

Risk perception, psychological heuristics and the water fluoridation controversy

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ABSTRACT

OBJECTIVES: Increasingly, support for water fluoridation has come under attack. We seek an explanation, focusing on the case of Waterloo, Ontario, where a 2010 referendum overturned its water fluoridation program. In particular, we test whether individuals perceive the risks of water fluoridation based not on 'hard' scientific evidence but on heuristics and cultural norms.

METHODS: A sample of 376 residents in Waterloo were surveyed in June 2012 using random digit dialing. We use factor analysis, OLS regression, as well as t-tests to evaluate a survey experiment to test the credibility hypothesis.

RESULTS: Perceptions of fluoride as a risk are lower among those who perceive fluoride's benefits ($B = .473, p < 0.001$) and those whose cultural view is 'egalitarian' ($B = .156, p < 0.05$). The experiment shows a lower level of perception of fluoride's benefits among respondents who are told that water fluoridation is opposed by a national advocacy group (Group A) compared to those who are told that the government and the World Health Organization support fluoridation (Group B) ($t = 1.6547, p < 0.05$), as well as compared to the control group ($t = 1.8913, p < 0.05$). There is no difference between Group B and the control, possibly because people's already general support for fluoridation is less prone to change when told that other public organizations also support fluoridation.

CONCLUSION: Public health officials should take into account cultural norms and perceptions when individuals in a community appear to rise up against water fluoridation, with implications for other public health controversies.

KEY WORDS: Fluoridation; public opinion; public policy

La traduction du résumé se trouve à la fin de l'article.

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Opposition to water fluoridation is witnessing a vigorous comeback. Since 2010, four Canadian cities have voted to end the practice: Waterloo (ON), Windsor (ON), Quebec City (QC) and Calgary (AB). By contrast, the 1980s and 1990s saw only four municipal plebiscites on fluoridation. The issue has even escalated to the provincial level, with the Quebec government ordering in 2012 a province-wide review of fluoridation, and to the national level with two large interest groups, the Council of Canadians and Eau Secours in Quebec, targeting municipal fluoridation.

Remarkably, this increased opposition exists despite overwhelming scientific evidence that, at optimal doses, fluoridation reduces incidence of caries without risks other than fluorosis, or a slight mottling of the teeth.¹ Moreover, fluoridation tends to enjoy majority support, at least as expressed in public opinion surveys. However, as reported by Quiñonez and Locker, this support fades when concerns are agitated, such as in a referendum.² They outline two recommendations to address such concerns. First, they argue it is futile to engage directly with anti-fluoride sentiments, noting "[n]o amount of credible science will satiate such appetites." Second, they recommend a 'social marketing' approach to counter anti-fluoride sentiment, under the purview of issues management and communications expertise in governments.²

Despite Quiñonez and Locker's hope that more communications leads to a better-informed electorate, their recommendations are

insufficient. Instead of raising support for fluoridation, a communications campaign may do the opposite. Research from about 40 years ago shows efforts to provide accurate and factual information about water fluoridation can turn the public to being more *opposed* to the practice.³ Our objective is to provide empirical evidence on what drives this perverse pattern. Our study here is particularly targeted to policy makers, who are urged to take into account public opinion dynamics when trying to build community-wide support for a public health measure. Analysis derives from scientific literature on risk perception which emphasizes both psychological and cultural influences.

Heuristics and culture

The 'psychometric' approach to the study of risk perception suggests citizens' perception of what constitutes a risk is not a product of carefully considered evaluations, but rather of mental shortcuts – heuristics – that guide and shape the response.⁴ Two

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heuristics commonly shape risk perception. One is the ‘affect’ heuristic, where people discount risks of things perceived as beneficial, while they magnify risks of things they dislike.⁵ For example, few perceive sun tanning as dangerous, despite repeated dermatologist warnings about risks of skin cancer, whereas many believe nuclear power poses a significant hazard, despite its comparatively few casualties.^{6,7} The second type of heuristic, the ‘credibility’ heuristic, explains people’s evaluations of a message based on the messenger. Celebrity endorsements of commercial products are an obvious example. Politics, too, makes use of this heuristic when opinion leaders and ‘elites’ advance a particular cause.^{8,9}

However, this literature cannot tell us why people like sun tanning, yet dislike nuclear power.⁶ Cultural theories of risk perception provide the missing link by explaining what people deem risky.^{10–14} Rooted in Mary Douglas’ anthropological work,¹⁵ this theory posits people first make commitments to a vision of the ‘good society’ along two dimensions. The ‘grid’ dimension distinguishes the extent to which roles should be differentiated and regimented, with hierarchically ordered societies at one end, egalitarian societies on the other. The ‘group’ dimension distinguishes the extent to which individuals should be embedded in communities or expect to function as autonomous decision-makers, i.e., communitarianism vs. individualism. The combination of these two dimensions form a typology of four distinct cultural worldviews (see Figure 1): fatalism (high grid/low group), hierarchicalism (high grid/high group), egalitarianism (low grid/high group) and individualism (low grid/low group).^{16,17}

According to this theory, people see things as risks to the extent they reinforce preferences for social organization along these two dimensions. For example, commitments to hierarchy correlate positively with the perception of risks from the human papillomavirus vaccine because it interrupts both traditional gender norms and parental authority.¹⁴ In other words, opposition to a public health measure such as the HPV vaccine does not stem from ignorance of substantive informational material about the vaccine; it is based on how the vaccination program conflicts with cultural and psychologically ingrained norms. Similar patterns are evident in other policy areas. For

instance, egalitarianism positively relates to perception of environmental risks because activities that threaten ecosystems (e.g., commercial activity, heavy technologies) are usually premised on forms of organization that challenge egalitarian visions of society. By contrast, people with hierarchical and individualistic predispositions tend to see greater risks from deviant behaviour (e.g., crime) and state encroachment on individual liberty (e.g., gun control) respectively.

The above represents a complicated picture of how people reason about risks. Controversies about water fluoridation reflect this complexity. Existing literature identifies different sources of opposition to fluoridation. One Canadian study showed opposition to water fluoridation stems from a range of ideological commitments, including: libertarian ideals; moral opposition to forced medical treatment; suspicion towards expertise, science and technology; and a preference for ‘natural’ treatments. “Although anti-fluoridationists come more from the ‘right’ than the ‘left,’ they have much in common with environmental and peace activists who also worry technological solutions are being applied without sufficient attention to long-term consequences.”¹⁸ Research from other countries finds more of the same.^{19–22}

Given this, one could expect individualism to be related to opposition to fluoridation on the grounds it might violate individual decision-making. However, we could also expect egalitarianism to be a source of opposition, given fluoridation’s association with technology, science and bureaucratic expertise. We apply these theoretical frameworks to understand more fully why water fluoridation emerges as a point of contention. We focus on the particular case of Waterloo, ON, where residents in a 2010 referendum voted to stop water fluoridation. Based on both the psychometric and cultural risk literature, we test three hypotheses:

- H1: Perception of risks from fluoridation is inversely related to their perception of benefits (affect heuristic).
- H2: Perception of benefits from fluoridation varies when presented with information from trustworthy sources (credibility heuristic).
- H3: Perceptions of risks and benefits from fluoridation vary with measures of hierarchy, individualism and egalitarianism (cultural theory).

METHODS

Analysis is based on a random digit dialing telephone survey administered June 7–29, 2012, by the University of Waterloo’s Survey Research Centre. The survey gathered a sample of landline and cellular-phone users who reside in the Regional Municipality of Waterloo, which comprises three cities – Waterloo, Cambridge and Kitchener, and four rural townships – Woolwich, Wellesley, Wilmont and North Dumfries.

It is important to note that the 2010 referendum was held only in the City of Waterloo, a municipality of about 100,000 people. The survey includes respondents who did not have the opportunity to vote in the referendum. We do not consider this a limitation as we are not explicitly gauging public opinion of an electorate at the time of decision in a referendum. Rather, we are testing hypotheses about perceptions of risks and benefits

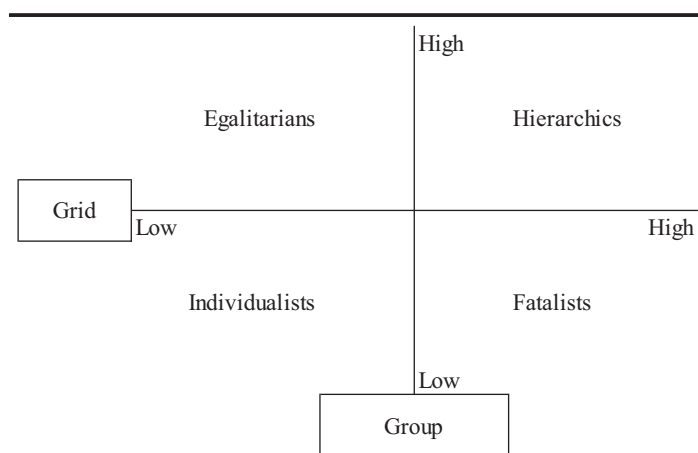


Figure 1. Typology of world views according to group and grid affiliations

of municipal fluoridation in one Canadian region. Also, residents all over the region were exposed to the same amount of debate and media coverage about the fluoridation referendum, therefore the issue has plausibly acquired a high level of salience among respondents throughout the region.

The survey gathered a sample of 376 respondents, with a response rate of 13.4%. While the sample was gathered through random digit dialing, there are some discrepancies when it is compared against population parameters. In particular, the sample's proportion of individuals who are older, female, homeowners, and Canadian born is higher when compared against the 2006 Census. We control for these discrepancies along socio-demographic variables.

The survey was confidential and voluntary; respondents had the option to refuse to answer any question. The questionnaire received ethics clearance through the University of Waterloo Office of Research Ethics.

Study design

Two key survey questions measured perceptions of risks and benefits for fluoridation. First, we measured respondents' level of agreement with the following two statements: 1) "I'm convinced that putting fluoride in the water supply helps reduce cavities," and 2) "I'm afraid that putting fluoride in the water supply might increase the risk of things like bone disease." Responses to both were coded on a continuous scale ranging from 1 (agree) to 0 (disagree). The Appendix provides a full description of how all variables were coded. Note that neither statement includes information on the dose dependency of the effect. Fluoride contributes to a reduction in cavities at low doses, but to skeletal fluorosis at very high doses and long exposures. Thus, the 'scientifically correct' response to the literal meaning of the statements is to agree to *both*. Given the generally low level of knowledge Canadians have about matters of public affairs,²³ let alone matters more technically complex, there is reason to expect few respondents to be able to answer this pair of questions 'correctly'.

The survey also contained measures to test whether opinions about the relative risks and benefits of fluoridation depend on the messenger, i.e., the credibility heuristic. We embedded an experiment whereby respondents were randomly assigned to one of three groups. Prior to being asked to agree or disagree with the statements about fluoride reducing cavities and causing bone disease, respondents in Group A were told: "the Council of Canadians, a large citizens' organization headed by Maude Barlow, opposes putting fluoride in municipal water."²⁴ Group B was told: "Health Canada and the World Health Organization [WHO] support putting fluoride in the water supply." Group C, the control, received no prompt. We assess the potential impact of the credibility heuristic through a series of one-tailed t-tests, applicable here given the randomness of assignment and the directional nature of our experiment. One group is simply paired against another to compare their mean scores along two variables: perception of fluoride's benefits, and perception of fluoride's risks.

Regardless of the results of the experiment, neither the credibility heuristic nor the affect heuristic can fully explain why individuals hold various perceptions. We examine cultural

theories of risk perception for further guidance. One common approach is to examine how positions on the standard left-right ideological spectrum relate to views about various public health measures. This holds very limited potential. On the one hand, left-wing suspicion of private corporations and capitalist competition can drive a suspicion of large pharmaceutical companies or of male doctors' excessive and dominant roles in the provision of health care services.²⁵ On the other hand, conservatives can find sources of concern in contemporary medicine, particularly as it threatens traditional role definitions. For example, the HPV vaccine, abortion and the birth-control pill have all been criticized by conservatives for their putative or excessive health risks.^{26,27} Accounting for the multidimensional nature of public opinion – including the perceptions of risks and benefits – is one of the major purposes behind cultural theory.²⁸ As a result, we test whether cultural theory accounts for a perception of benefits from fluoridation.

Towards this objective, the survey contained a battery of items developed in the United States to use cultural theory to explain opinions toward risks. They measure attitudes about equality, values, minority rights, gender roles, and the role of government (see Appendix for list of variables). From these, we conducted an exploratory factor analysis which, as will be reported in the next section, revealed four dimensions, which were assembled into indexes.

The survey also included a battery of control variables, namely: political party identification; trust in government; confidence in the medical community, judiciary and police, environmental groups and unions; and standard demographic items, namely education, homeownership, income, age and gender.

RESULTS

Table 1 presents ordinary least square regression models that set perception of fluoride's risk as the dependent variable. Model 1 shows a strong negative association between the perception of risks and the perception of benefits: those who recognize benefits to water fluoridation are less likely to perceive its health risks. Among the control variables, homeowners and those with favourable views of environmental organizations yield a positive association with perception of fluoride's risk, but the impact of these variables is weaker compared to perceptions of fluoride's benefits. These results are consistent with our first hypothesis. The affect heuristic is evident as the perception of fluoride's benefit (i.e., fights cavities) significantly predicts whether one sees fluoride as a risk (i.e., causes bone disease).

We next test the credibility hypothesis. As noted above, respondents were randomly assigned to three groups. The top panel of Table 2 shows the three groups' respective mean scores on the two variables. It should be noted, that, in general, individuals appear more likely to believe in fluoride's benefits rather than its risks. Regardless of experimental group, mean scores for this measure are consistently higher than those for risk. This is unsurprising, given the generally widespread views regarding dental hygiene and benefits of fluoride in toothpaste.

However, perceptions of fluoride's benefits are lower for individuals in Group A, who were told Maude Barlow and the Council of Canadians oppose fluoridation. Compared against Group B, which was told Health Canada and WHO support

Table 1. Ordinary least square regression models for perception of fluoride's risks

Variable	Model 1			Model 2			Model 3		
	Coef.	Std. Err.	p	Coef.	Std. Err.	p	Coef.	Std. Err.	p
Perceive benefits (fights cavities)	-.469	.056	0.000	—	—	—	-.708	.084	0.000
Cultural dimensions									
Hierarchicalism	—	—	—	.013	.103	0.896	.017	.103	0.871
Egalitarianism	—	—	—	-.184	.090	0.042	-.070	.091	0.444
Fatalism	—	—	—	-.115	.095	0.226	-.091	.096	0.345
Individualism	—	—	—	-.041	.088	0.638	-.162	.089	0.069
Party identification									
Liberal	-.127	.079	0.108	-.193	.096	0.047	-.051	.098	0.600
Conservative	-.036	.080	0.654	-.114	.100	0.256	-.011	.100	0.914
NDP	-.130	.084	0.122	-.212	.102	0.039	-.037	.104	0.723
Trust in government	-.055	.085	0.517	-.172	.106	0.106	.159	.107	0.140
Confidence in									
Medical community	-.028	.072	0.695	-.122	.087	0.162	.093	.088	0.290
Judiciary and police	.014	.077	0.855	-.014	.094	0.882	.021	.094	0.821
Environmental organizations	.129	.058	0.028	.158	.072	0.030	.084	.073	0.253
Unions	-.043	.090	0.636	.065	.111	0.559	-.074	.112	0.508
Education									
Less than secondary	.055	.078	0.482	.019	.096	0.848	.029	.097	0.766
Post-secondary	-.024	.033	0.463	-.072	.041	0.080	.036	.041	0.392
Income									
Lower third	-.042	.044	0.342	-.029	.053	0.584	-.050	.053	0.351
Higher third	-.029	.037	0.441	-.021	.047	0.661	-.056	.047	0.238
Age, years									
18–34	.031	.047	0.513	.020	.057	0.728	.033	.058	0.568
55+	-.017	.034	0.629	-.081	.041	0.048	.070	.042	0.095
Female	.024	.031	0.443	.067	.038	0.085	-.015	.039	0.698
Owner/renter	-.095	.045	0.038	-.097	.055	0.079	-.049	.056	0.378
Intercept	.860	.113	0.000	.831	.189	0.000	.893	.202	0.000
N	164	—	—	164	—	—	164	—	—
Adj. R-sq	.387	—	—	.109	—	—	.346	—	—
S.E.E.	.188	—	—	.226	—	—	.227	—	—

S.E.E. = Standard error of the estimate.

Table 2. Mean scores among experimental groups

	Mean score of perception of fluoride's...				
	Benefits	Risks			
Group A, anti-fluoridation prompt	.565	.471	—	—	—
Group B, pro-fluoridation prompt	.625	.414	—	—	—
Control, no prompt	.636	.411	—	—	—
One-tailed t-test of means of perception of fluoride's benefits					
	Diff.	n	t	df	
Group A vs. Group B	-.059	236	-1.6547	231.94	$p < 0.05$
Group A vs. Control	-.071	225	-1.8913	222.74	$p < 0.05$
Group B vs. Control	-.011	235	-0.309	229.24	—
One-tailed t-test of means of perception of fluoride's risks					
	Diff.	n	t	df	
Group A vs. Group B	.003	217	0.1022	211.03	
Group A vs. Control	.007	209	0.21	202.43	
Group B vs. Control	.003	214	0.0985	211.97	

fluoridation, a 0.059 difference in mean emerges, significant at $p < 0.05$. When Group A is compared against the control, an even larger difference emerges, 0.071 (also significant at $p < 0.05$). Group B and the control produce no statistically significant difference. This may reflect the fact that the public is generally favourable to fluoride, and the additional information that Health Canada and WHO support it makes little difference to prevailing attitudes.

There is no statistically significant difference among the groups as it pertains to perceptions of fluoride's risks. We suspect this

reflects survey design. The item that asks about fluoride's risks appears two questions after the source-credibility prompts, and one question after the item that asked about fluoride's benefits. Thus, it is possible the duration of the impact of the source prompt only lasts a few moments. This does not mean the effect is insignificant, even with a limited duration.

Analysis then examines cultural predispositions. Table 3 reports results from the exploratory factor analysis of our battery of cultural items, which reveals four dimensions: 1) views about hierarchical ordering of society; 2) egalitarianism; 3) 'fatalism',

Table 3. Factor loadings for cultural dimensions

Variable	Hierarchicalism 1	Egalitarianism 2	Fatalism 3	Individualism 4
Too far pushing minority rights	.714	-.027	.103	.062
Social problems come from decline of traditional family	.712	.233	.069	-.183
First Nations, immigrants and homosexuals want special rights	.586	-.083	.310	.091
Society has become too soft and feminine	.500	.055	.053	.275
Government needs to keep people from hurting themselves	.475	.344	-.268	.219
Discrimination against minorities still serious problem	.132	.686	.103	-.085
Everyone's basic needs should be met	-.025	.648	-.122	.181
Reduce inequalities	.126	.609	.127	.239
Society would be better if wealth were more equal	-.049	.572	.360	.077
Government interferes far too much	.091	.248	.749	.097
Government should stop telling people how to live	0.15	.044	.716	.231
Not government's business to protect people from themselves	.303	-.014	.594	-.045
Government should limit individual choices for better social good	.095	.116	.027	.830
Government should advance society's goals, even at cost of individual freedoms	.091	.190	.285	.653

which reflects a view that the state should refrain from micromanaging people's well-being; and 4) individualism; however the items were coded so that high scores reflect agreement that the government is justified in limiting individual choices.

Factor loadings guided the generation of four indexes that score on a continuous scale from 0 to 1. Regarding the egalitarianism index, reliability testing required the exclusion of its latter two items. The Appendix lists a full description of these composite measures and their associated reliability levels.

The four indexes were included in the regression model in Table 1. Model 2 includes all, however perception of fluoride's benefits was excluded in order to display the four indexes' impact on perception of risk. Of the four indexes, only egalitarianism yields a meaningful impact. Of the remaining variables, party ID (i.e., Liberal and NDP identifiers), confidence in environmental organizations and age emerge as relevant. However, the inclusion of perception of benefit (the affect heuristic) in Model 3 renders egalitarianism statistically insignificant. This suggests egalitarianism's effect on perception of risk mediates through perception of benefits. In other words, egalitarianism yields its own impact on perception of fluoride's risks, but it also impacts one's perception of fluoride's benefits, which in turn has an influence on risks.

DISCUSSION

Results suggest three conclusions. First, positions on water fluoridation are not always factually coherent. They are 'cognitively' coherent, however. People who think fluoridation reduces cavities are significantly more likely to think it does not cause bone disease, although scientific evidence suggests it does, albeit at doses higher than those to which Canadians are exposed. Second, although public attitudes towards fluoridation are largely positive, they are not ingrained. Our experiment suggests belief in the benefits of fluoridation can be reduced with the use of high-profile opinion leaders, although our evidence does not suggest the converse, i.e., that opinion leaders on the pro-fluoride side strengthen support for fluoride, consistent with previous research.^{2,3} Third, there is some indication that positions are also anchored on cultural norms, particularly commitments to egalitarianism.

The general implication here for policy makers is that facts, in themselves, are not sufficient to persuade a public about the merits of a public health practice, in contrast to Quiñonez and Locker's recommendation.² The nature of public opinion dynamics constrains the degree to which public health professionals can consider a seemingly democratic exercise, such as a referendum, as an effective means to implement scientifically supported policy. To a degree, results suggest a need to focus more attention on cultural theory of risk perception. If one's views about egalitarianism can influence one's perception of *both* fluoride's benefits *and* its risks, then this dimension can go some length toward demystifying why efforts to engage the public on this issue lead to divisiveness and, at times, a *reversal* of a very safe public health initiative. Those who wish to address some of society's inequalities are more likely to view fluoridation as a good thing, and less likely to be sensitive to its potential risks. However, other deeply held norms can be activated when the issue becomes more salient.

CONCLUSION

The fluoridation debate is likely to continue its resurgence. Our results here suggest some guidance, albeit tentative, on how this debate can be approached, or not approached, at least with regard to proponents of fluoridation. However, our findings would benefit from further analysis. We are constrained by our sample size of 376, which is reduced further by case-wise elimination for non-response on any of the variables. Although the remaining 164 respondents support our hypotheses, a larger sample can test whether there are multiple routes to opposition to fluoridation, as Carstairs and Elder found in the history of Canadian fluoridation.¹⁸ Moreover, the survey items used to measure cultural dimensions derive from questions imported from the United States. It is possible these do not measure underlying structures in the Canadian social context. We are currently developing survey instruments that show greater fidelity to both the Canadian context and the underlying theory. Nevertheless, results presented here show citizens' beliefs about fluoridation are products of both individual, cognitive processes and deeper value commitments.

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RÉSUMÉ

OBJECTIFS : On s'attaque de plus en plus à la fluoration de l'eau. Nous cherchons une explication, à partir du cas de Waterloo, Ontario, où un référendum a renversé le programme de fluoration de son eau en 2010. Plus particulièrement, nous tentons de savoir si les gens perçoivent les risques de la fluoration de l'eau non pas selon des « faits » scientifiques, mais selon des normes heuristiques et culturelles.

MÉTHODES : On a étudié un échantillon aléatoire de 376 résidents de Waterloo en juin 2012 au moyen de la composition téléphonique aléatoire. Nous avons recours à l'analyse factorielle, à la régression par les moindres carrés ordinaires (MCO) et à des tests pour évaluer une expérience de sondage afin de tester l'hypothèse de crédibilité.

RÉSULTATS : La perception que le fluor constitue un risque est plus faible chez ceux qui connaissent ses avantages ($B = -.473, p < 0,001$) et ceux dont la perspective culturelle est égalitaire ($B = -.156, p < 0,05$). L'expérience montre une perception moins favorable des avantages du fluor chez les répondants à qui on affirme qu'un groupe de pression national s'oppose à la fluoration de l'eau (groupe A) comparée à ceux à qui on affirme que le gouvernement et l'Organisation mondiale de la santé appuient la fluoration de l'eau (groupe B) ($t = -1,6547, p < 0,05$), ainsi qu'au groupe témoin ($t = -1,8913, p < 0,05$). Il n'y a aucune différence entre le groupe B et le groupe témoin, peut-être parce que les gens qui appuient déjà généralement la fluoration sont moins susceptibles de changer d'avis lorsqu'on leur dit que d'autres organismes publics l'appuient également.

CONCLUSION : Les représentants en santé publique doivent tenir compte des normes culturelles et des perceptions lorsque des membres d'une collectivité s'opposent publiquement à la fluoration avec les autres controverses possibles en santé publique.

MOTS CLÉS : fluoration; opinion publique; politique publique

Appendix. Survey questions and coding

Variable	Question wording	Coding
Perceive risk (causes bone disease)	I'm afraid that putting fluoride in the water supply might increase the risk of things like bone disease.	1 = Strongly agree; 0.66 = Agree; 0.33 = Disagree; 0 = Strongly disagree.
Perceive benefits (fights cavities)	I'm convinced that putting fluoride in the water supply helps reduce cavities.	Same as above.
Cultural dimensions		
Hierarchicalism (Cronbach's alpha = .773)	We have gone too far pushing minority rights in this province. A lot of problems in our society come from the decline of the traditional family.	Same as above. Same as above.
	It seems like First Nations people, immigrants and homosexuals don't want equal rights, they want special rights.	Same as above.
	Society as a whole has become too soft and feminine.	Same as above.
Egalitarianism (Cronbach's alpha = .709; reliability testing led to the exclusion of the first two items)	Discrimination against minorities is still a very serious problem in our society.	Same as above.
	It is society's responsibility to make sure that everyone's basic needs are met.	Same as above.
	We need to dramatically reduce inequalities between rich and poor and between men and women.	Same as above.
	Our society would be better off if the distribution of wealth was more equal.	Same as above.
Variable	Question wording	Coding
Fatalism (Cronbach's alpha = .653)	The government interferes far too much in our everyday lives. The government should stop telling people how to live their lives.	Same as above. Same as above.
	It's not the government's business to try to protect people from themselves.	Same as above.
Individualism (Cronbach's alpha = .475)	The government should put limits on the choices individuals make so they don't get in the way of what's good for society.	Same as above.
	The government should do more to advance society's goals, even if that means limiting the freedom and choices of individuals.	Same as above.
Party identification	In federal politics, do you usually think of yourself as a Liberal, Conservative, New Democrat, Green Party supporter, or none of these?	Recoded into three dummy variables: 1) Liberal identifiers; 2) Conservative identifiers; and 3) NDP identifiers. 'None of these' was set as the reference category.
Trust in government (Cronbach's alpha = .435)	We can trust the government to do what is right.	1 = Strongly agree; 0.66 = agree; 0.33 = disagree; 0 = strongly disagree.
	People running the government are a little crooked.	1 = Strongly disagree; 0.66 = disagree; 0.33 = agree; 0 = strongly agree.
Confidence	Now I'm going to read you a list of institutions in Canadian society. Please tell me if you have no confidence, some confidence or a lot of confidence in them.	
Medical community (Cronbach's alpha = .331)	Doctors	1 = a lot of confidence; 0.5 = some confidence; 0 = no confidence
Judiciary and police (Cronbach's alpha = .540)	Pharmaceutical companies	Same as above.
	Judges	Same as above.
	Police officers	Same as above.
Environmental organizations	Environmental organizations	Same as above.
Unions	Unions	Same as above.
Demographic items		
Education	Respondents' self-reported highest level of education was recoded into three dummy variables: 1) Less than high school; 2) Up to high school diploma; and 3) Post-secondary. 'Up to high school diploma' was set as the reference.	
Income	Respondents' self-reported pre-tax income was recoded into tertiles to create three dummies: 1) Lower third; 2) Middle third; and 3) Top third. 'Middle third' was set as the reference.	
Age	Respondents were divided into three age-group dummies: 1) 18 to 34 years; 2) 35 to 54 years; and 3) 55 years and older. The '35 to 54 years' group was set as the reference.	
Female	Female respondents were assigned a score of 1; all others a 0.	
Homeownership	Homeowners are assigned a score of 1; all others a 0.	