Democratic accountability and control require that people are reasonably well-informed about what policymakers do. Consider that an uninformed public is unable to hold policymakers accountable. Policymakers would have little incentive to represent what the public wants in policy—there would be no real benefit for doing so and no real cost for not doing so. An uninformed public, being unaware of what policymakers have already done, also is unable to guide policy. Policymakers thus would have little basis for representing the public even if they wanted to—expressed public preferences would contain little meaningful information about what the public wants. We clearly need an informed public; effective democracy depends on it.

Political scientists have posited that such a public would behave like a thermostat (Wlezien 1995, 2004; Soroka and Wlezien 2010). Imagine a situation in which the public prefers more policy than currently is in place and sends a signal to adjust policy accordingly, that is, to provide “more.” Further imagine that policymakers respond, and provide more but not too much more; the new policy position would more closely correspond to the public’s preferred level. Now, if the public is indeed responsive to what policymakers do, then it would not favor as much more policy. It might still favor more, on balance, but not as substantially as in the prior period. In effect, following the thermostatic metaphor, a departure from the favored policy temperature—which itself can change—produces a signal to adjust policy accordingly and, once sufficiently adjusted, the signal stops.

This conception of the public (and policymakers’ behavior) has deep roots in political science, particularly Easton’s (1965) depiction of a political system and Deutsch’s (1963) models of “control.” It still may seem far too stylized given the traditional view of public opinion (Campbell et al. 1960; Converse 1964; Kinder 1983; even Key 1961). It is even more demanding than Page and Shapiro’s (1992) fairly sophisticated characterization in their now-classic book, The Rational Public, in which they depicted a public whose preferences remained fairly stable over the short run but changed over time in understandable ways. Other work has supported Page and Shapiro’s view, highlighting the importance of heuristics to compensate for information shortfalls (Ferejohn and Kuklinski 1990; Sniderman, Brody and Tetlock 1991; Lupia 1994; Lau and Redlawsk 2006). More recent research has directly tested thermostatic public responsiveness and policy representation as well, and found evidence of both, as we will see below (for a summary, see Wlezien and Soroka 2016).
This chapter examines the thermostatic model and its applicability. First, it provides a basic formal representation of the model, focusing on public responsiveness to policy and policy responsiveness to public opinion. Second, it presents the empirical literature examining whether and under what conditions the model works, highlighting the characteristics of issues and political institutions. Third, it explores implications for politics, particularly election outcomes but also judgments of the broader political system. We will see that the simple thermostatic model is quite powerful; while it does not work everywhere or equally well even where it does work, the model helps us understand much of policymaking and politics in representative democracies.

**The thermostatic model**

The thermostatic model of opinion and policy consists of two equations, one for public responsiveness to policy and the other for policy representation of opinion.

**The public responsiveness equation**

The model implies that the public’s preference for “more” policy – its relative preference, $R$ – represents the difference between the public’s preferred level of policy ($P^*$) and the level it actually gets ($P$):

$$ R_t = P_t^* - P_t $$

(1)

where $t$ represents time. Thus, as the preferred level of policy or policy itself changes, the relative preference signal changes accordingly. Notice that, unlike the thermostat that governs the heating (and/or air conditioning) units in our homes, which sends a dichotomous signal, $R$ captures both direction and magnitude.

This equation is straightforward in theory, less so in practice. Most importantly, we rarely observe $P^*$. Survey organizations typically do not ask people how much policy they want. Instead, these organizations ask about relative preferences, whether we are spending “too little,” whether spending should “be increased,” or whether we should “do more.” This, presumably, is how people think about most policies. (Imagine asking people how much health or education spending they want.) The public preference, however defined, also is necessarily relative. In one sense, this is quite convenient, as we can actually measure the thermostatic signal the public sends to policy makers – to test the model, we need a measure of relative preferences, after all.

Because we do not directly measure the public’s preferred level of policy ($P^*$), and because all of the variables would have different metrics, we need to rewrite the model of $R$ as follows:

$$ R_t = a_0 + \beta_1 P_t + \beta_2 O_t + e_t $$

(2)

where $a$ and $e_t$ represent the intercept and the error term respectively, and $O$ designates a variety of “other,” exogenous determinants of $R$. The public’s preferences for defense spending may be driven by perceived security threats, for instance; preferences for welfare policy may be conditioned by concerns about economic security. Note that these variables, $O$, should not be viewed as control variables, but as instruments for $P^*$. That is, in lieu of having measures of preferred levels of policy, these are factors that we think are associated with $P^*$. The most critical part of equation 2 is the coefficient of feedback, $\beta_1$. If people respond thermostatically, $\beta_1$ will be negative.
Negative feedback of policy on preferences is the fundamental feature of the thermostatic model. It is what distinguishes a reasonably informed public – one that knows something about what policymakers actually do – from an uninformed public. Observing it means that the signal that the public sends to policymakers contains useful information. And it makes possible effective accountability and control, as the public is in a position to reward or punish the incumbent government for its actions. The public may not respond thermostatically to policy change, of course, and it even may be that policy feeds back positively on preferences – an increase in spending could lead people to want more spending in that domain. We do not gainsay these possibilities, which should be settled empirically, and the proof actually is in the empirical pudding of equation 2. There is nothing that requires $\beta_1$ to be negative, after all.\(^3\)

Although we have thus far characterized public responsiveness across time, an identical model applies across spatial contexts as well, whether across countries, across states or provinces within countries, or across counties, cities and even school districts within states. We have reason to think that the preferred level of education policy differs across contexts, say, states in the US. We know that the level of policy also differs. If the thermostatic model applies, the public’s relative preference would reflect the difference between the two across states $j$:

$$R_j = P_j^* - P_j$$

Here, the preference for more (or less) policy in each state will depend on whether and to what extent the public’s preferred level is greater than policy itself in the different states.

**The policy representation equation**

Now, let us turn to the policy representation equation. If there is representation, changes in policy ($P$) will be associated with levels of the public’s relative preference ($R$), which register support for policy change. We can express this expectation as follows:

$$\Delta P_t = a_0 + \gamma_1 R_{t-1} + \gamma_2 G_{t-1} + u_t$$

where $a_1$ and $u_t$ represent the intercept and the error term, respectively, and $G$ the partisan control of government. (Of course, other variables can be added to the model.) Notice that equation 4 actually captures both indirect and direct representation of public opinion. The former – representation through elections and the partisan control of government – is reflected in the coefficient $\gamma_2$; the latter – policy adjustment to changing preferences – is captured by $\gamma_1$.\(^4\)

The coefficient $\gamma_1$ is of special importance, as it provides evidence of policy responsiveness. It is important to recognize that a positive coefficient does not mean that politicians literally respond to changing public preferences, as it may be that they and the public both respond to something else – for example, changes in the need for more spending. All we can say for sure is that $\gamma_1$ captures policy responsiveness in a statistical sense – the extent to which policy change is systematically related to public preferences, other things being equal. This is significant, as we want to know whether public policy follows public preferences.

Evidence of responsiveness also does not mean that public preferences and policy actually are congruent (Achen 1978). It may be that there is a bias in representation, where policy correlates with opinion, but is consistently more (or less) conservative than people would like. Even if there is no bias, it may be that responsiveness is weak, and does not fully reflect preferences. For there to be congruence, we would need to observe not only a positive relationship between
opinion and policy, but an actual match. That is, we would need to know that policy equals opinion, at least that the two are not significantly different in the usual statistical sense. To make this determination, we need measures of opinion that tap the public’s preferred level of policy and which are on the same scale as policy. That this is not easily accomplished makes it difficult to directly observe congruence between the public’s preferred levels of policy and the actual policy level.

Finally, it is worth noting that modeling the change in policy in year \( t \) as a function of preferences in year \( t - 1 \) is not meant to imply that responsiveness is lagged, but to reflect the reality of decision making on fiscal matters, the subject of many empirical tests of the thermostatic model. That is, the model captures responsiveness to opinion when most budgetary decisions are made. The specification of opinion effects on policy differs from that for the effects of policy on opinion, which are at time \( t \), as per equation 1. This makes clear that the influences of each on the other are not simultaneous, but play out over time. The coefficients also are expected to be oppositely-signed, where opinion has a positive effect on policy and policy has a negative effect on opinion. As such, the effect in one direction cannot explain the effect in the other.

The model in practice

So far we have described a theoretical model. But does it work in practice? Under what conditions? As noted earlier, there is a good amount of research on the subject, which initially focused on the United States but increasingly has turned to other countries. Let us consider what we have learned, focusing first on public responsiveness to policy and then policy representation.

Thermostatic public responsiveness

The original statement of the thermostatic model focused on dynamics of spending preferences (Wlezien 1995), and much of the ensuing research has as well. This is not surprising given that we have had regular surveys, at least in the US, that ask about support for more (less) spending in different domains. The question typically asks “Are we spending too much, too little or about the right amount on [the military, armaments and defense]?” Spending is recurring as well and fairly easy to measure. (We need measures of both relative preferences for policy and policy itself to test the thermostatic model, after all.) Recall from equations 1 and 2 that it also is important to measure the public’s underlying preferred levels of policy, at least indirectly. Wlezien’s analysis of eight spending domains incorporated certain instruments and found that aspects of security – economic for social domains and national for defense – were particularly important.

Most importantly, Wlezien’s results revealed thermostatic responsiveness. That is, when spending increases (decreases), the public’s support for more spending decreases (increases), other things being equal. This was and is important. That the pattern of responsiveness varied across domains also is important. In some domains, especially defense and welfare, there was clear evidence of public responsiveness and it is very specific, where the public responds to spending within each of the separate domains. In other areas, namely, the remaining social spending domains, specific thermostatic responsiveness was not evident. Further analysis demonstrated that preferences in these areas are thermostatic but in a more general way, to spending in the set of social domains taken together, not separately. In yet other areas, it was not clear whether there is any thermostatic responsiveness whatsoever. The findings comport with research on the electoral salience of different issues (see Asher 1992; Abramowitz 1994). The influence of salience on public responsiveness is expected. Issues people care about are ones on
which they are likely to have meaningful opinions that structure party support and candidate
evaluation. Candidates are likely to take positions on the issue and it is likely to form the subject
of political debate, and people are more likely to pay attention to politicians’ behavior, as
reflected in news media reporting or as communicated in other ways.\(^9\)

Soroka and Wlezien brought the analysis to other countries in which similar spending pref-
erence questions were asked, specifically Canada (2004) and the UK (2005). This research also
revealed thermostatic public responsiveness, particularly in the latter country. Their subsequent
(2010) book on Degrees of Democracy explicitly incorporated characteristics of issues and political
institutions into the theoretical model and empirical analysis. They demonstrated that issue
importance significantly enhanced thermostatic public responsiveness and that the federal nature
of a domain – that is, the degree to which spending happens at multiple levels of government
– dampened it. A high level of mixing makes responsibility less clear to citizens, though there
are other possible mechanisms at work (see Wlezien and Soroka 2011).

Other scholars have examined thermostatic responsiveness in particular domains over time.
There is research in the US on the dynamics of racial policy (Kellstedt 2003) and recent innova-
tions in health care, namely, the Affordable Care Act (Morgan and Kang 2015). Research on
asylum applications and public support for asylum in the UK also finds negative feedback (Jen-
nings 2009). We see the pattern with defense spending preferences in a set of different countries
(Eichenberg and Stoll 2003) and in support for European unification across countries (Franklin
and Wlezien 1997).

Some research studies relationships in particular domains across contexts at particular points
in time, not over time. Much of this research concentrates on the US states, for which there is
a good amount of data. Goggin and Wlezien’s (1993) study of abortion policy and opinion was
the first of these, though there also is work on the environment (Johnson, Brace and Arceneaux
2005) as well as education and welfare (Pacheco 2013). All of this research finds negative feed-
back of policy on public preferences.

Other scholars have focused on general patterns of preferences across issues, most notably
Erikson, MacKuen and Stimson’s (2002) examination of policy “mood” that forms part of their
classic Macro Polity treatise. For their analysis, Erikson, MacKuen and Stimson rely on Stimson’s
(1991) measure of policy sentiment that captures the common flow of public opinion in various
policy domains, in effect, the parallelism in those preferences. They find strong evidence of
thermostatic public responsiveness to legislation.\(^10\) This also is true in other countries, including
the UK (Bartle, Delleplaine and Stimson 2011) and there is evidence across a range of countries
(Wlezien and Soroka 2012).

It thus is clear that thermostatic responsiveness is evident on numerous issues and across con-
texts. The relationship varies across issues to be sure, as discussed, and the public importance of
issues matters as does their federal quality. (The latter also has implications for differences across
contexts, e.g., countries, as well.) What may be most striking is that responsiveness tends to hold
across subgroups of the public, perhaps most importantly, education levels. People with less than
a high school education in the US are almost as responsive as those who have been to college
(Soroka and Wlezien 2010). Much the same is true for differences in income and party identi-
fication. This is not entirely surprising given Page and Shapiro’s (1992) analysis of parallel
publics, discussed above.\(^11\)

That there is thermostatic public responsiveness is important. It means that the public
somehow receives information about policy and uses it, at least in certain salient policy domains
and contexts. Surely the information the public receives is mediated, as few people have budgets
on their coffee tables or desktops, but the mechanism is unclear. We do know that only basic
information is required; that is, people need only recognize that spending on, say, health, has
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gone up, ideally whether it has increased by a little or a lot (Soroka and Wlezien 2010). And there is reason to think that such information is available in mass media reporting and that people can fairly easily draw basic inferences from this coverage, at least in certain areas (Neuner, Soroka and Wlezien 2015). That said, determining what information is transmitted about the policy activities of government in different domains requires more research.

Policy representation

Thermostatic public responsiveness indicates that the preference signals the public sends to policymakers in some policy domains are meaningful. This is important to be sure, but we also want to know whether policymakers follow those signals. Indeed, we are interested in public opinion largely because we want to know whether it matters for what policymakers do. Not surprisingly, the research on policy representation is voluminous, much larger than for public responsiveness. Much of the work focuses on representatives’ voting behavior and their positions, which we will eschew here; thankfully, there are useful summaries (see, for example, Burstein 2003; Shapiro 2011; Wlezien and Soroka 2016). Instead we focus on policy, and especially, but not exclusively, work in the thermostatic tradition (this complements the discussion of public responsiveness).

As for public responsiveness, some of the research on policy representation has focused on broad policy aggregates. Erikson, MacKuen and Stimson’s (2002) examination stands out. In addition to analyzing the positions of institutional actors in the US—the president, Congress and the Supreme Court—they examined “significant enactments,” building on David Mayhew’s (1991) novel data set. Erikson, MacKuen and Stimson found that the number of liberal-conservative enactments closely followed trends in Stimson’s measure of public mood, introduced in the discussion of public responsiveness. Public opinion is not the only thing that matters for policy in their analysis, and party control of the White House and Congress also play powerful roles.

Some research examines broad macro-representation in other countries. Most notable is Wlezien and Soroka’s (2012) analysis of domestic spending, which reveals a general pattern of representation that varies across countries. In another cross-national analysis, Hobolt and Klemmensen (2008) examine the relationship between the public’s issue priorities and public expenditure, and find a strong representational relationship that also varies across countries. Other work focuses specifically on government policy priorities, and this finds a correspondence between what the public cares about and government policy activities (Hobolt and Klemmensen 2005; Hakhverdian 2010; Bevan and Jennings 2014; also see Baumgartner and Jones 2005).

Numerous studies concentrate on specific issues. Hartley and Russett (1992) show that public opinion influences defense spending in the US. Wlezien (1996) confirms this finding and explores the dynamic interplay of thermostatic public responsiveness and representation. In other work, he shows that the representation relationship varies across US spending domains and the pattern is largely symmetrical to what we observe for public responsiveness (2004). There is a growing comparative literature as well. Eichenberg and Stoll (2003) find that defense spending follows opinion in the US and four European countries. In conjunction with their studies of opinion, Soroka and Wlezien examine representation in Canada (2004) and the UK (2005), and then for the US, Canada and UK taken together (Soroka and Wlezien 2010). They find that spending follows opinion in most domains but the relationship varies quite a lot.

Some of this work highlights the role of political institutions, both electoral and governmental (especially see Soroka and Wlezien 2010 and Hobolt and Klemmensen 2008). First, as regards electoral systems, scholars posit that proportionality dampens government responsiveness to
public opinion between elections. This expectation contrasts with research that focuses on representation after elections (Powell 2000), where coalition governments are predicted to better represent the median voter. The thinking in the recent work is that coalition governments cannot as effectively respond to changing opinion in between elections, and for a variety of reasons (Wlezien and Soroka 2015).13 Second, as regards government institutions, the research suggests that horizontal division of powers across legislative and executive branches enhances policy responsiveness to opinion. The idea here is that a balance of powers affords less policy independence and more “error correction,” that is, where one branch can check the misrepresentational tendencies of the other (see Soroka and Wlezien 2010). There is support for both expectations in broad comparative analysis (Wlezien and Soroka 2012).14

All of this research highlights that there is representation, at least in certain policy domains and institutional contexts. This is of obvious importance. But what is not clear from this work is who gets represented. Is it the preferences of the median citizen? Or are others better represented? There now is much work in this exploding area of research. Gilens’ (2012) powerful book examines the responsiveness of numerous policies to the preferences of different income groups. He demonstrates that policy change is responsive to the preferences of high-income citizens and less to the opinions of people with incomes in the middle and not at all to those at the bottom of the distribution.

Scholars continue to debate the issue. Soroka and Wlezien (2008) emphasize that unequal representation really matters when preferences differ and then show that this typically is not the case across income groups, at least for politically important spending domains; perhaps most importantly, the gaps they do detect are primarily between the poor on the one hand and the middle and upper classes on the other.15 In a very prominent article, Gilens and Page (2014) assess the influence of rich and middle income preferences and conclude that economic elites completely dominate American politics. They conclude: “When a majority of citizens disagrees with economic elites or with organized interests, they generally lose” (576). Enns (2015) challenges this result, and shows that even where rich and middle income preferences differ, it would not make a difference whether policymakers represented one group or the other. Branham, Soroka and Wlezien (2017) further demonstrate that, even when the rich and middle do disagree, both groups do almost equally as well.16 Clearly there is more research to be done, both in the US and in other countries.

Implications for elections and politics

We have seen that the thermostatic model works under some conditions, and that issues and institutions matter. There is evidence of both public responsiveness to policy and policy representation of opinion. In theory, this has implications for politics and political systems. To begin with, as discussed above, it provides the basis for electoral accountability.17 It also has potential consequences for public evaluations of democracy and the broader political system, which scholars are only beginning to consider.

There has been surprisingly little work on the electoral implications. What research there is mostly focuses on broad macro-representation and has concentrated on US elections, particularly for the presidency. Erikson, MacKuen and Stimson (2002) provide an indirect test. They show that the general public mood toward policy influences presidential elections in an expected way; that is, the more (less) liberal the mood, the greater (lesser) the vote for the Democratic candidate. Given that mood responds thermostatically to policy, discussed above, the result implies that the degree of representation matters for elections. Bølstad (2012) targets direct evidence and to that end includes the net number of liberal-conservative laws in his analysis of the
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presidential vote. The results support what he refers to as “thermostatic voting,” whereby the greater (lesser) the net liberal laws, the lesser (greater) the support for the Democratic candidate. Wlezien (2017) further demonstrates that the tendency accounts for a substantial portion of the cost of ruling effect in US presidential elections. To be absolutely clear, policy liberalism under presidents from different parties diverges over time as their tenure in the White House increases, and the degree to which it does negatively impacts electoral support for the party of the president.

There is little research on other countries, though Bartle, Delleplaine and Stimson (2011) show that policy mood influences the UK vote, which, like Erikson, MacKuen and Stimson’s (2002) analysis of the US, implies thermostatic voting. A promising theoretical development is “issue yield” theory, where political parties stress policies that promise the highest vote yield, which depends on the importance of the issue and the degree to which demands are met (De Sio and Weber 2014; De Sio, Franklin and Weber 2016). Since yield declines as votes are harvested, parties must move on to the next promising issue once public demand has been satisfied. Issue yield theory may therefore prove able to incorporate the thermostatic model within a broader framework that additionally provides guidance to parties (this volume, Chapter 31).

There has been even less work on the consequences of policy representation. Very recent work by Mayne and Hakhverdian (2017) considers whether and how representation influences satisfaction with democracy and reveals an effect. They find evidence that people care about what the authors call “egocentric” congruence – the match between individuals’ own preferences and the positions of elected officials. There is less support for broader “sociotropic” congruence – the correspondence between majoritarian public preferences and officials’ positions. This is not surprising given traditional conceptualizations and models of policy voting, which embed individuals’ personal preferences.

Other recent research on support for government responsiveness indicates similar egocentric effects. Bowler (2017) finds that individuals’ preferences for government representation of the public reflects their own support of the government, where those who are close to the governing parties – that is, people who voted for them – are less in favor of majoritarian responsiveness. Rossett, Giger and Bernauer (2017) demonstrate further that people’s responsiveness preferences depend on whether they stand to gain from such representation. This research is powerfully suggestive, though it really only begins to scratch the surface of public preferences for representation and their consequences.

Conclusion

A large body of research tests the thermostatic model and that research makes clear that the model works. We see that the public responds to policy. We also see that policymakers represent – effectively respond to – public preferences. The model does not work in all policy domains to be sure; indeed, it may not work in most domains. Even where it does, the model does not work equally well. Characteristics of issues matter and political context does as well. These causes also appear to have consequences, as representation impacts election outcomes and satisfaction with democracy itself.

What we do not know is exactly how well the thermostatic model works. While we have evidence of both public and policy responsiveness, we cannot determine whether the public ultimately gets what it wants – whether there is congruence. As discussed above, this is difficult to assess, particularly in areas where we cannot directly measure how much policy people want, because people simply do not know. (It also is true where we have measures of absolute support for particular policies.) It thus may be that policymakers are not representing the
public writ large, but a particular, privileged segment. It still may be that the average citizen often gets what it wants, but only because preferences of different groups in society often are quite similar. The problem is that we just cannot tell, at least not yet. That remains a subject for future research.

Notes
1 I thank Mark Franklin for making me write this chapter.
2 Indeed, Page and Shapiro demonstrated that different subgroups of the public responded in strikingly similar ways, what they referred to as “parallel publics.”
3 In practice, the parameter is the net effect of positive and negative feedback. If positive feedback is dominant, then it will overwhelm negative feedback and \( \beta_1 \) will be positive; if negative feedback is dominant, as we expect to generally be the case, then \( \beta_1 \) will be negative.
4 Technically, indirect representation reflects both \( \gamma_2 \) and the coefficient relating relative preferences (R) and the partisan composition of government (G).
5 We also can depict this formally, following Achen (1978):

\[
P = a + BP^* + \epsilon,
\]

where the units can be temporal, spatial or else policy types. If there is congruence, the coefficient (B) for opinion would be a perfect “1.0” and the intercept (a) would equal “0,” i.e., there would be no bias. If B is greater than 0 and less than 1, there still would be responsiveness; it just would not perfectly match preferences.
6 It is possible to match support for specific policies and policy adoption, and some scholars (Lax and Phillips 2012) have done this for various issues in the American states.
7 The effects are different as well, one between levels of policy and opinion and the other between levels of opinion and changes in policy.
8 Surveys ask about a wide range of categories, including welfare, health, education, the environment, big cities, crime and foreign aid, among others.
9 Politicians, meanwhile, are likely to pay attention to public opinion on the issue – it is in their self-interest to do so, after all. There are many different and clear expressions of this conception of importance. In issue domains that are not important, conversely, people are not likely to pay attention to politicians’ behavior, and politicians are by implication expected to pay less attention to public opinion in these areas. This reflects a now classic perspective (see, for example, Geer 1996).
10 Other work (Ura 2014) indicates that mood responds to judicial action, and in complex ways, with negative feedback in the short run and positive feedback over longer stretches of time.
11 Also see Enns and Kellestedt (2010) and Enns and Wlezien (2011).
12 That said, Ellis and Faricy (2011) demonstrate that the public responds very differently to direct spending on social programs and the indirect spending from tax expenditures.
13 The friction that characterizes coalition governments, particular diverse ones, is a leading suspect, but electoral incentives may matter as well.
14 Other research has elaborated the empirical effects of electoral systems (Soroka and Wlezien 2015).
15 Also see Enns and Wlezien (2011).
16 Of course, this is not to say that the rich do not matter more than they should.
17 Also see Franklin, Soroka and Wlezien (2014).

References
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