

# Negativity Biases in Reactions to Network News: A Cross-National, Psychophysiological Pilot Study <sup>1</sup>

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This research is focused on the sources of the human tendency to give more weight to negative information than to positive information. The importance of this “negativity bias” in the political sphere 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 a profound effect on the nature and quality of representative democracy. Understanding those effects, and considering their implications for the functioning of democratic politics, and for the design of political institutions, is the objective of this paper, the first step in what we hope will be a much larger cross-national project.

The paper proceeds as follows. First, we discuss in some detail the justification 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 the major consequence of this gap is an inability to distinguish the extent to which negativity biases (here, in political behavior and media consumption) are driven by evolutionary versus cultural factors. The key, we argue, lies in testing for cross-cultural differences in negativity biases. We then present results from what is to our knowledge the first directly comparable cross-national experiment on negativity biases, focusing in this case on psychophysiological responses to television news stories in Canada and Israel.

Results suggest, thus far at least, no significant cross-cultural differences in the way in which citizens respond to negative versus positive news. The Canadian and Israeli contexts vary widely on number of different dimensions, of course — so the absence of differences is rather striking. Results nevertheless, we hope, point to the importance of further cross-national experimentation.

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## Background

Our research question is driven by two widely-recognized features of modern-day political communications:

- A. Mass media news is a central and critical component of large-scale representative democracy. This is certainly a prominent argument in work on media (Martin 2008); but it is evident in theories of representative democracy as well (e.g., *The Federalist Papers*). In short, media provide a critical flow of information between elites and citizens, and are a vital mechanism for democratic accountability.
- B. Negative tone is a defining feature of news. Wars, financial crises, crime, and corruption are the stuff of headlines. Good news, in contrast, is nearly synonymous with the absence of news. This bias in news content 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). But it is equally clear in work on political campaigns in Canada (e.g., Andrew et al. 2006). It is also readily apparent in work on crime and economic news in the US, Canada and elsewhere (e.g., Soroka 2006, 2012).

The nature and quality of mass media news content is thus central to the nature and quality of representative democracy; but 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 how it might change). Why does media content tend to be so negative? Two explanations are most prominent in the literature. One account places the blame for negative political coverage on journalistic norms of cynicism towards public officials, stemming from a general decline of trust towards public figures in the United States (e.g., Sabato 1991; Cappella and Jamieson 1997; Farnsworth and Lichter 2007). In short, the Watergate scandal and the Vietnam war had an indelible and long lasting effect on both the American public and the journalistic culture. This historical events-oriented argument does little to explain why negative and strategic coverage are pervasive outside the US, however. Journalists in other countries may have had similar defining moments, perhaps; and

notions of how to conduct journalism may well have seeped from the US into other countries. But the apparent pervasiveness of negative coverage outside the US does seem to beg for an argument not rooted just in American political history.

Another explanation suggests that the *process* of making news tends to push journalists towards both sensational and negative news frames (see esp. Farnsworth and Lichter 2007; Patterson 1994). This argument revolves around the need for media to present new and exciting things to their audience. For a story to make the cut, it must have something to make it stand out, and framing politics as a horserace, a conflict between politicians, or errors made by individuals in the system, are methods of accomplishing this. This news-process explanation for negative frames is likely more generalizable (that is, more easily applicable outside the US) than the journalistic norms theory. That said, where negativity in media content is concerned, this account depends on the public being more interested in negative coverage.

People are said to be more interested in negative news, so audience-seeking news organizations tend to provide it. But existing survey evidence on individuals' attitudes towards news suggests that media consumers want *less* negative news (West 2001; Lichter and Noyes 1995). Theories of representative democracy suggest that media content designed to appeal to audiences seems to be at odds with consumers' best interests; but work on consumers' stated preferences for news also suggests that media content is at odds with the things that consumers are interested in! This is inherently paradoxical.

There are good reasons to be wary of survey evidence on individuals' preferences in news content. It may be that survey respondents' stated preferences for news content do not accurately reflect their actual news choices. That is, people may *say* they want one kind of news, even as they systematically *select* another. Indeed, there are reasons to believe that our preferences for negative information may be subconscious — we may find ourselves selecting negative stories even as we state that we would like other types of information. The presence of survey responses that decry negative frames in media, even as media consumption seems to point towards a preference for such type of information, reflects this fact (Graber 1984; Neumann 1991). And recent studies show that viewers' psychophysiological reactions are greater for negative news: stories with a negative tone affect both heart rate (attentiveness) and skin conductivity (activation) more strongly (e.g., Soroka and McAdams 2010; Grabe and Kamhawi 2006; Grabe et al. 2000). Similar negative biases have been shown in economic news coverage (Soroka 2006, 2012; Ju 2008), in journalists' decisions more generally (Zhong and Newhagen 2009), in framing effects on public perceptions of peace prospects in Israel (Sheafer and Dvir-Gvirtzman 2010), and in citizens' assess-

ments of governments and leaders (Klein 1991, 1996; Kinder 1978; Goren 2002). Across many domains, people react more strongly to negative information than to positive information.

### Why Are We So Negative?

What accounts for this (quite possibly subconscious) 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 the negativity biases are a product of cultural and institutional contexts.

#### *Universality*

Negativity biases may be a product of evolution. Attention to negativity may be advantageous for survival. Humans monitor the environment in search of threats for their 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 drawn from 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): “Because it is more difficult to reverse the consequences of an injurious or fatal assault than those of an opportunity unpursued, the process of natural selection may also have resulted in the propensity to react more strongly to negative than to positive stimuli” (Cacioppo and Gardner 1999). An apparently universal negativity bias (evident even in animals, see Miller 1961; Garcia and Koelling 1966) has also informed vast bodies of work on impression formation and other issues in psychology, for instance (for reviews, see 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.

There is some work identifying individual-level differences in the negativity bias — Grabe and Kamhawi (2006) find differences across men and women, for instance. But the story seems to be one about the varying strengths of negativity biases, not whether they exist. And the increasingly large bodies of evidence on negativity biases, across a wide range of contexts and behaviours both political and otherwise, do lend support to an evolutionary account. In so doing, they suggest that negativity biases in political behaviour and communication should be

evident around the world. Evolution has produced humans that prioritize negative information over positive information. Evolution has thus also produced political and communication environments that are predominantly negative.

### *Cultural/Institutional Variability*

There may nevertheless be significant cross-cultural differences in negativity biases. We can point towards both (a) psychological and (b) institutional possibilities.

Where psychology is concerned, there is a small body of literature focusing on cultural differences. This is particularly clear in Norenzayan and Heine's (2005) discussion of the lack of cross-cultural tests of what are typically assumed to be "psychological universals." Even so, there is some work directly examining cross-cultural variations on a range of attitudes, 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). This research, alongside meta-analyses of independent studies on these issues (e.g., Mezulis et al. 2004), point towards significant cross-cultural differences, where the main contrast is between what seem to be more optimistic countries in the West (typically the US) and less optimistic countries in the East (typically Japan). (In neurology, see Hot et al. 2006.) Cross-cultural explorations into the negativity bias are thus far relatively rare, though 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.

There is, in short, good reason to believe that the negativity bias may vary systematically across cultures, but thus far little cross-cultural analysis of this possibility. What might account for this cross-cultural variance? Most existing work relies on simple two-culture comparisons, and hypotheses about the nature of different cultures are not often addressed. But there does exist a literature on cultural values that points to some fascinating possibilities. Hofstede's (2001) influential work suggests that cultures can be placed along four dimensions; most salient for this study, he suggests that "uncertainty avoidance" varies systematically across cultures. 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. Hofstede's work has informed an increasing vast literature on comparing cultures on issues such as decision-making, leadership, negotiation, and social networks (for a review, see Kirkman et al. 2006). It has not yet been

used to investigate negativity biases, however; and this is of course just one of several different approaches to categorizing and understanding the impact of cultural difference on political-psychological phenomena.

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. The greater the left-right polarization in a country, for instance, the more media attention among the most educated (Pardos-Prado and Cano 2012); and polarization may increase attentiveness to negative (political) information as well. Another dimension of variability is rooted in the institutionally coded professional practices of journalists around the world. The perceived role of professional journalists towards loci of power varies cross-nationally, from “adversary watchdog” to “government loyalist” (Hanitzsch 2007, 373-374). The more the particular institutional culture of journalism values and praises adversarial coverage of government, the greater the expected negativity in news content. In Denmark or Germany, for example, news stories tend to be framed as a conflict between government and parliament; journalists routinely accord visible coverage to members of the House of Representatives. In majoritarian democracies such as the United Kingdom or Spain, on the other hand, the executive receives a greater proportion of news coverage (van Dalen 2012). In short, a strong professional requirement that journalists routinely cover politics in conflict terms may lead to viewers’ habitual expectation and attention to negativity. (Within-country variations in negativity may also point to differences across cultures; see, e.g., Boomgaarden et al. 2011; Vliegenthart et al. 2008; Schuck and de Vreese 2009.)

Cultural and institutional accounts needn’t be in competition, of course — institutions and cultures are fundamentally intertwined. Journalistic practices, and the structure of governing institutions likely both *reflect* and *affect* culture. In short, there are good reasons to expect that the negativity bias could vary systematically with a combination of cultural and institutional variables.

### Negativity Biases, Across Individuals and Cultural-Institutional Contexts

Indeed, evolutionary and cultural accounts need not be in competition either; it seems likely that negativity biases are conditioned by both evolutionary and cultural factors. Consider work in cultural psychology, for instance, that regularly considers the interaction of both universal and culturally-variant tendencies; recent 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). The goal of the research described here is not to pit one theory against the other,

but to examine the relative importance of these two accounts. Does the negativity bias vary systematically across cultures, and/or political institutions? Answering this will add not just to what we know about the sources of the negativity bias — it will help us understand the extent to which certain media and political institutions are enhancing negativity biases, and, relatedly, whether it might be possible to design institutions in ways that either capitalize upon or minimize the biases evident in political communication and behaviour throughout the world.

That said, we seek to connect variations in the negativity bias not just to cross-national differences in cultures and institutions — we also want to examine the direct, individual-level relationships between the negativity bias and both political preferences and participation. Evidence from the US indicates that social conservatives exhibit greater attention and more pronounced physiological responses to aversive images and startling noises (Oxley et al. 2008; Dodd et al. 2012). Is the same dynamic apparent elsewhere? Are citizens on the right of the political spectrum more sensitive to negative information cross-nationally? Answering this question will shed light on the sources of individuals' political attitudes. It will either add to work suggesting that political preferences may have biological/evolutionary sources, or point to novel individual-level differences across countries. The universality account suggests that a greater negativity bias among right-leaning voters should be apparent worldwide; a cultural variability account leads to opposite — and as-yet totally unexplored — expectations.

We are also concerned with the neglected relationship between sensitivity to negativity and political engagement. Are people who react more strongly to bad news more likely to get involved politically? Or are they more prone to become discouraged and lethargic? Work in US points to the former (Martin 2008), but, again, we have no sense for whether this finding is generalizable worldwide.

One goal of our future work is to examine inter-individual heterogeneity in negativity biases, and to articulate the political relevance of this heterogeneity. In the end, our results are intended to speak not just to the nature and effects of political media information, but to the relevance of the negativity bias in understanding political preferences and behaviour.

For the time being, our aim is somewhat more prosaic: we want to examine negativity biases, using physiological data from lab experiments in both Canada and Israel. It is to these first experiments that we now turn.

## Methodology

Thus far, we have conducted the same lab experiment in both Canada and Israel. We see this as responding — albeit only in part as of yet — 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; see Henrich et al. 2010 for a review).

We propose to capture negativity biases using both psychophysiological and attitudinal measures. 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 2012; Daignault, Soroka and Giasson 2013; Grabe and Kamhawi 2006; Grabe et al. 2000). Physiological measures have the advantage of capturing what may well be subconscious negativity biases. 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 a physiological study followed by a computer-based survey. We outline below details of the experiment, survey, and countries in which we intend to work.

### *The Experiment*

The goal of our experiment is to examine negativity biases in individuals' reactions to real network news content. The experiment we use is based on one already tested in Canada (Soroka and McAdams 2012; Daignault, Soroka and Giasson, 2013). Participants watch a news program on their own, on a large computer monitor in a quiet room, wearing noise-canceling headphones. They are connected to a number of biosensors on one hand, on their face, and around their torso. Sensors capture heart rate, skin conductance, respiration amplitude, and activation of the corrugator and zygomaticus facial muscles. Variations in skin conductance indicate arousal (Simons et al. 1999; Lang et al. 1999, 2000; Bolls et al. 2001; see review in Ravaja 2004). Heart rate is a measure of attentiveness (Lang 1990, 1995; Mulder and Mulder 1981; see also review in Ravaja 2004).

The experiment lasts roughly 25 minutes, during which participants view seven news stories, selected on a variety of topics, political as well as general news, and covering a range of tone, from very positive to very negative. The experiment is run using custom-designed software already developed for previous studies (Soroka and McAdams 2012; Daignault et al. 2013). Indeed, aside from the news stimuli, this experiment is exactly as it has already been fielded, twice, in Canada. The major difference here is that we have fielded the identical experiment with different stimuli, alongside a post-experimental survey, and across two countries. We employ a two-by-two, mixed factorial design, then — varying systematically the tone of news (high vs. low negativity) and participants' country of origin.

Of the seven stories presented to each participant, one was domestic and negative, and one was domestic and positive — all Canadian respondents saw the same

two Canadian stories, and all Israeli participants saw the same two Israeli stories. The remaining five stories were drawn from a sample of eight stories, four positive and four negative, all international. Tone was measured in several ways; here, we rely on second-by-second coding of tone, using a 5-point scale, by three expert coders. The stories themselves are listed in Table 1, alongside short descriptions, the overall tone (positive or negative), the average second-by-second tone evaluated by expert coders and ranging from -2 (very positive) to +2 (very negative), along with the average tone ratings of the experiment's participants on a scale ranging from 1 (very positive) to 7 (very negative).

[Table 1 about here]

Stories were presented in a random order, and separated by 40 seconds of grey screen. News stories were a carefully selected (non-random) sample of real news stories from BBC World News. The advantage of this news source is that it is aimed at a worldwide audience; stories accordingly focus on themes that are of relevance across the countries we wish to examine. Indeed, BBC World News is regularly aired in many of the countries we wish to study — it is as close as we can come to “regular” news across a wide range of countries.

Note that this distribution of stories means that respondents saw varying numbers of positive and negative stories – from two negative and five positive to the opposite, five negative and two positive. Note also that the two domestic stories will be different from one country to the next; and the remaining five were drawn from a sample used in both Canada and Israel. Our objective in this instance is to reap the benefits of both using identical stimuli across countries, and also test for the potential importance of cultural/geographic proximity.

Regarding the latter, we are concerned about the possibility that respondents care more about stories that are more proximate, even local. There is in fact a body of literature suggesting that citizens tend to pay more attention to stories that are more proximate, after all (cites). Our design allows us to test for this possibility. At the same time, the bulk of our stimuli are used across all countries. If there are culture differences in preferences for negativity, then we expect there to be variance in the degree of negativity or positivity in local stimuli. We wish to hold the negativity of stimuli constant, at least for the bulk of our experiment. Hence, we rely on a fixed set of eight stories.

One complication arising from using BBC World News across all countries is that the news source is in English. Our participants must thus understand English, or we must translate the content. (Note that BBC broadcasts news in other languages, but the stories are not the same.) We address this issue using a two-pronged approach. First, our countries are selected in part to allow us to conduct the entire study in English. Second, we explore the possibility of conducting our

work in other languages, thus extending even further our sample of participants. We will do this by examining directly the impact of subtitles on physiological and attitudinal reactions to the experiment. In short, we conduct one set of experiments in Israel with English-speaking Israeli, and another set of experiments with subtitled stories and Israelis with more variable English-language skills. Translations may serve to decrease, or increase, the impact of videos — there is no existing work on this matter to date. (These preliminary studies will accordingly dictate our approach as we move to the larger cross-cultural study.)

Participants were recruited at McGill University and the Hebrew University. Just as there are concerns about US-only samples in most psychological research, there are serious questions about the generalizability of student-based samples (Henrich, Heine and Norenzayan 2010). For this first study, we rely on students, then, but our long-term objective is to use non-student samples. Note also that the number of cases in each country — roughly 50 — is carefully determined. 50 participants provide ample data for psychophysiological experiments in which measures are captured at 1/256-second intervals. This sample size is standard in the discipline (e.g., Amodio et al. 2007; Oxley et al. 2008). And our survey-based inter-individual analyses will eventually rely on many more cases, across many more countries.

[Figures 1 and 2 about here]

Figures 1 and 2 illustrate the way in which our physiological experiment works. The figures are for two different respondents. Each shows results for fEMG data, heart rate, galvanic skin responses, and breathing. Positive stories are shown in light gray; negative stories are slightly darker; and the 40-second breaks between stories (as well as the 2-minute pre-experimental period) are shown in white. Note that the ordering of stories is randomized, and the seven stories are drawn from a sample of ten. Respondent X sees more negative stories than Respondent Y, then, and in a different order as well.

In this preliminary work, we focus just on skin conductance. For skin conductance (SC) analyses, data are originally sampled 256 times per second, but down-sampled for analysis by taking averages over 125-ms intervals. The SC signal is smoothed slightly for analysis, using Lowess smoothing with a bandwidth of .02. Skin conductance measures can tend to decrease over the experiment (a consequence of measurement issues with the electrodes). One option is to detrend the SCL measure (e.g., Soroka and McAdams 2012); here, we simply include the impact of time in our model.

Past work using very similar data has included respondent dummy variables in the analysis. These within-respondent ANOVAs have the advantage of filtering out the differences in skin temperatures across respondents. Of course, the re-

spondent dummies also capture many other respondent characteristics, both demographic and attitudinal. Here, we care about these respondent-level characteristics, in particular, country. Rather than include respondent dummies in our models, then, we use normalized measures of both skin conductance. Normalized measures take, for each respondent, (1) the raw measure, (2) subtract that respondents' mean SCL over the course of the experiment, and (3) divide the results by the standard deviation in SCL over the course of the experiment. Results are in standard units, then, and account not just for the fact that different respondents will have different levels of SCL, but also different variances.

### *The Survey*

After the experiment has been concluded, participants complete a short survey on the same premises. The survey captures basic sociodemographic information, media use, interest in politics, political participation, vote choice, party identification, and ideology (using items from the Wilson-Patterson attitude inventory). These elements allow us to ascertain which individuals are most susceptible to a negativity bias. In terms of political preferences, prior studies have demonstrated that genetic, neurological, and physiological factors are correlated more powerfully to general longstanding attitudes than to specific evanescent attitudes (Alford et al. 2005; Amodio et al. 2007; Oxley et al. 2008; Schreiber et al. 2009; Settle et al. 2009; Dodd et al. 2012). We therefore expect the sensitivity to negativity to exhibit stronger connections to ideology (and to a slightly lesser extent party identification) than to vote choice. The Wilson-Patterson ideological scale has often been used in the context of biopolitical studies (Alford et al. 2005; Oxley et al. 2008; Hatemi et al. 2009; Dodd et al. 2012). We investigate some of these survey-based results alongside the physiological data below.

### *Cultural/Institutional Contexts*

Our broader selection of countries is intended to capture a wide range in the cultural and institutional variables discussed above, including:

1. *Political institutions, particularly electoral systems and party system fractionalization:* We capture the widest possible range in electoral competition, based on Golder's (2005) "effective number of electoral parties" (1 party in China, 7.4 parties in Brazil); we include five single member plurality electoral systems, and ten using varied forms of proportional representation.
2. *Competitive media environments, with and without strong public broadcasters:* We include systems from low levels of media competition (China, Singapore) to very high levels (US); we have countries with strong (UK, Norway) and weak (US) public broadcasters (Hanretty 2010; Soroka et al. 2013).

3. *Perceived roles of professional journalists*: Drawing on existing work classifying journalistic norms from “detached watchdog” to “opportunistic facilitator” (Hanitzsch 2007, 2011; [worldsofjournalism.org](http://worldsofjournalism.org)) we capture the full range of variation in journalists’ views of their jobs (from the US to China).

4. *Cultural attributes*: Relying in the first instance on Hofstede’s path-breaking work (2001; data at [geert-hofstede.com](http://geert-hofstede.com)), we include countries across the full range in “uncertainty avoidance” (“the extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these”) – from Singapore (8/100) to France (86/100).

Note that these variables are orthogonal – there is vast variation across institutional and cultural variables that tend not to be highly correlated. We thus have considerable leverage where multivariate analysis is concerned. This is true when we have a larger sample of countries, at least. For the time being, our leverage is of course rather constrained. We cannot really distinguish which of the following factors matters most with just two cases. Rather, we mention these differences to signal our objectives in future research. For now, our goal is relatively simple: we will explore the possibility that results in Israel are different from results in Canada.

## Results

Our eventual goal is the analysis of a range of psychophysiological measures, alongside survey data, across a wide range of countries. Here, we focus on just a few preliminary questions: (1) Are there differences in skin conductance level (SCL) across the tone of stories in Canada and Israel?, (2) Are there differences in skin conductance across international versus local stories?, and (3) Are there differences in skin conductance when we use subtitles with respondents whose first language is not English?

We take two approaches to analyzing our results. First, we use relatively simple within-respondent analyses of covariance (ANCOVA) of SCL, averaged over entire stories. Each respondent-story combination is a case, and we are interested in the possibility that negative stories lead to different levels of activation and attentiveness than positive stories. Second, we analyse our data in 5-second intervals. There is, as we shall see, real variation in the tone of stories. We can (and do) capitalize on this variation by analyzing the data in smaller intervals.

### *The Dependent Variable*

Our analyses focus on within-respondent variations in standardized skin conductance. That said, there are several approaches to standardizing skin conductance levels, and we discuss our approach in some detail here. We standardize skin con-

ductance as follows. First, we take the mean skin conductance in the first 2-minutes of grey screen in the experiment. This is treated as the baseline skin conductance for each respondent. We then take the total variance in skin conductance for each respondent, and convert his or her skin conductance measures into standard-deviation variations from the baseline value.

Note that this form of standardization takes account of the fact that respondents will have varying levels of skin conductance. Using the 2-minute baseline is just one way of capturing these different levels — we might use the 2-minute baseline alongside each of the 40-second windows between stories, or we might use the average level for the entire experiment. These other methods make little difference to our results, however. What we want to focus on here is just that we do not regard an increase or decrease relative to the baseline as an indication of the impact of television stories relative to no television stories in respondents' regular daily lives. Being connected to a machine in a lab probably produces rather different (i.e., higher) skin conductance levels than sitting in your living room. What is most important for our purposes, then, is the difference in skin conductance levels of a respondent across positive and negative stories. Where these two levels are anchored in relation to the baseline is less important.

Note also that this form of standardization assumes that every individual reaches their (near-)maximum and (near-)minimum skin conductance levels during the experiment. That is, we calculate standard deviations in skin conductance based on our observations of each respondent, and in so doing assume that whatever we have measured captures “high” and “low” skin conductance for that individual. This may or may not be true. If someone is only partly interested, after all, we may be observing only a narrow range of the potential variation. We suspect that this is rarely the case. Nevertheless, we should make clear that what we have here is based on standardizing the variation that we observe, which is likely to — but may not — capture high- and low-activation for each participant.

### *Story-Level Analyses*

Our story-level analysis is relatively simple. We first model average SCL as a function of the following:

- (1) an ordinal variable representing the order of presentation of the stories, to capture the possibility that respondents' reactions change based on the number of stories they have seen thus far (1 to 7);
- (2) a country dummy (Israel=1), to capture differences in levels across countries;
- (3) a local dummy (local=1), to capture the impact of local versus international stories;

- (4) a subtitles dummy (subtitles=1), to capture differences in levels for stories with subtitles;
- (5) an interval-level measure of negativity, based on the average of by-second tone of stories (see the penultimate column of Table 1);
- (6) and a series of interactions allowing for variations in the impact of negativity across variables 1 through 4.

Table 2 shows results of the analysis. For these first analyses, we produce separate models for Canada and Israel. Doing so allows all variables (and interactions) to vary across national contexts – though in time we expect to produce models that include all countries, alongside tests of the relevant country-level interactions. The left columns show the partial sums of squares from an ANCOVA, while the right columns show the corresponding OLS regression coefficients.

[Table 2 about here]

As found in past work, negative stories lead to higher average skin conductance levels (and skin conductance declines over the course of the experiment more modestly when stories are negative). This is clearly the case in Canada, at least – in Israel the direct effect of negativity is insignificant. Given the number of interactions in Table 2, however, the impact of negativity is difficult to visualize. Figure 3 plots the estimated impact of negative versus positive stories, holding other variables constant. The figure makes clear both that skin conductance is higher for negative stories in both countries, though the difference is significant here only in Canada, where negative stories produce skin conductance levels that are about .2 standard deviations higher than positive stories (as opposed to about .15 standard deviations higher in Israel).

[Figures 3 and 4 about here]

Figure 4 illustrates the impact of local stories (by levels of negativity). The interaction between local stories and negativity has quite different effects in Canada and Israel. Canadians appear to be more interested in the positive local story than in positive foreign stories, but the difference disappears for negative stories – where foreign stories become more activating. Israelis are in contrast more interested in local stories, and particularly negative ones. The fact that negativity may matter differently for local versus foreign stories is critical to our experiment, since using the same stimuli across countries requires that we rely mainly on international stories. But we are not sure how much we can generalize from these estimations, given that we have just one negative and positive local story in each experiment. It may be that the particular positive and negative stories produce peculiar results. Uncovering this possibility will require further experimentation.

[Figure 5 about here]

Figure 5 shows how the influence of tone is affected by the presence of subtitles. Hebrew subtitles on English-language stories tend to enhance, rather than diminish, reactions of Israeli participants to negativity; even though the effort expended on following subtitles shifts the gaze and distracts from the unfolding of images on the screen. It may be that the additional impact of understanding the stories better outweighs whatever distraction subtitles create. This is pure conjecture at this stage, however. Moreover, results are only suggestive – neither the interaction of subtitles with tone nor the direct effect of subtitles on skin conductance is statistically significant in this model.

### *5-second Analyses*

Story-level analyses have the advantage of being relatively simple, statistically speaking. They mask the fact there is a good deal of variation in tone within stories, however. Figure 6 shows 5-second means of by-second tone, coded by and averaged across three expert coders. Vertical dashed lines show 95-percent confidence intervals, based on the three sets of codes. There are larger confidence intervals as stories change tone — largely a consequence of coders selecting slightly different seconds in which to change their codes. Even so, there are clear trends within the articles. Positive stories do tend to be positive most of the time; negative stories similarly tend to be negative most of the time. But there are times when the tone is clearly neutral in each.

[Figure 6 about here]

We can capitalize on this variation by analysing our data in 5-second intervals. (5-second intervals are relatively common in the existing literature, since they tend to capture physiological changes that may not be immediate.) Table 3 shows a re-estimation of our models using these 5-second data. The structure of 5-second data requires a somewhat different specification, however. Now our data are powerfully related over time — any given value in our dependent variable is highly correlated with its value in the previous period. We deal with this by “differencing” our dependent variable: we now predict *changes* in skin conductance, from one 5-second period to the next. We add to the model lagged levels of skin conductance, to control for the fact that upward changes are less likely when skin conductance is already high. We also move to a more dynamic measure of negativity — here, changes in the average by-second negativity in the current and preceding 5-second periods. Negativity thus captures changes in a ten-second rolling average. The rest of the model is identical to the models of story-level analyses.

[Table 3 about here]

ANCOVA results confirm that negativity tends to be positively related to skin conductance, in both countries. Again, the impact of negativity is difficult to discern in the table, so we illustrate the results in Figures 7 and 8. These largely mirror what we have seen in Figures 3 and 4 — in spite of the fact that we are now focused on changes over 5-second intervals. In this case, the difference between negative and positive stories is significant in both countries (Figure 7); and, again, Israelis are clearly more activated by the local stories, while Canadians are less so (Figure 8). We see this repetition of results as powerful indications of the difference that negativity makes to skin conductance.

[Figures 7, 8 and 9 about here]

In Figure 9, we re-examine the relevance of subtitles with the 5-second model. Positive and negative stories produce significantly higher skin conductance when they are subtitled; suggesting that precise comprehension of the narrative track boosts emotional activation. The contrast between positive and negative stories in skin conductance is also slightly larger when subtitles are shown, though this interaction is again not significant. While the negativity bias is not absent without subtitles, the importance of language proficiency warrants further exploration before we move to a widely comparative setting. Consequently, we will replicate the Canadian experiment among Francophones who have difficulty with English, and randomly allocate subtitles. These findings also invite speculation about the practices of different countries with regard to subtitling vs. dubbing. It may well be that the pattern among French-speaking Canadians will be the opposite of the one observed among Israelis, because English programming in French Canada tends to be dubbed rather than subtitled, and people may not be used to reading text on screen.

## Conclusions

We regard the preceding results as preliminary, but illustrative of the potential (and need) for further work. Thus far, we have found some similarities in the way in which Canadians and Israelis react to negative information. In spite of significant cultural and media-institutional differences, not to mention quite different information environments where negativity (and particularly military threat) is concerned, we find that Canadians and Israelis react more (and roughly the same amount more) to negative stories. These results may point to the relative strength of the universality rather than the cultural account of negativity biases.

That said, our results are very preliminary. We have looked only at one physiological measure thus far, and heartrate and EMG data, not to mention survey responses, may reveal greater cross-national differences. (Activation may be equal across countries, but attentiveness may not, for instance.) We also have looked at two countries that are different on some but not all the relevant dimensions. The

Israeli information environment is likely quite different from the Canadian one; but we can certainly shift to countries in which there is greater variation in journalistic practises, for instance, and information environments that are markedly more negative. These extensions are certainly critical if we are going to settle the issue of universality versus cultural variability in negativity biases.

We also have not delved at all into the possibility that survey questions capture important sources of heterogeneity in negativity biases – and, correspondingly, the possibility that this heterogeneity varies systematically across cultural contexts. These too are important extensions of the work presented here – and the objective of our future work. For the time being, our results point to the possibility of universality rather than cultural variability. We are hopeful that additional work will both further test this possibility, and capture a much broader range of the issues related to, and resulting from, negativity biases in political behaviour and communication.

## Bibliography

- Abalakina-Papp, Marina, Cookie White Stephan, Walter G. Stephan, Tatyana Stepanyenko and Cristina Gabrieldidis. 2001. "Memory for Cultural Information About Russia and the United States." *Journal of Cross-Cultural Psychology* 32(1): 32-42.
- Alford, John R., Carolyn L. Funk, & John R. Hibbing. 2005. "Are Political Orientations Genetically Transmitted?," *American Political Science Review*, 99: 153-168.
- Amodio, David M., John T. Jost, Sarah L. Master & Cindy M. Yee. 2007. "Neurocognitive Correlates of Liberalism and Conservatism", *Nature Neuroscience*, 10: 1246-1247.
- Andrew, Blake, Antonia Maioni and Stuart Soroka. 2006. "Just When You Thought It Was Out, Policy Is Pulls Back In." *Policy Options* (March 2006).
- Baumeister, Roy F., Ellen Bratslavsky, Catrin Finkenauer, and Kathleen D. Vohs. 2001. "Bad is Stronger than Good." *Review of General Psychology* 5(4): 323-70.
- Blumer, J.G. and Gurevitch, M. 1995. *The Crisis of Public Communication*. London: Routledge.
- Bolls, Paul D., Annie Lang, and Robert F. Potter. 2001. "The Effects of Message Valence and Listener Arousal on Attention, Memory, and Facial Muscular Responses to Radio Advertisements." *Communication Research* 28(5): 627-651.
- Boomgaarden, H. G., van Spanje, J., Vliegthart, R., & de Vreese, C. H. 2011. Covering the crisis: Media coverage of the economic crisis and citizens' economic expectations. *Acta Politica*, 46, 353-379.
- Brown, Jonathan D, Juajian Cai, Mark A. Oakes, Ciping Deng. 2009. "Cultural Similarities in Self-Esteem Functioning." *Journal of Cross-Cultural Psychology* 40(1): 140-157.
- Cacioppo, John T., and Wendi L. Gardner. 1999. "Emotion." *Annual Review of Psychology* 50: 191-214.
- Cappella, J. N. and Jamieson, K. H. 1997. *Spiral of cynicism: The press and the public good*. New York: Oxford.
- Carmon, Ziv and Dan Ariely. 2000. "Focusing on the Forgone: Why Value Can Appear So Different to Buyers and Seller." *Journal of Consumer Research* 27: 360-70.
- Cavalli-Sforza, L. & Feldman, M. 1981. *Cultural transmission and evolution: a quantitative approach*. Princeton, NJ: Princeton University Press.
- Chang, Edward C. and Kiyoshi Asakawa. 2003. "Cultural Variations on Optimistic and Pessimistic Bias for Self Versus a Sibling: Is there Evidence for Self-Enhancement in the West for for Self-Criticism in the East When the Referent Group is Specified?" *Journal of Personality and Social Psychology* 84(3): 569-581.
- Chiao, Joan Y. and Katherine D. Blizinsky. 2010. "Culture-gene coevolution of individualism-collectivism and the serotonin transporter gene." *Proceedings of the Royal Society B* 277: 529-537.
- Hanretty, Chris. 2010. "Explaining the De Facto Independence of Public Broadcasters." *British Journal of Political Science*, 40: 75-89.
- Daignault, Penelope, Stuart Soroka and Thierry Giasson. 2013. "The Perception of Political Advertising During An Election Campaign: A Preliminary Study of Cognitive and Emotional Effects," forthcoming in the *Canadian Journal of Communication*.

- Dehaene, Stanislas, Michael I. Posner, and Don M. Tucker. 1994. "Localization of a Neural System for Error Detection and Compensation." *Psychological Science* 5: 303-5.
- Diener, E., Diener, M., & Diener, C. 1995. "Factors predicting the subjective well-being of nations." *Journal of Personality and Social Psychology*, 69, 851-864.
- Dodd, Michael, Amanda Balzer, Carly Jacobs, Michael Gruszczynski, Kevin Smith, & John Hibbing. 2012. "The Left Rolls with the Good, The Right Confronts the Bad: Physiology and Cognition in Politics", *Philosophical Transactions of the Royal Society*, 367: 640-649.
- Edelman, M. 1987. *Constructing the Political Spectacle*. Chicago: University of Chicago Press.
- Farnsworth, S.J., Lichter, S.R. 2007. *The Nightly News Nightmare: television coverage of U.S. presidential elections, 1988-2004*. New York: Rowman & Littlefield.
- Garcia, John, and Robert A. Koelling. 1966. "Relation of Cue to Consequence in Avoidance Learning." *Psychonomic Science* 4: 123-24.
- Gehring, William J., Brian Goss, Michael G.H. Coles, David E. Meyer, and Emanuel Donchin. 1993. "A Neural System for Error Detection and Compensation." *Psychological Science* 4(6): 385-90.
- Golder, Matt. 2005. "Democratic Electoral Systems Around the World, 1946-2000," *Electoral Studies*, 24: 103-121.
- Goren, Paul. 2002. "Character Weakness, Partisan Bias, and Presidential Evaluation." *American Journal of Political Science* 46(3): 627-41.
- Grabe, M. E. & Kamhawi, R. (2006). Hard wired for negative news? Gender differences in processing broadcast news. *Communication Research*, 33 (5) 346-369.
- Grabe, M. E., Lang, A., Zhou, S., & Bolls, P. 2000. Cognitive access to negatively arousing news: An experimental investigation of knowledge gap. *Communication Research*, 27, 3-26.
- Graber, D. 1984. *Processing the News*, New York: Longman.
- Grossman, Igor, Phoebe C. Ellsworth, and Ying-yi Hong. 2011. "Culture, Attention and Emotion." *Journal of Experimental Psychology: General* 141(1):31-6.
- Hanitzsch, Thomas. 2007. Deconstructing journalism culture: Towards a universal theory. *Communication Theory*, 17 (4), 367-385.
- Hanitzsch, Thomas. 2011. Populist disseminators, detached watchdogs, critical change agents and opportunist facilitators: Professional milieus, the journalistic field and autonomy in 18 countries. *International Communication Gazette* 73 (6): 477-494.
- Hatemi, Peter K., Sarah E. Medland & Lindon J. Eaves. 2009. "Do Genes Contribute to the Gender Gap?", *Journal of Politics*, 71: 262-276.
- Heine, Steven J. 2004. "Positive Self-Views: Understanding Universals and Variability Across Cultures." *Journal of Cultural and Evolutionary Psychology* 2(1-2): 109-122.
- Heine, Steven J. and Darrin R. Lehman. 1995. "Cultural Variation in Unrealistic Optimism: Does the West Feel More Invulnerable Than the East?" *Journal of Personality and Social Psychology* 68(4): 595-607.
- Henrich, J., Heine, S. J., & Norenzayan, A. 2010. "The weirdest people in the world?" (Target Article, Commentaries, and Response). *Behavioral and Brain Sciences* 33: 61-83, 111-135.
- Hofstede, G. 2001. *Culture's consequences: Comparing values, behaviors, institutions and*

- organizations across nations*. Thousand Oaks, CA: Sage (2<sup>nd</sup> Edition).
- Hot, Pascal, Yasuhiko Saito, Osamu Mandai, Toshinori Kobayashi and Henrique Sequeira. 2006. "An ERP investigation of emotional processing in European and Japanese individuals." *Brain Research* 1122: 171-178.
- Hunt, Pamela S., and Byron A. Campbell. 1997. "Autonomic and Behavioral Correlates of Appetitive Conditioning in Rats." *Behavioral Neuroscience* 111(3): 494-502.
- Ju, Y. (2008). The asymmetry in economic news coverage and its impact on public perceptions in South Korea. *International Journal of Public Opinion Research*, 22, (2) 237-249.
- Kahneman, Daniel, and Amos Tversky. 1979. "Prospect Theory: An Analysis of Decision Under Risk." *Econometrica* 47(2): 263-92.
- Kahneman, Daniel, Jack L. Knetsch, and Richard H. Thaler. 1990. "Experimental Tests of the Endowment Effect and the Coase Theorem." *Journal of Political Economy* 98(6): 1325-48.
- Kinder, Donald R. 1978. "Political Person Perception: The Asymmetrical Influence of Sentiment and Choice on Perceptions of Presidential Candidates." *Journal of Personality and Social Psychology* 36(8): 859-71.
- Kirkman, Bradley L., Kevin B. Lowe and Cristina B. Gibson. 2006. "A Quarter Century of 'Culture's Consequences': A Review of Empirical Research." *Journal of International Business Studies* 37(3): 285-320.
- Klein, Jill G. 1991. "Negativity Effects in Impression Formation: A Test in the Political Arena." *Personality and Social Psychology Bulletin* 17: 412-18.
- Klein, Jill. 1996. "Negativity in Impressions of Presidential Candidates Revisited: The 1992 Election." *Personality and Social Psychology Bulletin* 22(3): 288-95.
- Lang, Annie. 1990. "Involuntary Attention and Physiological Arousal Evoked by Structural Features and Emotional Content in TV Commercials." *Communication Research* 17(3): 275-299.
- Lang, Annie. 1995. "What Can the Heart Tell Us About Thinking?" In *Measuring Psychological Responses to Media*, edited by Annie Lang, 99-112. Hillsdale, NJ: Lawrence Erlbaum.
- Lang, K. and Lang, G. 1966. "The Mass Media and Voting" in B. Berelson and M. Janowitz (eds), *Reader in Public Communication*. New York: Free Press.
- Lang, K. and Lang, G. 1968. *Politics and Television*, Chicago: Quadrangle.
- Lang, Lang, A., Bolls, P., Potter, R. F., & Kawahara, K. 1999. "The effects of production pacing and arousing content on the information processing of television messages." *Journal of Broadcasting & Electronic Media*, 43: 451-475.
- Lang, Annie, Shuhua Zhou, Nancy Schwartz, Paul D. Bolls, and Robert F. Potter. 2000. "The Effects of Edits on Arousal, Attention, and Memory for Television Messages: When an Edit Is an Edit Can an Edit Be Too Much?" *Journal of Broadcasting & Electronic Media* 44(1): 94-109.
- Lichter, S.R. and Noyes, R.E. 1995. *Good Intentions Make Bad News: Why Americans Hate Campaign Journalism*, Lanham MD: Rowman and Littlefield.
- Livingstone, Sonia. 2003. "On the Challenges of Cross-National Comparative Media Research." *European Journal of Communication* 18: 477-500.

- Luu, Phan, Paul Collins, and Don M. Tucker. 2000. "Mood, Personality, and Self-Monitoring: Negative Affect and Emotionality in Relation to Frontal Lobe Mechanisms of Error Monitoring." *Journal of Experimental Psychology: General* 129(1): 43-60.
- Martin, Paul S. 2008. The mass media as sentinel: Why bad news about issues is good news for participation. *Political Communication*, 25 (2) 180-193.
- Mezulis, Amy H., Lyn Y. Abramson, Janet S. Hyde, Benjamin L. Hankin. 2004. "Is There a Universal Positivity Bias in Attributions? A Meta-Analytic Review of Individual, Developmental, and Cultural Differences in the Self-Serving Attributional Bias." *Psychological Bulletin* 130(5): 711-747.
- Miller, N.E. 1961. "Some Recent Studies on Conflict Behavior and Drugs." *American Psychology* 16: 12-24.
- Miltner, Wolfgang H.R., Cristoph H. Braun, and Michael G.H. Coles. 1997. "Event-Related Brain Potentials Following Incorrect Feedback in a Time-Estimation Task: Evidence for a 'Generic' Neural System for Error Detection." *Journal of Cognitive Neuroscience* 9(6): 788-98.
- Mulder, G., and L. J. M. Mulder. 1981 "Information Processing and Cardiovascular Control." *Psychophysiology* 18(4): 392-402.
- Neuman, R.W. 1991. *The Future of the Mass Audience*, Cambridge: Cambridge University Press.
- Newhagen, J., & Reeves, S. 1992. The evening's bad news: Effects of compelling negative television news images on memory. *Journal of Communication*, 42 (2), 25-41.
- Newton, K. 2006. "May the weak force be with you: The power of the mass media in modern politics". *European Journal of Political Research* 45: 209-234.
- Norenzayan, Ara and Steven J. Heine. 2005. "Psychological Universals: What Are They and How Can We Know." *Psychological Bulletin* 131(5): 763-784.
- Öhman, Arne, Alfons Hamm, and Kenneth Hugdahl. 1998. "Cognition and the Autonomic Nervous System: Orienting, Anticipation, and Conditioning." See Cacioppo et al 1998. In press.
- Oishi, Shigehiro, Ed Diener, Dong-Won Choi, Chu Kim-Prieto and Incheol Choi. 2007. "The Dynamics of Daily Events and Well-Being Across Cultures: When Less is More." *Journal of Personality and Social Psychology* 93(4): 685-698.
- Oishi, Shigehiro. 2002. "The Experiencing and Remembering of Well-Being: A Cross-Cultural Analysis." *Personality and Social Psychology Bulletin* 28(10): 1398-1406.
- Oxley, Douglas R., Kevin B. Smith, John Alford, Matthew V. Hibbing, Jennifer L. Miller, Mario Scalora, Peter K. Hatemi, & John R. Hibbing. 2008. "Political Attitudes Vary with Physiological Traits", *Science*, 321: 1667-1670.
- Pardos-Prado, S., & Cano, F. 2012. Education and media exposure across systemic levels of conflict. *International Journal of Public Opinion Research*. Forthcoming.
- Patterson, T.E. 1994. *Out of Order*. New York: Vintage Books.
- Price, Vincent, Lilach Nir, and Joseph N. Cappella. 2005. "Framing public discussion of gay civil unions." *Public Opinion Quarterly* 69: 179-212.
- Ravaja, Niklas. 2004. "Contributions of Psychophysiology to Media Research: Review and Recommendations." *Media Psychology* 6(2): 193-235.
- Robinson M.J. and Sheehan, M.A. 1983. *Over the Wire and on TV: CBS and UPI in Campaign 80'*. New York: Russell Sage Foundation.

- Rogers, A. R. 1988. "Does Biology Constrain Cultures?" *American Anthropology* 90: 819-831.
- Rozin, Paul, and Edward B. Royzman. 2001. "Negativity Bias, Negativity Dominance, and Contagion." *Personality and Social Psychology Review* 5(4): 296-320.
- Sabato, L. 1991. *Feeding Frenzy: How Attack Journalism Has Transformed American Politics*. New York: The Free Press.
- Schreiber, Darren, Alan N. Simmons, Christopher T. Dawes, Taru Flagan, James H. Fowler, & Martin P. Paulus. 2009. "Red Brain, Blue Brain: Evaluative Processes Differ in Democrats and Republicans", Paper presented at the Annual Meeting of the American Political Science Association.
- Schuck, A. R. T., & de Vreese, C. H. 2009. Reversed mobilization in referendum campaigns: How positive news framing can mobilize the skeptics. *International Journal of Press/Politics*, 14 (1), 40-66.
- Segall, M. H., Campbell, D. T. & Herskovits, M. J. 1966. *The influence of culture on visual perception*. Bobbs-Merrill.
- Settle, Jaime E., Christopher T. Dawes, & James H. Fowler. 2009. "The Heritability of Partisan Attachment", *Political Research Quarterly*, 62: 601-613.
- Sheafer, T. & Dvir-Gvirsman, S. 2010. The spoiler effect: Framing attitudes and expectations toward peace. *Journal of Peace Research* 47 (2), 205-215.
- Shoemaker, P. 1996. Hard wired for news: Using biological and cultural evolution to explain the surveillance function. *Journal of Communication*, 46 (3), 32-47.
- Simons, Robert F., Benjamin H. Detenber, Thomas M. Roedema, and Jason E. Reiss. 1999. "Emotion Processing in Three Systems: The Medium and the Message." *Psychophysiology* 36(5): 619-627.
- Smith, N. K., Cacioppo, J. T., Larsen, J. T., & Chartrand, T. L. 2003. "May I have your attention, please: Electrocortical responses to positive and negative stimuli." *Neuropsychologia* 41: 171-183.
- Smith, Kevin B., Levente Littvay, Chris Larimer, and John R. Hibbing. 2007. "Evolutionary Theory and Political Leadership: Why Certain People Do Not Trust Decision Makers." *Journal of Politics* 69(2): 285-99.
- Soroka Stuart, Blake Andrew, Toril Aalberg, Shanto Iyengar, James Curran et al. 2013. "Auntie Knows Best? Public Broadcasters and Current Affairs Knowledge," forthcoming in the *British Journal of Political Science*, 43(4): 719-739.
- Soroka, Stuart. 2006. Good news and bad news: Asymmetric responses to economic information. *Journal of Politics*, 68 (2), 372-385.
- Soroka, Stuart. 2012. "The Gatekeeping Function: Distributions of Information in Media and the Real World," *The Journal of Politics* 74(2); 514-528.
- Soroka, Stuart, and Stephen McAdams. 2012. "News, Politics and Negativity," Working Paper 2012s-14, CIRANO, Scientific Series.
- Taylor, Shelley E. 1991. "Asymmetrical Effects of Positive and Negative Events: The Mobilization-Minimization Hypothesis." *Psychological Bulletin* 110(1): 67-85.
- Thaler, Richard. 1980. "Toward a Positive Theory of Consumer Choice." *Journal of Economic Behavior & Organization* 1(1): 39-60.
- Tversky, Amos, and Daniel Kahneman. 1991. "Loss Aversion in Riskless Choice: A Reference dependent Model." *Quarterly Journal of Economics* 106(4): 1039-61.
- Van Dalen, A. 2012. Structural bias in cross-national perspective: How political systems and journalism cultures influence government dominance in the news. *The In-*

- ternational Journal of Press/Politics*, 17 (1), 32-55.
- Vliegthart, R., Schuck, A. R. T., Boomgaarden, H. G., & de Vreese, C. H. 2008. News coverage and support for European integration, 1990-2006. *International Journal of Public Opinion Research*, 20 (4), 415-439.
- West, D.M. 2001. *The Rise and Fall of the Media Establishment*. New York: Bedford/St.Martin's.
- Zhong, B. & Newhagen, J. E. 2009. How journalists think while they write: A trans-cultural model of news decision making. *Journal of Communication*, 59, 587-608.

Table 1. Experimental Stimuli

ID	Title	Description	Tone	Coder Negativity	Participant Negativity
<i>Domestic Stories</i>				(-2 to +2)	(1 to 7)
<i>Canada</i>					
21	Magnotta	Serial killer is caught and returned to Canada	negative	0.96	6.02
22	Lottery	Group of workers win lottery	positive	-1.06	1.88
<i>Israel</i>					
23	Ultra Orthodox	Ultra orthodox Jews protest against education for girls	negative	0.95	5.49
24	Dog TV	Television programming created for dogs	positive	-0.89	1.41
<i>International Stories</i>					
11	Peru	Small town of Chimbote burns down	negative	1.07	5.05
12	May Day	May Day protests following economic downturn	negative	0.58	4.42
13	Niger	Food Shortages in Niger	negative	1.26	5.61
14	UN Sri Lanka	UN investigations in war crimes in Sri Lanka	negative	1.31	5.68
15	Gorillas	Gorillas released into wild	positive	-0.98	1.81
16	Folding Car	New electric, folding car intended to reduce congestion	positive	-0.49	1.48
17	Young Director	11-yr old makes stop-motion films	positive	-1.23	1.25
18	Cured Liver	Young child recovers from liver disease	positive	-0.68	1.59

Table 2. Story-level analyses

## Canada

ANCOVA				OLS Regression	
	Partial SS	df	F	Raw Coeff.	
Model	39.75	5	15.44***		
Negative tone	6.01	1	11.68***	Negative tone	.386 (.086)***
Local	2.34	1	4.55**	Local	.166 (.078)*
Local*Negative	3.32	1	6.45**	Local*Negative	-.197 (.078)**
Order	31.00	1	60.22***	Order	.139 (.018)***
Order*Negative	5.60	1	60.22***	Order*Negative	-.059 (.018)***
Residual	213.13	414		Constant	-.641 (.084)
Total	252.88	419		R-squared	.157

N=420 \* p &lt; .05, \*\* p &lt; .01, \*\*\* p &lt; .001

## Israel

ANCOVA				OLS Regression	
	Partial SS	df	F	Raw Coeff.	
Model	35.68	7	11.08***		
Negative tone	.166	1	.36	Negative tone	-.056 (.089)
Local	7.42	1	16.13***	Local	.296 (.073)***
Local*Negative	1.53	1	3.34*	Local*Negative	.143 (.048)*
Order	22.16	1	48.18***	Order	.115 (.017)***
Order*Negative	.208	1	.45	Order*Negative	.011 (.017)
Subtitles	.942	1	2.05	Subtitles	.099 (.070)
Subtitles*Negativ	.369	1	.80	Subtitles*Negative	.063 (.071)
Residual	189.48	412		Constant	-.631 (.089)
Total	225.16	419		R-squared	.159

N=420 \* p &lt; .05, \*\* p &lt; .01, \*\*\* p &lt; .001

Table 3. 5-second interval-level analyses

Canada

ANCOVA				OLS Regression	
	Partial SS	df	F	Raw Coeff.	
Model	18.37	6	52.31***		
Lagged SCL	17.87	1	300.16***	Lagged SCL	-.045 (.002)***
Negative tone	.224	1	3.83*	Negative tone	.016 (.006)*
Local	.303	1	.52	Local	-.004 (.006)
Local*Negative	.015	1	.26	Local*Negative	-.006 (.013)
Time	.389	1	6.64**	Time	.000 (.000)**
Time story	.677	1	11.56***	Time story	-.000 (.000)***
Residual	664.43	11353		Constant	-.011 (.006)
Total	382.80	11359		R-squared	.027

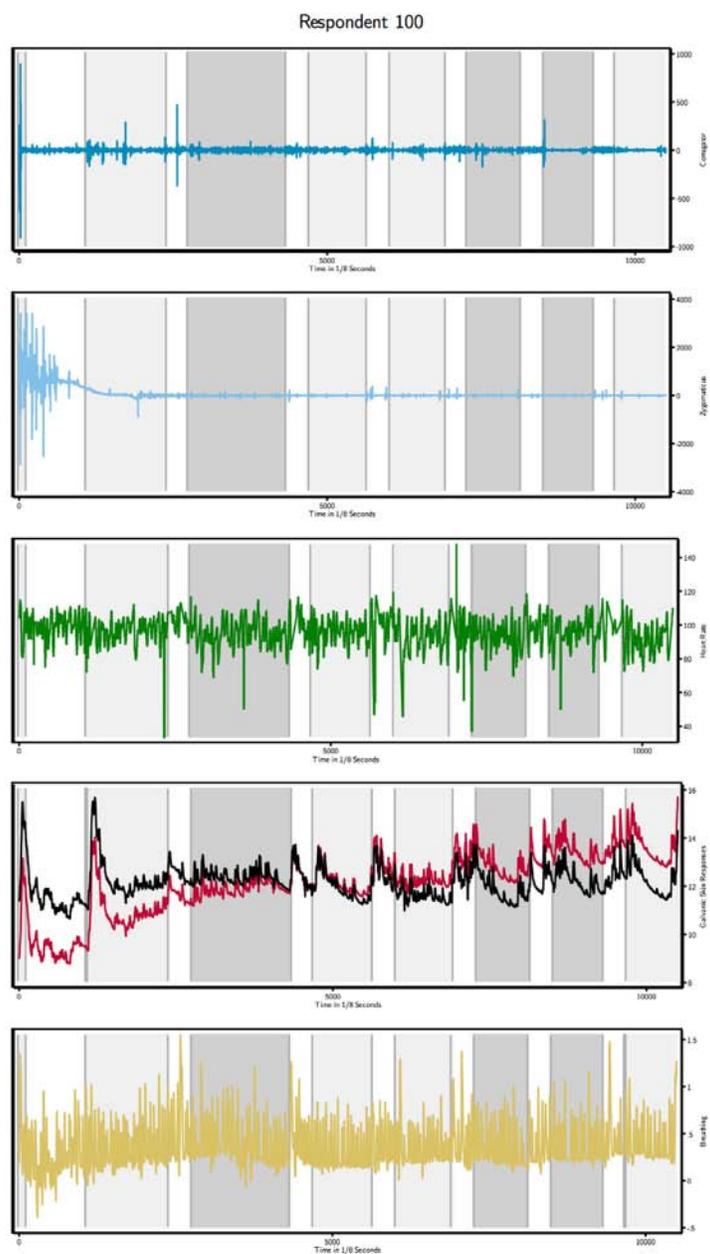
N=11360 \* p < .05, \*\* p < .01, \*\*\* p < .001

Israel

ANCOVA				OLS Regression	
	Partial SS	df	F	Raw Coeff.	
Model	25.94	8	48.57***		
Lagged SCL	24.98	1	374.19***	Lagged SCL	-.053 (.003)***
Negative tone	.335	1	5.03*	Negative tone	.008 (.010)
Local	.542	1	8.13**	Local	.015 (.005)**
Local*Negative	.034	1	.55	Local*Negative	.011 (.015)
Subtitles	.49	1	7.34**	Subtitles	.013 (.005)**
Subtitles*Negativ	.02	1	.33	Subtitles*Negative	.007 (.012)
Time	.54	1	8.07**	Time	.000 (.000)**
Time story	2.38	1	35.71***	Time story	-.001 (.000)***
Residual	801.77	12011		Constant	-.022 (.007)**
Total	827.71	12013		R-squared	.031

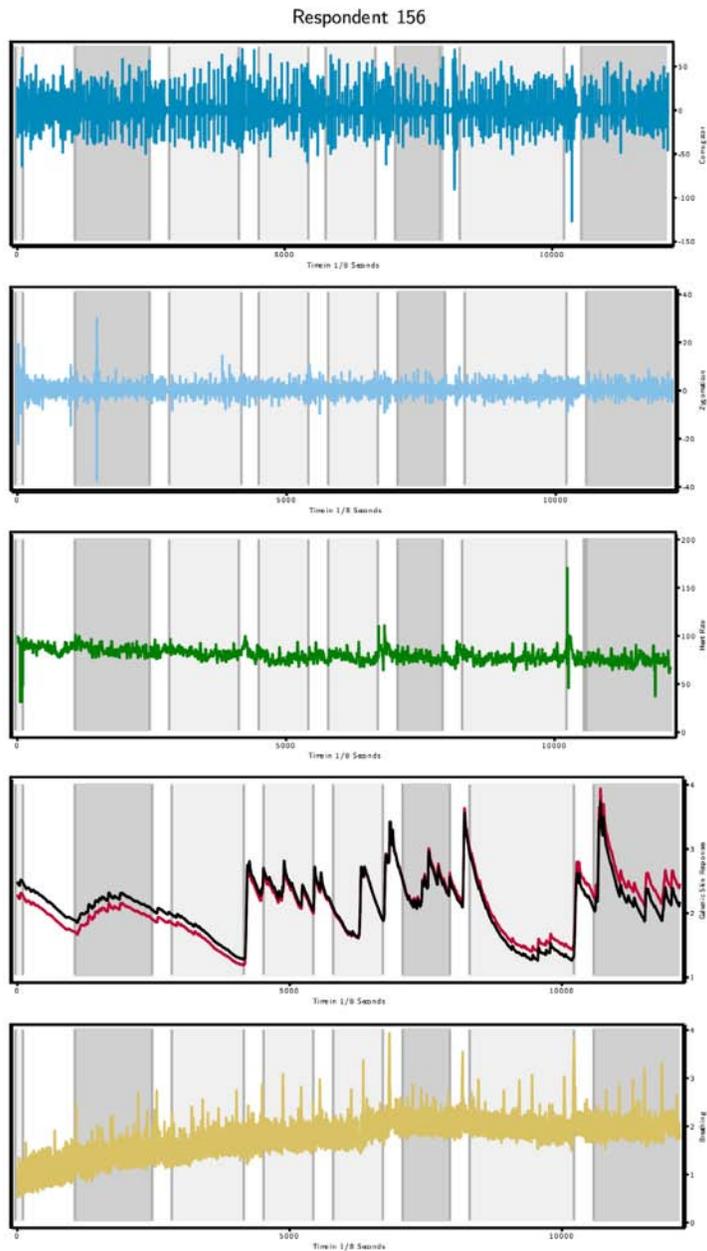
N=12020 \* p < .05, \*\* p < .01, \*\*\* p < .001

Figure 1. Respondent 100



fEMG data (blue) are in their raw form; heart rate (green) is extracted from the unsmoothed raw signal; skin conductance, based on a smoothed signal, is shown in both the de-trended (black) and not de-trended (red) form; breathing (yellow) is shown as a raw signal. Grey lines denote the beginning and end of stories, including the shift from baseline to stimulus. The tone of stories is indicated by the background color, where positive is light grey and negative is darker grey.

Figure 2. Respondent 156



FEMG data (blue) are in their raw form; heart rate (green) is extracted from the unsmoothed raw signal; skin conductance, based on a smoothed signal, is shown in both the de-trended (black) and not detrended (red) form; breathing (yellow) is shown as a raw signal. Grey lines denote the beginning and end of stories, including the shift from baseline to stimulus. The tone of stories is indicated by the background color, where positive is light gray and negative is darker gray.

Figure 3. The impact of tone on skin conductance, story-level analyses

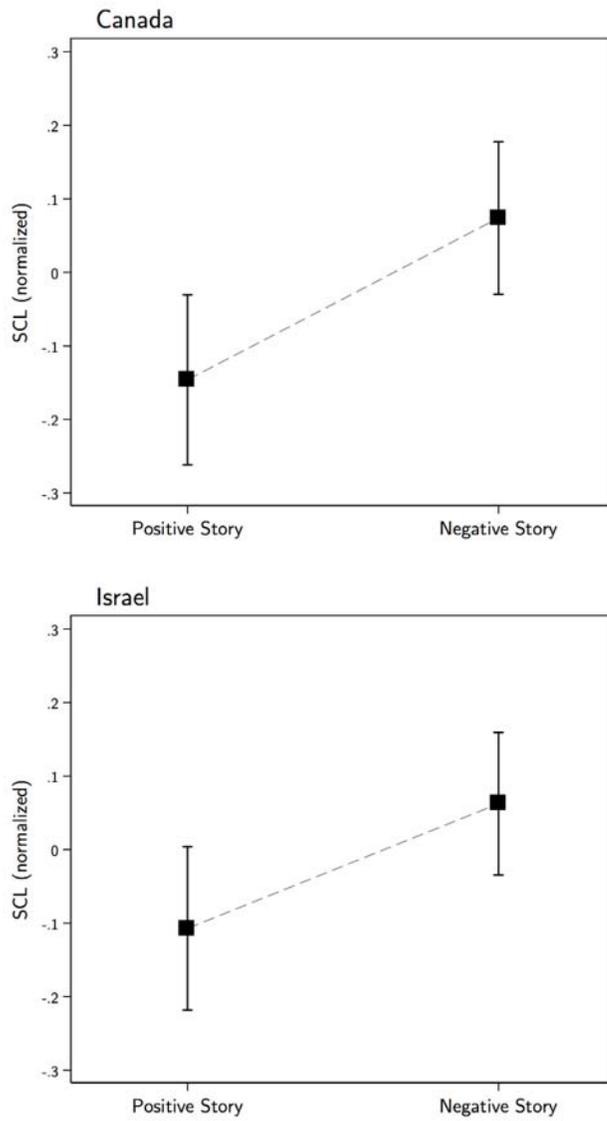


Figure 4. The impact of tone and proximity on skin conductance, story-level analyses

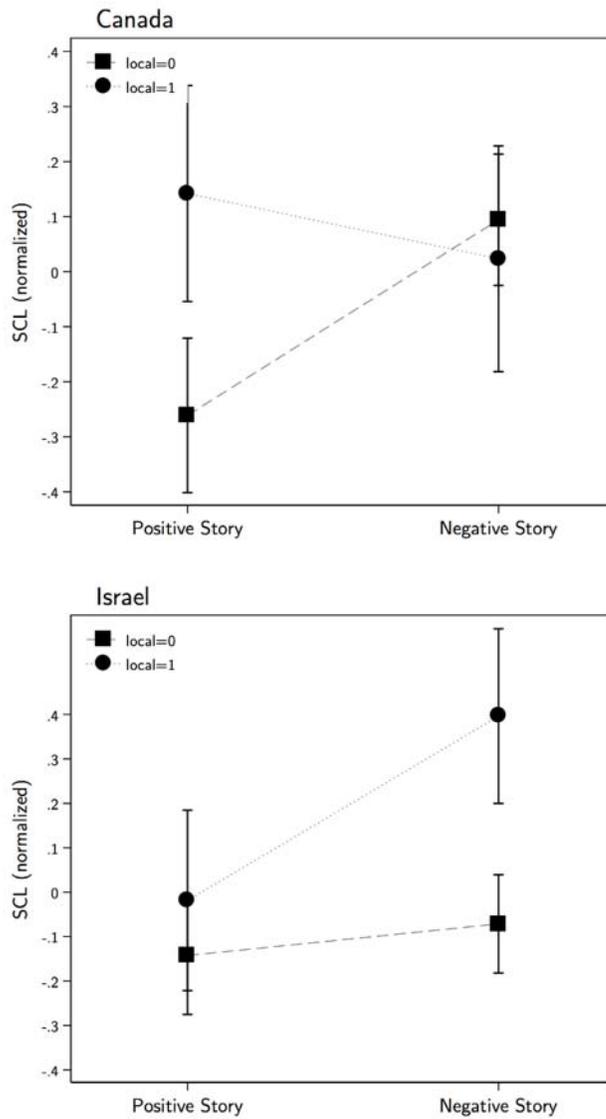


Figure 5. The impact of tone and subtitles on skin conductance, story-level analyses

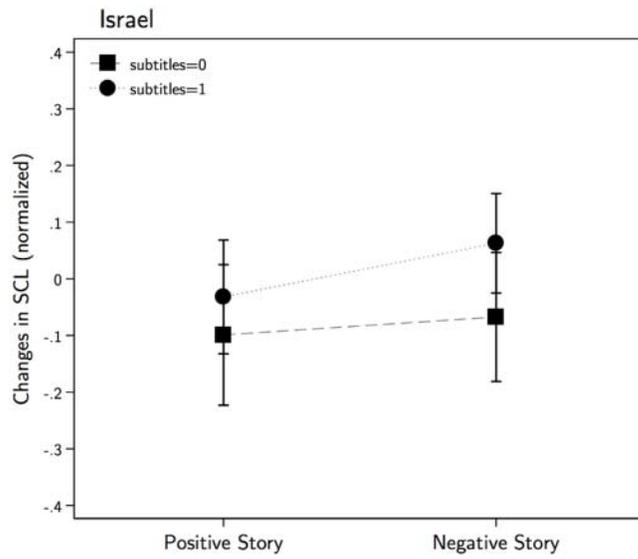


Figure 6. Tone by Story

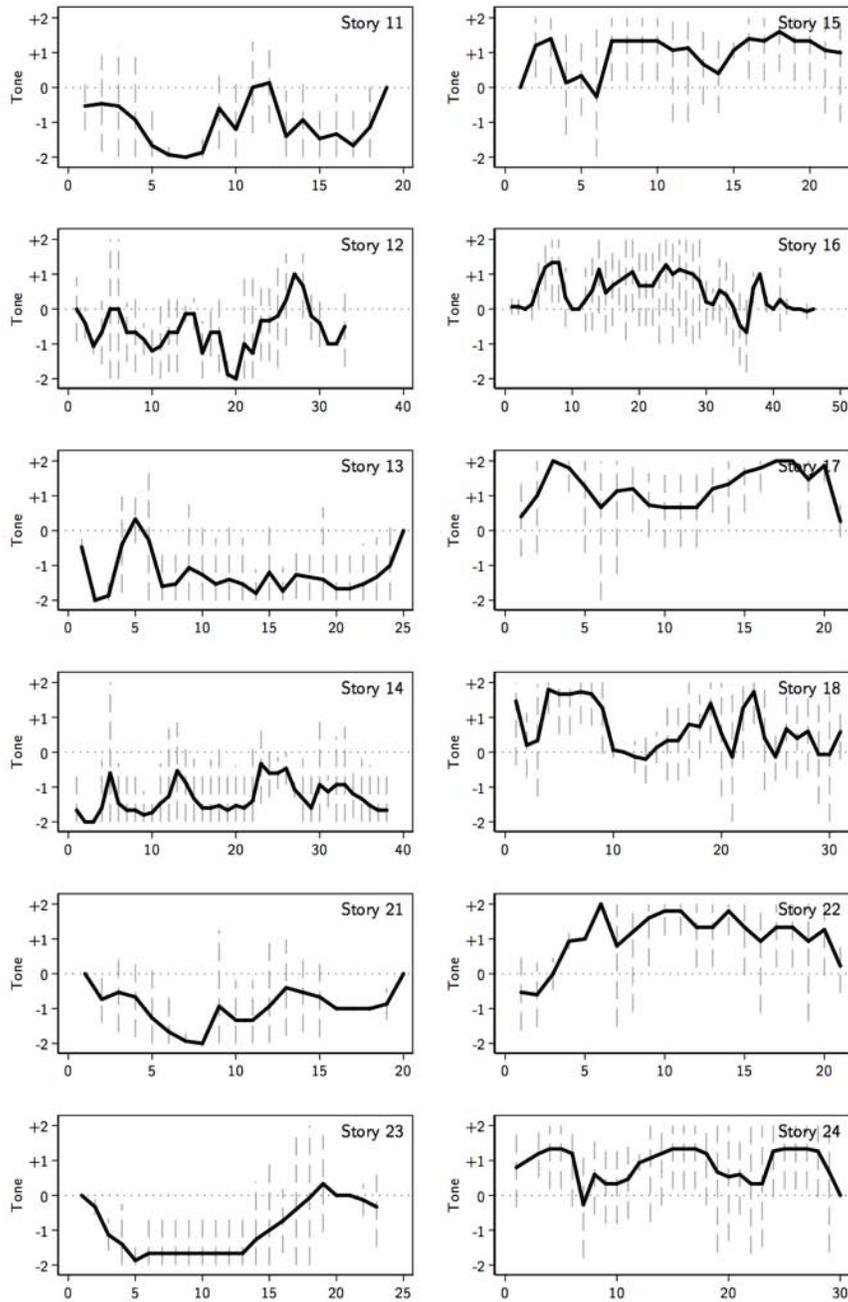


Figure 7. The impact of tone on skin conductance, 5-second analyses

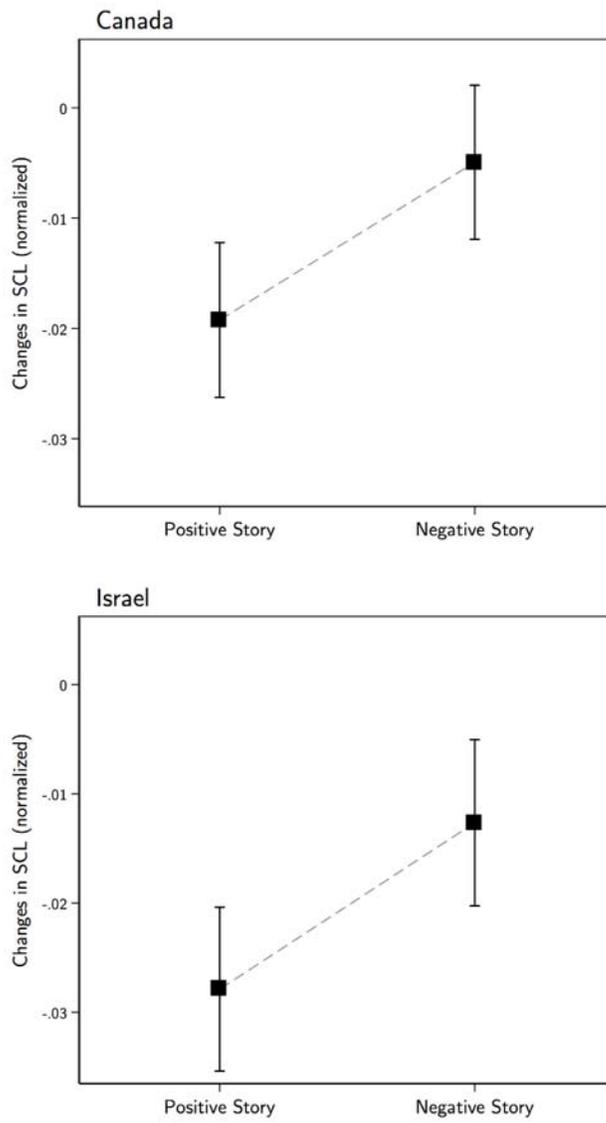


Figure 8. The impact of tone and proximity on skin conductance, 5-second analyses

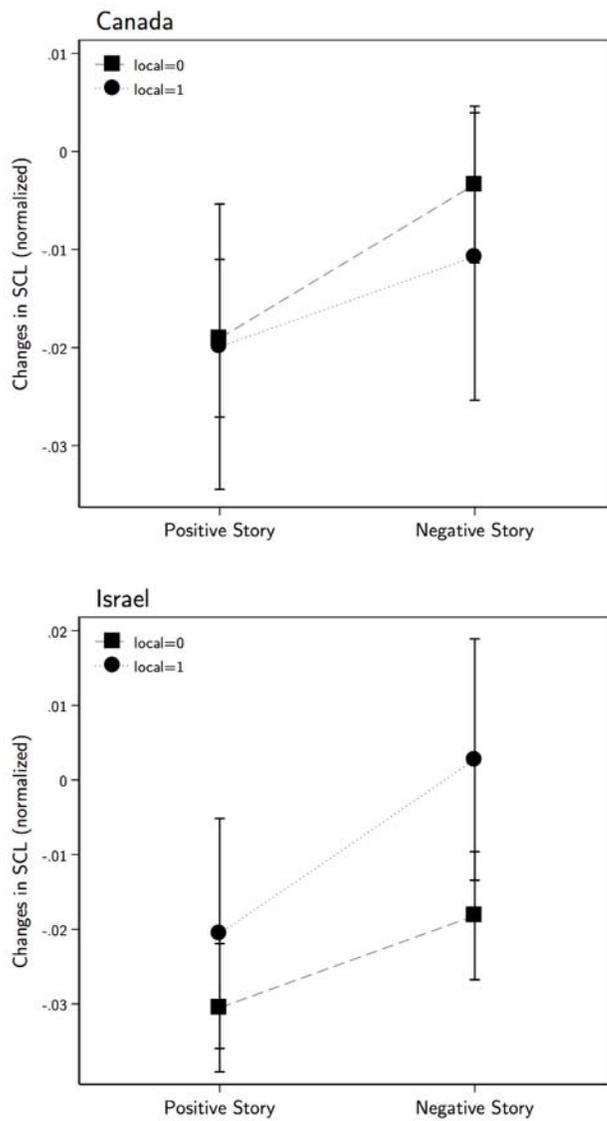


Figure 9. The impact of tone and subtitles on skin conductance, 5-second analyses

