

A Cross-National, Psychophysiological Study of the Connection between Negativity Biases and Political Preferences ¹

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Abstract: There is a considerable body of work across the social sciences suggesting that people react more powerfully to negative than positive information. That said, most research focuses on the US, and relies on stimuli that are only tangentially related to our political world. These limitations have consequences for our understanding of the sources of negativity, which are of real significance particularly for those interested in the nature of political communications and behavior. This paper reports preliminary results from what is thus far a 12-country study, examining psychophysiological and survey-based reactions to televised news content. Even at this early stage, results provide insights into the sources and consequences of negativity biases in political communication and behavior.

This paper is focused on the human tendency to give more weight to negative information than to positive information. The importance of a “negativity bias” in political communication is, we believe, relatively clear. Negativity biases both affect the content of political news, and structure the content of political debate. In so doing, negativity biases have effects on the nature and quality of representative democracy. Understanding those effects, and consid-

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ering their implications for the nature of political debate and for the functioning of democratic politics more broadly, is a central objective of this research.

We are admittedly still far from making bold claims about how political and media institutions might enhance public debate and democratic representation. Indeed, we are still at the exploratory stage of our work. We nevertheless regard the research discussed below as adding much to what we know about the generalizability of existing findings on negativity biases. The paper proceeds as follows. First, we discuss the need for a cross-national study of psychophysiological responses to network news. We review the existing literature on negativity biases, highlight the paucity of comparative research on the issue, and note that one major consequence of this gap is an inability to distinguish the extent to which negativity biases (here, in reactivity to news content) are identical across individuals, perhaps driven by purely evolutionary factors, or vary across individuals, due to a combination of individual-level and cultural, political, or media-system factors. The key lies in testing for differences in negativity biases, not just across a large number of individuals, but across a wide range of cultures. We then present results from what are to our knowledge the first directly comparable cross-national experiments on negativity biases in psychophysiological responses to television news.

Results suggest that there are real differences in the way in which individuals react to negative versus positive news content. That said, these differences are not easily – if at all – explained by culture or country. We regard the absence of clear cross-national differences as rather striking, given rather stark differences in national contexts, both in terms of political and media systems. At the same time, individual-level variables, insofar as they vary across countries, may provide clues about the nature of both individual- and country-level variation; and our findings suggest that individual-level differences are potentially powerful, psychophysiological predictors of a range of socio-political attitudes and behaviors. Given recent work in the field connecting psychophysiological differences to political ideology, we offer a preliminary exploration here of the degree to which individual-level differences across twelve countries are connected to scores on a left-right ideological scale. Our results confirm the cross-national applicability of American findings from the existing literature. For us, they are also a signal of the importance of paying attention to individual-level heterogeneity – ideological and otherwise – in negativity biases and information processing more generally.

Background

Our research was initially motivated by two widely-recognized features of modern-day political communications. (1) Mass-mediated news is a central and critical component of large-scale representative democracy. This is a prominent argument in work on media (Martin 2008); it is evident in theories of representative democracy as well (e.g., *The Federalist Papers*). Media provide a critical flow of information between elites and citizens, and are a vital mechanism for democratic accountability. (2) Negative tone is a defining feature of news; good news, in contrast, is nearly synonymous with the absence of news. This bias in coverage has been the focus of massive body of work on election campaigns in the US (e.g., Patterson 1994; Sabato 1991; Lang and Lang 1966, 1968; Robinson and Sheehan 1983; Edelman 1987; Blumer and Gurevitch 1995; Lichter and Noyes 1995; Cappella and Jamieson 1997; West 2001; Newton 2006; Farnsworth and Lichter 2007). It is equally clear in work on politi-

cal campaigns in Canada (e.g., Andrew et al. 2006). It is also readily apparent in, for instance, crime and economic news in the US, Canada and elsewhere (e.g., Soroka 2006, 2012, 2014), and in journalists' decisions cross-nationally (Zhong and Newhagen 2009).

In sum, the nature and quality of mass media news content is central to the nature and quality of representative democracy, and that content is systematically biased towards negative information. The tone of news content has accordingly been cited as a source of systematic biases in what citizens know about their governments and the world around them (e.g., Patterson 1994). Inadequate or biased political knowledge, citizen apathy and disengagement — these are just some of the consequences attributed to the “negativity bias” in news content. We know that mass media news is central to representative democracy; but we also know that it may be fundamentally flawed.

These facts point to the importance of understanding why media content is the way it is, and whether or how it might change. Relatedly, these facts highlight the need to understand if and why media consumers prioritize negative coverage. Concerns about media coverage typically focus on the supply side of the media, i.e., mass media; but work on negativity biases suggests that the demand side may be equally important. And recent work makes clear that even as people *say* they want more positive news, they systematically *select* more negative news (Trussler and Soroka 2014). This should come as no surprise: there are after all burgeoning literatures across the social sciences identifying negative biases in human information processing and behavior.²

What accounts for the apparently widespread preference for negative information? There are two main competing accounts: (1) an account rooted in evolutionary theory, suggesting that negativity biases are universal, and (2) an account linked to work on cultural psychology and anthropology, and to recent work on “media systems,” suggesting that negativity biases in news selection may be a product of cultural and institutional contexts.

The universality argument is as follows. Negativity biases may be a product of evolution. Attention to negativity may be advantageous for survival. Negative information alerts to potential dangers (Shoemaker 1996); it attracts more attention because it is novel and deviant; as a consequence, it is more memorable and more easily recalled (Grabe et al. 2000; Newhagen and Reeves 1992). This account of the negativity bias is evident in literatures in physiology (e.g., Taylor 1991) and neurology (e.g., Smith et al. 2003; Dehaene, Posner and Tucker 1994; Gehring et al. 1993; Luu, Collins and Tucker 2000; Miltner, Braum and Coles 1997), and particularly work on the importance of “orienting responses” in evolutionary biology (Öhman et al. 1998; Hunt and Campbell 1997). Indeed, negativity biases are even evident in animals (e.g., Miller 1961; Garcia and Koelling 1966). (For reviews of the vast related literature, see Baumeister et al. (2001), Cacioppo and Gardner (1999), and Rozin and Royzman (2001).)

There may nevertheless be cross-cultural differences in negativity biases. There is after all

² For instance, see work on impression formation and other issues in psychology (Baumeister et al. 2001; Cacioppo and Gardner 1999; Rozin and Royzman 2001), and on loss aversion (e.g., Kahneman and Tversky 1979; Tversky and Kahneman 1991) and endowment effects (e.g., Thaler 1980; Kahneman, Knetsch and Thaler 1990; Carmon and Ariely 2000) in economics.

work examining cross-cultural variation in related psychological phenomena, including self-assessments (e.g., Chang and Asakawa 2003; Heine 2004), self-esteem (e.g., Brown et al. 2008), satisfaction (Oishi et al. 2007), and optimism (Heine and Lehman 1995).³ The main contrast in this work is between what seem to be more optimistic countries in the West (typically the US) and less optimistic countries in the East (typically Japan). And while cross-cultural explorations into negativity biases specifically are rare, there are several important exceptions: Grossman et al.'s (2011) comparison of Russians and Americans finds the former spend more time focusing on negative photos than the latter; Ablanakina-Paap et al. (2001) find similar results across these countries for recognition of unfavorable information about their cultures; Oishi's (2002) study of well-being finds that differences in satisfaction across European and Asian Americans are related to differences in the unconscious weighting of positive and negative information.

What might account for this cross-cultural variance? The literature on cultural values points to some possibilities (e.g., Hofstede 2001). For instance, societies deal with anxiety about future uncertainties in different ways; and the extent to which members of a culture feel threatened by ambiguous or unknown situations may well affect the tendency to focus on negative information. A range of institutional factors may also matter. Societal tension between groups, and especially conflict that has crystallized in the polarization of political party systems, may matter for negativity, at least where attentiveness to news coverage is concerned. Another dimension of variability is rooted in the institutionally coded professional practices of journalists (e.g., Hanitzsch 2007). A strong professional requirement that journalists routinely cover politics in conflictual terms may also lead to viewers' habitual expectation and attention to negativity.

Evolutionary and cultural-institutional accounts are not in competition, of course; negativity biases could be conditioned by both evolutionary and cultural-institutional factors. Consider work on the importance of "social learning," alongside biology, as the basis of culture (e.g., Rogers 1988); and work in neurology and physiology on culture-gene coevolution (e.g., Cavallie-Sforza and Feldman 1981; Chiao and Blizinsky 2010). We also do not want to discount the possibility that variation in negativity biases is not a primarily cross-cultural phenomenon, but an individual one. There already is work suggesting that negativity biases in reactions to network news vary across gender, for instance (Grabe and Kamhawi 2006; Kamhawi and Grabe 2008; Soroka, Gidengil, Fournier and Nir 2016). And there is a growing literature focused on differences in negativity biases across political ideologies (e.g., Oxley et al. 2008; Smith et al. 2011; Dodd et al. 2012; Renshon et al. 2015; Osmundsen et al. 2017).

This political-ideological literature highlights for us not just the substantive political importance of understanding negativity biases, it highlights the fact that we needn't view cross-cultural and individual-level factors as operating independent of each other. Individual-level variables may be at the root of cross-cultural variation, insofar as individual-level factors vary across cultures. Just as conservatives may exhibit stronger negativity biases, so too might a more conservative country.

That said, we are still far from a precise theory of how or why negativity biases vary, across

³ Also see meta-analyses of independent studies on these issues, e.g., Mezulis et al. 2004.

individuals or otherwise. We are at this stage focused just on the first step: Is there evidence of cross-national and/or individual-level differences in negativity biases in reactions to news coverage?

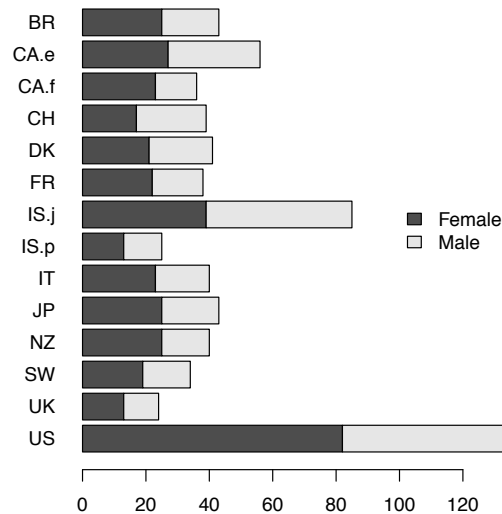
Methodology

We see this research as responding to a growing body of work that pleads for a more comparative approach to (political) psychology (e.g., Henrich et al. 2010), and more comparative work in political communication as well (e.g., Livingstone 2003). We also build upon a small but growing literature focused on cross-national experimentation in psychology and economics (e.g., Segall et al. 1966; Diener et al. 1995).

Our analyses are based on lab experiments run thus far in twelve countries: Brazil, Canada, Chile, Denmark, France, Israel, Italy, Japan, New Zealand, Sweden, the UK and US. The study protocol is relatively complex; rather than discuss it in great detail here, we provide a sizable Methodological Appendix describing the nature of our study (and including all the material typically included in a CONSORT checklist). The current version of that Appendix is available at <http://www.snsoroka.com/files/Method.Appendix.pdf>.

The number of respondents included in the current draft, by country and gender, is shown in Figure 1. The total sample size for our estimations is 705 respondents, spread across 12 countries. Note that although we have 12 countries, we refer below to 14 “samples.” This is because we run separate samples of both Anglophones and Francophones in Canada, and both Jews and Palestinians in Israel. We do so for several reasons, including the need to test for the impact that using subtitles might have on physiological responses in countries with high variation in English-language proficiency, and the advantages of being able to vary culture independent of political and media institutions. In sum, this is to our knowledge the most broadly comparative psychophysiological study to date.

Figure 1. Number of Respondents by Sample and Gender



We capture negativity biases using both psychophysiological and attitudinal measures, and focus here entirely on the former. There already is a considerable body of work examining negativity biases in psychophysiology; there is a growing literature on psychophysiological reactions to political news content as well (e.g., Soroka and McAdams 2015; Daignault, So-

roka and Giasson 2013; Grabe and Kamhawi 2006; Grabe et al. 2000). Physiological measures have the advantage of capturing real-time, quite possibly subconscious, reactions to news content. Attitudinal (survey-based) measures can confirm physiological measures in some instances; but they also allow us to measure a wide range of related attitudes and opinions. Our experiment thus combines two physiological studies, followed by a computer-based survey.

In this paper we focus just on variations in skin conductance, or galvanic skin levels (GSL), over the course of seven randomly-ordered BBC news stories. GSL is originally sampled 256 times per second, but downsampled for analysis by taking averages over 125-ms intervals. The GSL signal is smoothed slightly for analysis, using Lowess smoothing. GSL measures tend to decrease over the experiment (a consequence of measurement issues with the electrodes). One option is to detrend the GSL measure (e.g., Soroka and McAdams 2015); here, we simply include the impact of time in our model. In addition, as is common in the literature, we use ‘normalized’ measures of GSL that rescale results as deviations from the baseline, captured during a 2-minute gray screen at the beginning of the experiment. The measure thus takes into account the fact that different people will have different baseline GSLs.

‘Normalized’ *GSL* is our dependent variable; the tone of video content is the primary independent variable. *Tone* was measured in several ways; here, we rely on averaged second-by-second coding of each story, using a 5-point scale, by three expert coders. The stories themselves are listed in the Methodological Appendix, alongside short descriptions. Appendix Figure 1 shows second-by-second tone (positive or negative), averaged across coders at 5-second intervals, and ranging from -2 (very negative) to +2 (very positive). The figure confirms our overall assessment of the tone of videos as being generally positive or negative; although there is some within-story variation as well. It is for this reason that we rely on an average of second-by-second coding, rather than a simple binary positive-negative coding of stories.

We have in past work focused on the “phasic” (short-term) effects of tone on GSL, by modeling GSL across 5-second intervals⁴ using a time-series panel estimation (e.g., Soroka, Gidengil, Fournier and Nir 2016). Here, we take a somewhat simpler approach: we explore the “tonic” (longer-term) effects of tone on GSL by looking at a model of tone for each respondent, across each of the seven stories they watched. There is no obvious advantage to one approach or the other – we do not yet have a good sense for the extent to which reactions to the tone of video will be most clearly evident (or vary in important ways) second-to-second, or minute-to-minute, or story-to-story. We can say only that there is evidence of physiological reactions to video stimuli at both the phasic and tonic levels; and we have opted for a tonic approach here. We accordingly use a panel dataset in which every respondent-story combination is a separate case, and we rely on the following relatively simple model:

$$GSL_{i,s} = \alpha + \beta_1 tone_{i,s} + \beta_2 order_{i,s} + \beta_3 length_{i,s} + \beta_4 subtitles_{i,s} + \varepsilon_{i,t},$$

where *GSL* and *tone* are exactly as they are described above; *order* is an ordinal variable representing the order of presentation of the stories, to capture the possibility that respondents’

⁴ 5-second intervals are relatively common in the existing literature, since they tend to capture physiological changes that may not be immediate.

reactions change based on the number of stories they have seen thus far; *length* is an interval-level variable counting the number of 5-second intervals in each story, in case the length of a story leads to lower or higher average GSL; and *subtitles* is a dummy equal to 1 for respondents who watched videos with subtitles, since preliminary work suggests that subtitles tend to dampen (but not significantly change the variance in) GSL.

We refrain from adding a battery of demographic variables to this model, in part because any level differences that are a consequence of demographics will be taken care of when we normalize GSL. (It is for this reason that we rely on a pooled estimation as well – a within-respondent panel estimation is no different in this case, since normalization has erased level differences between respondents.) Of course, if cultural or individual-level factors moderate the impact of story tone, this will still be evident in more complex models of our normalized data. One such model, our test of cross-national difference, adds to the model above a set of dichotomous variables indicating each separate sample, as well as interactions between these variables and tone. Another includes a test for individual-level differences, focused here on political ideology, as captured by a shortened variant of the Wilson-Patterson Conservatism scale. A common instrument in psychophysiological studies, this index captures “resistance to change and adherence to tradition” (Hibbing, Smith, and Alford 2014: 102). Rather than being asked whether or not they consider themselves conservative, respondents indicate whether or not they “agree” with various issues.⁵

Figure 2. Mean and Interquartile Range in Respondents’ Wilson-Patterson Conservative Scale, by Sample

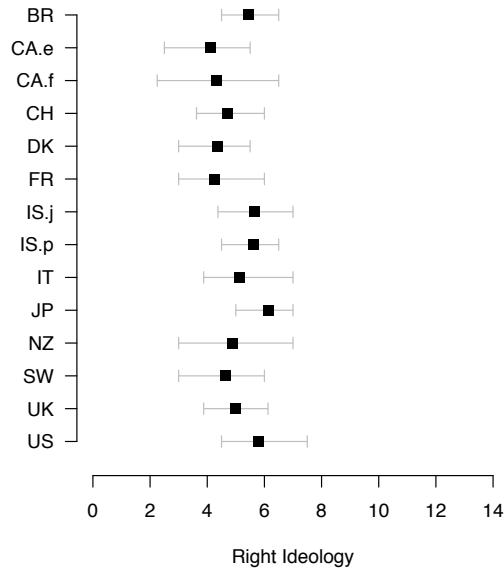


Figure 2 shows results for the left-right ideological index, across our 14 samples. We do not take the data in Figure 2 as an accurate representation of each population, since our ability to

⁵ Very American issues such as the draft, moral majority, and school prayer were dropped. We selected 14 issues that we felt could be meaningful across the diverse set of countries of our study: abortion, capitalism, censorship, death penalty, gay marriage, gun control, immigration, military spending, obedience, patriotism, pollution control, socialism, tax cuts, and women’s equality.

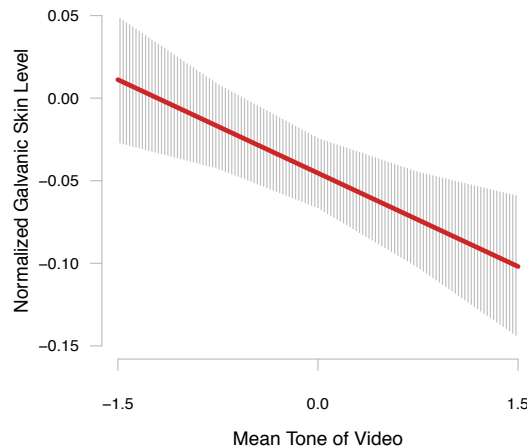
recruit representative samples varied widely across countries. (See the Methodological Appendix for details.) Even so, there are differences both within and across samples; and we focus below on the possibility that the impact of negative versus positive news content is moderated by this measure of political ideology.

Results

Appendix Table 1 shows results of all estimated models. The most important variable for our purposes is story tone, the impact of which is captured in Models 1 through 3 as a simple direct effect. (We did test for the possibility that tone was moderated by story order and/or subtitles, and found no such evidence.) Results for story tone are roughly similar to what we have seen in past work, but now with a much larger, cross-national sample. Tone is negatively related to GSL, suggesting that positive stories tend to reduce GSL. The basic effect, drawing on results from Model 1, is illustrated in Figure 3.

Model 2 of Appendix Table 1 adds a set of binary variables capturing level differences across countries. We cannot be sure that these are cultural/ethnic/institutional effects, since they may also capture differences due to lab conditions (e.g., temperature). Even so, there are relatively few significant differences here. The more important test of cross-national difference comes in Model 3, where we include interactions between each sample-level variable and tone. Does negativity matter differently across countries? Generally speaking, no, although the tendency for these (mostly insignificant) coefficients to be positive points to the possibility that respondents from outside the US (the residual category in these models) exhibit a somewhat weaker negativity bias in reactions to network news than respondents within the US. That said, all interactions are insignificant except for Japan; in that instance, the magnitude of the interaction suggests no negativity bias whatsoever in that country, at least in these tonic analyses of network news content.

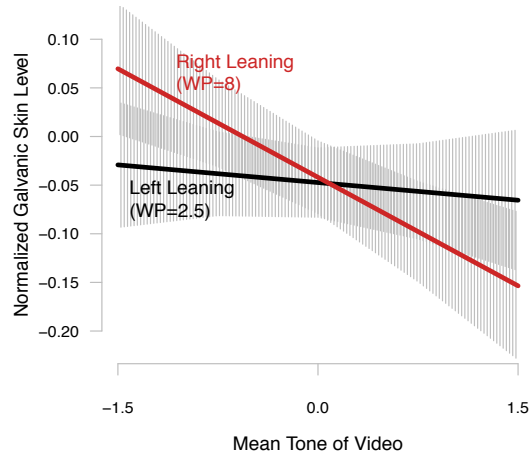
Figure 3. The Estimated Impact of Story Tone on GSL



Recall that we are interested also in the possibility that political partisanship is related to negativity biases in reactions to network news. The matter may be of importance to understanding cross-national differences as well, insofar as there are ideological differences across countries. Model 4 accordingly inserts the left-right ideological index, and allows it to moderate the impact of tone. The addition makes only marginal differences to sample effects – to the

extent that there are differences across samples, they do not appear to be a product of ideology; nor, for that matter, does ideology reveal stronger sample-level differences.

Figure 4. The Estimated Impact of Story Tone on GSL, by Ideology



This is not to say that political ideology does not matter, however – it does, and in roughly the same way that the existing US literature would suggest. The interaction between ideology and story tone is (weakly) statistically significant; Figure 4 illustrates the effect. The figure shows the impact of story tone on average GSL, at what in our data are the 10th and 90th percentiles of the Wilson-Patterson scale. Left-leaning participants show no significant difference in activation across the range of story tone; right-leaning participants, in contrast, show a rather striking (and statistically significant) effect.

Even as our results point to few systematic cross-national differences in physiological reactivity to the tone of network news stories, then, there is evidence of heterogeneity across individuals. In this instance, it appears as though conservatism is associated with greater variation in GSL across positive versus negative news stories.

Conclusion

It is worth reiterating that these are preliminary results, based on a large but still-growing body of psychophysiological data. We anticipate experiments in roughly six additional countries over the next two years (including Russia, the Czech Republic, India, and South Africa), and those results may well lead to slightly different findings.

Even so, the current database produces results in line with existing literatures, and robust enough that we expect them to be unchanged with the broader sample. First and foremost, we find strong evidence that people react differently to positive and negative news content, namely, they tend to experience stronger psychophysiological activation when facing negativity. We find striking similarities in reactivity across 14 samples, in spite of major cultural, media and institutional differences. These results point to a widespread and pervasive negativity bias. This is not solely an American story, it is a human one.

There may nevertheless be small cross-national differences, and results here point to Japan as a potential outlier. We do not want to make too much of this finding, for several reasons. First, in preliminary analyses of the phasic rather than tonic effects of news tone, it is Sweden, not Japan, that stands out. The difference is one of degree – Japan falls just above sta-

tistical significance in this case, and Sweden just below; and the opposite is true in the phasic analyses. More importantly, however, we are not willing to stake a strong claim on cross-national difference without first exploring a broader range of individual-level predictors. Particularly given high variability in our cross-national samples, controlling for demographic and attitudinal variables seems especially important to a consideration of national/cultural/institutional effects – either because we need to control for individual-level factors in order to properly estimate cross-national differences, or because cross-national differences are in fact the product of identifiable individual-level differences.

For the time being we have focused on political ideology, an individual-level factor that has been especially salient in recent psychophysiology-based political science literature. In line with that work, we find significant individual differences linked to ideology. People on the right and the left of the ideological spectrum behave distinctly. Conservatives appear to be more affected by negative information than liberals. This matches what has been found in previous research, of course; but our study stands out in several ways, by relying on experimental evidence from 14 very different samples, and also by identifying negativity biases in response to stimuli that are more directly connected to our political lives.

In all the countries that we have surveyed, there is a sense that television news is predominantly negative. Our findings help to make sense of this tendency – insofar as news needs to find an attentive, activated audience, there may be advantages to negativity. At the same time, individual-level differences in reactivity to negative news content point to the possibility that tendencies in news coverage will have differential effects across individuals, advantageous or not, and for whom, we do not yet know. Considering the possibilities is the aim of our ongoing work.

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Appendix Table 1. Models of GSL

	(1)	(2)	(3)	(4)
Mean Story Tone	-0.038** (0.012)	-0.038** (0.012)	-0.075** (0.026)	-0.016 (0.044)
Order	-0.069*** (0.005)	-0.069*** (0.005)	-0.069*** (0.005)	-0.068*** (0.005)
Length	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)
Subtitles	-0.004 (0.022)	-0.088 (0.050)	-0.086 (0.050)	-0.088 (0.051)
WP Conservatism Scale				0.001 (0.006)
Mean Story Tone * WP				-0.011 ^a (0.006)
<i>Country Direct Effects</i>				
Brazil		0.136 (0.069)	0.147* (0.070)	0.159* (0.071)
Canada, English		-0.093* (0.045)	-0.092* (0.046)	-0.097* (0.048)
Canada, French		0.096 (0.060)	0.107 (0.061)	0.114 (0.062)
Chile		-0.016 (0.071)	-0.013 (0.071)	-0.008 (0.072)
Denmark		0.029 (0.049)	0.034 (0.049)	0.040 (0.050)
France		0.236** (0.072)	0.235** (0.072)	0.246*** (0.074)
Israel, Jewish		-0.005 (0.049)	-0.001 (0.049)	0.003 (0.049)
Israel, Arab		0.027 (0.077)	0.029 (0.077)	0.049 (0.079)
Italy		0.146* (0.070)	0.152* (0.072)	0.160* (0.072)
Japan		-0.056 (0.048)	-0.038 (0.049)	-0.016 (0.049)
New Zealand		0.068 (0.049)	0.078 (0.049)	0.084 (0.050)
Sweden		0.032 (0.053)	0.038 (0.053)	0.042 (0.054)
UK		0.091 (0.062)	0.086 (0.063)	0.092 (0.063)
<i>Country * Tone</i>				
Brazil			0.075 (0.052)	0.079 (0.053)
Canada, English			-0.009 (0.050)	-0.046 (0.053)
Canada, French			0.098 (0.057)	0.067 (0.059)
Chile			0.027 (0.053)	0.022 (0.055)
Denmark			0.061 (0.049)	0.050 (0.050)
France			0.001 (0.059)	-0.012 (0.061)
Israel, Jewish			0.032 (0.043)	0.036 (0.043)
Israel, Arab			0.001 (0.066)	0.001 (0.068)
Italy			0.046 (0.059)	0.044 (0.059)
Japan			0.111* (0.052)	0.117* (0.053)
New Zealand			0.091 (0.054)	0.087 (0.055)
Sweden			0.091 (0.062)	0.075 (0.063)
UK			-0.036 (0.066)	-0.041 (0.066)
Constant	0.276*** (0.042)	0.282*** (0.048)	0.267*** (0.048)	0.253*** (0.059)
Observations	4,556	4,556	4,556	4,444
R2	0.038	0.047	0.050	0.052

Cells contain coefficients with standard errors in parentheses from a pooled OLS panel model.

^a p < .10; * p < .05; ** p < .01; *** p < .001.