schmutzler, 2006; Scruggs & Benegal, 2012). Since 2009, high-ranking Republican politicians have increasingly communicated messages advocating climate change denial, and US survey data suggest a marked decline of policy support among self-identified Republicans in the following years (McCright, Dunlap, & Xiao, 2013b). Related to this, the success of past environmental ballots in Switzerland depended significantly on whether political parties and associations expressed support for the respective policy proposal (Stadelmann-Steffen, 2011).

4.3. Geography and weather

The experience of recent extreme weather events such as droughts and heat waves – probably mediated via media exposure and increased issue importance – has been shown to immediately affect attitudes by increasing stated support for environmental legislation (Owen, Conover, Videras, & Wu, 2012).⁶ The role of geography and the experience with climate change-related weather events may be important for two reasons. First, they represent a window of opportunity for public debate. Second, an increasing number of experienced events is likely to translate into more policy support. One may also speculate that those who are geographically more exposed to climate hazards are more likely to support policies. Park and Vedlitz (2013) find no evidence for this hypothesis in a US study among people living near the coast and in other areas prone to floods, storms, and droughts and those living in less exposed areas. Other lines of research explore the influence of emphasizing the geographical patterns of climate change impacts. Results from these studies are anything but conclusive. Some scholars suggest that a local/regional and hence more personal framing of climate change impacts tends to yield higher WTP values (Longo, Hoyos, & Markandya, 2012), others find slightly stronger effects for national climate impacts (Yarnal, O'Connor, & Shudak, 2003), while yet others find no differences in policy preferences between paying attention to either local or national impacts (Shwom, Dan, & Dietz, 2008).

4.4. Media coverage and framing

Many of the previous remarks hint at the idea that media coverage at least indirectly affects policy preferences. For instance, research from Sweden found that public attitudes towards CO₂ taxation became more favourable after the release of Al Gore's documentary 'An Inconvenient Truth' and the publication of the 'Stern Review' (Löfgren & Nordblom, 2010). A study from Australia finds media exposure to be a significant factor in explaining policy support (Akter & Bennett, 2011), while a different Australian study indicates that for a subgroup of less climate-engaged people, policy support might have decreased after intensive exposure to media coverage (Morrison & Hatfield-Dodds, 2011). In the US, there was seemingly little change in policy preferences after early public debates in 1997 surrounding the Kyoto treaty (Krosnick, Holbrook, & Visser, 2000). More recent controversies such as the so-called 'Climategate' might have increased public opposition to some climate policies (Stoutenborough et al., 2014). Another US study finds that citizens who pay a lot of attention to political news express less policy support, while those who tend to follow scientific and environmental news are more in favour of climate policies (Zhao et al., 2011).

One might conclude from the above that perhaps even more important than mere media exposure is the content of communications and campaigns, that is, its messages and framings (Lakoff, 2010). While framing research on climate change abounds, only a few studies have used policy preferences

or attitudes as the dependent variable or tried to frame climate policies differently. One example of the latter is a study for the UK by Lockwood (2011). He found that expansion of renewable energy – framed as a strategy for reducing energy independence – garnered significantly more support from study participants than when it was framed as an economic opportunity or a way to tackle climate change. An Australian study suggests that framing action on climate change in terms of creating societal well-being and progress may elicit more support – particularly from climate change sceptics – than highlighting the risks of climate change (Bain, Hornsey, Bongiorno, & Jeffries, 2012).

Sometimes only a single word suffices to activate frames. An experimental study by Hardisty, Johnson, and Weber (2009) shows that self-identified Republicans preferred to pay more for an identical environmental charge when it was labelled as a ‘carbon offset’ than when it was labelled as a ‘carbon tax’. No such differences were found for self-identified Democrats. This finding is not only related to the above-mentioned importance of trust in governments, but also to the well-established idea of ‘tax aversion’. Other studies suggest a similar negative effect of the tax label on policy support and WTP (Brannlund & Persson, 2012; Kallbekken, Kroll, & Cherry, 2011). However, a similar US experiment shows no differences in public support for gasoline taxation when climate change mitigation was either framed as leading to ‘higher prices’ or to ‘higher taxes’ (Villar & Krosnick, 2011), while a UK experiment finds somewhat more support for ‘carbon’ rather than ‘energy’ taxation (Parag, Capstick, & Poortinga, 2011). Other research suggests that framing climate change as a public health issue may lead to more favourable policy attitudes (Petrovic, Madrigano, & Zaval, 2014), although this effect may be moderated by political orientation according to Hart and Nisbet (2012). Results of a study by Hart (2011) suggest framing climate change impacts in thematic instead of episodic terms.

5. Synthesis and conclusions

5.1. Factors affecting policy support

Table 1 provides a summary of the major factors influencing policy support that we have identified in our review of the literature. In view of the scope of our review and the wide variety of factors, it is useful to qualify the findings and put them into perspective. Comparing results across different fields of research is difficult and one must be careful about drawing overly general conclusions. We also want to highlight opportunities for synthesizing the findings, and mention some caveats of this study. After this we will be able to offer suggestions for policy and future research.

Drawing on different literatures brings the obvious advantage of obtaining a broad understanding of the research topic, but it is also true that different disciplines use distinct concepts, terminology, and levels of analysis. While some research areas primarily focus on personal characteristics, others stress the importance of wider social, economic, institutional, or contextual forces. This offers partly contrasting and partly complementary insights.

The reviewed studies use a variety of measures of policy attitudes. Some studies use indices of ‘policy support’ consisting of up to ten or more policies, whereas others use single-item measures (e.g. a gasoline tax). Some focus on national policy measures, while others study international agreements. As a result, a direct comparison of findings is often complicated, and conclusions regarding ‘policy support’ or attitudes towards climate policy are to be treated with caution.

TABLE 1 A summary of the main factors identified in past research as influencing public support for climate policies

General categories	Factors	Main findings and effects on policy support
Social–psychological factors and climate change perception	Political orientation	Left-wing orientation (+), right-wing orientation (–)
	Worldviews	Egalitarianism (+), individualism (–), hierarchism (–)
	Religiosity	Beliefs in ‘Christian end-times theology’ (–), evangelical beliefs (–)
	Personal values	Self-enhancement (–), self-transcendence (+), environmental values (+)
	General environmental beliefs	Endorsement of the New Environmental Paradigm (+)
	Beliefs about climate change	Existence (+), human causation (+)
	Risk perception	Beliefs in present/soon and severe impacts, at personal and societal level (+)
	Knowledge	Assessed climate change knowledge (+), self-rated knowledge (0)
	Information seeking and processing	Effortful and systematic (+)
Perception of climate policy and its design	Affect and emotions	Negative affect and imagery (+); emotions such as worry (+), interest (+), hope (+), fear (–)
	Pull versus push measures	Pull measures (e.g. subsidies) tend to be favoured over push measures (e.g. restrictions, taxes)
	Perceived policy effectiveness and benefits	Policy is perceived as effective and beneficial in addressing climate change (+)
	Policy costs	Higher personal economic costs (–)
	Perceived fairness of policy	Progressive distribution of policy costs (+)
Contextual factors	Use of revenues	Recycling and earmarking of policy revenues (+)
	Trust	Trust in key actors (e.g. government/politicians, scientists) (+)
	Social norms	Perceived policy support by others (+)
	Participation/deliberation	Civil society involvement and public deliberation (+)
	Economic and political aspects	Economic downturn (–), contrary discourses on climate change by political elites (–)
	Geography and weather	Experience of extreme weather (+), geographical exposure (0)
	Media coverage and framing	Media matters, though the direction of influence depends much on content and frequency; diverse set of framings are proposed, e.g. framing of climate change as a public health issue (+)

Notes: (+) indicates a positive effect on policy support, (–) indicates a negative effect, (0) indicates no effect.

The previously described factors obviously cannot be considered in total isolation, as factors are connected and may interact in various ways. For example, some social-psychological factors (e.g. worldviews and values) may underlie others (like political orientation). Perceived policy effectiveness may be moderated by levels of education and knowledge. Another type of interaction exists between individual-level and contextual factors. For instance, media coverage of climate change influences policy support, but it probably does so indirectly by shaping individual beliefs and knowledge about climate change itself. Such effects should be taken into account, but disentangling all of them is beyond the scope of this review.

With this caution in place, we feel confident to offer some lessons learned. First, among the explanatory factors related to social psychology and climate change perception, left-wing and green political orientation can be considered as a strong positive influence on policy support. Self-transcending and environmental values tend to be associated with stronger policy support, as do egalitarian worldviews. The reverse is observed for self-enhancing values as well as hierarchical and individualistic worldviews. Policy support is stronger when people hold certain key beliefs about climate change (e.g. that it is real, human-caused, and harmful). Objectively assessed knowledge about climate change that people possess may be one of the most robust predictors of favourable attitudes. Emotions such as worry, interest, and hope may further strengthen policy support. Second, with regard to policy characteristics and associated beliefs, pull measures tend to garner more support than (more coercive) push measures. The more individuals perceive policies as effective, the more they support them, whether or not these perceptions are 'objectively' true. Higher financial costs and behavioural efforts associated with policy result in lower public support. Fairness principles in the distribution of the policy burden are clearly relevant, and redistribution of policy-generated revenues (e.g. from carbon taxation) can substantially increase support. Third, we examined several contextual factors. Trust in societal actors such as politicians and scientists has a positive effect on policy support. Certain social norms, as well as forms of public participation and deliberation, may strengthen policy support. Policy preferences are further affected by the economic situation of a country. Geography in terms of vulnerability and exposure to climate change impacts and the experience of extreme weather events may influence public attitude, although the evidence covered here is mixed. Finally, the media can shape public attitudes, notably through the framing of messages.

5.2. Implications for policy and practice

We briefly discuss a number of policy implications. To begin, it is important to acknowledge the role of different ideologies, values, and worldviews in determining policy attitudes. However, these factors are generally hard to change, and communication efforts to bridge such differences are challenging (e.g. Corner, Markowitz, & Pidgeon, 2014). It might be easier to increase concrete knowledge about climate change or to alter related beliefs. To achieve this, tailoring messages, targeting specific population segments, and using trusted information sources and channels can be useful. Nevertheless, although much attention has been given to scepticism about (or denial of) climate change, the majority of people in most countries in fact tend to believe in its existence as well as its human causation. Further communication of climate change is certainly needed, but it may be worth focusing more on strategies and solutions for the problem. This can foster public beliefs that climate change can be solved, which in turn would increase the perceived importance of the problem (Patt & Weber, 2013).

A general suggestion for policy makers is thus to study how policy characteristics are perceived by the general public (in a manner similar to that in Section 3). For example, a relatively clear message emerging from the results is the need to correct misperceptions regarding the effectiveness of policies, especially those with high (perceived) financial and behavioural costs. Moreover, information provision could improve public understanding of the main purpose of environmental taxes, which is to influence behaviour and not to raise revenues. Beyond mere communication about policies and strategies, governments might perform policy experiments through trial runs in order to change individuals' beliefs about a policy's effectiveness, benefits, and costs through lived experience.

Policies are implemented by governments, who need the trust of their citizens. Two possible ways to increase trust might be to promote transparency of the policy process and to encourage greater involvement of civil society. An implication of the research on framing effects is that it may be worth reframing certain policies such as a carbon tax, for example, as an offset or a charge, as the 'tax' label evokes negative affective reactions that lead to unfavourable attitudes. Given the importance of social norms, it may further help to raise awareness that, according to recent poll data (Amdur, Rabe, & Borick, 2014), a significant number of people are already in favour of stringent climate policies. Finally, timing also matters for communication and policy. Governments and practitioners could take advantage of so-called 'teachable moments' or 'policy windows of opportunity' when issue salience is high due to weather events or media coverage (Hart & Leiserowitz, 2009).

5.3. Future research

We end with a few suggestions for future research. A key question left unanswered in this article concerns the relative importance of each of the factors. Future work could try to disentangle effects and measure their relative strength through the use of quantitative meta-analysis. This might include socio-economic factors, which were omitted here for reasons of space. Next, there seems to be broad scepticism about whether and how climate change can be mitigated (see also Capstick & Pidgeon, 2014, on 'response scepticism'). To this end, research might dive deeper into explaining how people make sense of different policies, its effectiveness, as well as other attributes. For example, there is little understanding of how people see the effectiveness of policies related to the international dimension of climate change, collective efforts, and indirect system-wide effects, such as carbon leakage, energy/carbon rebound, and oil market responses (green paradox). Furthermore, instead of soliciting opinions on single policies, research may benefit from examining public support for more complex policy packages like combinations of carbon taxation and renewable R&D subsidies, or shifting taxes from labour to the environment, as these are stressed by many policy experts as necessary to make a transition to a low-carbon economy. A particularly puzzling question may receive attention in this context, namely why a revenue-neutral environmental/carbon tax reform receives relatively little support in politics and society thus far. Research could also study a wider array of policies that can address climate change, such as the introduction of alternative well-being indicators, working time reduction, restrictions on certain types of advertising, and measures to discourage conspicuous consumption. Given that the majority of studies covered here are empirical, future research may use more experiments to better identify the causal relation between factors and policy support. A final remark concerns the geographical scope, namely that the bulk of the reviewed research focuses on

public opinion in North America, Australia, and Europe. Little is known about countries in other geographical areas and hence cultural contexts.

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Notes

1. Due to space limits, we cannot offer a comprehensive coverage of the existing research on WTP for climate policy. Note further that a few partial reviews, restricted to a limited set of factors, are already available (Johnson & Nemet, 2010, unpublished; Diederich & Goeschl, 2014; Alló & Loureiro, 2014).
2. See, e.g., Huijts, Molin, and Steg (2012) for a review on psychological factors influencing acceptance of energy technologies.
3. Note that a considerable amount of literature studies environmental concern and risk perception independently of policy attitudes.
4. Note that a number of studies in the field of transportation have dealt with the question of policy acceptability. We do not provide a comprehensive overview of these studies here, mainly because transport constitutes only one out of many areas of climate policy.
5. Note that the welfare theory of optimal externality policy in environmental economics shows that environmental tax revenues should not be earmarked or serve to raise additional tax revenues but should be recycled neutrally to tax payers (Baumol, 1988).
6. A recent review of climate change perceptions over time (not specifically on policy attitudes) identifies a significant role of temperature anomalies and discrete weather events, although it remains unclear how long lasting such changes in perception are (Capstick, Whitmarsh, Poortinga, Pidgeon, & Upham, 2015).

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