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RESEARCH ARTICLE

Development and Validation of an Instrument for Assessing Climate Change Knowledge and Perceptions: The Climate Stewardship Survey (CSS)

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Abstract

The Climate Stewardship Survey (CSS) was developed to measure knowledge and perceptions of global climate change, while also considering information sources that respondents 'trust.' The CSS was drafted using a three-stage approach: development of salient scales, writing individual items, and field testing and analyses. Construct validity and alpha-level reliability was conducted on the 122-item test instrument to produce a refined 84-item CSS. The field tested CSS includes five scales (1) Impacts of Climate Change, (2) Causes of Climate Change (3) Misunderstandings about Climate Change (4) Issues and (5) Policy. Four knowledge dimension sub-scales and seven perception dimension sub-scales are included in the accepted instrument. The CSS is particularly applicable to studies interested in measuring potential respondent's ideas on the impacts, causes, and misunderstandings that are important to global climate change knowledge and perceptions as they relate specifically toward climate change issues and policy.

Key Words: Climate stewardship survey, CSS, climate change knowledge and perceptions

Introduction

"Climate change deniers have seriously impeded the development of rational policies to deal with what the best scientific research tells us is happening with our climate, a distortion that may prove to have fatal consequences" (Schwartz, 2011, p. 119) is the strong nature of the language emanating from one segment of today's multifaceted climate change debate. Other perspectives springing from the social milieu range from

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messages fictionalized by movie screen writers as entertainment (Bedford, 2010; Heffron & Valmond, 2011); newspaper opinion-editorial columnists advocating their opinions (e.g., Ambrose, 2011; Murdoch, 2008); statements of "fact" espoused by experts in fields other than climate science (ex. Chapman, 2008); organized "deniers" as Schwartz (2011) has noted; and politicians polarizing the arguments (Dunlap & McCright, 2008); to those who simply do not know enough about the topic to make an informed statement. In order to determine how to improve sound communication regarding climate science amongst the varied, and often divergent, perspectives we must put ourselves in a position to educate the population about the pertinent issues and work toward propagating climate scientists, or at least those knowledgeable about climate science, throughout our education systems—systems both formal and informal. Thus, if epistemology is the study of how we know, in this case how we know the science of climate change, then *agnotology* is the study of what we do not know (Proctor & Schiebinger, 2008). Our higher education research system has a strong background in epistemology and disseminating knowledge about how we know climate change science, however, in order to develop a cognizant population that can communicate about climate change from factual, data-driven positions, rather than from emotional and/or political positions, it is time to also develop approaches toward the study of what we do not know and how it is, from a broad cultural perspective, that we do not know it.

This paper outlines the development and validation of a survey instrument aimed at gathering data regarding several aspects of what a population knows and does not know about climate change, how that knowledge has come about, and the population's perceptions toward climate change as an initial piece of a larger research project. The aim of the larger project was to work with citizens from formal and informal learning environments to make educated climate change-related decisions and enable them to become solution providers rather than potential disseminators of disinformation—*agnogenesis* (Bedford, 2010) perpetuators as it were—whether intentional or not. The question immediately at hand though is how can we leverage the plethora of current climate change-oriented survey instruments and modify them and/or develop and validate new instrument scales to meet these needs?

Environmental Psychology Survey Instruments

Approaching environmental perception and knowledge study by means of survey instrument has been well established over the last four decades. As early as the 1970s, Maloney and Ward (1973) recognized the importance of the influence of knowledge on one's behavior in terms of ecological psychology and how investigating that knowledge is a crucial step toward behavioral modification. It was through a 130-item survey instrument that they sought to…

> … determine what the population "knows" regarding ecology, the environment, and pollution; how they feel about it; what commitments they are willing to make; and what commitments they do make. These are necessary antecedent steps that must be made before an attempt can be made to modify critically relevant behaviors. (1973, p. 584)

Maloney and Ward were entrenched within the post-Silent Spring (Carlson, 1962) era when environmental psychology was expanding from investigations of traditional architectural and spatial human environments—"*proximics"* as Wohlwill called it (1970, p. 304)—toward that of the environment being considered in terms of the larger context of wide-scale pollution and the depletion of natural resources. Wohlwill issued a challenge to psychologists of the time to consider the importance of the study of

"attitude formation and change, and its application to environmental problems" (1970, p. 308). While the study of human environments has multidisciplinary roots reaching back to the 1930s with Henry Murray's development of the notions of environmental *press* and *pressive apperception*—unconscious reactions to the potential of the environment (1938)—and Kurt Lewin's psychological field theory (1936) derived from physics, it has been the wide-reaching use of survey instruments that has proved helpful in meeting Wohlwill's 1970 challenge.

Survey instruments have been used to investigate at least five broad categories related to humans and the environment in terms of Wohlwill's larger context of environment—that which supersedes the proximics of buildings and city spaces of prior research. According to Walker (2010) surveys have been used since the early 1970s to gain access to a variety of populations' (1) knowledge of, (2) attitudes toward, (3) values pertaining to, (4) behavior toward, and (5) affect toward the natural world. Since 1973, no less than eighteen broad-ranging, published instruments have been developed and administered to groups ranging from adult populations; graduate, undergraduate, secondary, and elementary students; and to students' parents. These studies have been as far reaching as Canada, Australia, Taiwan, the United States of America, Poland, Hong Kong, Turkey, Switzerland, Greece, and Indonesia (Walker, 2010), and likely further. Of these instruments though, none pertain to more recent controversies related to global climate change.

Climate Change Survey Instruments

Spawned by notions of energy efficiency, environmental externality costs, regulatory policy movements, and the advent of publications related to climate change of the late 1980s and early 1990s, studies related to climate change knowledge and perceptions began to emerge. For instance, Kempton's ethnological interviews of "ordinary citizens" (1991, p. 183) and their conceptualizations related to energy consumption and global climate change informed Read, Bostrom, Morgan, Fischhoff, and Smuts' development of a risk-analysis oriented, structured questionnaire to access a sample of the general public's knowledge of "causes and effects of global warming" (1994, p. 971). In their follow-up study 17 years later they found the public's perceptions had changed little (Reynolds, Bostrom, Read, & Morgan, 2010) despite increased public awareness efforts on the issue.

The Read, Bostrom, Morgan, Fischhoff, and Smuts' questionnaire-style longitudinal study focused on the mental models of their population and considered their sample population's knowledge of (1) facts, (2) causes, (3) effects, and (4) policy effects related to climate change. Other investigators, in the more recent past, have considered knowledge from a variety of different perspectives, as well as a variety of different populations. For instance, Boon (2009) used a 7-item, self-report instrument to investigate high school students' knowledge of the (1) causes of the greenhouse effect and (2) climate change, (3) climate change vs. ozone depletion, and perceived (4) impacts of climate change. She then compared her Australian students' results to those of a 1991 study of similarly aged UK students finding that "both seem to be under-informed" (Boon, 2009, p. 55).

Sundblad, Biel, and Gärling took a different approach, analyzing (1) knowledge of the current state of climate change, (2) causes of climate change, (3) impacts of climate change, and (4) confidence in knowledge [self-efficacy] of Swedish "experts, [environmental] journalists, politicians, and laypersons" (2009, p. 281). As one might imagine, the results spanned a broad spectrum on their four scales.

Numerous other climate change survey investigations have been conducted in the recent past, however, they are too abundant to detail here. Yet, a brief outline demonstrates a growing body of climate change perception and knowledge research using survey instruments to gather data. For example, Brody, Zahran, Vedlitz, and Grover (2008) looked at public perceptions of climate change in the context of risk perception and spatial location. Similarly, yet on a more practical scale, Borberg, Cone, Jodice, Harte, and Corcoran considered a variety of knowledge and preparatory behaviors of "Oregon coast professionals who make decisions about development in the coastal zone" (2009, p. 2)—perhaps in what we could label applied risk perception and spatial location. Meanwhile, Dunlap, and McCright (2008) considered climate change knowledge from a partisan perspective—"nowhere is the partisan gap on environmental issues more apparent than on climate change" was their overarching conclusion (p. 27). Heath and Gifford (2006) took free-market ideology and environmental apathy into consideration in their study about beliefs and perceived knowledge related to climate change.

In addition to the above studies that are strongly focused on select measures of knowledge there have recently been large-scale studies from major polling organizations and prominent universities. While these larger studies tend toward awareness/opinion polls, they do contain some elements of their study population's knowledge of climate change and are thus noteworthy here. Pugliese and Lyons (2010) reported on a Gallup poll of over 1,000 Australian adults who are reported to have the highest awareness of climate change in the world. In contrast to the Gallop poll, the Pew Research Center for the People and the Press conducted a large-scale, 1,500 adult survey (2009) and reported declining perceptions of anthropomorphic climate change. However, what is likely the largest (N=2,030 US adults) and most comprehensive study of knowledge (81 items) of climate change comes from the Yale Project on Climate Change Communication (Leiserowitz, Smith, & Marlon, 2010) that grades participants on 15 scales. Incidentally, only 8% of the respondents, representative of the United States' population, scored an A/B (80% and above) on climate change knowledge.

In the development of the Climate Stewardship Survey (CSS) presented here, we considered these surveys in light of our overall project's goal and modified knowledge and perception scale components, as well as informed our item creation in order to develop a customized instrument that combines various aspects of the previously noted instruments and aids us in learning what is lacking in our informal and formal learning environments in the Southeastern United States. This paper outlines the stages of development of the CSS, along with the reliability and validity descriptions of the new instrument with a pilot population.

Method

Data Collection

The survey sample was a non-probability sample of convenience drawn from voluntary participants predominantly associated with secondary and post-secondary environmental and geographic education in the southeastern United States. The survey instrument development described below, the Climate Stewardship Survey (CSS), was available on the World Wide Web through a survey development platform that allows for organized survey posting, data collection, and data download as approved by our Institutional Review Board. The sample of respondents consisted of 122 students and teachers peripherally associated with the Climate Literacy Partnership in the Southeast (CLiPSE). Of the respondents, 1 was from Alabama, 26 were from Arkansas, 1 from the District of Columbia, 41 from Louisiana, 1 from Mississippi, 1 from New York,

1 from South Carolina, 7 from Tennessee, and 43 from Texas. Of this sample population 62% reported their occupation as educator, 16% were students, and the remaining 22% represented administrators, scientists, unemployed, and other. The majority were female (67%), White (91%), Christian (75%), and of independent political party affiliation (43%).

This non-probability sample's data was not used to compare responses or considered as representative, rather, it was used to aid in investigating the reliability and validity of the CSS, to reduce the number of items in the pilot survey, to solicit feedback from a sample of respondents, and to determine how much time was required to complete the survey in order to finalize the instrument into a new instrument from which we could utilize for a larger-scale study.

Stages of Development of the Climate Stewardship Survey (CSS)

The development of the CSS used a well established three-stage approach following Fraser (1986) and others (Jegede, Fraser, & Fisher, 1998; Walker, 2010; Walker, & Fraser, 2005) for developing social perception survey instruments. The first stage involved identification of salient scales to determine knowledge and perception dimensions related to climate change. Stage 2 involved developing and field-testing items within each of the knowledge and perception dimension scales. And, stage 3 required field-testing the items followed by scale/item analyses and validation procedures. Below are more detailed descriptions of the steps involved in each development stage.

Stage 1, the identification and development of salient scales, involved four steps. (1) The first step was a review of the literature related to environmental psychology and climate change investigations in order to identify key components previously deemed important by researchers and practitioners in terms of climate change knowledge and perception dimensions. Likewise, this search noted literature surrounding agnotology and how such research has been utilized in environmental psychology and climate change research or how it could be transferable to such. (2) The second step involved reviewing previously developed survey instruments for their knowledge and perception scales that might be modified for the CSS or to inform the development of scales for the CSS. (3) The third step entailed the classification of knowledge and perception scales to ensure adequate coverage of these two dimensions. (4) The final step in this stage required the development of a set of preliminary scales to be reviewed by a panel of experts. After review by three university climate scientists, one geoscientist, an economist, and a public policy professor, five scales were agreed upon, some having related sub-scales. The Knowledge Dimension scales/sub-scales were: (1) *Impacts of Climate Change*, (2) *Causes of Climate Change* (sub-scales of: Temperature, Contribution, Greenhouse Gases), and (3) *Misunderstandings about Climate Change* (sub-scales of: Climate vs. Weather, Misinformation). The Perception Dimension scales/sub-scales were: (4) *Issues* (sub-scales of: Importance, Informed About, Sources Of, Beliefs About), and (5) *Policy* (sub-scales of: Threats, Role, Environmental Quality, Priority).

Stage 2, writing individual items, required (1) modifying items from previously published surveys and (2) developing new items for each of the above five Knowledge and Perception Dimension scales. This stage also included (3) the development of demographic items, some of which are unique to this survey, such as religion, political party affiliation, and occupation, among others. The final step involved (4) moving the instrument to the World Wide Web platform/interface and running a pilot test of the online instrument to check for errors in layout, design, data retrieval, etc.

Stage 3, field testing and analyses, involved a two-step process of (1) field testing the draft instrument with a sample in order to collect responses for statistical analyses and participant feedback. Participants were asked to time themselves and report how long it took them to complete the instrument at the end of the survey and to face validate the items by offering any notations regarding spelling errors, items making sense, and other practical usage comments. The second step involved (2) exploratory factor analysis to identify items which removal might enhance the factor structure of the instrument, and analysis of internal consistency reliability to determine the extent to which items within a scale measure the same construct as other items within that same scale. These analyses were conducted in order to statistically refine the CSS scales and to provide reliability and validity of refined scales. Data were analyzed using Cronbach's alpha coefficient to measure internal consistency in terms of item intercorrelation. Items not associated above 0.45 within their a priori scale were removed and data were reanalyzed until all of the items with low item-scale correlations were removed and alpha coefficients were maximized.

Results

The development of the Climate Stewardship Survey (CSS) relied upon an *internal strategy* where only items with modest factor loading within their own scale and weak loading on other scales are kept. It also makes use of the *intuitive-rational strategy* whereby only those items with good internal consistency remain in the final instrument (Hase & Goldberg, 1967). Described here are the results by which the CSS was refined and its reliability and validity were determined.

Reliability

During the development of the CSS, each scale was analyzed for internal consistency. Table 1 presents the alpha reliability for each refined scale. Of the 14 scales/sub-scales three were removed due to low reliability (alpha < 0.50). These were the entire sub-scales of: Greenhouse Gases (α = 0.29), Climate vs. Weather (α = 0.38), and Beliefs (α = 0.49). Thus, 17 additional items were removed. The overall instrument reliability after the removal of poor items was α = 0.93.

Table 1.
Scale reliability using Cronbach's alpha coefficient

Dimension/Scale	Final Number of Items	Alpha Reliability
Knowledge Dimension		
Impacts of global climate change (K.I1)	11	0.85
Causes of global climate change - *Temperature* (K.C1)	6	0.87
Causes of global climate change – *Contribution* (K.C2)	7	0.71
Misunderstandings about global climate change – *Misinformation* (K.M2)	3	0.70
Perception Dimension		
Issue Perception – *Importance* (P.IP1)	3	0.51
Issue Perception – *Informed* (P.IP2)	4	0.92
Issue Perception – *Sources (Quantity)* (P.IP3)	9	0.80
Issue Perception – *Sources (Trust)* (P.IPx)	28	0.94
Policy Perception – *Role* (P.PP2)	5	0.82
Policy Perception – *Environmental Quality* (P.PP3)	3	0.81
Policy Perception – *Priority* (P.PP4)	5	0.89

N = 122.

Validity

Content validity was addressed in Stage 1 with a panel of experts, and in Stage 2 with a pilot test. We do not assume external validity, or the generalizability, of the results, as this was a test of the instrument itself with a non-representative sample. Construct validity was investigated through principal component factor analysis with varimax rotation, Kaiser normalization, and Eigenvalues greater than one. The aim of factor analysis is to determine the basic structure of a set of variables to determine how strongly items load on a priori scales. That is, it is a method to determine if an item within a given scale is measuring that scale. Only items with a factor loading of at least 0.45 with their own scale and less than 0.45 with all other scales were kept (see Appendix A).

Thirty-four "faulty" items were identified and removed. In addition to the loss of those 34 items the entire sub-scale of Threats under the Perception Dimension was lost due to low factor loading. Likewise, due to factor loadings, the Perceptions Dimension sub-scale of Sources in the Issues scale was split into Sources (Quantity) and Sources (Trust). In hindsight this is clearly due to the question stems that read: "How much have you learned about global warming from these sources?" (quantity of information) in one set, and "How much do you trust the following sources?" (trusting sources of information) in another set. In the end the total number of items in the refined scale was 84, down from the original 128.

Table 2 presents the dimensions, scales, and scale descriptions of the new Climate Stewardship Survey (CSS). The table also presents the original number of items tested in the pilot study and the number of items remaining after validity and reliability analyses.

Table 2
Climate Stewardship Survey (CSS)

Dimension	Scale	Scale Description	Original Items	Final Items
Knowledge	Impacts of global climate change	K.I1. Measures the extent to which the population has knowledge of the impacts of global climate change.	18	11
	Causes of global climate change	Measures the extent to which the population has knowledge of the causes of global climate change.		
		K.C1. Sub-scale: Temperature affect	9	6
		K.C2. Sub-scale: Contribution	9	7
		K.C3. Sub-scale: Greenhouse gases	6	0
	Misunderstandings about global climate change	Measures the extent to which the population has misunderstandings regarding global climate change.		
		K.M1. Sub-scale: Climate v. weather	6	0
		K.M2. Sub-scale: Misinfo	4	3
Perceptions	Issue perceptions	Measures the population's perceptions related to global climate change issues.		
		P.IP1. Sub-scale: Importance	5	3
		P.IP2. Sub-scale: Informed	4	4
		P.IP3. Sub-scale: Sources Quantity	41	9
		P.IPx. Sub-scale: Sources Trust		28
		P.IP4. Sub-scale: Beliefs	6	0

(Cont.)

Table 2 (Cont.)

Policy perceptions	Measures the population's perceptions related to governmental policies toward global climate change.		
	P.Po1. Sub-scale: Threats	7	0
	P.Po2. Sub-scale: Role	5	5
	P.Po3. Sub-scale: Env Quality	3	3
	P.Po4. Sub-scale: Priority	5	5

Discussion

This study has defined a new survey instrument, the Climate Stewardship Survey (CSS)(see Appendix B), that considers both the participant's knowledge related to global climate change and their perceptions of global climate change while also considering how they are informed to consider the agnotological aspects of the issues. Influenced by prior climate change-oriented environmental psychology instruments, the CSS was drafted and field tested with 128 items. Knowing that the original number of items had to be reduced in a methodical and statistically sound way, we eliminated 44 items due to either low factor loading or low internal consistency reliability using data from 122 pilot participants. With the refined 84-item CSS one now able to implement the new instrument to complete a study about what a population knows and does not know about climate change, how that knowledge has come about, and that population's perceptions toward climate change and to the extent each of these components exists. Researchers will be able to determine to a degree where, if any, agnogenesis (Bedford, 2010) exists and direct resources toward altering misconceptions where they exist through outreach and education in both formal and informal learning environments so that the constituents might become solution providers rather than passive (mis)information absorbers.

This study is admittedly limited by the number of field study participants. A significantly larger number of participants will be necessary to determine if the statistically weakest points of the new CSS will hold up in further studies—namely the weaker sub-scale of Importance in Issue Perceptions where the reliability of the scale was low (α = 0.51) and items with marginal factor loadings below 0.50. As with any sound survey research, reliability and validity will need to be considered with future populations under investigation. Likewise, the sub-scales with low numbers of items may need to be rolled into larger scales instead of sub-scales or additional items should be added in future studies.

Nonetheless, investigators using the CSS in future studies, with diligence, should be able to view climate change perceptions and knowledge in a finer grain than in some previous research. A finer grain where impacts, causes, and misunderstandings are important to global climate change knowledge study and perceptions related specifically toward climate change issues and policy are regarded as noteworthy. What is more, future studies could conceivably modify the CSS with additional scales to investigate associations between the CSS's five scales in two dimensions and any additional scales of specific interest to the researcher. Of particular interest too will be the investigation of associations between the scales of the CSS to find out what influence knowledge has on perceptions and what influence perceptions have on knowledge and where misconceptions and agnogenesis—global climate change disinformation—may fit into the larger scheme.

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Biographical statements

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Appendix A

Factor loadings for a refined 98-item version of the CSS.

Item	P.IPx	K.I1	K.C1	P.IP2	P.PP2	K.C2	P.IP3	P.PP3	P.PP4	K.M2	P.IP1
Impact 1		.645									
Impact 2		.756									
Impact 3		.744									
Impact 4		.483									
Impact 5		.521									
Impact 6		.653									
Impact 7		.510									
Impact 8		.552									
Impact 9		.561									
Impact 10		.587									
Impact 11		.557									
Cause 12			.762								
Cause 13			.794								
Cause 14			.684								
Cause 15			.649								
Cause 16			.505								
Cause 17			.504								
Contrib 18						.456					
Contrib 19						.767					
Contrib 20						.788					
Contrib 21						.724					
Contrib 22						.537					
Contrib 23						.765					
Contrib 24						.696					
Misinfo 25										.708	
Misinfo 26										.636	
Misinfo 27										.488	
Import 28											.463
Import 29											.884
Import 30											.828
Inform 31				.768							
Inform 32				.864							
Inform 33				.876							
Inform 34				.827							
SourceQ 35							.686				
SourceQ 36							.539				
SourceQ 37							.699				
SourceQ 38							.690				
SourceQ 39							.781				
SourceQ 40							.738				
SourceQ 41							.761				
SourceQ 42							.455				
SourceQ 43							.508				
SourceT 44	.851										
SourceT 45	.814										
SourceT 46	.658										
SourceT 47	.768										
SourceT 48	.776										
SourceT 49	.661										
SourceT 50	.818										

SourceT 51	.801									
SourceT 52	.728									
SourceT 53	.556									
SourceT 54	.832									
SourceT 55	.867									
SourceT 56	.765									
SourceT 57	.781									
SourceT 58	.791									
SourceT 59	.632									
SourceT 60	.619									
SourceT 61	.599									
SourceT 62	.759									
SourceT 63	.734									
SourceT 64	.560									
SourceT 65	.764									
SourceT 66	.815									
SourceT 67	.700									
SourceT 68	.826									
SourceT 69	.815									
SourceT 70	.848									
SourceT 71	.724									
Role 72				.809						
Role 73				.827						
Role 74				.695						
Role 75				.618						
Role 76				.768						
EnvQual 77							.782			
EnvQual 78							.907			
EnvQual 79							.749			
Priority 80								.859		
Priority 81								.872		
Priority 82								.846		
Priority 83								.699		
Priority 84								.825		
% Variance	14.28	14.21	7.40	4.84	4.39	4.39	4.05	3.71	3.28	2.88	2.71

N=122; Principal component extraction; Varimax rotation with Kaiser normalization. Factor loadings smaller than 0.45 have been omitted. Sub-scales with poor reliability have been omitted.

Appendix B

Climate Stewardship Survey (CSS)
This appendix presents the scales and sub-scales, the items within each scale/sub-scale, the mean, the standard deviation, and variance of each scale/sub-scale of the new CSS.

Knowledge Scales	Scale Description	Items	Mean	*sd*	*Var*
Impacts of global climate change	K.I1. Measures the extent to which the population has knowledge of the impacts of global climate change. Response Scale: *4 definitely true* *3 probably true* *2 probably false* *1 definitely false*	A warming of the Earth can cause… 1. Disruptions in agriculture 2. Changes in animal migration patterns 3. Changes in regional environments 4. More UV radiation 5. An increase in the size of the ozone hole 6. Sea level rise 7. Glaciers to melt 8. Arctic ice to melt 9. Coral reef die off 10. Flooding of New York City 11. Increased homeland security threats	3.36	0.44	0.19
Causes of global climate change	Measures the extent to which the population has knowledge of the causes of global climate change.				
	K.C1. Sub-scale: Temperature affect *4 always true* *3 sometimes true* *2 seldom false* *1 never false*	To what extent does each of the following affect the Earth's temperature? 12. Volcanic eruptions. 13. Dust in the atmosphere. 14. Clouds. 15. Carbon dioxide. 16. Greenhouse gases. 17. Methane.	3.32	0.21	0.05
	K.C2. Sub-scale: Contribution *4 definitely true* *3 probably true* *2 probably false* *1 definitely false*	Which of these contribute to global warming? 18. Cows. 19. Automobiles/trucks. 20. Deforestation. 21. Burning fossil fuels for electricity. 22. The hole in the ozone layer. 23. Chlorofluorocarbons (CFC) 24. Greenhouse gases influence the Earth's temperature.	2.99	0.85	0.72
Misunderstandings about global climate change	Measures the extent to which the population has misunderstandings regarding global climate change.				

	K.M2. Sub-scale: Misinformation *4 definitely true* *3 probably true* *2 probably false* *1 definitely false*	25. The Earth is cooling, not warming. 26. Global warming is more beneficial than harmful. 27. Global warming is natural, not human caused.	1.87	0.21	0.04
Perception Scales	**Scale Description**	**Items**	**Mean**	***sd***	***Var***
Issue perceptions	Measures the population's perceptions related to global climate change issues.				
	P.IP1. Sub-scale: Importance *4 very* *3 somewhat* *2 rarely* *1 not at all*	28. How concerned are you about global warming? 29. How important is saving money on home energy costs to you? 30. How important is saving money on automobile fuel to you?	3.70	0.26	0.07
	P.IP2. Sub-scale: Informed *4 very* *3 somewhat* *2 rarely* *1 not at all*	How well informed are you about... 31. How the Earth's climate system works? 32. Causes of global warming? 33. The consequences of global warming? 34. Methods to reduce global warming?	3.13	0.05	0.00
	IP3. Sub-scale: Sources (Quantity) *4 very much* *3 some* *2 a little* *1 not at all*	How much have you learned about global warming from these sources? 35. Television 36. Internet 37. Books 38. Magazines 39. Newspapers 40. Family 41. Friends 42. Zoos, museums, aquariums 43. Government	2.44	0.31	0.10
	P.IPx. Sub-scale: Sources (Trust) *4 very much* *3 some* *2 a little* *1 not at all*	How much do you trust the following sources of information about global warming? 44. The Federal Government 45. The State Government 46. Local Government 47. President Obama 48. Federal elected politicians 49. Republican officials 50. Democratic officials 51. Tea Party officials	2.43	0.58	0.33

		52. Libertarian party officials 53. Green Party officials 54. National Oceanic and Atmospheric Administration (NOAA) 55. National Science Foundation (NSF) 56. Environmental Protection Agency (EPA) 57. National Aeronautics and Space Administration (NASA) 58. Intergovernmental Panel on Climate Change (IPCC) 59. University scientists 60. Government scientists 61. FOX News 62. MSNBC News 63. CNN News 64. Weather channel 65. Local TV news 66. Cable TV news 67. Church, temple, or synagogue officials 68. Focus on the Family 69. Family Research Council 70. Cornwall Alliance for the Stewardship of Creation 71. School teachers			
Policy perceptions	Measures the population's perceptions related to governmental policies toward global climate change.				
	P.PP2. Sub-scale: Role *4 significant* *3 somewhat* *2 rarely* *1 not at all*	How much of a role should… 72. Governments take in addressing global warming? 73. Businesses take in addressing global warming? 74. Courts take in addressing global warming? 75. Religious organizations in addressing global warming? 76. You take in addressing global warming?	3.50	0.42	0.18

	P.PP3. Sub-scale: Env Quality *4 excellent* *3 good* *2 fair* *1 poor*	Please rate the overall quality of the environment… 77. In this country today 78. In 10 years if we stay on the same track 79. In 50 years if we stay on the same track	2.23	0.45	0.20
	P.PP4. Sub-scale: Priority *4 significant priority* *3 somewhat of a priority* *2 low priority* *1 not a priority*	Please rate the following by priority… 80. America's environmental health 81. Protection of the nation's environment 82. Protection of the Earth's environment 83. America's economic health 84. America's energy security	3.80	0.71	0.01

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RESEARCH ARTICLE

İklim Değişikliği Bilgi ve Algısını Ölçmek için Bir Ölçme Aracının Geliştirilmesi ve Güvenirliği: İklim Yönetim Anketi (İYÖ)

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Özet

İklim Yönetim Anketi (İYÖ), katılımcıların güvenli bilgi kaynaklarını da göz önüne alarak küresel iklim değişikliği hakkındaki bilgisini ve algısını ölçmek amacıyla geliştirilmiştir. İYÖ üç aşamalı bir yaklaşımla geliştirilmiştir: belirgin kıstasların geliştirilmesi, maddelerin yazımı, alanın test edilmesi ve analiz. Yapı geçerliği ve alfa güvenilirlik düzeyi 122 maddelik test üzerinden yürütülmüş ve tam 84 maddelik bir İYÖ üretilmiştir. Alan testi yapılmış İYÖ beş boyut içerir: (1) İklim değişikliğinin etkileri, (2) iklim değişikliğinin nedenleri, (3) iklim değişikliği ile ilgili yanlış anlamalar (4) sorunlar ve (5) politika. Oluşturulan ölçme aracında bilgi boyutunda dört, algı boyutunda yedi alt boyut mevcuttur. İYÖ potansiyel katılımcıların özellikle iklim değişikliği ve buna yönelik politikaları, iklim değişikliğinin etkileri, nedenleri ve yanlış anlamaları ölçmek amacıyla yapılan çalışmalarda kullanılabilir.

Anahtar Kelimeler: İklim yönetim anketi, İYÖ, iklim değişikliği bilgisi ve algısı

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