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Advisory Board

(WHO) declares swine flu pandemic

From the PSO President
Trends and Mutations in Public Policy

A much anticipated new PSO journal, *World Medical and Health Policy*, has now made its appearance. Details and the first issue are at http://www.psocommons.org/wmhp/ .The editors are:

> Dr. Otmar Kloiber, Secretary General, *World Medical Association*
>
> Dr. Arnauld Nicogossian, *George Mason University*
>
> Dr. Thomas Zimmerman*, International Society of Microbial Resistance*.

Anyone who looks at the preoccupations of Victorian era newspapers will appreciate how health issues such as water supply have been a major public policy concern for a very long time. What is new is the startling expansion of academic policy programs to train leaders in the field. These complement existing public health programs and have being growing rapidly. They attract a wide variety of students, some of whom are medical doctors and other who come from such varied disciplines as communications, architecture, urban planning, and law. Often the students already have a doctorate. Courses commonly range across several faculties. There has also been a growth in undergraduate studies in the field.

An example on the graduate level is the Center for the Study of International Medical Policies and Practices at George Mason University. (See http://policy-csimpp.gmu.edu/affiliations/index.shtml) The center works with the U.S. Medicine Institute for Health Studies, the Chinese Academy of Sciences and many others. If you want to appreciate just how many issues this field encompasses do look at the inaugural number with its discussions of Japanese medical policy, pandemic influenza, Iraqi health concerns, and continuing government challenges over smoking.

Paul Rich
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From the Proceedings Editor

An expanding tool for the teaching of policy studies.

During 2009 we got to establish the PSO Proceedings as a regular publication adjunct to all of our journals, with the intention to serve as a tool for the profession. With the expansion of public policy programs all across the country we thought we should be doing something that may be helpful to the teaching duties of professors in the field. The Proceedings then was meant to serve as a vehicle to share research that doesn't necessarily fit the form of a journal article per se, but that still deserves to be seen and may help others advance their own academic endeavors. In other words, the Proceedings intended as a tool for cooperation among teachers.

We invited people to share their syllabi on different courses on public policy and we published them in previous issues. We're sure they will give others a lot of ideas at the moment of designing their own courses. We also invited everyone to take advantage of new electronic tools that we made available through the **Policy Studies Commons** (www.psocommons.org), where anyone can share their research with a growing community of experts and search through a directory of policy scholars.

We have ideas to continue expanding the Proceedings. This year we'll be publishing research notes, data sets, pedagogy book reviews, the proceedings of our annual Dupont Summit on science and technology policy and of course more syllabi. We'd like to invite everyone to send us material for consideration. Do contact me anytime if you have something you'd like to share with the world. We're also inviting people to become part of the Editorial Board, so don't hesitate to contact me if you're interested.

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New Editorial Offices and Editor of the *Review of Policy Research* in Canada

The new editorial offices of the PSO journal Review of Policy Research are at Ryerson University in Toronto and the new editor is Professor Christopher Gore of the Ryerson University Department of Politics and Public Administration. Professor Gore is involved in two graduate programs and one research centre at Ryerson: Environmental Applied Science and Management, Immigration and Settlement Studies, and the Centre for Studies of Food Security. His own research interests relate to the politics and policy of environmental and urban issues in North America and Sub-Saharan Africa. Many of his publications deal with how different forms of knowledge influence policy and decision-making systems, and how different interests from different scales interact in these systems.

He is a participant currently in three collaborative research projects: a three year, Social Science and Humanities Research Council (Canada) funded project with Dr. Pamela J. Robinson (Ryerson University), surveying all municipalities with a population over 1,000 across Canada, to understand their response to climate change; a three year, multi-university project funded by the GEOIDE Network of Centres of Excellence, which examines the role of the 'geoweb' and Web 2.0 tools, to engage the public in environmental management and decision-making; and, a multi-university (Ryerson, University of Toronto, University of Nairobi, Egerton University), Canadian International Development Agency (CIDA) funded project, studying the relationship between food security, nutrition, livelihoods, and HIV/AIDS in Nakuru, Kenya.

This is the first time that a PSO journal has had editorial offices in Canada. Professor Gore succeeds Professor J.P. Singh of Georgetown University, who served for a number of years and was responsible for many improvements to the journal, and who continues on various PSO committees. Like Professor Singh, Professor Gore is active in the science and technology section of the American Political Science Association. He will serve as the PSO delegate to the American Association for the Advancement of Science.

Professor Gore received his PhD from the University of Toronto. His latest book is *Environmental Challenges and Opportunities: Local-Global Perspectives on Canadian Issues* (with Peter J. Stoett) (2009). He is interested in corresponding with the scholarly community about new ways in which the Review can serve and will be responsible for the first issue in 2011 and thereafter. He plans an inaugural meeting of his editorial board at the APSA meetings in Washington in September 2010 and can be reached at chris.gore@politics.ryerson.ca

A Research Note on Climate Change that has Relevance for "Climategate"

Professor Scott Bennett has been investigating aspects of the current climate and global warming debate that have some relevance to perceptions about the change and the accuracy of information and the status of certain research information. At the Dupont Summit on science policy in December 2009 sponsored by the Policy Studies Organization at the Carnegie Institution for Science in Washington, the presentation by the American Meterological Society was marked by sharp questioning regarding the effect on international opinion of publicity regarding "Climategate". Of course the controversy is in its early stages, but one can certainly agree with Professor Bennett that all matters concerned with the climate change discussion should be looked at closely.

Briefly, with regard to "Climategate", the hacking of a large number of emails regarding climate research has placed some results in question, at least for some. Those who are so upset about the emails feel that they show a deliberate discounting of information that might mitigate views about the severity of climate change. Pennsylvania State University is investigating the role of Professor Michael Mann, director of the school's Earth System Science Center. The University of East Anglia has asked Professor Phillip Jones, director of the Climatic Research Unit (CRU) to step aside while investigation. The National Center for Atmospheric Research in the United States is also involved.

One should emphasize in the strongest possible way that the intentions and effects of the emails are not really known at this point. We can say that the study by Professor Bennett has some tangential relevance to the entire issue but he warns, "This is one of those studies that points in an interesting direction, but it is still preliminary in the sense that I think some of the results are sensitive to the fairly small number of cases in the experimental design." We think this is an excellent topic for classroom discussion, one that brings up such matters as the standards of proof in social science, the role of the popular press in shaping perceptions of research and policy, and a host of other matters.

Paul Rich
President, Policy Studies Organization

An Experimental Study of Opinion on Climate Change: Labile Causalities and Stable Realities

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Research Note

Overview of the Problem-Changing Public Opinion

The primary analytic task at hand is to determine whether or not a specific video information treatment can change opinions about broad climate change issues. The expectation that the treatment will have some effect on the study's dependent variables is our main hypothesis. More specifically, we anticipate that the treatment group will become more skeptical of the reality of global warming, its impacts and conventional views about its causation. It was also anticipated that information might affect opinions about the causation of climate change differently from foundational opinions about the reality and impact of climate change. However, initially, there was no definite expectation of how these two areas might differ in our results.

In light of the direction of the primary hypotheses, it should be apparent that the informational treatment was counter to conventional views of global warming and climate change. This was not done with any particular perspective on the climate science issues involved. Instead, this perspective was taken in order to make a more severe test of the power of video information treatments to change opinion. Such a test could best be constructed by using a treatment that was counter to mainstream views on the topic in question.

There could be much discussion of what constitutes mainstream views on global warming and climate change. This is the case because there is considerable variability in opinions on such matters. Any attempt to assess the nature of these opinions is further complicated by differences between elite and mass views. In very capsulized form, our starting point is that a large percentage of elites and the general population in polities with developed economies take the view that global warming must be taken seriously and that its cause is strongly rooted in human or anthropogenic factors. Those with alternative views, of the kind that might arise from our treatment, would be less certain about all or part of the mainstream perspective.

Having said that, what we term the conventional or mainstream view is not held by everyone, and some dispute that it is held by a clear majority. However, in the USA, where some of the most pertinent data have been collected, we find a great deal of mass support for the view that global warming is real and important. Yet, in that country there is considerable variation in support for these ideas, and even more variation when people are asked about causal factors and the role of human beings. (Pew Research Center, July 12, 2006). So, one might be more justified in referring to the mainstream view as the acceptance of anthropogenic global warming perspective (Begley, 2007). This would be in contrast with the alternative skepticism toward anthropogenic global warming view (Lindzen, 2006; Lomborg, 2007). The complexity and instability of mass views on global warming is supported by another, very recent, Gallup study indicating a decrease in American acceptance of the urgency and importance of global warming (Gallup, 2009).

In a true experiment with a relatively limited number of cases, the best uses of data are to examine the impact of any treatment variables on the dependent variables. If there are multiple treatment variables, then it would also be important to test interaction effects

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between and among those treatments. Since there is only one true treatment in this study, we only need to concentrate on estimating that main effect as far as treatments are concerned.

Yet, there may be non-treatment independent variables (sometimes referred to as covariates) that can be brought to bear in explaining the dependent variables, and these can be used in a variety of ways. In this study, we will make primary use of three non-treatment independent variables that reflect general value orientations. Specifically, these variables reflect the perceived relative importance of environmental issues, left-right political orientation and the level of commitment to views of religion. Since this is a true experiment, these non-treatment independent variables should not be, and in this case are generally not, strongly related to the treatment variable. This is a normal and desirable result of random assignment to groups in the research design. However, they may still impact the dependent variables directly. We will examine these direct impacts of the non-treatment variables primarily to see how strongly they impact the dependent variables compared to the treatment variable. This will allow us to put the strength of treatment effect in context using comparison variables that have an established relationship with opinion on the environment (Bennett, 1997). There is particularly current analysis on the impact of political orientation on environmental opinion (Gallup, 2009; Pew, 2006).

The three non-treatment independent variables described above form the basis of our secondary hypothesis. This secondary hypothesis states that the treatment variable will generally have a more powerful impact on the dependent variables than these non-treatment value orientations. In other words, the immediate effect of complex informational treatments will dominate even value orientations that are a well established part of underlying causal structures for certain types of opinion.

It is of interest that one could also analyze other types of effects with this data. For example, one could examine interactions between the treatment variable and the non-treatment value orientations. In fact, we have some limited basis for expecting this might be relevant based on previous research, albeit on a larger and more complex data set (Corbett and Durfee, 2004). Models were tested including various specifications of interaction terms. The approach that most closely adheres to best practice indicated that the interactions themselves seldom had a significant influence on dependent variables. So, we will not include that part of our analysis in this paper.

Even though we can put the questions and variables of interest in context, one might well ask whether it is practically important to examine the change of opinion. The link between opinion and behavior is not always a clear and straightforward one. Furthermore, since the theoretical work of Downs (1972) there is a considerable reason to believe that opinion about the environment fluctuates considerably over time. Research in this area is further complicated by the fact that public opinion may be poorly correlated with well established facts due to media biases (Ader, 1995). Nevertheless, there is reason to believe that opinion in conjunction with various forms of political participation does have an impact on the direction of policy (Agnone, 2007; Guber 2003).

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Research Note

Description of the Research Design and Measurement Procedures with a Brief Comment
on Analytic Techniques to be Used

A simple but classic experimental design was used in which a control group and a
treatment group were given a questionnaire focused on general climate and
environmental issues. The treatment group was then shown an hour long video that was
critical of views promoting the anthropogenic view of green house gases' origins and
global warming. The treatment group was then given the questionnaire again for a second
administration. The control group was simply administered the questionnaire again. A
total of 45 adult subjects were recruited for the groups, and they were randomly assigned
to the treatment and control groups. 23 people were in the control group, and 22 were in
the treatment group.

By way of briefly describing the treatment device, it was a documentary video produced
for British TV. It is somewhat flamboyantly titled, "The Great Global Warming
Swindle." Despite the provocative title, the content is a best representation of counter
arguments to mainstream views on climate change. The content is provided by a variety
of scientific sources associated with major universities, research institutes and even the
IPCC (Intergovernmental Panel on Climate Change). As well, some interest group
activists and public officials provide context on the growth of the environmental
movement as a political phenomenon. Remember that the intent was to provide a
treatment that provided a strong counter argument to popular currents in mass culture and
opinion, and no claim is made in this paper that the video is correct in every instance.
One must also note that alternative video treatments were far less appealing in terms of
production standards and prima facie credibility. It was also thought that some form of
multi-dimensional media treatment would be more generalizable than simple
decontextualized information treatments based on print information (Davis, 1995). The
fabric of real world views on the environment is very much bound up in the imagery of
and exposure to popular media productions (Stamm, Clark & Eblacas, 2000).

The measurement instrument was a questionnaire. The questions were developed through
several stages of focus groups and pretesting. Therefore, while they do not always phrase
issues in the way that an expert on climate change would like, they do function very well
in capturing the understanding and definitions used by moderately well educated adults.
The primary questions of interest are measures of opinion concerning climate change,
global warming, the possible underlying causes of such phenomena and their likely
impact. These constitute the 11 dependent measures in this study, and they are measured
on 7 point scales generally reflecting a range of responses from complete disagreement
with a statement to complete agreement with it.

Above and beyond these basic dependent measures, there were other blocks of questions
probing the full range of subjects' policy priorities, their knowledge of relevant
phenomena, certain political preferences and socio-economic variables. These other

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blocks of variables will not be used in this paper. They are simply mentioned here for those interested in the overall structure of the measurement instrument.

As is well known, there are a number of approaches that might be taken to the analysis of longitudinal, experimentally generated data. There are two particularly common approaches to such analysis. The more conventionally accepted approach, sometimes, referred to as the covariate approach, involves removing the influence of first stage measures from second stage measures and then determining whether the treatment variable makes a difference in the adjusted second stage measures used as dependent variables. A less conventionally accepted approach is to compute change or gain scores reflecting the difference between later and earlier scores on a dependent variable. Then the treatment variable is used to see if it makes any difference in the change scores. While this latter approach was once criticized for problems in measurement reliability (i.e. Lord's paradox), (Hand and Taylor, p.166) it is now generally accepted that its virtue or lack of it depends on the type of hypotheses being tested. Ultimately, our main results are based on a version of the covariate approach. The covariate approach is best suited to a true experimental design as opposed to an observational or correlational design (Fitzmaurice, Laird and Ware, p. 122-124).

This sort of analysis can either be implemented with analysis of variance or regression techniques. We will rely on the ordinary least squares regression technique. It has advantages in terms of flexibility and subsequent model building. In each initial regression, the effect of the treatment variable, controlling for the pretreatment measures of the dependent variable, is estimated. Then, in a second stage of regression, the individual value orientations are added into the model.

One of the constraints that particularly influenced this analysis was that such a small data set does not accommodate the simultaneous use of a large number of variables. It is not uncommon to find guidance in multivariate texts suggesting that a minimum ratio of cases to variables should be in the 6 to 12 range or even more. While being mindful of these constraints, we do sometimes press those limits without any apparent distortion. Nevertheless, the small number of cases does impose some limitations. In light of it, we will not estimate models including all the value orientation variables at once.

A final point to note is that, as indicated, we are examining 11 separate dependent or criterion variables in this study. Each one arises from the 2 point in time measurement of a particular questionnaire item. With a larger number of cases, one might approach this data using some form of dimensional reduction analysis, but such analysis should not be emphasized given the number of subjects in this study.

<u>Descriptive Overview of Data Generated</u>

Prior to presenting the main analysis, it will be useful to provide an overview of the basic pattern of response to the main dependent measures. The questionnaire began with a number of items on a seven point scale (1 representing complete disagreement with the

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question and 7 representing complete agreement) and focused on respondent views of global warming and climate change. The basic results are presented below for the whole sample, including both treatment and control subjects. Average scores for each variable are presented at time 1 (pre treatment) and time 2 (post treatment). The average change between the two measurements is also presented.

Table 1: Total Sample Averages for Main Dependent Variables			
Variable	Average at First Measurement	Average at Second Measurement	Average Change
Global warming is occurring in every region of the world.	5.47	5.24	-.23
Global warming is taking place, but not in every region of the world	2.84	2.53	-.31
Beyond any reasonable doubt, global warming is taking place	5.82	5.53	-.29
Global warming is taking place, but it is not certain that its negative impacts will be greater than its positive impacts.	3.62	3.35	-.27
The primary cause of climate warming is green house gas emission	4.44	3.91	-.53
The green house gases that lead to global warming are primarily generated by human activity	4.64	3.98	-.66
Climate change involves more than just global warming	6.18	6.0000	-.18
The world will definitely get warmer if people don't change their behaviour	4.87	4.62	-.25
Changes in human behaviour can significantly reduce global warming	5.09	4.42	-.67
Human behaviour is of such minor importance that modifying it will not have any major impact on the global climate.	2.91	3.47	.56
Any significant change in human behaviour that could possibly impact on the climate would require a massive reduction in economic activity.	3.60	3.78	.18

Table 1 provides an overview of basic results without touching on issues of significance. It simply provides an introduction to the preliminary descriptive contours of the data. Once treatment – control distinctions and other variables are brought to bear, the significance of findings will be relevant.

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The basic pattern revealed in the data is that respondents generally accepted conventional views of anthropogenically induced global warming at the time of the pre-treatment or earlier measurement. Albeit, there was some hesitancy in completely accepting that perspective, but the average tendency of responses was in the direction of acceptance. In the second responses, we find some very modest reductions in the average acceptance of the conventional perspective. The largest reductions in acceptance of the conventional perspective occur in those variables that are most specifically linked to the influence of green house gases on climate and those variables that reflect the relative importance of human activity on climate change. This is what one would expect for those in the treatment group because of the nature of the information to which they were exposed. However, it is possible that part of these reductions in acceptance occurred in the control group as well simply as a result of having to think about some of the dimensions of climate change in a more sustained way.

One other variable that we wish to highlight at this point relates to subject knowledge of climate change as opposed to their opinions. Subjects were asked at two points in time what they thought was the most commonly occurring green house gas. The correct objective answer is water vapor, but many members of the public seem to have limited knowledge of these sorts of facts. Only 6.7 percent of subjects new the correct answer at before treatment. At the second or later measure, this had increased to 24.4 percent. This was largely due to the exposure of the treatment subjects to additional information. However, it is still not a huge increase considering the information content of the treatment. In general, it is important to remember that real world public views of causes of climate phenomena and environmental phenomena are only weakly based on knowledge of any sort and are often confined to a narrow realm (Bennett, 1997; Bord, Fisher & O'Connor, 1998). Having said that, one is sometimes able to find knowledge variables that predict views about environmental problems and how to deal with them, but such relationships can be quite selective in terms of the variables and types of subjects involved. (Bennett, 1997; Bord, Fisher & O'Connor, 1999). In light of this, we did not make formal knowledge of climate phenomena a centerpiece of this study. However, some of the variables examined are indicators of broad contours of implicit knowledge.

Having set the stage by showing the basic contours of the dependent variables, we can now proceed to test our hypotheses.

Substantive Results

Did the Treatment Make a Difference in Response?

Initially, we are going to examine the later measure of each of our dependent variables as a function of two independent variables: the treatment-control group distinction variable and the earlier measure of the dependent variable. In this type of analysis the primary point of interest is the treatment variable. We want to see if exposure to the treatment has an impact on the later measures of a dependent variable. The use of the earlier measure of

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the dependent variable is simply to control for the influence of initial responses. The effect of the treatment variable becomes the effect of treatment exposure controlling for any influences of initial scores. In this type of analysis, we fully expect that the initial measure of a variable will always have a strong and significant impact on the later measure of the variable that is taken as a dependent; early and late measures of the same thing tend to be related. So, our real interest is seeing what the impact of the treatment variables is.

In table 2 below, we see that the earlier measure of a dependent variable is always a strong and significant predictor of the later measure of the variable being used as dependent. This is entirely as expected. However, we also find that the treatment variable did produce some significant impacts on the dependent variable even after controlling for initial measurement. For example, we find significant or very nearly significant treatment impacts on the following variables, where we consider .05 or less to be clear significance and .05 to .1 to be near significance.

- The primary cause of climate warming is green house gas emission
- The green house gases that lead to global warming are primarily generated by human activity
- Climate change involves more than just global warming (near significance)
- Changes in human behaviour can significantly reduce global warming
- Human behaviour is of such minor importance that modifying it will not have any major impact on the global climate

In each of these cases but one, the effect of treatment exposure was to reduce agreement with the ideas that green house gases are the only major influence on global warming and that human production or such gases are the only factors worthy of note with respect to the climate influence of such gases. Related to this, there was increased acceptance of the view that human behaviour is only a small part of any global warming phenomenon. The one variable where there was near significance had a sign that indicates treatment exposure decreased acceptance of the idea that global warming was only one possible dimension of the broader realm of climate change. All of the changes, except for the last one, were consistent with the content of the video that constituted the treatment. The last effect relating to whether or not there is more to climate change then global warming suggests a greater acceptance of a narrow view of a climate phenomenon even though causes relating to it were now assessed differently.

There were, of course, variables that were not significantly impacted by the treatment variable at this point in the study. These had mostly to do with the generality and reality of global warming phenomenon. Also, dependent variables requiring respondents to judge the broader impact of global warming did not even come remotely close to being associated with a significant treatment effect.

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Dependent Variables: 2nd Measures of Each Variable	Adjusted R Square	Significance of Adjusted R Square	Regression Coefficient for Treatment	Regression Coefficient for First Measure of a Variable
Global warming is occurring in every region of the world 2nd measure	.655	.000	b = -.427 beta= -.116 sig.= .202	b = .870 beta = .795 sig.= .000
Global warming is taking place, but not in every region of the world 2nd measure	.650	.000	b = .403 beta = .113 sig.= .213	b = .716 beta = .802 sig.= .000
Beyond any reasonable doubt, global warming is taking place 2nd measure	.519	.000	b = -.430 beta = -.121 sig.= .256	b = .821 beta = .722 sig.= .000
Global warming is taking place, but it is not certain that its negative impacts will be greater than its positive impacts 2nd measure	.557	.000	b = .122 beta = .038 sig.= .723	b = .715 beta = .746 sig.= .000
The primary cause of climate warming is green house gas emission 2nd measure	.746	.000	b = -.701 beta = -.220 sig.= .006	b = .880 beta = .862 sig.= .000
The green house gases that lead to global warming are primarily generated by human activity 2nd measure	.605	.000	b = -1.039 beta = -.317 sig.= .002	b = .703 beta = .713 sig.= .000
Climate change involves more than just global warming 2nd measure	.256	.001	b = -.611 beta= -.235 sig.= .087	b = .636 beta = .429 sig.= .003
The world will definitely get warmer if people don't change their behaviour 2nd measure	.583	.000	b = -.533 beta=-.150 sig.= .135	b = .909 beta = .743 sig.= .000
Changes in human behaviour can significantly reduce global warming 2nd measure	.502	.000	b = -1.246 beta =-.374 sig.= .001	b = .687 beta =.632 sig.= .000
Human behaviour is of such minor importance that modifying it will not have any major impact on the global climate 2nd measure	.555	.000	b = 1.314 beta =.361 sig.= .001	b = .843 beta =.668 sig.= .000
Any significant change in human behaviour that could possibly impact on the climate would require a massive reduction in economic activity 2nd measure	.467	.000	b = -.018 beta = -.005 sig.= .966	b = .752 beta = .700 sig.= .000
All regressions are based on the total sample of 45 cases.				

Let us now consider what impact the secondary independent variables have once they are added to the simple model developed thus far. Recall that these variables relate to location on the political spectrum, degree of religious commitment and importance assigned to environmental issues. In the context of our secondary hypothesis, we want to see if these additional variables have a greater or lesser impact than the treatment variable.

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We will examine each of these three variables separate from one another in conjunction with the predictors already used in previous regressions. The direct effect of one of the three value variables will be assessed, and the same sort of analysis will be conducted for each of the other secondary independent variables. We will begin with the variable reflecting the perceived, relative importance of environmental issues as a main or direct effect.

Importance of Environmental Issues as a Secondary Independent Variable

To begin with, note that the environmental variable was part of a series of ranking questions in which subjects were asked to rank the importance of general issue areas from 1 to 7 where 1 represented most important issue. Results in which this variable is added to our basic model are presented below.

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Table 3: Regression Results Adding the Impact of the Importance of Environmental Issues to the Basic Model

Dependent Variables: 2nd Measures of Each Variable	Adjusted R Square	Significance of Adjusted R Square	Regression Impact for Treatment	Regression Impact for First Measure of a Variable	Regression Impact for Relative Importance of Environment Issues
Global warming is occurring in every region of the world 2nd measure	.648	.000	b= -.424 beta= -.115 sig.= .210	b= .874 beta= .799 sig.= .000	b= .037 beta= .031 sig.= .733
Global warming is taking place, but not in every region of the world 2nd measure	.653	.000	b= .397 beta= .111 sig.= .218	b= .735 beta= .824 sig.= .000	b= -.122 beta= -.105 sig.= .252
Beyond any reasonable doubt, global warming is taking place 2nd measure	.519	.000	b= -.434 beta= -.122 sig.= .251	b= .803 beta= .705 sig.= .000	b= -.126 beta= -.109 sig.= .308
Global warming is taking place, but it is not certain that its negative impacts will be greater than its positive impacts 2nd measure	.546	.000	b= .120 beta= .037 sig.= .730	b= .717 beta= .748 sig.= .000	b= -.007 beta= -.007 sig.= .947
The primary cause of climate warming is green house gas emission 2nd measure	.741	.000	b= -.701 beta= -.220 sig.= .007	b= .878 beta= .860 sig.= .000	b= -.035 beta= -.034 sig.= .663
The green house gases that lead to global warming are primarily generated by human activity 2nd measure	.629	.000	b= -1.047 beta= -.319 sig.= .001	b= .663 beta= .673 sig.= .000	b= -.194 beta= -.183 sig.= .059
Climate change involves more than just global warming 2nd measure	.238	.003	b= -.608 beta= -.234 sig.= .094	b= .644 beta= .435 sig.= .004	b= .016 beta= .019 sig. =.891
The world will definitely get warmer if people don't change their behaviour 2nd measure	.631	.000	b= -.597 beta= -.168 sig.= .077	b= .746 beta= .609 sig.= .000	b= -.310 beta= -.268 sig.= .015
Changes in human behaviour can significantly reduce global warming 2nd measure	.518	.000	b= -1.244 beta= -.373 sig.= .001	b= .638 beta= .587 sig.= .000	b= -.183 beta= -.169 sig.= .127
Human behaviour is of such minor importance that modifying it will not have any major impact on the global climate 2nd measure	.583	.000	b= 1.317 beta= .362 sig.= .001	b= .780 beta= .618 sig.= .000	b= .233 beta= .197 sig.= .057
Any significant change in human behaviour that could possibly impact on the climate would require a massive reduction in economic activity 2nd measure	.462	.000	b= -.019 beta= -.005 sig.= .965	b= .746 beta= .695 sig.= .000	b= .105 beta= .086 sig.= .442

In 5 of the 11 regressions, neither the treatment nor the importance of environmental issues variable impact significantly on a dependent variable. In the remaining models, we find:

➢ In 3 instances the treatment variable is significant or marginally significant while the environmental issues variable is insignificant. Here the secondary hypothesis about the relative impact of the treatment and non-treatment variables is supported.

➢ In 2 instances where both predictors are either significant or marginally significant, the treatment variable has the larger standardized effect or Beta. This also supports the secondary hypothesis.

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> ➢ In one instance, where both predictors have significant or near significant impacts, the environmental issues variable has a larger Beta and a better level of significance. This counters the secondary hypothesis.

Overall our secondary hypothesis tends to be confirmed but within a specific subset of the dependent variables.

As was the case with the initial regression analysis, the dependent variables that are significantly impacted tend to involve perceptions of causation climate phenomena with emphasis on perceptions of human involvement. The general direction of treatment effects is still tending toward reduced agreement with conventional views on climate change. Still standing slightly apart from other findings, we continue to see the treatment reducing agreement with the view that there is more to climate change than global warming.

Left-Right Political Orientation as a Secondary Independent Variable

Note that political orientation is measured on a 7 point scale with 1 representing extreme left and 7 representing extreme right. Results for this and related variables are presented in the next table.

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Table 4: Regression Results Adding the Impact of Left-Right Political Orientation to the Basic Model

Dependent Variable: 2nd Measures of Each Variable	Adjusted R Square	Significance of Adjusted R Square	Regression Impact for Treatment	Regression Impact for First Measure of a Variable	Regression Impact for Left-Right Political Orientation
Global warming is occurring in every region of the world 2nd measure	.647	.000	b = -.424 beta = -.115 sig. = .210	b = .875 Beta =.799 sig. = .000	b = .027 Beta = .017 sig. = .857
Global warming is taking place, but not in every region of the world 2nd measure	.647	.000	b = .407 beta = .114 sig. = .211	b = .698 beta = .782 sig. = .000	b = .119 Beta = .075 sig. = .421
Beyond any reasonable doubt, global warming is taking place 2nd measure	.510	.000	b = -.429 beta = -.120 sig.= .261	b= .838 beta= .736 sig.= .000	b= .091 beta= .058 sig.= .601
Global warming is taking place, but it is not certain that its negative impacts will be greater than its positive impacts 2nd measure	.582	.000	b = .192 beta = .060 sig. = .568	b = .651 beta = .679 sig. = .000	b = .274 beta = .193 sig. = .068
The primary cause of climate warming is green house gas emission 2nd measure	.760	.000	b = -.695 beta = -.219 sig.= .005	b = .862 beta = .845 sig.= .000	b = -.195 beta = -.139 sig.= .069
The green house gases that lead to global warming are primarily generated by human activity 2nd measure	.658	.000	B = -1.037 Beta = -.316 sig.= .001	b = .717 beta = .726 sig = .000	b = -.351 beta = -.243 sig = .009
Climate change involves more than just global warming 2nd measure	.257	.002	b = -596 beta = -.229 sig.= .095	b = .671 beta = .453 sig.= .002	b = .155 beta = .135 sig.= .312
The world will definitely get warmer if people don't change their behaviour 2nd measure	.573	.000	b = -.533 beta = -.150 sig.= .139	b = .909 beta = .743 sig = .000	b = -.013 beta = -.008 sig.= .934
Changes in human behaviour can significantly reduce global warming 2nd measure	.506	.000	b = -.1.243 beta = -.373 sig.= .001	b = .666 beta = .612 sig.= .000	b = -.185 beta = -.126 sig.= .247
Human behaviour is of such minor importance that modifying it will not have any major impact on the global climate 2nd measure	.545	.000	b = 1.314 beta = .361 sig. = .001	b = .840 beta = .665 sig. = .000	b = .038 beta = .023 sig. = .821
Any significant change in human behaviour that could possibly impact on the climate would require a massive reduction in economic activity 2nd measure	.454	.000	b = -.018 beta = -.005 sig. = .966	b = .751 beta = .700 sig. = .000	b = .005 beta = .003 sig. = .977

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In 5 of the 11 regressions, neither the treatment nor the importance of environmental issues variable impact significantly on a dependent variable. In the remaining models, we find:

- In 3 instances the treatment variable is significant or marginally significant while the left-right political orientation variable is insignificant. Here the secondary hypothesis about the relative impact of the treatment and non-treatment variables is supported.
- In 2 instances where both predictors are either significant or marginally significant, the treatment variable has the larger standardized effect or Beta. This also supports the secondary hypothesis.
- In one instance, only the left-right political orientation variable has a significant impact, and this is counter to the secondary hypothesis.

Overall, the secondary hypothesis continues to be supported but still mostly within a subset of the dependent variables.

The same types of dependent variables as before tend to be associated with significant impacts along with the same underlying narrative of reduced acceptance of conventional views of climate change causation. However, we again see the somewhat anomalous narrowing of conceptual focus in which the treatment produced greater disagreement with the idea that there is more to climate change than global warming. The one instance where only the environmental issues variable has a significant impact does clearly differ from other findings. It links more to complexities and uncertainties of possible influences of global warming.

Level of Commitment to Views on Religion as a Secondary Independent Variable

The level of commitment to views on religion was a trichotomous ordinal variable. The relevant regression results are provided below.

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Table 5: Regression Results Adding the Impact of Level of Commitment to Views on Religion

Dependent Variable: 2nd Measures of Each Variable	Adjusted R Square	Significance of Adjusted R Square	Regression Impact for Treatment	Regression Impact for First Measure of a Variable	Regression Impact for Level of Commitment to Views on Religion
Global warming is occurring in every region of the world 2nd measure	.659	.000	b = -.532 beta = -.143 sig. = .127	b = .859 beta = .786 sig. = .000	b = .258 beta = .109 sig. = .236
Global warming is taking place, but not in every region of the world 2nd measure	.671	.000	b = .526 beta = .146 sig. = .110	b = .707 beta = .792 sig.= .000	b = -.392 beta = -.171 sig. = .063
Beyond any reasonable doubt, global warming is taking place 2nd measure	.515	.000	b = -.517 beta = -.143 sig. = .194	b = 797 beta = .700 sig. = .000	b = .198 beta = .086 sig. = .442
Global warming is taking place, but it is not certain that its negative impacts will be greater than its positive impacts 2nd measure	.584	.000	b = .180 beta = .055 sig = .608	b = .713 beta = .744 sig. = .000	b = -.354 beta = -.172 sig. = .095
The primary cause of climate warming is green house gas emission 2nd measure	.760	.000	b= -.569 beta= -.180 sig.= .024	b= .869 beta= .865 sig.= .000	b= -.251 beta= -.125 sig.= .108
The green house gases that lead to global warming are primarily generated by human activity 2nd measure	.599	.000	b = -1.049 beta = -.321 sig. = .002	b = .702 beta = .722 sig. = .000	b = .198 beta = .095 sig. = .339
Climate change involves more than just global warming 2nd measure	.287	.001	b = -564 beta = -216 sig. = .124	b = .704 beta = .478 sig. = .001	b = -.294 beta = -.177 sig. = .201
The world will definitely get warmer if people don't change their behaviour 2nd measure	.576	.000	b = -.447 beta = -.125 sig. = .226	b = .902 beta = .741 sig. = .000	b = -.212 beta = -.094 sig. = .360
Changes in human behaviour can significantly reduce global warming 2nd measure	.480	.000	b = -1.238 beta = -.370 sig. = .002	b = .688 beta = .634 sig. = .000	b = -.021 beta = -.010 sig. = .929
Human behaviour is of such minor importance that modifying it will not have any major impact on the global climate 2nd measure	.542	.000	b = 1.253 beta = .343 sig. = .002	b = .846 beta = .675 sig. = .000	b = .079 beta = .034 sig. = .750
Any significant change in human behaviour that could possibly impact on the climate would require a massive reduction in economic activity 2nd measure	.504	.000	b = -.175 beta = -.047 sig. = .674	b = .713 beta = .665 sig. = .000	b = .579 beta = .243 sig. = .033

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In 4 of the 11 regressions, neither the treatment nor the level of commitment to views on religion variable impact significantly on a dependent variable. In the remaining models, we find:

➢ In 4 instances the treatment variable is significant or marginally significant while the level of commitment to views on religion variable is insignificant. Here the secondary hypothesis about the relative impact of the treatment and non-treatment variables is supported.
➢ There are no instances where both predictors are either significant or marginally significant.
➢ In 3 instances, only the level of commitment to views on religion variable has a significant or near significant impact, and this is counter to the secondary hypothesis.
➢ There were a greater than usual number of variables that fell just short of marginal significance.

Overall, the main hypothesis and secondary hypothesis continue to be supported but mostly within a subset of the dependent variables. However, the secondary hypothesis is less clearly supported in another subset of dependent variables that emerge as being of importance for the first time at this stage of analysis.

The same types of dependent variables as before tend to be associated with significant impacts of the treatment variable. These dependent variables reflect perceptions of causality of climate change and the human role in such causality. On the other hand, the dependent variables that are impacted by the level of commitment to religious views tend to reflect possible scope and impact of global warming or similar phenomena. Also, the somewhat anomalous treatment effect observed earlier reducing agreement with the view that climate change is more than global warming has moved to insignificance here.

Concluding Discussion

Or main hypothesis was that the treatment variable would indeed significantly impact the dependent measures. In particular, the dependent measures would be moved in a direction suggesting less acceptance of conventional views of global warming and climate change. This was confirmed but only for a subset of the dependent measures having mostly to do with perception of causality of climate change and human involvement in such causality.

Our secondary hypothesis stated that the treatment effect would have a greater impact than additional independent variables reflecting value orientations of various kinds. This was partly confirmed mostly for the subset of dependent measures that were highlighted in the first part of our analysis. It was most obviously supported in the regressions using perceived importance of environmental issues and left-right political orientation. It was less clearly supported in the regressions using level of commitment to views on religion. Here, the impact of this non-treatment independent variable was stronger than the treatment in more than one instance. Furthermore, the level of commitment to views on religion variable affected a substantively different set of dependent measures than the

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treatment. While the treatment continued to be focused mostly on perceptions of causality, the level of commitment to religious views variable had greatest impact on measures reflecting the scope and impact of climate change phenomena.

We can conclude that complex video informational treatments can change opinions about climate change within a short period of time. Of course, we cannot conclude that this will be a lasting change, but it is at least a real, short-term change. Furthermore, we see that change is more likely to occur in the context of personal models of causation that people use to understand the phenomena underlying their opinions as opposed to their basic views about the reality of phenomena or the complexity of impacts. In subsequent studies, it will be interesting to determine whether or not this is sustained in other types of opinion-policy interfaces.

We can also conclude the treatment effect tends to have greater influence on opinion about climate change than selected value orientation variables. In particular, this seems to be most true when we are dealing with value orientation variables that are linked to the shaping of personal political realities. For example, indicators of political orientation and the prioritization of certain public problems compared to others are relevant in this regard. Furthermore, this domination of political and policy orientations by complex informational treatments is focused on the type of dependent variables highlighted elsewhere: those relating to personal perceptions of causation.

Nevertheless, the comparative importance of an informational treatment over political and policy orientations does not necessarily extend to other types of value orientations. Our results suggest that aspects of more general beliefs, such as level of commitment to religious views, can dominate short term informational treatments. Furthermore, more general value orientations can also extend beyond personal causation maps to other types of dependent variables that tap the basic views about the reality and impact of policy problems and their solutions.

Whether opinions about causal mechanisms or opinions about perceptions of reality are more easily changed is an intriguing areas deserving further analysis. Our immediate findings indicate that information can most easily change perceptions of causal mechanisms. However, other kinds of treatments might affect basic assessments of the reality of climate phenomena or other important areas of policy relevance. Yet, the foundational nature of defining phenomena of importance, such as global warming, may make it less labile and changeable than the models the public uses to explain its causation.

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