

Voting in a Multi-dimensional Space: A Conjoint Analysis Employing Valence and Ideology Attributes of Candidates

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Most formal models of valence competition add a single, separable and unweighted component to the standard one-dimensional utility function of voters. This article presents the results of a conjoint analysis experiment in which respondents were asked to choose between two candidates whose profiles vary along five attributes. Four of these traits behave like valence or policy issues as expected, but one, which has been employed in recent formal and empirical works, does not. Moreover, policy and valence are not separable. They interact at least in some cases, taking a competency form whereby the marginal impact of valence on voters' choice is conditional on candidates' policies. This result lends support to recent studies that have found more extensive valence voting under ideological convergence. Finally, policy trumps valence in awkward choices. Respondents even prefer corrupt candidates with similar policy views to honest ones with different opinions, despite integrity being declared the most important attribute.

Valence matters in voting behavior, but how, exactly? A large body of scholarly research concludes that valence adds a second important dimension to the standard policy-based electoral competition. Valence issues have the peculiar property that voters have identical preferences about them. They all prefer more to less of a given valence attribute. For example, they prefer more to less competent politicians, and they prefer more to less honest politicians. Fittingly, Groseclose (2007) argues that valence adds “half” a dimension to the standard one-dimensional Downsian model of electoral competition.

Indeed, most formal models of electoral competition add a single and separable valence component to the voters' utility function (for example, Londregan and Romer 1993; Ansolabehere and Snyder Jr. 2000; Groseclose 2001; Aragones and Palfrey 2002, 2004; Schofield 2003, 2007; Adams and Merrill 2009; Castanheira, Crutzen and Sahuguet 2010). The utility U_i of voter i is therefore represented as:

$$U_i(x_c) = \delta_c - \phi(|x_c - x_i|).$$

It is a positive function of the valence δ_c of candidate C and a negative function of the difference between x_i and x_c , the voter's and the candidate's positions along a policy dimension, where δ_c, x_i and $x_c \in \mathbb{R}$ (Groseclose 2001). Voters hold homogeneous views with regard to the valence issue, and policy and valence dimensions have the same saliency. Variants to this standard approach

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include uncertainty over the valence advantage (Londregan and Romer 1993; Adams and Merrill 2009), multiple policy dimensions and valence traits (Ansolabehere and Snyder 2000; Adams *et al.* 2011), and different types of politicians (Groseclose 2001; Adams and Merrill 2009).

Only Groseclose (2001, Appendix B) takes seriously the possibility that policy and valence components are non-separable. Valence may take what he calls the *competency* form. He argues:

Suppose valence represents the candidate's *competency* for implementing the policy position that he or she announces. Here, it is reasonable to believe that the voter appreciates a candidate's competency more when the candidate has adopted a policy that he or she likes... That is, the marginal gains from valence is [sic] larger when policy distance is smaller (882).

These models are designed to produce expectations about politicians' positioning on the policy-valence space. Valence also plays a central role in the literature that conceives elections as screening mechanisms (for example, Besley and Coate 1997; Fearon 1999; Caselli and Morelli 2004; Messner and Polborn 2004; Mattozzi and Merlo 2008; Galasso and Nannicini 2011). Galasso and Nannicini (2011), for instance, assume that in a one-dimensional policy space, only centrist voters care about valence, while extreme voters choose their preferred party, regardless of its valence. This is equivalent to assuming that voters do not hold homogeneous views about valence, or that only a subset of voters assigns a saliency weight to valence that is strictly greater than zero. More extremely, Caselli and Morelli (2004) propose a model of citizen-candidates in which valence is the only relevant dimension of competition. These works are primarily concerned with the selection mechanisms of specific types of low- or high-valence politicians.

Regardless of whether the focus is on competition or selection, these models rely on a set of assumptions about voting behavior. But how exactly do voters behave in a multi-dimensional choice setting? How do they choose between candidates who embody more and less likable traits? Empirical studies of voting behavior provide contradicting results. For instance, Green and Hobolt (2008) for Britain and Buttice and Stone (2012) for the United States find that valence voting plays a greater role as parties and candidates converge ideologically. Cross-country studies suggest otherwise. Pardos-Prado (2012) shows that the effect of valence on the propensity to vote for a party increases as ideological polarization intensifies; similarly, Clark and Leiter (2014) find that the valence effects on electoral performance increase as parties diverge from the mean voter's ideological position.¹

In this article, we employ an experimental technique called conjoint analysis to understand how voters make decisions when faced with multi-dimensional choices. We have designed a so-called stated preference experiment in which participants are asked to choose between candidates who vary along three valence (education, income and honesty) and two ideological (attitudes toward taxation and spending and the rights of same-sex couples) attributes. We administered the experiment to 347 subjects in 2012–13, resulting in 9,352 votes over pairwise compared candidates. Our results indicate that education and integrity, but not income, indeed behave like valence issues in which voters prefer more to less. More interestingly, policy positions and valence attributes are non-separable. They interact, apparently taking the competency form. The impact of higher valence on the likelihood of voting for a candidate is conditional on the candidate's policy positions: it is higher when the candidate's positions are closer to those of

¹ In an experimental study, Mondak and Huckfeldt (2006) find that competence and integrity matter the most when participants with clear political views evaluate candidates with clear political affiliations. They matter less if signals about political affiliation are mixed or if participants hold centrist views. However, without measures of participant-candidate ideological proximity, it is hard to infer whether these results support positive or negative complementarity. Recently, Galeotti and Zizzo (2014) have analyzed the trade-off between candidates' competence and trustworthiness, showing a slight bias in favor of the latter.

the respondents. Finally, when push comes to shove, policy trumps valence. Voters are ready to trade a higher-valence candidate, with whom they do not share policy views, for a lower-valence one with whom they share such views.

In the next section, we formalize voters' choices in a multi-dimensional space employing spatial voting theory, emphasizing the importance of separable and non-separable preferences and of the saliency of the dimensions. We then introduce the design of the experiment, explain the estimation model and discuss the main results.

VOTER CHOICE BETWEEN CANDIDATES WITH MULTIPLE ATTRIBUTES

Let $\mathbf{C} = \{1, \dots, C\}$ be a set of candidates, $\mathbf{A} = \{1, \dots, A\}$ a set of attributes, and $\mathbf{v}_a = (v_a^1, \dots, v_a^l)$ an l -tuple of values of attribute a , where v_a^l is the l th value of attribute a and $l \geq 2$ for $\forall a$. \mathbf{V} is the set of all attributes' values, and the profile of the c th candidate is denoted by a column vector of attributes' values $\mathbf{P}_c = [v_{1c} \dots v_{Ac}]'$, where v_{ac} is the value of attribute a for candidate c . For example, there may be three relevant attributes—such as education, integrity and position on taxation and spending—each of which can take any of three ordered values. The profile of a candidate can be characterized by low education, high integrity and a pro-spending position.

The ideal candidate of respondent i is represented by the column vector $\Theta_i = [\theta_{i1}, \dots, \theta_{iA}]'$, where θ_{ia} is her ideal value of attribute a and $\theta_{ia} \in \mathbf{V}$. In a pairwise comparison of candidates' profiles (that is, $c = 2$), let $Y_i(\mathbf{P}_c) \in \{0, 1\}$ be the potential binary outcome of respondent i over a candidate with profile \mathbf{P}_c . A value of 1 indicates that the respondent would choose the c th profile if she got the treatment \mathbf{P}_c , while a value of 0 means that she would not choose such a profile. Since respondents must choose one profile in each decision, $\sum_{c=1}^C Y_i(\mathbf{P}_c) = 1$ for $\forall i$. Employing the weighted Euclidean distance of spatial voting theory (Enelow and Hinich 1984; Hinich and Munger 1997, 80), we have:

$$Y_i(\mathbf{P}_c) = 1 \text{ iff } [(\mathbf{P}_c - \Theta_i)' \mathbf{S}_i (\mathbf{P}_c - \Theta_i)]^{1/2} < [(\mathbf{P}_{-c} - \Theta_i)' \mathbf{S}_i (\mathbf{P}_{-c} - \Theta_i)]^{1/2},$$

where \mathbf{S}_i is a symmetric positive-definite matrix of order A .² The diagonal elements in \mathbf{S}_i measure the salience that respondent i attaches to each attribute, and the off-diagonal elements capture the interaction across attributes. If \mathbf{S}_i is an identity matrix, respondent i attaches the same weight to each attribute, and preferences are separable across attributes. If the diagonal elements in \mathbf{S}_i take different values, the respondent assigns more salience to some attributes in her voting decision. For instance, she may consider a candidate's integrity to be more important than his income. In a bidimensional space, indifference contours take an elliptical rather than a circular shape. If the off-diagonal elements in \mathbf{S}_i are different from zero, preferences are non-separable and attributes interact along the lines of the competency form discussed by Groseclose (2001). Attributes can be positive (negative) complements if a higher level of one attribute makes a respondent want more (less) of another attribute.³ For instance, a voter may value a candidate's level of

² In case of equivalence, the respondent is indifferent between the two candidates and we assume that she flips a coin.

³ Take the case of two attributes, the weighted Euclidean distance (WED) is $w_1(\theta_1 - v_1)^2 + 2z(\theta_1 - v_1)(\theta_2 - v_2) + w_2(\theta_2 - v_2)^2$, where θ_a , v_a and w_a are, respectively, the ideal and candidate values and the salience weight of attribute $a = 1, 2$, while z the interaction between the attributes (the off-diagonal element in \mathbf{S}_i). Since $\partial \text{WED} / \partial (\theta_1 - v_1) = 2w_1(\theta_1 - v_1) + 2z(\theta_2 - v_2)$, the marginal effect of the difference between the ideal and candidate values along attribute 1 is also a function of such difference in attribute 2 and of the sign of the interaction term z . The spatial model cannot not capture the possibility that sets of attributes may be non-separable from other sets of attributes (Lacy 2001, 240).

education more when the candidate shares the voter's opinions on policy. If a candidate's reputation is tainted, she may display more conservative attitudes toward taxation and spending.

A CONJOINT ANALYSIS VOTING EXPERIMENT

Conjoint analysis is a method that allows us to isolate the aspects that influence a respondent's choice in a multi-dimensional space. It originates from mathematical psychology (Luce and Tukey 1964) and has been extensively employed in marketing research and economics to measure consumer preference, forecast demand and develop new products (Green and Rao 1971; Green, Krieger and Wind 2001; Hensher, Rose and Greene 2005; Raghavarao, Wiley and Chitturi 2010). It has been applied only very recently to research questions in political science (Hainmueller and Hopkins 2012; Hainmueller, Hopkins and Yamamoto 2014).

We have designed a conjoint analysis voting experiment to assess how candidates' attributes related to valence and ideology affect voters' choices. Respondents are subject to K choice tasks in which they have to choose between two generically labeled candidates A and B.⁴ These candidates are characterized by five attributes, each of which takes one of three values; hence $\mathbf{C} = \{1, 2\}$, $\mathbf{A} = \{1, \dots, 5\}$ and $\mathbf{v}_a = (v_a^1, v_a^2, v_a^3)$ where $a = 1, \dots, 5$.

The five attributes and their values are described in Table 1; three are meant to be related to valence, and two to ideology or policy. Following Stokes (1963) seminal contribution, the literature offers a long list of possible valence factors, from the strength of the economy (for example, Butler and Stokes 1969; Fiorina 1975; Anderson 2000; Palmer and Whitten 2000; Lewis-Beck, Nadeau and Elias 2008) to issue ownership (for example, Budge and Farlie 1983; Clarke *et al.* 2004; Bélanger and Meguid 2008; Green and Hobolt 2008), party unity (Clark 2009), incumbency, name recognition and campaigning skills (for example, Fiorina 1981; Enelow and Hinich 1982; Londregan and Romer 1993; Groseclose 2001; Stone and Simas 2010; Adams *et al.* 2011). These factors are not particularly meaningful or useful in pairwise comparisons between generically labeled candidates. They are either context specific or instrumental—and the latter are not valued intrinsically by voters. In light of the models reviewed above, we are interested in candidate-specific and character-based attributes related to competence and integrity (for example, McCurley and Mondak 1995; Funk 1996; Kulisheck and Mondak 1996; Funk 1999; Mondak and Huckfeldt 2006; Clark 2009; Stone and Simas 2010; Adams *et al.* 2011; Clark and Leiter 2014).

Directly attributing a level of competence to a candidate would make the whole exercise pleonastic. The choice between a competent candidate and an incompetent one is banal. We instead employ education and income, which are considered proxies for competence in several recent models (Caselli and Morelli 2004; Messner and Polborn 2004; Galasso and Nannicini 2011). Higher educational attainment is plausibly related to greater perceived competence, as it indicates (or even determines) higher cognitive and problem-solving skills in policy making. The link between income and competence, or valence more generally, may raise a few eyebrows. Yet citizen-candidate models, which seek to fully endogenize candidacies by removing the distinction between the electorate and the political class, and are particularly concerned with

⁴ Like Hainmueller, Hopkins and Yamamoto (2014), we exclude party labels because participants' opinions of a given party may either be correlated with existing attributes or be proxies for omitted ones, therefore confounding our analysis of how respondents trade between policy and valence. With generic labels, the unobserved components of the choice function are less likely to be cross-correlated and more likely to have the same distribution (Hensher, Rose and Greene 2005, 112–3). The design of the experiment is also simplified because otherwise you would need several party labels and more tasks. The downside is that we cannot test the impact of party identification.

TABLE 1 *Attributes and Attribute Levels*

Attributes	Attribute levels
Education	Junior high/middle school diploma (<i>licenza media</i>) High school diploma (<i>diploma superiore</i>) University degree (<i>laurea</i>)
Income	Low (less than € 900 a month) Middle (between € 900 and € 3,000 a month) High (more than € 3,000 a month)
Integrity	The candidate has been convicted of corruption The candidate is under investigation for corruption No proceedings against the candidate
Social services and taxation	“More social services, even at the cost of higher taxes” “Maintain the level of provision of social services and taxation” “Cut taxes, even at the cost of fewer social services”
Family law	“Same rights to same-sex couples” “Some rights to same-sex couples” “No rights to same-sex couples”

politicians' qualities (Dewan and Shepsle 2011), unabashedly assign to income a strong connotation of valence as “a measure of market success and ability” (Galasso and Nannicini 2011, 79). For Caselli and Morelli (2004, 775), “voters use [candidates'] market incomes as a signal of their competence” in office. Yet income may signal other features, such as class membership, and therefore display no valence behavior. Our experiment will test these assertions.

The education attribute includes three levels of attainment: junior high school diploma, high school diploma and university degree. In Italy, they are called *licenza media*, *diploma superiore* and *laurea*. The levels of income are low, medium and high. Low income is specified as below €900 a month, which is approximately the second decile of the 2009 income distribution in Italy. High income is specified as above €3,000 a month, approximately the 95th percentile.⁵

The honesty attribute is introduced as additional information, thus avoiding more laden terms such as integrity. Corruption is the most common office-related crime a politician is likely to be charged with. Thus a candidate may have been convicted of corruption, be under investigation for corruption or have a clean sheet.

Candidates also differentiate along policy positions that are derived from well-established cleavages: the liberal-interventionist economic divide and the liberal-conservative social one (for example, Kitschelt 1994; Benoit and Laver 2006, 160). To capture the former, we established that candidates may want to increase the provision of social services, even at the cost of more taxation, to maintain the current levels, or to cut taxes, even at the cost of fewer social services. These are frequently the top priorities of government according to Italian public opinion (European Commission 2010, 24). For the liberal-conservative social dimension, candidates may want to grant no family-related rights to same-sex couples, to grant these couples some rights or even the same rights as traditional families. This is currently the most-debated issue that captures the liberal-conservative social divide in Italy. Others, such as abortion and euthanasia, are less prominent.

Table 2 illustrates an example of a choice task. Note that it does not offer the possibility of abstention. Although including this option would better reflect the true situation in which voters find themselves, we are not interested in participation in this context. Our objective is to assess the

⁵ According to the Eurostat dataset on the distribution of income by quantiles in 2009, available at http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di01&lang=en.

TABLE 2 *Example of a Choice Task*

Question: for whom would you vote?		
	Candidate A	Candidate B
Education	High school diploma	High school diploma
Income	High (more than € 3,000 a month)	Middle
Other information	The candidate is under investigation for corruption	The candidate is under investigation for corruption
Opinion on social services and taxation	More social services, even at the cost of higher taxes	Cut taxes, even at the cost of fewer social services
Opinion on family law	Some rights to same-sex couples	Same rights to same-sex couples

impact of candidates' attributes on voters' choice. A no-vote alternative is a hindrance for our analysis, because the only information that can be derived from abstention is that the respondent would prefer not to choose. We do not obtain any information about why this is so. As Hensher, Rose and Greene (2005, 176) argue, "by forcing decision makers to make a choice, we oblige decision makers to trade off the attribute levels of the available alternatives and thus obtain information on the relationships that exist between the varying attribute levels and choice."

Experimental Design Considerations

Which candidate profiles should be included in the conjoint analysis, and how should they be paired? A full factorial design enumerates all possible treatment combinations (that is, profiles) (Hensher, Rose and Greene 2005, 109). With five attributes and three levels per attribute, we have 243 (that is, 3^5) different profiles. Since we ask respondents to pairwise compare candidates, the full enumeration of choice tasks amounts to 29,403, that is $\binom{243}{2}$, combinations. Such a design is clearly unfeasible. We will therefore use only a fraction of these combinations—a so-called fractional factorial design.

The minimum number of profiles of a fractional factorial design is determined by the degrees of freedom we need for the subsequent model estimation. Since the alternative candidates are unlabeled, estimating the main effects of five attributes requires at least six degrees of freedom for a linear model and, because each attribute takes three values, at least 11 degrees for a non-linear model. Moreover, testing the competency form entails interactions. Adding an interaction between two attributes requires the estimation of one more parameter (for a linear model) and four more parameters (for a non-linear model). In other words, if we want to estimate the main effects and, say, two interactions, we need at least eight degrees of freedom for a linear model and 19 degrees for a non-linear model.

Additionally, a statistically efficient fractional factorial design must be orthogonal, in which columns display zero correlation (Hensher, Rose and Greene 2005, 115). In other words, the levels that an attribute takes across all choice tasks should be statistically independent from the levels other attributes take. Orthogonality may require a number of combinations that exceeds the minimum requirement imposed by the degrees of freedom (in our case, 19 for a non-linear model). However, for unlabeled designs, only within-alternative orthogonality needs to be maintained (Hensher, Rose and Greene 2005, 152). Thus the education attribute of candidate A across all the choice tasks does not need to be orthogonal to the education attribute of candidate B. Finally, the design should be balanced. Each level of any given attribute should appear the same number of times.

Since we require only within-alternative orthogonality, we generated a main-effects orthogonal design for five attributes with three levels for each attribute, setting the minimum number

of cases (rows) at 27. The design is balanced, because each level of each attribute appears nine times. We have assigned attributes to the columns of the design in order to ensure statistically efficient estimations of the main effects and of the interactions between education and the two policy dimensions (for details on the procedure, see Hensher, Rose and Greene 2005, 127–50). Seven of the possible 10 two-way interactions between attributes display zero correlation with the main effects. Several interactive terms are also uncorrelated with each other. In practice, this means that we can efficiently estimate the marginal effects of all 10 pairwise interactions among the five attributes.⁶ We have now 27 orthogonal profiles of candidate A. We have then randomized the sequence of these profiles and assigned them to candidate B, making sure that the randomized combination does not match the original. This procedure ensures within-alternative orthogonality (Hensher, Rose and Greene 2005, 152).

The core of the experiment consists of 27 choice tasks (that is, $K = 27$) in which respondents are requested to choose between two candidates' profiles. The order of the attributes, as it appears in Table 2, does not change for each respondent in order to ease the cognitive burden, but the sequence of tasks is randomized across respondents in order to minimize primacy and recency effects.

The only applications of conjoint analysis in political science are in the field of public opinion (Hainmueller and Hopkins 2012; Hainmueller, Hopkins and Yamamoto 2014). In light of the formal literature reviewed above, our interest is more circumscribed. We want to analyze how respondents reconcile candidates' valence and policy features in their voting choices. We are less interested in how different types of respondents prefer different candidates, although trade-offs may differ across types. Given the nature of our inquiry, a set of relatively homogeneous respondents allows us to better control for unobservables that may confound the interaction between attributes (Hensher, Rose and Greene 2005). We have therefore involved 155 undergraduate students in the period between February and May 2012, and then repeated the exercise with a further 192 students between January and May 2013. The experiment, structured as an online survey, has been administered by the Opinion Polls Laboratory (*Laboratorio Indagini Demoscopiche*) of the Università degli Studi di Milano. Clearly, our results are not generalizable to a wider population, but we are nevertheless able to highlight similarities with recent public opinion studies (Hainmueller, Hopkins and Yamamoto 2014). Future research should consider developing a representative online sample for further corroborating these findings.

ESTIMATION

To estimate how candidates' attributes influence respondents' choices, we employ a binomial model with a conditional logit link function. Voting is assumed to be generated by a Bernoulli process. The stochastic component of the model is therefore $Y_{ic} \sim \text{Bernoulli}(y_{ic} | \pi_{ic})$, where $\pi_{ic} = \text{Pr}(Y_{ic} = 1 | \beta)$ for respondent i and candidate c . The systematic component is

$$\pi_{ic} = \frac{\exp \left[\left(\sum_{a=1}^4 \beta_a v_{ac} \right) + \beta_5 v_{1c} v_{4c} + \beta_6 v_{1c} v_{5c} + (\beta \circ \mathbf{R}_i) \cdot \mathbf{P}_c \right]}{\sum_{c=1}^2 \exp \left[\left(\sum_{a=1}^4 \beta_a v_{ac} \right) + \beta_5 v_{1c} v_{4c} + \beta_6 v_{1c} v_{5c} + (\beta \circ \mathbf{R}_i) \cdot \mathbf{P}_c \right]} \quad (1)$$

⁶ The fractional factorial and orthogonal design is the most widely used in the conjoint analysis literature. In introducing this method to political science, Hainmueller, Hopkins and Yamamoto (2014) recently proposed a randomized variant of conjoint analysis that does not require any assumption about choice probabilities. Our design imposes no restrictions on the pairwise interactions or to five of the six three-way interactions. Of the interaction between income, integrity and family law, only the following profiles are observed: middle income, corrupt and some rights; high income, investigated and some rights; high income, corrupt, no rights.

where v_{ac} is the value of attribute a for candidate c , with the interactions between education (v_{1c}) and the two policy dimensions (v_{4c} , v_{5c}). $\beta \circ R_i$ is the Hadamard product of row vectors of betas and socio-demographic and political characteristics⁷ of respondent i , while P_c is the column vector of candidates' attributes. Respondent characteristics must interact with candidate attributes, because they do not display within-group variance—that is, they do not vary across profiles.

VALENCE, IDEOLOGY AND VOTING

The results of the estimation are reported in Appendix Table A1. In this section, we first assess whether the attributes we selected behave as expected. Next, we evaluate whether respondents' preferences take the competency form. Finally, we analyze how respondents trade off profiles of candidates in their voting decisions. The online appendix includes diagnostic tests.

The Behavior of Valence and Policy Attributes in Voting Decisions

Do the first three attributes indeed behave like valence issues in which voters prefer more to less? Do the last two attributes display the features of policy issues that split voters into different groups? In other words, do the core assumptions underpinning formal models of policy valence-based electoral competition hold? Are the measures of valence used in recent formal and empirical analyses valid?

Figures 1a to 1c display the marginal effects of different attributes on the probability that respondents will vote for a particular candidate, at different levels of respondents' interest in politics, left-right self-placement and issue saliency (see the online appendix for similar figures on the remaining traits).⁸ For instance, the upper-left panel in Figure 1a displays on the vertical axis the marginal effect on the probability that respondents will vote for a candidate with a high school diploma compared to one with a junior high school diploma, at different levels of interest in politics declared by the respondents. The dots indicate the mean predicted probabilities and the lines the 95 percent confidence intervals. The bottom right panel is a histogram of respondents' traits.

To a large extent, education behaves like a valence attribute. For almost any respondent trait, a university-educated candidate is significantly more likely to be preferred over a candidate with only a junior high school diploma. For instance, assuming intermediate values for other traits,⁹ respondents are between 23.8 and 25.5 percentage points more likely to choose the former profile, for any level of declared interest in politics (with 95 percent confidence intervals ranging from 9.7 to 37.9 percentage points). Right-, center- or left-leaning respondents are between 16.2 and 30.2 percentage points more likely to support such a candidate, with estimates ranging between 1.1 and 39.7 points. If education is considered an important attribute, a candidate with a university degree is between 23.2 and 33.5 percentage points more likely to win support, with the estimate ranging between 11.1 and 41.5 points. Yet, there are some nuances. Better-educated

⁷ As socio-demographic traits, we include gender, age, nationality, working status and high school education; as political traits, interest in politics, left-right self-placement, and saliency attached to attributes. Finally, we include an indicator variable for respondents participating in 2013.

⁸ Marginal effect plots are produced following Brambor, Clark and Golder (2006) and the STATA code available at <https://files.nyu.edu/mrg217/public/interaction.html#code>. These effects are bounded between -0.5 and 0.5 because we set the non-varying attributes at the baseline levels. Had we set them at different levels, the effects would have been confounded by the interactions between respondent characteristics and such attributes. The asymmetric confidence intervals in Figure 3 and Figures A6 to A9 in the online appendix result from the interactions among profile attribute levels.

⁹ In computing marginal effects, we keep the respondents' socio-demographic and political traits, which are not object to analysis, to their mean or modal values.

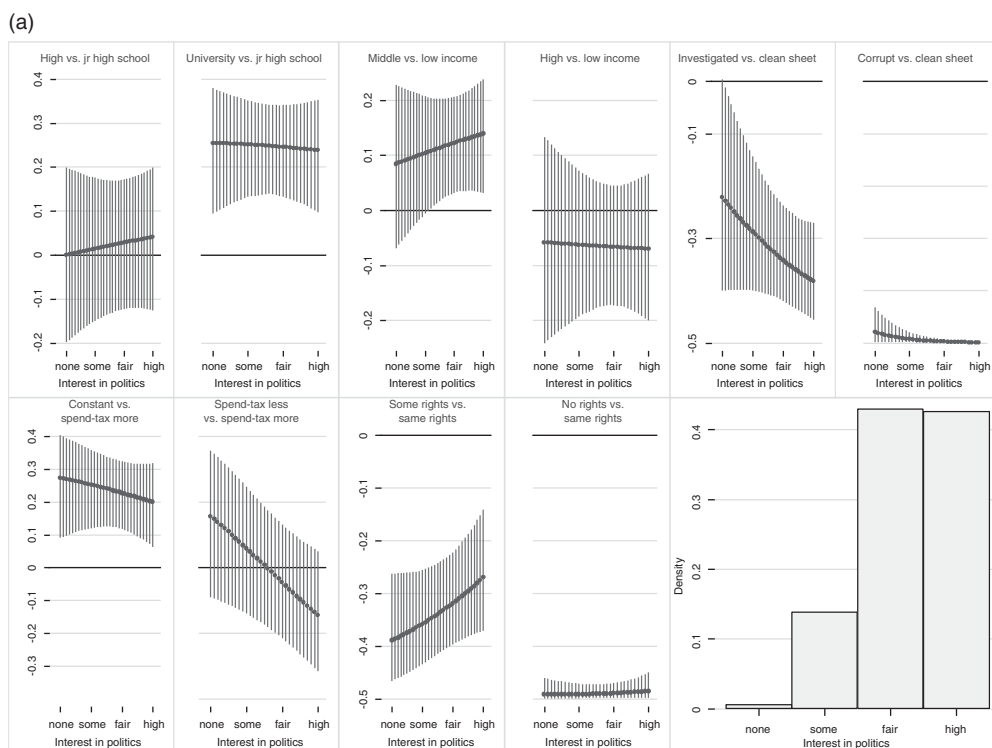


Fig. 1a. Marginal effects of candidate attributes at different levels of respondents' interest in politics

Note: non-varying attributes are set at their baseline values (junior high school diploma, low income, clean, more taxation and spending, same rights to same-sex couples).

candidates are not significantly preferred over less-educated ones by respondents who are either strongly right-leaning or who attach limited importance to education. These subjects make up 22.8 percent of the respondent pool. Nevertheless, like in the candidate experiment of Hainmueller, Hopkins and Yamamoto (2014), the overall valence features of education are evident.

The same cannot be said for income. Middle-income candidates are slightly advantaged over low-income ones, especially if respondents are left-leaning and interested in politics.¹⁰ But, noticeably, this is also true for subjects who attach limited relevance to this attribute. More importantly, rich candidates are not significantly preferred over poor ones, for any respondent trait. If anything, high income is a liability rather than an asset. Respondents who attribute fair or high importance to income are between 18.9 and 28.2 percentage points *less* likely to prefer a rich over a poor candidate. These results resonate well with those of Hainmueller, Hopkins and Yamamoto (2014), in which middle income matters, slightly, to win contests but high-income candidates are rated lower. Far from being an indicator of ability, or even competence in office (cf. Caselli and Morelli 2004, 775; Galasso and Nannicini 2011, 79), respondents view high income quite suspiciously.¹¹

The last, somewhat obvious, result is that the valence behavior of the integrity attribute is beyond doubt. For any respondent trait, a clean candidate is significantly more likely to be

¹⁰ Full-time students and Italian nationals also display this behavior.

¹¹ Moreover, candidates who have a high income and are corrupt face the harshest penalties.

(b)

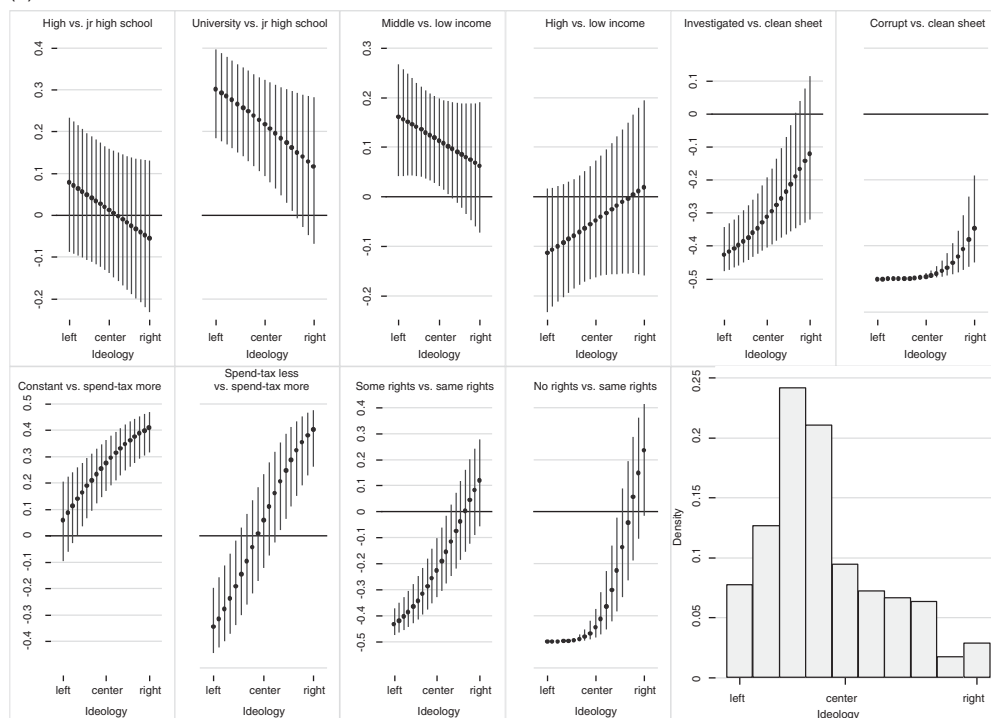


Fig. 1b. Marginal effects of candidate attributes at respondents' different left-right self-placements

Note: non-varying attributes are set at their baseline values (junior high school diploma, low income, clean, more taxation and spending, same rights to same-sex couples).

preferred over a corrupt one. Even nuances are quite minor. Respondents who are either strongly right leaning or who display no interest in politics¹² are indifferent between candidates who are clean and those who are under investigation, but these participants make up only 9.5 percent of the respondent pool.

Contrast this with candidates' opinions on spending and taxation. Figure 1b illustrates that respondents are neatly split along the left-right axis. A candidate proposing to cut spending and taxation is 34.6 percentage points *less* likely to win support from a left-wing respondent and 40.3 percentage points *more* likely to win support from a right-wing respondent than a candidate proposing more spending and taxation. Consequently, moderately positioned candidates are favored over extremely positioned ones for most values of respondent traits—of course, with the exception of strongly left- or right-leaning subjects.

The issue of rights for same-sex couples behaves in a similar way, though less neatly. A candidate advocating no rights for same-sex couples is 50 percentage points *less* likely to win support from a left-wing respondent and 23.4 percentage points *more* likely to win support from a right-wing respondent than a candidate proposing the same rights as traditional families (the latter value is significant at the 90 percent confidence interval). Still, for most values of respondent traits, except ideology, candidates arguing for equal treatment are preferred to those willing to recognize only some rights. The young age of the respondents most likely explains

¹² Non-Italian respondents as well.

(c)

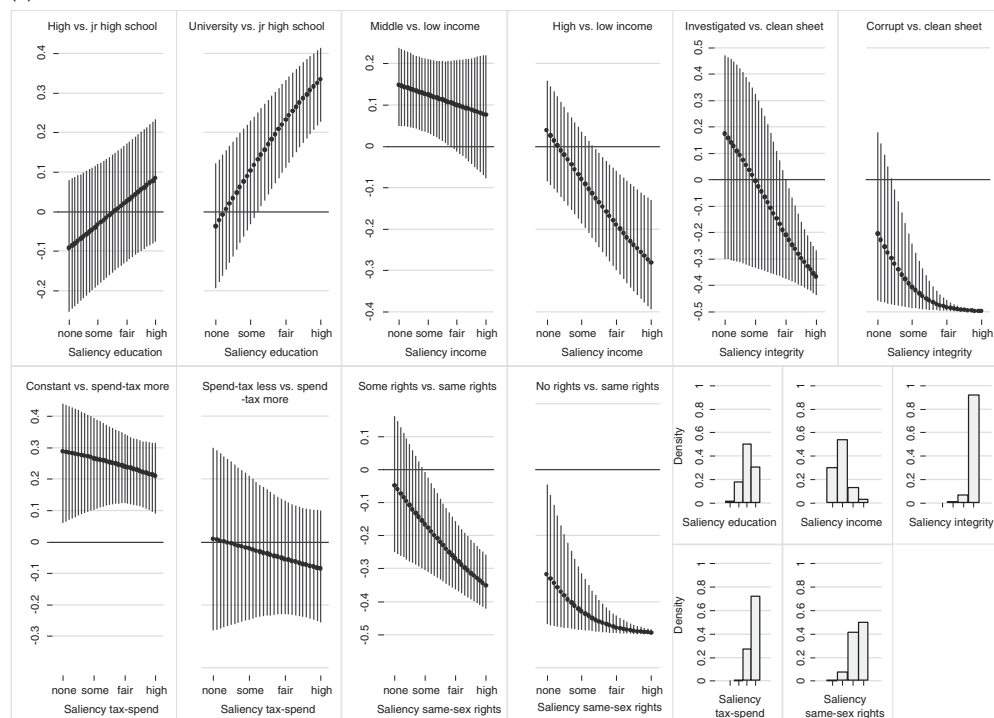


Fig. 1c. Marginal effects of candidate attributes at different levels of respondents' saliency attached to attribute
Note: non-varying attributes are set at their baseline values (junior high school diploma, low income, clean, more taxation and spending, same rights to same-sex couples).

these liberal views (for example, Bartels 2013). Having established the valence behavior of education and integrity, and the policy behavior of the positions on taxation and spending and on the rights of same-sex couples, we move on to analyze how participants trade off between these attributes.

Evidence of a Competency Form: Interaction among Education and Policy Attributes

Is it plausible to assume that valence is a separable component that is simply added to a standard policy-based dimension, as most formal models of electoral competition do? Or do valence and policy attributes interact, perhaps taking what Groseclose (2001) calls a *competency form*? In other words, do voters attach less value to valence when a candidate's policy position differs from their own?

Figure 2 illustrates the marginal effects of different levels of educational attainment, our proxy for competence, on the probability that a typical respondent¹³ will vote for a particular candidate policy profile (the online appendix includes the complementary Figures A4 and A5 on the marginal effects of policy positions). For instance, the top three panels display the marginal

¹³ Our typical respondent is an Italian female full-time student with a fair interest in politics and left-of-center views. She is 21 years old, comes from a lyceum and attaches high saliency to the integrity and spending dimensions, fair saliency to education and couples' rights, and some importance to income.

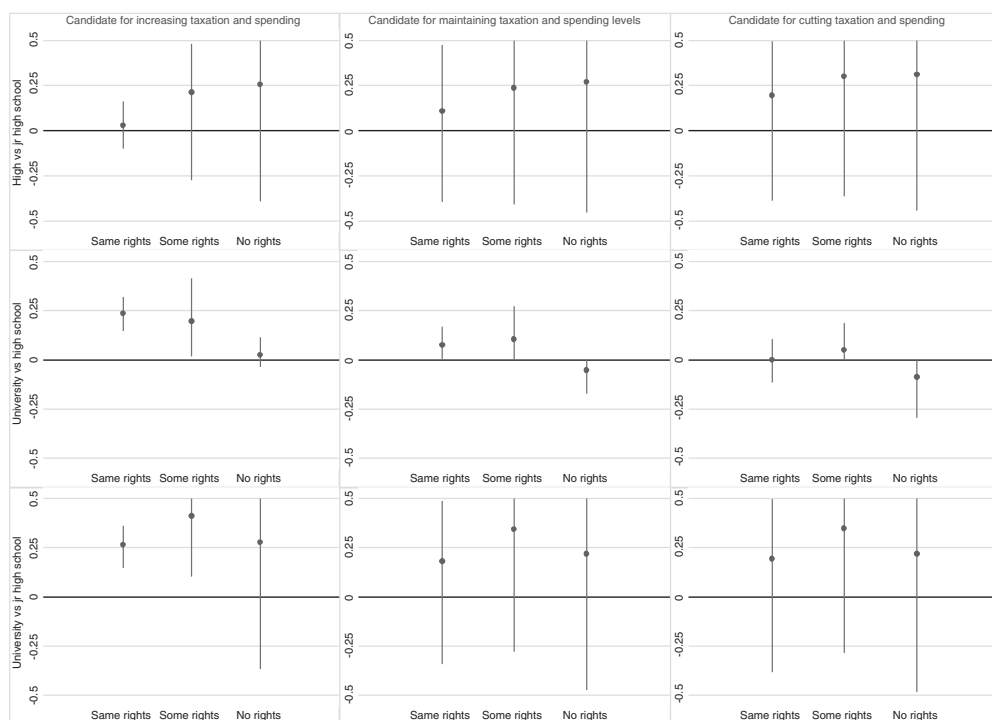


Fig. 2. Competency form: the interaction between education and policy positions

Note: non-varying attributes are set at their baseline values (low income, clean).

effects on the probability that a typical respondent will vote for a candidate with a high school diploma, compared to one with a junior high school diploma, across the nine combinations of policy profiles. In this case, higher education does not have much of an effect.

Consider now the left panels in the second and third rows of Figure 2. Candidates who support spending and at least some rights for same-sex couples are between 20 and 23.4 percentage points more likely to be chosen if they have a university degree, rather than a high school diploma. These figures increase to 26.4 and 42.6 points, respectively, when university education is compared to a junior high school diploma. Conversely, if a candidate opposes the recognition of rights to same-sex couples, there is no level of education that is going to make him more palatable. A policy of opposing same-sex rights is strongly opposed by our typical respondent. Hence, the marginal gains from higher education vanish when policy distance increases—the key trait of Groseclose's (2001) competency form.

As the right panel in the second row of Figure 2 illustrates, higher education can even become a liability. A university-educated candidate is 9.5 percentage points *less* likely to be chosen than a candidate with a high school diploma if, in addition to opposing rights for same-sex couples, he supports spending cuts as well (the estimate varies between 31 and 0.04 points). These two positions are strongly disliked by our typical respondent,¹⁴ and higher competence is perceived as worrisome in this case.

¹⁴ There is no level of education (or stance on the rights issue) that makes a pro-cuts candidate more appealing than a pro-status quo one (bottom row of Figure A4), and a no-rights position is comprehensively penalized (second and third rows of Figure A5).

For intermediate profiles, our typical respondent trades between candidate attributes, depending on their levels. Consider a candidate supporting full recognition of rights (left column of Figure A4). If he opposes spending, higher education does not increase his chances of being selected. If he supports cuts, and is poorly educated, he is between 30.9 and 35.4 percentage points less likely to be chosen than a pro-spending or pro-status quo candidate.

Take now a candidate supporting partial recognition. In the case of a status quo position on spending, a university education makes a candidate 10.9 percent more likely to be preferred compared to a high school diploma (center panel in Figure 2). In case of a pro-cuts position, a university education gives a 40.9 percentage point increase compared to a junior high school diploma (right panel in the third row).

In other words, the preferences of our typical respondents are finely balanced with intermediate profiles. If a candidate is for partial recognition but has only a junior high school diploma, a pro-status quo fiscal attitude makes him 35.3 percentage points more likely to be chosen than a spendthrift one (top row of Figure A4). Poor education makes our respondents wary of profligacy. But this does not necessarily extend to rights issues. If a candidate is pro-spending but poorly educated, a full-recognition stance still makes him 15.5 percentage points more likely to be chosen than a partial-recognition position (top row of Figure A5).

The trade-offs are indeed quite complicated in these intermediate profiles. The important point is the significant interactions between valence and policy attributes as envisaged by Groseclose's (2001) competency form. This emerges more clearly on the dimension of same-sex couple rights. An F-test for the joint significance of the interaction terms rejects the null hypothesis that the effects of university education are identical across attribute levels (p -value ≈ 0.003). Moreover, the null hypothesis cannot be rejected when comparing candidates that support full and partial recognition (p -value ≈ 0.38), while it is easily rejected when comparing candidates who support full and no recognition (p -value ≈ 0.005). These results appear to indicate positive complementarity, in line with the findings of Green and Hobolt (2008) and Buttice and Stone (2012). On the spending dimension, since respondents hold a moderate position, this dynamic does not emerge as clearly.

Which attributes ultimately prevail when respondents are confronted with awkward choices? We move to this question in the next section, where we finally pull in integrity—the archetypal valence attribute.

Policy Trumping Valence in Awkward Choices

Candidates with dubious traits frequently win elections. In citizen-candidate models, this outcome results from an oversupply of low-quality candidates due to limited electoral competition or the failure of high-quality citizens to coordinate (for example, Myerson 1993; Caselli and Morelli 2004). The ideal candidate of our typical respondent has a university education and a clean sheet, though only a middle income. Respondents also typically prefer full recognition of rights and oppose spending cuts. This candidate profile trumps all the alternatives,¹⁵ but are respondents more likely to sacrifice valence or policy attributes when confronted with awkward choices? How do voters choose if a high-quality candidate is on offer, but his policy views are far from their ideal?

Figure 3 lists, on the left-hand side, profiles of candidates who support full recognition of rights and oppose spending cuts, but fall short in terms of valence (their educational attainment

¹⁵ More precisely, the typical respondent is significantly more likely to prefer a profile with these traits over one with at least one different trait—with one small caveat. Keeping constant the other ideal traits, a university-educated candidate is preferred to one with a high school diploma only at a 90 percent confidence interval. Note that the typical respondent is indifferent between a pro-status quo and a pro-spending candidate. These policy positions resonate well with Bartels' (2013) analysis, considering the young age of the respondents.

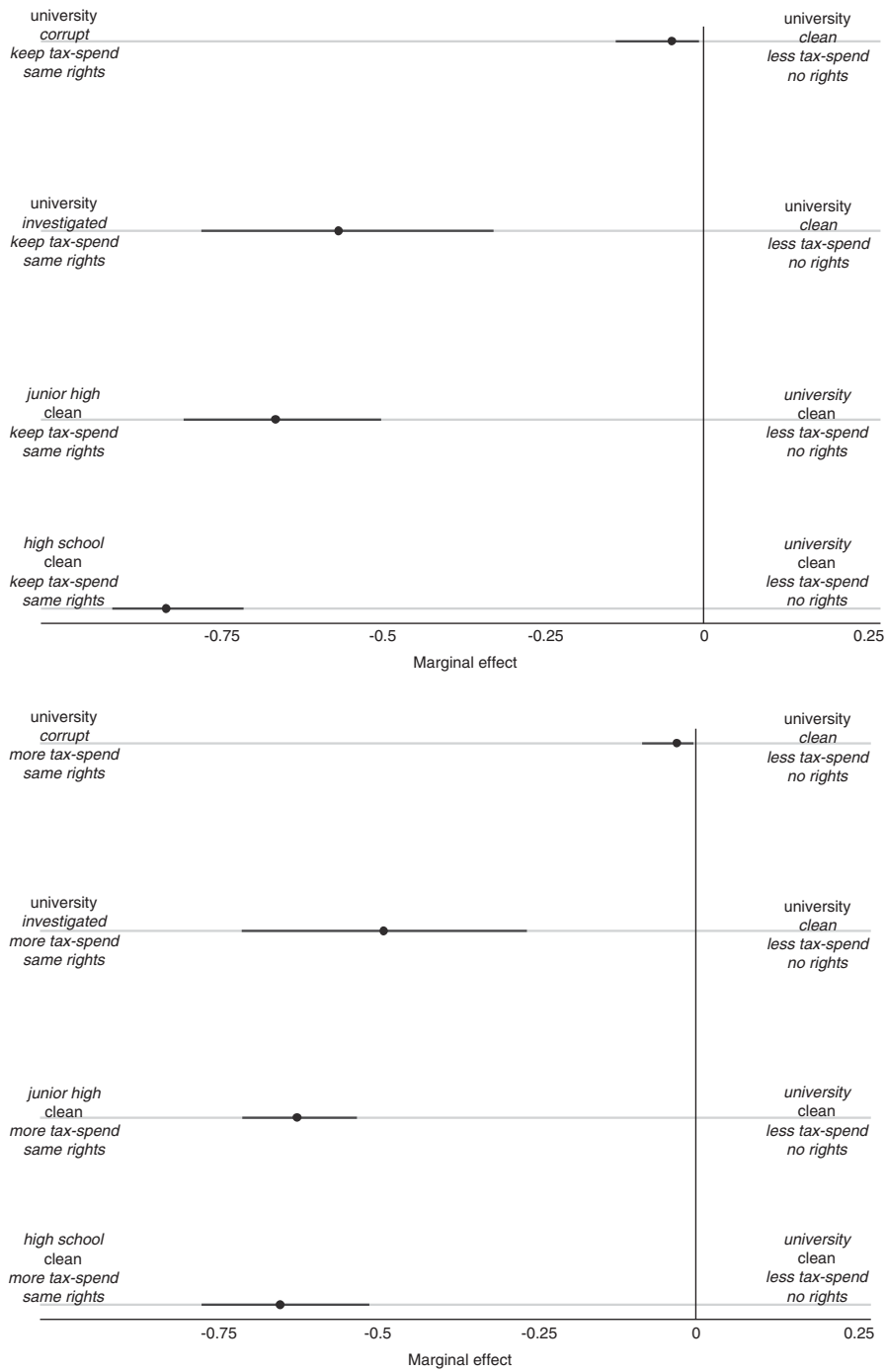


Fig. 3. Awkward choices
Note: respondent with mean or modal traits, all candidates with middle income.

is lower or there are issues concerning their integrity). The candidates on the right-hand side are university educated and honest, but they are pro-cuts and against the recognition of rights. Figure 3 displays the marginal effects of choosing the latter candidates, given the former; in other words, the changes in the probability of preferring a high-valence candidate with different policy views over a lower-valence candidate with ideal policy views. If the marginal effect is lower (higher) than zero, respondents are less (more) likely to prefer the higher-valence candidate.

Policy clearly trumps valence in these awkward choices. Even in the most difficult situation of deciding between a corrupt candidate who shares her policy views and a clean one who does not, our typical respondent is between 2.9 and 4.9 percentage points more likely to prefer the corrupt over the honest (despite the fact that the respondent assigns the highest average saliency to integrity, compared to the other four attributes). These figures increase to 48.7 and 56.2 points, respectively, if the candidate is only under investigation.

Better education is even more emphatically disregarded. Respondents are between 62.3 and 82.9 percentage points more likely to prefer less-educated candidates with ideal policy views than better-educated ones with disliked policy positions.

These results hold even with left, center or (more weakly) right-wing respondents, who have political interest and saliency traits at the mode or mean value of their subsets (see Figures A7 to A9 in the online appendix). In awkward choices, centrist voters also trump valence for policy (cf. Galasso and Nannicini 2011).

CONCLUSION

Valence comes out somewhat tarnished from this exercise. To most scholars, it is not surprising that income is far from being perceived as an indicator of valence. We suspect that this is unrelated to the characteristics of our respondent pool, so more careful thought is required. Because high income is unlikely to be rewarded electorally (and it could even be a liability), Galasso and Nannicini's (2011) finding that higher-income candidates are assigned to marginal seats may be related to different selection mechanisms.

Moreover, despite being considered primarily as a simple additive component of voters' utility, valence influences voting behavior only conditionally. Education—a plausible proxy for competence—interacts with candidates' policies displaying traits of positive complementary, especially along the same-sex rights dimension, where our respondents hold a strong equal-rights position. In line with recent studies of voting behavior, which have found more extensive valence voting under ideological convergence (Green and Hobolt 2008; Buttice and Stone 2012), we show that the effect of university education increases as candidates' and respondents' policy opinions converge. Education may even be a liability for profiles that combine particularly disliked policy positions. On the spending dimension, however, our respondents take a moderate position and perhaps there is not enough ideological dispersion to allow positive or negative complementary to materialize.

Further, integrity (the archetypal valence attribute) may be ignored. Our typical respondent prefers a corrupt (but socially and economically progressive) candidate to a clean but conservative one. In other words, policy trumps valence in awkward situations, and this applies across all types of respondents, regardless of their political traits. Integrity, despite being assigned the highest mean saliency across the five attributes by most respondents, is disregarded in awkward settings.

This is not to say that, at the margin, a valence advantage is irrelevant. It may shape both citizens' incentives to enter the electoral competition and politicians' positioning in the policy-valence space. However, valence could indeed be relegated to the backstage in countries like

Italy, which displays comparatively high levels of public dissensus on social and economic values and an appreciable association between partisan attachment and these values (see Bartels 2013, 50). Polarization could therefore be a fertile breeding ground for low valence politicians. In these settings, the selection of party candidates through primaries may enhance valence-based competition at the expense of policy-based competition, while selection by party elites may produce the opposite.

In conclusion, even though the similarity of some findings with the candidate conjoint experiment of Hainmueller, Hopkins and Yamamoto (2014) is of some comfort, these results need corroboration beyond the confined settings of an experiment. This is a worthy objective of future research.

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APPENDIX

TABLE A1 *Voting, Valence and Policy Attributes*

Variables	Estimate (s.e.)	Variables	Estimate (s.e.)
<i>Attributes of candidates</i>		<i>Interactions between attributes</i>	
High school diploma	0.231 (0.552)		
University degree	0.307 (0.661)	High school diploma × Maintain tax and spend	0.479*** (0.128)
Middle income	0.581 (0.486)	High school diploma × Cut tax and spend	0.690*** (0.221)
High income	0.793 (0.535)	University degree × Maintain tax and spend	0.087 (0.113)
Under investigation	0.518 (1.184)	University degree × Cut tax and spend	0.023 (0.124)
No proceedings	0.355 (1.153)	High school diploma × Some same-sex rights	−0.470*** (0.164)
Keep spend and tax levels	0.300 (0.787)	High school diploma × No same-sex rights	−0.189 (0.183)
Cut taxes and spending	−0.840 (0.946)	University degree × Some same-sex rights	−0.151 (0.173)
Some rights to same-sex couples	−1.501** (0.634)	University degree × No same-sex rights	−0.731*** (0.261)
No rights to same-sex couples	−3.302*** (1.028)		
<i>Socio-demographic and political traits</i>			
Interest in politics × High school diploma	0.035 (0.092)	Ideology × High school diploma	−0.039 (0.026)
Interest in politics × University degree	−0.02 (0.097)	Ideology × University degree	−0.063** (0.03)
Interest in politics × Middle income	0.049 (0.08)	Ideology × Middle income	−0.029 (0.025)
Interest in politics × High income	−0.009 (0.104)	Ideology × High income	0.038 (0.029)
Interest in politics × Under investigation	−0.202 (0.138)	Ideology × Under investigation	0.132*** (0.043)
Interest in politics × No proceedings	−0.346** (0.143)	Ideology × No proceedings	0.326*** (0.043)
Interest in politics × Maintain tax and spend	−0.078 (0.109)	Ideology × Maintain tax and spend	0.136*** (0.033)
Interest in politics × Cut tax and spend	−0.269** (0.118)	Ideology × Cut tax and spend	0.269*** (0.040)
Interest in politics × Some same-sex rights	0.172 (0.107)	Ideology × Some same-sex rights	0.205*** (0.029)
Interest in politics × No same-sex rights	0.088 (0.172)	Ideology × No same-sex rights	0.515*** (0.048)
Male × High school diploma	−0.179 (0.133)	Age × High school diploma	−0.017* (0.01)
Male × University degree	−0.043 (0.140)	Age × University degree	−0.011 (0.011)
Male × Middle income	0.023 (0.119)	Age × Middle income	−0.011 (0.014)
Male × High income	0.087 (0.135)	Age × High income	−0.005 (0.011)
Male × Under investigation	0.426** (0.212)	Age × Under investigation	0.014 (0.017)
Male × No proceedings	0.391* (0.202)	Age × No proceedings	0.023 (0.027)

TABLE A1 (Continued)

Variables	Estimate (s.e.)	Variables	Estimate (s.e.)
Male × Maintain tax and spend	-0.305* (0.157)	Age × Maintain tax and spend	0.01 (0.017)
Male × Cut tax and spend	0.098 (0.177)	Age × Cut tax and spend	0.009 (0.021)
Male × Some same-sex rights	0.339** (0.151)	Age × Some same-sex rights	0.018 (0.014)
Male × No same-sex rights	0.975*** (0.278)	Age × No same-sex rights	0.015 (0.022)
Italian × High school diploma	-0.105 (0.281)	Student × High school diploma	0.026 (0.123)
Italian × University degree	-0.163 (0.387)	Student × University degree	0.198 (0.132)
Italian × Middle income	0.023 (0.195)	Student × Middle income	0.151 (0.117)
Italian × High income	-0.294 (0.232)	Student × High income	-0.014 (0.131)
Italian × Under investigation	-0.307 (0.424)	Student × Under investigation	0.425* (0.220)
Italian × No proceedings	-1.057*** (0.389)	Student × No proceedings	0.295 (0.223)
Italian × Maintain tax and spend	-0.083 (0.313)	Student × Maintain tax and spend	0.187 (0.165)
Italian × Cut tax and spend	-0.405 (0.342)	Student × Cut tax and spend	0.265 (0.193)
Italian × Some same-sex rights	0.421 (0.356)	Student × Some same-sex rights	-0.132 (0.155)
Italian × No same-sex rights	0.117 (0.680)	Student × No same-sex rights	-0.139 (0.270)
Lyceum × High school diploma	0.008 (0.148)	Saliency education × High school diploma	0.152** (0.062)
Lyceum × University degree	0.067 (0.149)	Saliency education × University degree	0.362*** (0.07)
Lyceum × Middle income	-0.140 (0.119)	Saliency income × Middle income	-0.065 (0.071)
Lyceum × High income	-0.123 (0.143)	Saliency income × High income	-0.300*** (0.082)
Lyceum × Under investigation	0.278 (0.249)	Saliency honesty × Under investigation	-0.565** (0.233)
Lyceum × No proceedings	0.001 (0.232)	Saliency honesty × No proceedings	-0.807*** (0.185)
Lyceum × Maintain tax and spend	-0.546*** (0.181)	Saliency tax-spend × Maintain tax and spend	-0.093 (0.123)
Lyceum × Cut tax and spend	-0.224 (0.204)	Saliency tax-spend × Cut tax and spend	-0.084 (0.136)
Lyceum × Some same-sex rights	0.016 (0.168)	Saliency same-sex rights × Some same-sex rights	-0.309*** (0.095)
Lyceum × No same-sex rights	0.308 (0.280)	Saliency same-sex rights × No same-sex rights	-0.552*** (0.152)
<i>Control</i>			
Survey 2013 × High school diploma	-0.151 (0.119)		
Survey 2013 × University degree	-0.228* (0.132)		
Survey 2013 × Middle income	0.026 (0.110)		

TABLE A1 (Continued)

Variables	Estimate (s.e.)	Variables	Estimate (s.e.)
Survey 2013 × High income	0.016 (0.122)	Observations	18,704
Survey 2013 × Under investigation	0.015 (0.196)	Pseudo-R2	0.368
Survey 2013 × No proceedings	−0.122 (0.198)	Log-likelihood	−4100
Survey 2013 × Maintain tax and spend	0.076 (0.150)	Wald chi2	1647
Survey 2013 × Cut tax and spend	0.203 (0.172)		
Survey 2013 × Some same-sex rights	0.027 (0.144)		
Survey 2013 × No same-sex rights	−0.02 (0.254)		

Note: conditional logit model. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Dependent variable: $\Pr(Y = 1)$. Probability of choosing a candidate with given attributes. Standard errors are clustered by respondent.