

# Revisiting Bedrock Values: The Stability and Predictive Power of the Society Works Best Index

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## **Abstract**

In this research note, we report a reevaluation of the argument of Smith et al. (2011) in *Political Psychology* that the Society Works Best Index captures a stable attitude that is strongly influenced by biological factors. Smith et al. (2011) argue that there is a set of fundamental or bedrock values that predict ideology and that are strongly influenced by genetics. These values are considered universal, stable and less susceptible to environmental changes. Smith et al. (2011) propose a scale to measure such values: the Society Works Best Index (SWBI). This is an important contribution, but the SWBI requires further evaluation. Using novel panel data, we evaluate the measure, improve on the empirical application with a national panel, and suggest improvements in the scale. We find that the SWBI is no more stable than other measures of ideology and that the observed changes are attributed to measurement error and environmental factors. Furthermore, like many other political attitudes, its predictive power is mediated by levels of political interest.

# 1 Introduction

Political science has identified a wide variety of processes internal and external to an individual that may structure or bias political attitudes. Belief systems, socialization and group identities, emotional and cognitive processes, modes of processing information and acquiring knowledge, and framing, priming, projection, and learning interact to generate attitudes and opinions (Converse, 1964; Fiorina, 1981; Chong and Druckman, 2007; Chong and Druckman, 2013, Krosnick and Kinder, 1990; Zaller, 1992; Iyengar and Kinder, 2010). Some of these processes, such as belief systems and identities, work over a long span of a typical person's life; others, such as framing and priming, can be short-term influences on how an individual perceives and responds to the political world.

Recently, scholars have suggested that variation across individuals in long-term political dispositions is shaped in a significant way by biological factors. Fowler, Baker and Dawes (2008) introduced the argument that the interaction of genetic characteristics and environmental factors is central to the understanding of how political behavior and opinions develop. More broadly, Hibbing, et al. (2014) argue that differences in "political orientations are connected to deep physiocognitive predispositions" that may be rooted in biological variations among humans, including genetic, hormonal, and nervous system differences. If these biological sources are genetic in origin, the affect political orientations are expected to be nearly universal, fundamental to shaping everyday political attitudes, and quite stable. Smith, et al. (2011) propose the "Society Works Best Index" (SWBI) as a candidate for capturing the fundamental predispositions and argue that political ideology reflects, in part, the influence of those predispositions.

In this research note, we reevaluate the SWBI. After reviewing some concerns about the construction of the SWBI and its initial application, we describe and implement several tests of the original SWBI measure using a new panel data. We find that SWBI is no more stable than other measures of political orientations, such as self-reported ideology, and that the claims about the effect of the predispositions measured by the SWBI must be

qualified in important ways. Specifically, the effects of SWBI on political ideology appear to be heavily conditioned by political interest and SWBI is itself affected by current political evaluations. Because of the limitations of the original SWBI scale that we demonstrate, we revise the SWBI measure and show that an adjusted measure remains less stable than ideology and varies with political evaluations, but, as expected, it is more strongly associated with ideology. These findings raise questions about whether SWBI captures “bedrock values” as intended. We conclude with a brief discussion of the difficulty of identifying political attitudes that are tied to biological processes.

## 2 The Previous Test of Bedrock Values’ Effects on Political Ideology

In a series of papers over recent years, Alford, Hibbing, Smith, and other collaborators have offered a general theory of genetics, the environment, personality, and political attitudes.<sup>1</sup> The central argument, influenced by Carmen (2007), is that genetics influence political attitudes indirectly through biological systems, cognition, personality, and a general ideology, all of which also are influenced by environmental factors (see Figure 1). The argument is that humans may inherit political predispositions, although the effects of those predispositions on expressed political attitudes or opinions are dependent on context. Smith, et al., review studies that confirm many of the linkages in this framework, but they also present an analysis of the effect of bedrock values, measured by the SWBI, on political ideology in their report in *Political Psychology* to confirm the existence of a linkage that is central to their theoretical framework and research program.

[FIGURE 1 GOES HERE]

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<sup>1</sup>For additional background on biological influences on political dispositions, attitudes, and behavior, see Alford et al. 2005, Bell et al. 2009, Bouchard and McGue 2003, Fowler et al. 2008, Hatemi et al. 2007, 2009, Hibbing and Smith 2007, Hibbing, Smith, and Alford 2014, Klemmensen et al. 2012, Martin and Eaves 1986, Smith and Hatemi 2013.

Smith, et al. treat bedrock values as an important dimension of a broader conception of ideology than the one associated with the *The American Voter* and most American politics literature that followed. In their account, it is troubling that *The American Voter* conception requires an individual to understand U.S.-specific issues and the correct application of liberal and conservative labels to be considered ideological, the causal relationship between ideology and positions on specific issues is ambiguous or inconsistent in the literature, and “Conversionian” ideology lacks a “deeper” psychological meaning that is implied by ideological studies in psychology. Ideology, they insist, must represent a “general life orientation” (378).

As a consequence, *ideology*, in the Smith, et al., conception, should incorporate all facets of life, including tastes in art and leisure, humor, religion, occupation, and politics. Such a general ideology reflects values and psychological tendencies that are common across polities. A significant component of this general ideology is the value placed on social rules and order. These “bedrock values” include (1) the appropriate role of traditional values and moral conduct in social conduct, (2) treatment of both outgroup and ingroup rule breakers, (3) proper contours of group leaders, (4) the role of the individual within a group, and (5) whether compromise or absolutism should regulate human relations (Smith, et al., 2011, 381). The central purpose of their empirical analysis is to demonstrate that a measure of dispositions about these bedrock issues is predictive of political ideology in the traditional narrow sense.<sup>2</sup>

Smith, et al., measure bedrock attitudes with a battery of 14 questions. The battery does not include questions that refer to issues that would “make sense” only in a particular culture (381). The responses to the batteries are treated in two ways. A simple additive index (-14 to 14) is constructed with directionality set so that a low score reflects a preference of a society that cares for its neediest members, tolerates outgroups, forgives rulebreakers,

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<sup>2</sup>Several studies offer evidence of a link between general and political ideology. Friesen (2011) finds a significant relationship between individualist orientation toward society and a more conservative and religious beliefs. In another study, Friesen and Ksiazkiewicz (2014) find a strong association between beliefs on social organization and political and religious attitudes. Drake, et al. (2013) confirm this same pattern by offering evidence that traditional values shape individuals’ partisanship. To our knowledge, however, no one has replicated or extended the Smith, et al., analysis as we do here.

favors egalitarian leadership, and supports flexible moral codes. This is labeled the Social Works Best Instrument (SWBI). In addition, the 14 items were subject to a factor analysis that, with orthogonal rotation, produced five dimensions that represent the five components of bedrock issues noted above.

To confirm that general ideology drives political ideology, Smith, et al., identified a random telephone sample from an unnamed “medium-sized U.S. city” and screened them to select those with “strong political interests” (380-1). The 200 selected individuals, who were disproportionately white and educated, were interviewed in a lab. To evaluate the validity of the SWBI, the SWBI responses were compared with the results of an implicit association test designed to measure latent orientations toward social conduct and found to be correlated,  $r = .52$ . To evaluate the SWBI effect on political ideology, Smith, et al., asked 21 issue questions and constructed an additive index representing the number of conservative responses. They also asked an ideological self-placement question. Multivariate estimates of the effect of SWBI, education, income, gender, and age on the issue index and self-placement ideology show significant effects for SWBI. Three of the five dimensions, those said to capturing commitment to traditional moral codes, outgroups, and leadership styles, were most strongly related to political ideology.<sup>3</sup>

As far as it goes, the demonstration of the SWBI-political ideology relationship is persuasive, but there are several limitations to the Smith, et al., (2011) study that should be addressed, as we do here.

(1) The stability of bedrock values is not demonstrated by previous one-shot applications of the SWBI index. Clearly, “bedrock value” and the linkage to biological processes implies substantial stability in those values and measures of them, but the theoretical frame-

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<sup>3</sup>From a cross-sectional study of over 1300 individuals in the Minnesota Twins Registry, the same research team (Smith, et al., 2012, Funk, et al., 2013) report a sizable inheritability factor for SWBI responses and a significant relationship to a set of personality and political attitude measures, which appears to confirm their findings that SWBI predicts political ideology and connect SWBI to biological processes. Smith, et al. (2012) make the additional argument that variation in genetic factors create variation in susceptibility to environmental factors. Moreover, the same research team appears to have repeated the small city study with a Midwest county sample of 340 and reconfirmed their finding (Hibbing, Smith, and Alford 2014).

work, which makes explicit the potential effects of environmental factors, leaves the predicted stability of the SWBI measure ambiguous. The index includes items that, on the face of it, seem likely to be strongly influenced by recent experience. For example, one SWBI question asks about whether society works best when people realize the world is dangerous or when people assume all those in far away places are kindly. A reasonable hypothesis is that events can move expressed attitudes about the state of the world.

(2) If attitudes about social rules and order are universal, we would expect that social rules and order are relevant and stable across all segments of the sample. We note, however, that the decision of Smith, et al. (2011) to limit their sample to individuals with “strong political interests” is not justified.<sup>4</sup> Focusing on people with political interest may have been a reasonable way to recruit people to visit a lab to complete a lengthy questionnaire, including the IAT battery, on computers. However, previous work gives us reason to argue that individuals at the high end of the education, sophistication, and interest scales are distinctive in ways that might affect these findings. High-knowledge, high-interest individuals tend to have stronger ideological and partisan commitments that bias political evaluations.<sup>5</sup>

(3) If the SWBI is to be the basis for predicting political ideology and other attitudes, it must be a coherent measure of a single attitudinal dimension. However, Smith, et al. (2011) recognize that the multidimensional character of the bedrock battery responses raises questions about what is being measured. Plainly, at least as they show, there is no single scale of bedrock values. Two of the five components they identify seem to have no relationship to political ideology.

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<sup>4</sup>Other applications of SWBI did not limit the sample in this way.

<sup>5</sup>High-knowledge, high-interest individuals tend to have stronger ideological and partisan commitments that bias political evaluations (Converse 1964, McCloskey and Zaller 1984, Pomerantz, Chaiken, and Tordesillas 1995, Taber and Lodge 2006, Chong 2013), more stable opinions (Krosnick and Milburn 1990; Sniderman and Bullock 2004), and, in the U.S., at least, stronger commitment to democratic norms (Delli Carpini and Keeter 1996), and greater partisan and issue polarization (Abramowitz 2013). More generally, we know that political sophistication conditions a wide range of political attitudes and behavior by affecting how information is received, processed, and interpreted (Popkin and Dimock 2000, Price and Zaller 1993, Sniderman, Brody, and Tetlock 1991, Bartel 1996, Benoit 2004, Gilens 2001, Koch 2008, Lau, Anderson, and Redlawsk 2008, Zaller 1991, 1992)

In the interest of advancing the discussion of bedrock values as an intermediate step between biology and political attitudes, we (1) examine stability in SWBI scores, determined by the original formulation, over three waves conducted within a single year and consider their relationship to current political evaluations, (2) use the model of Smith, et al., to estimate the effects of SWBI on ideology with a national probability sample and observe that political interest conditions SWBI effects, and (3) consider the dimensional structure of the SWBI items, propose a scale that excludes several of the items in the original scale, and repeat the analysis of stability, the effects of current political evaluations, and the effects of the *adjusted* SWBI on ideology. We find that the revised measure remains less stable than ideology and varies with political evaluations, but, as expected, it is more strongly associated with ideology.

### 3 Data and Methods

Our investigation draws upon The American Panel Survey (TAPS). TAPS has a nationally-representative sample that comprises up to 2,000 respondents drawn from the U.S. Postal Service’s computerized delivery sequence file (CDSF) which covers around 97% percent of the physical addresses in all fifty states of the United States.<sup>6</sup> The recruitment of panelists is based on a random stratified sampling process with a mild oversampling of Hispanics and young adults due to low non-contact and response rates among these groups.

The interviews are completed online on a monthly basis.<sup>7</sup> The time of completion ranges approximately from 15 to 25 minutes. TAPS included the SWBI battery in three waves: January 2014, May 2014, and October 2014. The SWBI battery comprises 14 items with two possible answers to the question “*Society works best when...*”. 1,504 panelists completed at least 2 of these three waves, and 1,092 individuals completed the survey in all

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<sup>6</sup>This frame is appended with information regarding household residents’ names, demographic characteristics of the inhabitants, and landline telephone numbers obtained from other sources such as the U.S. Census files and commercial data bases (e.g. White pages)

<sup>7</sup>Internet and necessary hardware are provided in the case that a selected respondent does not have access to them. This reduces sampling bias.

three waves.

The SWBI measure was constructed as in Smith et al. (2011) and has a theoretical range of -14 to 14, where -14 indicates attitudes that favor a more tolerant and caring society, egalitarian values and more flexible moral codes, while +14 indicates attitudes that advocate for individualistic values, stricter punishments for rule breakers and enduring moral codes.

To measure ideology, we use a 7-point scale where 1 means very Liberal and 7 means very conservative. Other control variables include education (measured in years), gender, income, age, religiosity, political knowledge (composite index of correct answers to political questions) and interest in politics (4-point scale ranging from “not at all interested in politics and public affairs” to “very interested in politics and public affairs”). The descriptive statistics of these variables and their wording are presented in the Appendix.

## 4 Findings

### 4.1 Original Scale: Stability and Predictive Power

In panels (a) and (c) of Table 1, we report within-subject correlations for SWBI scores and self-reported ideology over the three waves among low-interest and high-interest subsamples. The estimates show that inter-wave correlations are higher for self-reported ideology than for SWBI scores. Further, there are lower correlations among low-interest than high-interest groups for both measures and these differences are statistically significant. However, the differences between low and high interested respondents are much stronger for the SWBI scores. These findings confirm a theme of previous research that highly interested individuals show higher levels of stability of political attitudes. Moreover, these findings raise three questions that we discuss and test below.

[TABLE 1 GOES HERE]



### 4.1.1 Stability of SWBI

First, does the lower level of stability observed for SWBI scores than for ideology call into question the argument that SWBI captures bedrock values that are more directly grounded in stable biological factors than contemporary political attitudes? If we had perfect measures of both theoretical constructs, the findings would challenge the theory. But the relative stability of SWBI scores and self-reported ideology may be a product of differences in the frequency of non-attitudes for the two measures or differences in the error associated with measuring the two constructs. For example, is the ideology question “easier” to answer than the bedrock battery? If it is non-attitudes, and we have no way to test for that here, the number of nonresponses to the survey questions might yield clues. In fact, the number of nonresponses to the SWBI and ideology questions are not different and, if anything, nonresponse is slightly higher for the ideology question. The proportion of “Don’t know” and “Refused” in the December/January waves for ideology and the SWBI is 14% and 13% respectively.

### 4.1.2 Impact of environment on ideology and bedrock values

Second, are SWBI responses moved by short-term political forces? In the theoretical framework proposed by Smith, et al., the political environment may affect bedrock values, although the effect of the environment on political ideology should be at least as great because biological factors have more direct effects on bedrock values than ideology. To explore whether bedrock values or ideology is more responsive to a common measure of the political environment, we consider the effect of presidential and congressional approval ratings on SWBI scores and ideology.<sup>8</sup> To do this, we fit a hierarchical latent measurement model that also allows us to account for measurement error. This approach models short-term forces associated with the “true” variability of the outcomes and also includes time-invariant covariates

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<sup>8</sup>Job approval of the president has been used in outstanding studies to capture attitudes about the most prominent actor in American politics (Fiorina 1981; Jacobson 2012). For comparison, we also consider job approval of Congress.

aiming to capture latent traits.

Table 2 shows the main results. First, in columns 1 and 3 we can observe that there are time-invariant covariates that significantly predict SWBI and ideology. As expected, there are several demographics that are significantly associated with both core ideology and bedrock values: partisanship, education, age, religiosity and being a Fox News viewer. All of these relationships have the expected sign. For example, regarding partisanship, Republicans exhibit more need for social order and Democrats less need than independents and, of course, are more conservative than independents or Democrats. Female respondents and those with higher levels of political knowledge tend to describe themselves as liberals.

Moreover, the first two rows of Table 2 show interesting results. Changes in SWBI (column 1) and ideology (column 3) over the three waves are significantly associated with changes in presidential approval. Therefore, this finding provides some evidence that the volatility we observe in both ideology and bedrock values is systematically associated to changes in the environment and it is not random, as measurement error would suggest.

From these findings, it appears that SWBI scores are as susceptible to short-term political forces as self-reported ideology. This finding is even stronger if we consider that the time intervals between the SWBI and ideology measures are relatively short. Further, they were recorded during a time without outstanding political events or shocks that could be expected to change core values. SWBI scores appear to behave much like other summary political scales—they are influenced by short-term political evaluations (and a range of variables commonly associated with political ideology). We are forced to question whether SWBI adequately measures values that are more fundamental and more closely tied to biological factors than everyday political ideology as Smith, et al., argue given the volatility we observe in a short span of time.

[TABLE 2 GOES HERE]

### 4.1.3 Political interest and bedrock values

Finally, a third question motivated by the low correlations of SWBI is: did the exclusion of people who did not have “strong political interests” bias the Smith et al. (2011) finding that SWBI scores predict ideology? To explore this possibility, we estimate three linear mixed effects models: first, one of the original models presented in Smith et al. 2011 study, a second one that also includes both “interest in politics” and an interaction of interest with SWBI, and a third model that includes other demographics relevant in explaining self-reported ideology.<sup>9</sup> Table 3 (Column 1) shows one of the models presented in Smith et al. 2011 article. As in the original study, results indicate that SWBI has a significant and positive effect on ideology. However, in contrast to the Smith et al. findings, we find that other demographics also have a reliable impact on our outcome: higher education and being a female are associated with more liberal self-perception, while higher income with conservative ones. These differences could be associated to the characteristics of their highly sophisticated and interested sample.

When we include interest in politics and the interaction with SWBI, key estimates change. Column 2 indicates that the effect of SWBI is no longer significant. However, the effects of being in the high interest group and the interaction of this covariate with SWBI are significant. In fact, SWBI scores have a positive relationship with ideology only for those

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<sup>9</sup>For the third model, we include demographic characteristics that are shown to drive ideology in previous studies (Feldman and Johnston 2004). Jost et al. (2007) find that levels of conservatism increase with changes in priorities, uncertainty management and resistance to change that are positively associated with age. Cutler and Kaufman (1975) challenge the claim of the relationship between aging and conservatism but point out that there is a widening gap between cohort conservatism levels that leads to higher observed levels of conservatism among older people. On the other hand, income plays a significant role in the socialization process of an individual that in turn shapes the policy preferences and therefore set of beliefs that they hold (Jennings and Niemi 1968). Also, associated with policy preferences, we observe differences in ideological beliefs between racial groups (Sidanius, Pratto and Bobo 2006) and a significant effect of implicit race attitudes on political behavior (Greenwald et al. 2009). Furthermore, several studies suggest that women are less conservative (Feldman and Johnston 2014) due to the different interests and policy preferences they favor and that are more closely related to welfare such as health, child care, and others (Campbell 2004). In contrast, religiosity is linked to more conservative attitudes given the traditional values promoted by religious institutions (Friesen and Ksiazkiewicz 2014). Finally, higher political knowledge and interest are factors that are associated with lower levels of conservatism as explained in the work of Feldman and Johnston (2014) and Converse (2000). Because of the panel structure of the data and the multiple measures of both self reported ideology and SWBI, we use a linear mixed effects model with random effects per panelist.

panelists who report high levels of political interest, as shown in Figure 2. Column 3 confirms these results and also highlights the importance of other factors for explaining ideology. It appears that the evidence marshaled by Smith, et al., is likely biased in favor of finding an SWBI effect.

[TABLE 3 GOES HERE]

[FIGURE 2 GOES HERE]

## 4.2 Dimensionality of the Original SWBI Items

Smith, et al., found a multidimensional structure to the SWBI items and still proceeded to scale all of them. We begin by revisiting the items and replicate their factor analysis of the 14 SWBI items and reconsider the model reported in Table 3 with a revised SWBI measure.

First, we consider whether the 14 SWBI items load properly in the five sub-dimensions proposed by Smith, et al.: traditional and moral values, outgroup/rulebreakers, role of group/individual, leadership, and absolutes. We conduct exploratory factor analyses for categorical variables with a number of factors ranging from 1 to 5 in both the pooled data<sup>10</sup> and on each wave dataset.<sup>11</sup> Table 4 presents the results from the January wave. The first thing to highlight is that comparable results to other waves could not be computed using the third wave. Due to overfactoring, the models with four and five factors could not be estimated, which indicates a poor fit of the data and a departure from the structure envisioned for the SWBI.

For the first two waves, for which estimates were readily calculated, there is little support for a fifth dimension and some items do not scale as claimed.<sup>12</sup> In both waves we can observe that the majority of the 14 items have loadings larger than 0.5 in the “correct”

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<sup>10</sup>The 5-factor model could not be completed due to multicollinearity.

<sup>11</sup>All of the factor analyses were conducted using Mplus v. 7.4. following the specifications of the original Smith et al. paper.

<sup>12</sup>The goodness of fit of the analyses in both waves are favorable: the RMSEA is lower than the generally accepted 0.05 when estimating the 5-factor model.

dimensions, but we also observe items that load on the wrong dimension or exhibit the wrong sign.<sup>13</sup>

[TABLE 4 GOES HERE]

Beyond this exploratory exercise, we also conduct a confirmatory factor analysis (CFA) with categorical variables for each of the waves under analysis. CFA allows us to explicitly investigate whether the SWBI performs as originally envisioned by its authors. The CFA procedure yields information regarding how well latent constructs explain the variance in the observed items, in other words how sub-scales such as “Traditional values/moral codes” explain the answers to each of their components. Furthermore, goodness of fit indicators help us to assess how well a theoretical model performs given the data at hand.

We defined the model as specified by Smith et al. with five uncorrelated sub-dimensions using a weighted least squares estimator for categorical data (WMSLV).<sup>14</sup> For ease of interpretation, we show the standardized coefficients and standard errors (see Table 5). We also report two indicators of goodness of fit: root mean squared error of approximation (RMSEA, with its respective upper limit) and the comparative fit index (CFI).<sup>15</sup>

The results from this analysis indicate that the model fits the data appropriately in each of the three waves: the RMSEA upper limits are 0.052, 0.048, and 0.048, respectively. Positive coefficients suggest that a change of one standard deviation on the latent variable

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<sup>13</sup>For example, the item “society works best when every member contributes, or more fortunate members sacrifice to help others” loads stronger in the “Role of group/individual” dimension than in the designed “Outgroups/rule breakers” one. This is not surprising given the characteristics of the item that clearly suggest an interactive relationship between the group and the individual. Furthermore, the items of the “Absolutes” dimension not only present low loadings on this dimension, but also have a negative sign: a result that contradicts the expectations. The results show that this dimension is problematic and should be revisited. The items that it contains are 1) SWBI when people recognize the unavoidable flaws of human nature, or people recognize that humans can be changed in positive ways, and 2) SWBI when our leaders compromise with their opponents in order to get things done, or our leaders adhere to their principles no matter what. Other problematic items loading in different dimensions are society works best “when people are proud they belong to the best society there is” versus “when people realize that no society is better than any other,” and “when our leaders are obeyed” versus “our leaders are questioned.”

<sup>14</sup>We also conduct a CFA on the pooled data specifying correlations among waves but independence among dimensions; the main results hold. The CFA was ran using MPlus v. 7.4. and an WLSMV estimator. No imputation was conducted. Following common practices, the first item of each sub-scale was set to 1.

<sup>15</sup>For the assessment of these quantities, we use common thresholds: RMSEA < 0.05 indicates good model fit, together with values of CFI greater than 0.95.

generates an increase in the probability of observing a value of 1 on each of the items (recall that the items can take values of -1 and 1). Most of the  $p$ -values are below 0.01, which indicates that the latent dimensions predict changes on the items. However, several coefficients again call into question the use of those items as measures of the different latent constructs. In the first wave, for example, the items from the “Absolutes” dimensions are not significant at less than 0.05, which leads us to be less than confident that the latent construct is related to these items that were intended to measure it. Furthermore, the second items from the “Leadership” and “Absolutes” dimensions show a negative sign in the first and third waves.

### 4.3 The Adjusted Scale: Stability and Predictive Power

Based on the evidence above suggesting weak fourth and fifth dimensions, we conduct another set of CFAs retaining only the items from the first three factors, thereby dropping four items with a poor fit to the latent scale.<sup>16</sup> When comparing the full model and the reduced one, the latter also shows strong and stable goodness of fit indicators with higher CFIs than the full one and slightly higher RMSEAs that remain in an acceptable range. This confirms the finding that the two last sub-scales are adding noise to the original one, potentially decreasing its explanatory power. Therefore, we repeat the analyses above but using this *adjusted* scale that includes only items from the first three factors.

Table 3 (right panel) reports the inter-wave correlations for the adjusted scale. We would expect that the removal of items from the scale that added only noise would not change the inter-wave correlations much and that is what we find. The correlations for the adjusted scale are nearly identical to the correlations for the original scale and remain lower than the inter-wave correlations for ideology.

By reducing error in measuring the latent construct, the adjusted scale should produce

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<sup>16</sup>We would like to highlight that given that the sub-dimensions are supposedly uncorrelated, an additive scale using the scores per factor is not the most appropriate approach. However, we are trying to replicate the building process of the scale as presented by Smith et al. Furthermore, the CFA showed that the correlation between factors is significantly different from 0.

smaller standard errors in estimating relationship between SWBI and political and demographic variables. That is what we find. In the right column of Table 4, smaller standard errors allow change in congressional approval to be related to change in SWBI. In this period (2014), with Republican congressional majorities, the sign is the opposite of the coefficient for presidential approval with a Democratic president.

Table 3 reports the estimates of the effect of adjusted SWBI on ideology. In contrast to the full scale, the adjusted SWBI scores are significantly associated with ideology for every level of political interest. The effect of SWBI on ideology remains mediated by political interest, but the adjusted SWBI effect remains significant for the more fully specified models.

[TABLE 5 GOES HERE]

## 5 Discussion

Our replication of the Smith, et al., analysis for the original SWBI measure confirms the finding about the relationship to ideology but only in an underspecified model. For a more fully specified model, even an improved version the SWBI shows an effect on political ideology only for high-interest individuals. Furthermore, lower levels of stability with respect to self-reported ideology and susceptibility to the influence of short-term political factors lead us to question the success of the SWBI as a measure “fundamental” or “bedrock” values.

For the remaining questions in the adjusted scale, we must question whether the SWBI is capturing a theoretical construct that is separable from everyday political ideology. The wording of most of the remaining items appears to reflect quite directly what is meant by liberal and conservative in current political discourse. Thus, as a matter of face validity, it is not obvious to us that the adjusted scale measures something more fundamental, universal, or distinct from the everyday meaning of ideological labels in modern America. In fact, the adjusted measure performs in a manner very similar to the standard political ideology measure.

With these considerations in mind, it is not obvious that the SWBI is a good candidate for a measure of some bedrock and universal values that hold an intermediate place between biological factors and everyday political attitudes. Of course, we do not conclude that the framework proposed by Smith et al. (2011) (Figure 1) is *disconfirmed* by our findings. The framework is just a framework and allows that environmental factors may influence bedrock values. We find some environmental influence on both SWBI scores and political ideology. However, SWBI scores are not more stable than standard measures of political attitudes as we would expect if they are more directly grounded in biological processes, and especially considering the moderate time intervals between the different measures we used. SWBI scores appear to be more strongly conditioned by interest in politics than ideology, which suggests that they may be more, not less, sensitive to changes in the political environment than ideology.

At this early point in the analysis of biological sources of political attitudes, we remain skeptical that there is one optimal way of measuring a dominant disposition, such as the one with respect to social order, that flows from those sources and influences political attitudes. Smith, et al., are persuasive that a disposition toward social order is a viable candidate, but the evidence for that disposition as captured by the SWBI is not sufficient to limit the search at this time.

More important, it appears that we are not close to meeting the expectations of Smith, et al., for a conception and measure of “general ideology” or a “general life orientation” that is reasonably homogeneous as a theoretical construct and that can be measured by a coherent scale. When we make modest improvements in the proposed measure, SWBI, we discover that the remaining items appear to be very similar to modern American meanings attached to the liberal and conservative labels and probably do not capture the intended “general life orientation”. Consequently, while we are impressed with the general theoretical framework proposed by Smith, et al, for guiding a research program on the biological sources of political attitudes, we would also like to highlight the challenges of identifying the dispositions, or



variety of dispositions, that are rooted in biological processes.

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## 7 Figures and Tables

Figure 1: Causal path linking genetics and political attitudes

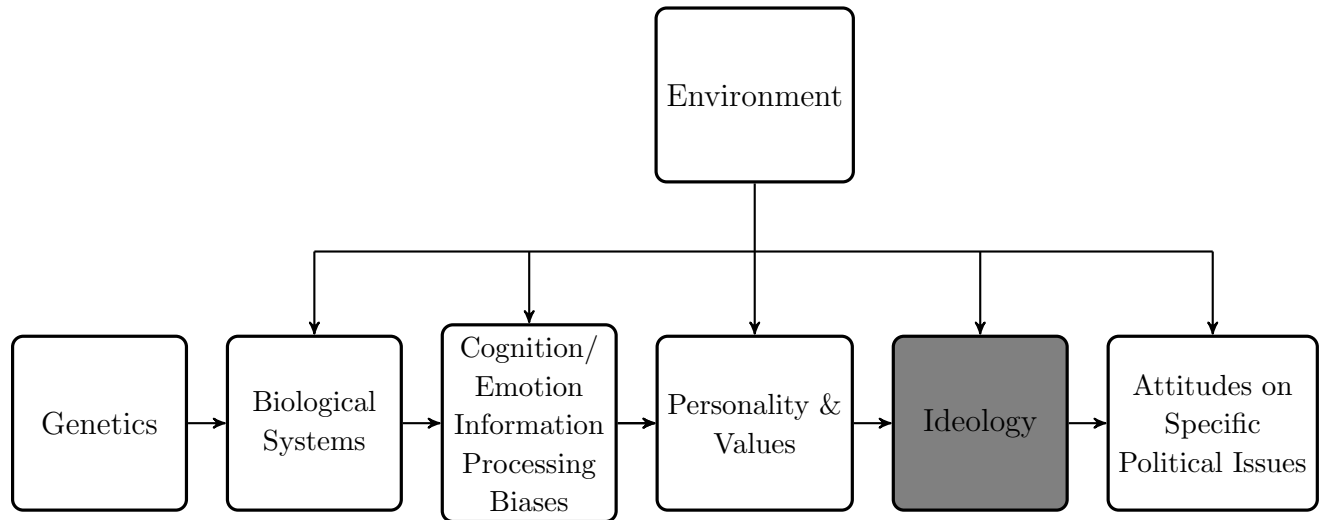


Table 1: Correlation of SWBI and ideology between waves (low and high interest)

(a) SWBI scores

		<i>High interest</i>	
Wave 1		0.76	0.77
0.56	Wave 2		0.81
0.59	0.61	Wave 3	
<i>Low interest</i>			

(b) Adjusted SWBI score

		<i>High interest</i>	
Wave 1		0.75	0.74
0.59	Wave 2		0.79
0.56	0.58	Wave 3	
<i>Low interest</i>			

(c) Self-reported ideology

		<i>High interest</i>	
Wave 1		0.88	0.89
0.83	Wave 2		0.89
0.82	0.82	Wave 3	
<i>Low interest</i>			

*Note:* All the correlations are significant at less than 0.01. Furthermore, we compare the correlations of pair of waves between interest groups. Similarly, all intergroup correlation differences are significant with a  $p$ -values of less than 0.01.

Table 2: Determinants of Bedrock values: Hierarchical Latent Measurement Model with Time-Invariant and Time-Varying Predictors

<i>Time-varying predictors</i>	Full SWBI	Adjusted SWBI	Ideology
Pres. App <sub>t</sub> → Outcome <sub>t</sub>	0.739* (0.112)	0.431* (0.065)	0.232* (0.040)
Cong. App <sub>t</sub> → Outcome <sub>t</sub>	-0.145 (0.120)	-0.126* (0.059)	-0.002 (0.028)
<i>Outcome Constant</i>			
Intercept	-1.166 (1.084)	-0.527 (0.585)	3.144* (0.273)
Political knowledge	0.069 (0.049)	0.042 (0.031)	-0.057* (0.016)
Female	-0.163 (0.220)	-0.088 (0.133)	-0.234* (0.063)
Democrat	-2.020* (0.293)	-1.207* (0.216)	-0.898* (0.084)
Republican	1.706* (0.311)	1.179* (0.258)	0.910* (0.095)
Interest	0.061 (0.259)	-0.039 (0.195)	-0.056 (0.086)
Education	-0.214* (0.059)	-0.148* (0.037)	0.069* (0.024)
Income	0.107 (0.078)	0.065* (0.022)	-0.019 (0.022)
Employed	0.461 (0.246)	0.263 (0.143)	-0.043 (0.075)
Age	0.042* (0.008)	0.021* (0.004)	0.007* (0.002)
Black	0.497 (0.427)	0.328 (0.246)	-0.127 (0.119)
Hispanic	-0.300 (0.330)	-0.062 (0.204)	-0.077 (0.136)
Religiosity	0.199* (0.066)	0.243* (0.048)	0.188* (0.019)
Fox News viewer	1.670* (0.412)	1.236* (0.294)	0.504* (0.143)
Married	0.688 (0.872)	0.341 (0.561)	0.082 (0.308)
Have children	0.099 (0.256)	-0.105 (0.164)	0.126 (0.075)
$\sigma^2_\alpha$	11.933* (0.632)	8.048* (0.297)	1.047* (0.058)
AIC	128113.747	170867.492	110463.954
BIC	129679.935	172493.843	112029.163
SRMR	0.018	0.019	0.024
N	2,242	2,242	2,242

Note: \*p<0.05

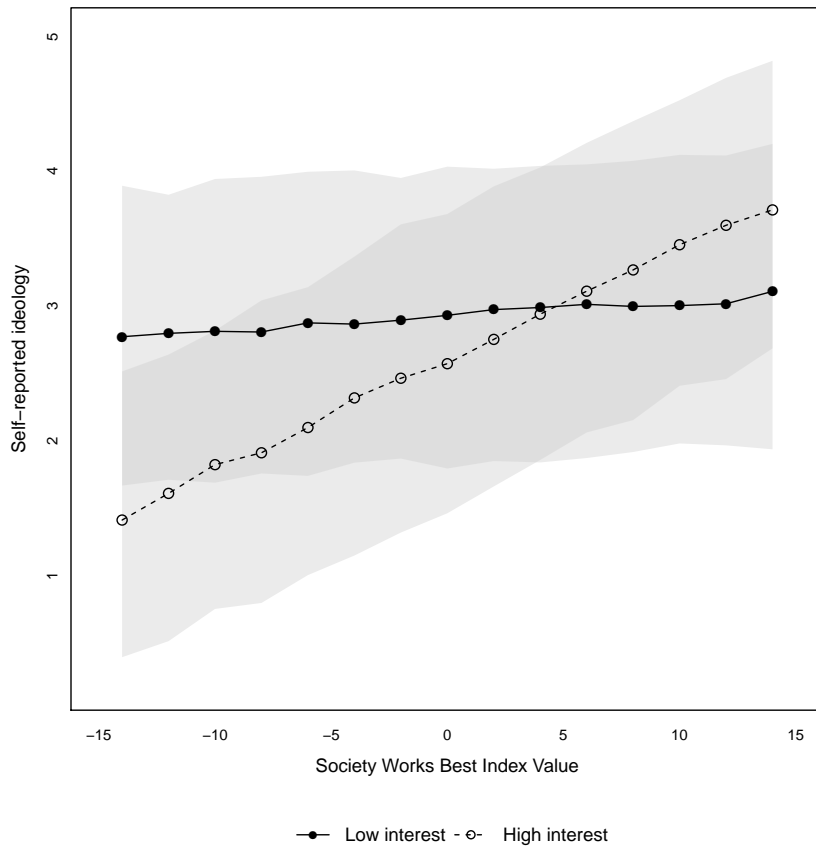


Table 3: Factors Associated with SWBI scores and Bedrock Values: Linear Mixed Effects Model

	Self-reported Ideology		
	(1)	(2)	(3)
SWBI	0.059*	0.010	0.009
	(0.004)	(0.008)	(0.008)
Education	-0.139*	-0.131*	-0.119*
	(0.023)	(0.023)	(0.024)
Income	0.029*	0.031*	0.019
	(0.012)	(0.012)	(0.012)
Gender (Female = 1)	-0.249*	-0.260*	-0.393*
	(0.078)	(0.078)	(0.080)
Age	0.003	0.004	0.003
	(0.002)	(0.003)	(0.003)
Interest (High = 1)		-0.310*	-0.235*
		(0.096)	(0.100)
SWBI × High interest		0.073*	0.067*
		(0.010)	(0.010)
Race (Black = 1)			-1.000*
			(0.149)
Race (Hispanic = 1)			-0.532*
			(0.135)
Religiosity			0.280*
			(0.023)
Political knowledge			-0.063*
			(0.020)
Constant	5.348*	5.377*	5.319*
	(0.281)	(0.283)	(0.292)
N	3,329	3,228	2,903
Log Likelihood	-4,899.399	-4,703.253	-4,143.814
AIC	9,814.798	9,426.505	8,319.628
BIC	9,863.681	9,487.302	8,415.204

Note: \*  $p < 0.05$ ; Standard errors in parentheses.

Figure 2: Predicted Values of Ideology as a Function of SWBI, by Level of Interest



*Note:* Predictions based on model 2. Covariates are set to either their mean or median (in the case of gender). We implemented 1,000 simulations for the calculation of the prediction intervals.

Table 4: EFA: Factors loadings, January 2014

	Factors				
	(1)	(2)	(3)	(4)	(5)
<i>Traditional values/moral codes</i>					
Item 1	0.868	0.231	0.08	0.179	0.013
Item 2	0.729	0.257	0.111	0.163	0.039
Item 3	0.636	0.198	0.141	0.156	0.055
<i>Outgroups/rulebreakers</i>					
Item 4	0.239	0.732	-0.027	0.03	0.017
Item 5	0.136	0.505	0.093	0.355	-0.003
Item 6	0.128	0.579	0.103	0.318	-0.002
Item 7	0.255	0.139	0.037	0.535	0.007
<i>Role of group/individual</i>					
Item 8	0.053	0.245	-0.022	0.833	-0.02
Item 9	0.19	0.305	0.115	0.656	0.022
Item 10	0.206	0.529	0.1	0.328	0.006
<i>Leadership</i>					
Item 11	-0.079	-0.051	-0.849	-0.022	-0.004
Item 12	0.14	0.118	0.66	0.066	0.018
<i>Absolutes</i>					
Item 13	0.16	0.337	0.101	0.152	-0.007
Item 14	-0.316	-0.003	-0.099	0.002	-4.268
Eigenvalue	4.742	1.781	1.382	1.089	0.819
RMSEA	0.018				

*Note:* Factor loadings and RMSEA for model with 5 factors.

Item 1: Traditional values vs. Changing circumstances

Item 2: Expectations based on external code vs. expectations allowed to evolve

Item 3: Leaders stick to beliefs vs. leaders change positions

Item 4: World is dangerous vs. those in far away places are kind

Item 5: Take care of our own people vs. people deserve our help

Item 6: Rulebreakers are punished vs. rulebreakers are forgiven

Item 7: Every member contributes vs. more fortunate members sacrifice for others

Item 8: Reward according to merit vs. need

Item 9: Take responsibility for own welfare vs. join together to help others

Item 10: Proud to belong to the best society there is vs. No society is better than other

Item 11: Leaders are obeyed vs. leaders are questioned

Item 12: Leaders call the shots vs. leaders are forced to listen others

Item 13: Recognize unavoidable flaws vs. humans can change in positive ways

Item 14: leaders compromise in order to get things done vs. leaders adhere to their principles.

Table 5: CFA Results

	CFA		
	January	May	October
<i>Traditional values/moral codes</i>			
Item 1	0.874* (0.022)	0.885* (0.020)	0.851* (0.022)
Item 2	0.821* (0.023)	0.819* (0.023)	0.814* (0.024)
Item 3	0.723* (0.025)	0.779* (0.023)	0.773* (0.024)
<i>Outgroups/rulebreakers</i>			
Item 4	0.587* (0.034)	0.575* (0.036)	0.584* (0.036)
Item 5	0.623* (0.031)	0.593* (0.032)	0.714* (0.028)
Item 6	0.643* (0.038)	0.644* (0.037)	0.612* (0.038)
Item 7	0.566* (0.035)	0.655* (0.034)	0.635* (0.034)
<i>Role of group/individual</i>			
Item 8	0.690* (0.030)	0.695* (0.030)	0.695* (0.029)
Item 9	0.757* (0.029)	0.787* (0.029)	0.795* (0.027)
Item 10	0.692* (0.029)	0.632* (0.031)	0.698* (0.029)
<i>Leadership</i>			
Item 11	0.647* (0.073)	0.673* (0.068)	0.619* (0.067)
Item 12	-0.899* (0.094)	0.869* (0.082)	-0.830* (0.081)
<i>Absolutes</i>			
Item 13	0.176 (0.129)	0.270* (0.073)	0.232* (0.075)
Item 14	-0.179 (0.132)	-0.318* (0.084)	-0.329* (0.102)
RMSEA	0.047	0.043	0.041
RMSE Upper limit	0.052	0.048	0.047
CFI	0.949	0.961	0.966

Note: \*  $p < 0.05$ ; Standard errors in parentheses.

Table 6: Factors Associated with *Adjusted* SWBI Scores and Bedrock Values: Linear Mixed Effects Model

	Self-reported ideology		
	(1)	(2)	(3)
Adjusted SWBI	0.067*	0.026*	0.020*
	(0.005)	(0.009)	(0.009)
Education	-0.136*	-0.125*	-0.120*
	(0.022)	(0.022)	(0.023)
Income	0.028*	0.028*	0.018
	(0.011)	(0.011)	(0.011)
Gender (Female = 1)	-0.236*	-0.258*	-0.383*
	(0.074)	(0.074)	(0.077)
Age	0.003	0.004	0.003
	(0.002)	(0.002)	(0.003)
Interest (High = 1)		-0.221*	-0.173
		(0.091)	(0.095)
Adjusted SWBI × High interest		0.064*	0.060*
		(0.010)	(0.010)
Race (Black = 1)			-1.023*
			(0.142)
Race (Hispanic = 1)			-0.528*
			(0.128)
Religiosity			0.269*
			(0.023)
Political knowledge			-0.052*
			(0.019)
Constant	5.309*	5.284*	5.256*
	(0.262)	(0.266)	(0.277)
N	3,799	3,639	3,274
Log Likelihood	-5,500.904	-5,226.077	-4,627.140
AIC	11,017.810	10,472.150	9,286.279
BIC	11,067.750	10,534.150	9,383.780

\*  $p < 0.05$ ; Standard errors in parentheses

## 8 Appendix

Table 7: Descriptive statistics

Statistic	N	Mean	St. Dev.	Min	Max
High interest	1,677	0.701	0.458	0	1
Democrat	1,514	0.375	0.484	0	1
Republican	1,514	0.262	0.440	0	1
Religiosity	1,798	2.348	1.684	0	5
Education	1,993	11.062	1.900	2	15
Income	1,894	5.597	3.691	0	15
Female	2,004	0.517	0.500	0	1
Age	1,993	54.733	16.244	20	115
Political knowledge	2,141	6.415	2.553	0	10
Ideology, Dec '13	1,498	4.094	1.768	1	7
Ideology, Jun '14	1,394	4.209	1.656	1	7
Ideology, Oct '14	1,345	4.172	1.672	1	7
SWBI, Jan '14	1,510	2.475	5.252	-14	14
SWBI, May '14	1,459	2.731	5.254	-12	14
SWBI, Oct '14	1,337	2.836	5.293	-12	14