Is Cultural Theory useful? A pragmatist application to wildfire risk

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Abstract

Grid-group Cultural Theory (GGCT) proposes that people's views of environmental risks will be shaped by, and shape, their social situation, and further that these views can be understood as expressions of one of four "cultural biases" – Individualism, Fatalism, Hierarchy, or Egalitarianism. This article proposes a pragmatic test of GGCT, in which it is examined for its ability to predict people's views of particular issues, aid in understanding the logic behind those views, and workability as a frame to ensure inclusion of all perspectives. GGCT is tested through the use of Q method and a survey about the risk of wildfire in New Jersey, USA and New South Wales, Australia. The results call into question GGCT's usefulness as an explanation of risk perception.

Keywords: cultural theory; risk perception; wildfire; Pine Barrens; Sydney

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Introduction

One of the most widely noted developments in the last 30 years of research on the social aspects of environmental risks is Grid-Group Cultural Theory (GGCT). In *Risk and Culture*, Mary Douglas and Aaron Wildavsky stated the provocative thesis that concern about risks is a result of patterns of social organization, and that there are exactly four such patterns (Douglas and Wildavsky 1982).

Since its entry onto the scene, GGCT has expanded to address far more than just risk perception, becoming in the hands of some writers nearly a social theory of everything (6 2003, Thompson, Ellis and Wildavsky 1990). Yet it has also attracted critics who allege that for all its theoretical appeal, it lacks any empirical basis (Sjöberg 2003). Though GGCT presents a detailed theory about how institutions and worldviews interact, it is the four-culture typology of Individualism, Fatalism, Hierarchy, and Egalitarianism that has drawn the most attention.

If it is valid, GGCT's parsimony and universality would recommend it as an important practical tool in dealing with risk-related controversies. Those engaged in environmental management would be able to use GGCT's worldview categories to make sense of their interlocutors' positions, and to ensure that they have considered the full range of perspectives and institutional mechanisms. This article applies just such a pragmatist criterion to examining GGCT. Through case studies of wildfire management in New Jersey and New South Wales, it casts doubt on GGCT's practical relevance.

Grid-Group Cultural Theory

The basics

GGCT is a functionalist theory based on the work of Emile Durkheim. (Douglas 1982, Rayner 1992) "Grid" refers to the degree to which a metaphorical cross-hatch of rules restrict freedom. High grid characterizes rigid caste system, in which one's station is irrevocably established at birth. In a low grid society, "all men are created equal," with status differences – if there are any – based on achievement. "Group" refers to the degree to which a society is characterized by strong ingroup-outgroup boundaries, with corresponding solidarity and collectivism within the group. At the low end of the group dimension, discrete groups give way to open-ended networks.

GGCT recognizes four ways of organizing society. Most familiar are hierarchies (high grid and high group) and markets (low grid and low group). Enclaves, characterized by low grid but high group, are tight-knit bands in which everyone is equal. Isolates are high grid and low group individuals, cast adrift from group's fellowship, but subject to grid's imposition of social roles.

Each of the four forms of social organization is associated with a worldview, or "cultural bias." The worldviews of markets, isolates, hierarchies, and enclaves are, respectively, Individualism, Fatalism, Hierarchy, and Egalitarianism.

Individualism asserts that the primary value is freedom, and that unfettered competition between self-interested and formally equal individuals is the best way to let talent rise to the top and earn its deserved rewards. Nature is seen as resilient to any shocks that the competitors may apply to it.

Fatalism's overriding value is survival. Fatalists see the world as unpredictable and out of their control, and hence eschew long-term plans in favor of adaptation and coping. They see nature as similarly capricious.

Hierarchy promotes order above all else. Individuals are ranked – by birth, expertise, or some other variable – and hold differential responsibilities within society. Yet each part contributes in its own way

to the good of the whole, so long as it doesn't seek to rise above its station or neglect its duties. To Hierarchists, nature is resilient only within limits that must be discerned and enforced by an elite.

Egalitarianism focuses on equality, at least within the group. Consensus, brotherly love, and xenophobia are Egalitarians' watchwords. To Egalitarians, nature is delicately balanced, a disaster waiting to happen whose urgency overrules infighting.

Each worldview serves, in a functionalist way, to justify and uphold the associated social structure. A person's worldview filters and makes comprehensible the world around him or her, directing attention to important issues and away from unimportant ones. For example, Hierarchy shores up the legitimacy of the hierarchs' authority by focusing on rulebreaking and deviance. On the other hand, Egalitarians maintain their solidarity, and suppress intra-group conflict, by identifying grave threats (such as Satan or nuclear technology) in the outside world.

Some have seen the four-box grid-group model as a heuristic, marking out four ideal types in a space defined by continuous variables (Douglas 1992). Others view the four corners as attractors or equilibrium points, with any impure social structure being unstable and movement between them possible only through revolution and religious-type conversion (Thompson 1982a). The most complex version of the theory is Perri 6's, which proposes that the four cultural types are nested at multiple scales (6 2003). There is also disagreement about the degree to which individuals can be part of multiple cultures, either simultaneously or sequentially over time (Rayner 1992, Olli 1999).

Some GGCT proponents stress that the theory is far more than the grid-group typology (Tansey and O'Riordan 1999, Tansey 2004a). Though this is true, it is not without reason that the debate has focused on that typology. The typology is the most distinctive feature of GGCT, while the theory's other claims – such as the essentially political nature of "risk perception" – are widely echoed through much other risk research. What's more, the typology is potentially the most powerful aspect of GGCT, as it brings the lofty

generalizations down into a concrete form. The typology gives a dramatic illustration of the idea that, contrary to the implicit universalization of the "psychometric paradigm" or simple lay vs expert contrasts, different people approach risk issues in different ways.

Defenses and critiques of GGCT

Demonstrations of GGCT's validity have been pitched mainly at the theoretical level (Thompson, Ellis and Wildavsky 1990, Douglas and Ney 1998, Douglas 1999). Indeed, some GGCT proponents explicitly deny the relevance of empirical "tests" to a theory located within the interpretive tradition (Adams 1995, Tansey 2004a, Tansey 2004b) – though it should be noted that both of the founders engage with not just empirical tests, but the dreaded positivistic quantitative attitude survey (Wildavsky and Dake 1990, Douglas 2003). Space prevents detailed consideration of these theoretical debates, but the reader may check the references for key critiques (Wartofsky 1986, Nash and Kirsch 1988, Friedman 1991, Selle 1991, Boholm 1996, Nowacki 2004) and rebuttals (Douglas 1990, Wildavsky 1991, Ellis 1993).

Numerous studies, including Mary Douglas's original formulations (Douglas 1975, 1992), have applied GGCT in a qualitative case study context, either ethnographic (Thompson 1982b, Rayner 1986, Owen 1992, Hendriks 1994, Archibald and Richards 2002, Kim 2003) or historical (Ellis and Wildavsky 1990, Hammer 1994, Malecha 1994, Lockhart 2001). It is unclear to what extent most of this research can be interpreted as testing or defending GGCT, except in the minimalist sense that GGCT did not completely fail to make any sense of the phenomenon at issue. Nevertheless, there are some examples of qualitative research that have made more systematic attempts to assess the validity of GGCT (Bloor and Bloor 1982, Schwartz and Thompson 1990, Murphy and Maynard 2000, Murphy 2001, Scott and Carr 2003) Qualitative studies directly asserting the inadequacy of GGCT are rare (exceptions include Grätz 2003, Pokorny and Schanz 2003, Schlüter, Phillimore and Moffatt 2004).

The best-known empirical defense of GGCT is a stream of research beginning with the work of Karl Dake. Dake developed a set of statements that could be used as Likert scale items to measure people's adherence to the four worldviews (Dake and Wildavsky 1991, Dake 1992). The use of factor analysis to verify the utility of the worldview scales generally gives positive results, though with a number of exceptions (Marris, Langford and O'Riordan 1998, Caulkins 1999, Dake and Thompson 1999). Attempts to categorize respondents into worldviews often encounter difficulty (Marris, Langford and O'Riordan 1998, Jayne 2003). Numerous researchers using Dake's or similar scales report significant correlations between worldviews and other variables – for example, risk perception (Peters and Slovic 1996, Palmer 1996, Marris, Langford and O'Riordan 1998), environmental attitudes (Ellis and Thompson 1997, Grendstad and Selle 1997), or party preference (Grendstad 1995, Olli 1999). It is stressed that the *patterns* of risk concern match those predicted by GGCT (Dake 1992, Marris, Langford and O'Riordan 1998, Rippl 2002). This research shows GGCT to generally be comparable to, or better than, socio-demographic variables (Ellis and Thompson 1997, Pendergraft 1998) or other general worldview theories – notably the left-right political spectrum (Coughlin and Lockhart 1998) and postmaterialism (Pollock, Vittes and Lilie 1992, Grendstad and Selle 1997).

The most noted critic of GGCT, Lennart Sjöberg, asserts that even the most optimistic work following Dake's paradigm does not actually prove what pro-GGCT authors claim it does (Sjöberg 1997, 1998, 2002, 2003, 2005) (see also Brenot, Bonnefous and Marris 1998 and Poortinga, Steg and Vlek 2002). His surveys result in similar data, but he argues that while the relationship between GGCT worldviews and risk perception may be statistically significant, the weak correlations (r-squared averaging about .05 and rarely as much as . 20) do not explain enough of the variation in people's risk perceptions to be worth caring about.

Pragmatism

The perspective taken by this paper comes from the pragmatist tradition. The basic idea is well stated by Pierre Bourdieu: "'Theories' are research programs that call not for 'theoretical debate' but for a practical utilisation that either refutes or generalizes them, or better, specifies and differentiates their claim to generality" (Bourdieu and Wacquant 1992). The basic pragmatist insight is that to answer a question, you must first decide what difference it makes if the question is answered one way or another (James 1955).

Thus, a theory may be true in one sense, but not true for those who want to use it for a different purpose. The more carefully specified and demanding one's purposes, the narrower the range of theories that might fit the bill. Depending on the nature of the phenomenon in question, it may well happen that a single model proves most useful for any conceivable human purpose.

Pragmatism is widely alluded to by people writing about GGCT. Eero Olli, for example, rests his defense of GGCT against both alternative typologies and poststructuralist particularism on the claimed usefulness of the theory (Olli 2006). In the course of attempting to deny the relevance of Sjöberg-type disproofs, John Adams (1995) proposes something like a pragmatist criterion for evaluating GGCT:

> Cultural theory might best be viewed in the uncertain world we inhabit as the anthropologists' myth of myths. The validity of such a super-myth is not to be judged by the statistician's correlation coefficients and t-tests, but by the degree to which it accords with people's experience. And its utility can be judged only by the extent to which people find it helpful in their attempt to navigate the sea of uncertainty.

"The statistician's correlation coefficients and t-tests" are – especially in the minds of anti-positivists – attempts at objective, goal-neutral examinations of phenomena. Adams seems to be saying that GGCT may (or may not) fail such across-the-board tests, but in the narrower sense it may still prove to be a useful way to model the social world for certain purposes.

Yet Sjöberg also suggests something like a pragmatist criterion. He asserts that it is inadequate to look solely at the statistical significance of correlations between risk perception and GGCT worldviews (Sjöberg 1997). Even if the correlation is thereby shown to be real, it may be unimportant if it does not account for very

much of the variance in risk perception. What use is it, we can ask, to know that GGCT worldviews have an effect on people's risk perceptions if that effect is trivial compared to the effects of other factors?

What, then, is GGCT for? Many writers assert, explicitly or implicitly, that GGCT provides a useful guide to people involved in social and environmental controversies in three ways: prediction, comprehension, and inclusion.

Dake and Thompson (1997) exemplify GGCT's predictive utility with their claim that "if you are thinking of siting a nuclear waste repository ... and the people round about turn out not to sort their washing out into separate piles, forget it!" (because such people are Egalitarians and will oppose the plan). While this particular example is somewhat fanciful (when would it be easier to assess a population's washing habits than their views on nuclear power?), it does highlight the idea that if GGCT is right about the clustering of attitudes and their relationship to structural factors, it should be possible to anticipate what types of viewpoints certain groups of people will put forward, and hence to design one's approach accordingly.

In the realm of comprehension, GGCT can help each participant understand where his or her interlocutors are coming from. (Douglas and Ney 1998, Swedlow 2002) Following such comprehension, one can use GGCT as a guide for designing policies, or reframing existing ones, in such a way that all cultures feel that their values are adequately satisfied. (Kahan and Braman 2003)

Finally, GGCT provides a heuristic for ensuring the inclusion of all perspectives. In addition to the positive claim that all four worldviews will always be present, GGCT makes a normative claim that all four worldviews (or all but Fatalism) should have a voice in any policymaking process. (Hendriks 1994, 2004, Thompson 1997, see also Dryzek 2001 for a similar argument in a non-GGCT context) Proactive inclusion can prevent nasty surprises down the road (Elkington and Trisoglio 1996). Representation of all worldviews also ensures that all of the blind spots are covered, and that vigorous debate occurs to strengthen proposals.

(Douglas and Ney 1998, Ney and Molenaars 1999, Ney and Thompson 1999) Some writers assert that there is intrinsic moral value in satisfying the values of all four cultures (Lockhart and Franzwa 1994).

This article aims to establish a first-cut plausibility of GGCT. If GGCT survives this test, then it can be recommended for further use by practitioners, who can report back on its usefulness. To establish this first-cut plausibility, a researcher can use standard techniques (in this case, Q Method and a mail survey) to assess the perspectives of the relevant population. We can then examine the results to see if GGCT helps to make sense of them. Does GGCT capture the major themes and cleavages? Does it appear likely that a person engaged in the issue would have been able to predict and comprehend her interlocutors, and achieve balanced representation of viewpoints, by thinking in GGCT terms?

Case studies: wildfire management in New Jersey and New South Wales

To apply the pragmatist criterion, it is necessary to specify a particular problem or issue that GGCT may aid in solving. Such a focus also satisfies concern that generalized surveys abstract from social context. (Tansey and O'Riordan 1999, Nash and Kirsch 1988, Baxter and Greenlaw 2005) If GGCT does not explain the important features of a narrowly specified issue, then the utility of GGCT would be seriously compromised.

This article examines wildfire management in the Pine Barrens of southern New Jersey, USA and the outer suburbs of Sydney, New South Wales, Australia. These two regions are broadly similar in their ecology, insofar as both are home to ecosystems subject to frequent natural wildfires. (Forman and Boerner 1981, Boerner 1981, Bradstock et al. 1998, Batcha 2003, Pyne 2006, Mathur 2007) Both are also the site of expanding suburban and exurban settlement. (Hughes 1987, Gill and Williams 1996, Walker and Solecki 1999, Bunker and Holloway 2001)

Fire management is an appropriate case study because it is an issue whose management has generated controversy and disagreement and hence one in which useful way of making sense of competing views is needed. Further, fire is not among the issues usually considered by GGCT proponents, making it a useful test of the theory's ability to be generalized beyond its paradigm applications to nuclear energy (Peters and Slovic 1996, Sjöberg and Drottz-Sjöberg 2001) and climate change (Thompson and Rayner 1998, Douglas, Thompson and Verweij 2003).

It is easy to imagine views of wildfire management that match the GGCT worldviews. An Individualist would highlight the rights of individual residents to make their own choices about the appropriate tradeoffs between safety and other values such as aesthetics or cost. Residents of fire-prone areas have frequently been accused of being Fatalists, believing that there is little that anyone can do to prevent destructive fires and therefore declining to spend much time worrying about them. A Hierarchist perspective would emphasize science-based fire management and the authority of fire services to enforce safety standards. Finally, Egalitarians would be drawn to the current vogue for participatory, community-based fire management while expressing concern about environmental impacts.

The case studies each employ two methodologies: Q method and a mail survey. The Q method results address the criteria of comprehension and inclusion, by inductively giving a detailed picture of the ways that people in the case study area think about wildfire. We can thereby see if GGCT helps us understand the existing perspectives, and whether GGCT would provide a helpful guide in ensuring that all of the perspectives are included in the debate. The mail survey focuses on the criterion of prediction, examining whether the relationships GGCT posits among general worldviews, views of the specific issue, risk perception, and social structure are actually present.

Q method

Methodology

One well-established method for assessing viewpoints is Q method (Brown 1980, McKeown and Thomas 1988, Dryzek and Berejikian 1993, Addams and Proops 2001). Q method is an effective way to identify the prevailing views about an issue (Steelman and Maguire 1999, Danielson, Webler and Tuler forthcoming). Q allows viewpoints to emerge from the participants, rather than pre-defining the viewpoints of interest and measuring participants against them (Robbins 2000, Robbins and Krueger 2000). The basis of Q is a "sideways" factor analysis that creates clusters of similar *people*, as opposed to "normal" factor analysis that looks for clusters of similar *statements* or other tests.

Q method begins by selecting a sample of statements aiming to represent the breadth of different things that are said about the issue of interest. A number of participants are each asked to sort the statements into a quasi-normal distribution along an affective continuum (e.g. "most agree" to "most disagree"). These "Q sorts" are then entered into a factor analysis that looks for correlations between the individuals. Each of the resulting factors constitutes a "discourse," that is, a shared way of thinking about the topic (represented, in the output of Q Method software, as an idealized Q sort).

The statements for this study were primarily drawn from 11 open-ended background interviews with stakeholders in the two case study areas, supplemented with items drawn from the academic and popular literature on wildfire. Potential statements were sorted into the four GGCT worldviews, and 13 statements were chosen from each (plus four other statements). The full list of statements is presented in Appendix A. When asked, most study participants could not think of any important issues that were not covered by the statements.

Because Q is based on correlating individual people's overall viewpoints, rather than correlating individual statements, it is neither necessary nor appropriate to use a large sample of study participants (Thomas and Baas 1992). For this study, a total of 25 people from New Jersey and 28 people from New South Wales participated. Some individuals were identified as "key informants" – people in positions of special power with respect to fire management, such as representatives of the fire service or environmental groups. The remainder was drawn from the general public, usually through contacting churches and other community organizations to solicit volunteers.

Each participant in this study separately sorted two versions of the 56 statements. The "normative" set described how the participant would like wildfires to be managed. The "descriptive" set described how participants thought that wildfires were actually being managed at present. This distinction parallels the discussion in the GGCT literature of utopias and dystopias – conditions under which the actual environment basically corresponds to an organization or person's worldview, or corresponds to a different worldview (Thompson, Ellis and Wildavsky 1990, Janssen 2002). The descriptive and normative sorts from each study area were factor-analyzed separately, applying Principal Components Analysis and Varimax rotation[1].

For reasons of space, the descriptions of the discourses given here are much abbreviated. Readers interested in obtaining more detailed interpretations should refer to the dissertation from which this material was drawn (#redacted for blind review#).

New Jersey normative discourses

Discourse A: Responsible Managers Responsible Managers aim at a traditional division of labor between the fire service and residents. Residents are expected to be responsible with ignition sources and keep

[1]Q methodologists often recommend Centroid analysis and judgmental rotation (Brown 1980). Centroid analysis was attempted on this data set, leading to a very similar result. Judgmental rotation is useful when one has a specific hypothesis about which sorts will correlate, or wants to look at how one particular sort relates to the others. When, as in this research, one does not have such a hypothesis, judgmental rotation would aim at clustering the sorts onto distinct factors – a procedure achieved more efficiently with Varimax (Watts and Stenner 2005).

their own homes in order, while the fire service provides education and carries out the work of fighting fires.

Discourse B: Community Planners Community Planners focus on planning for fire control. Their first priority is for fire management to be scientific, and second for it to involve residents as well as professionals. They take a generally manipulative attitude toward the environment.

Discourse C: Populists Populists' main concern is preserving the community's discretion and involvement against the use of fire danger as an excuse for government meddling. They oppose top-down fire management. They also show concern for the environment.

Discourse D: Accountable Citizens Accountable Citizens see a need for strong action and sacrifices by both residents and officials to deal with elevated risks. They are relatively unconcerned with environmental impacts, emphasizing instead the control and widespread yet careful use of fire.

Discourse E: Scientific Environmentalists: Scientific Environmentalists prioritize policies that would protect the environment (although they also highly value human life). They favor a more natural fire regime. In their view, scientific expertise is central to establishing a good fire policy.

New South Wales normative discourses

Discourse F: Traditionalists For Traditionalists, fire safety is an enforced responsibility of residents. People living in fire-prone areas are expected to do their part to make their own homes fire-safe. The law, however, will step in and enforce this responsibility. Traditionalists reject the idea that individuals should have discretion to make their own choices about fire, or even to participate in decision making. For them, human safety trumps protection of property or the environment.

Discourse G: Responsible Residents Responsible Residents also focus on concrete fire safety actions that residents can take. However, the role of the fire service and the law are placed in the background –

instead, they want residents to be well-informed, and they are less hostile than other discourses to individuals making their own fire safety decisions. Responsible Residents favor protecting both human life and the environment. They also stress the role of using controlled burning in fire management.

Discourse H: Expert Authorities Expert Authorities see the role of official planning as central. In their view, the Rural Fire Service and other authorities should take charge. All decision-making should be science-based and apolitical. Laypeople are not entirely trusted to follow fire safety practices, but Expert Authorities hold out hope for the effectiveness of education.

Discourse I: Green Democrats Green Democrats also take a planning-centered view, but with a more bottom-up orientation. They stress the need to involve all stakeholders in fire decision making, while also having a strong scientific basis for policy. Their perspective is communitarian, not libertarian. Green Democrats also emphasize the need to protect the environment.

New Jersey descriptive discourses

Discourse V: Responsible Managers This discourse takes the same name as one of the normative discourses because its view of the status quo strongly resembles the ideal proposed by normative Responsible Managers – and indeed, many sorters adhered to both of those discourses. In this view, fire management is successfully taken care of by the responsible agencies, while residents do their part to help out.

Discourse W: Skeptical Neighbors Skeptical Neighbors feel that the risks of fire remain high despite strong action by firefighters. They see irresponsible individualistic action as leading to a failure to protect life, property, or the environment.

Discourse X: Safe Skeptics Safe Skeptics are optimistic about the success of current fire policy in protecting human life, but they place the responsibility for this success at the local level. To them, the fire service is unreliable, politicized, and underfunded. However, fires are kept well under control.

Discourse Y: Unsuccessful Managers Unsuccessful Managers also see the fire service as unreliable. In their case, however, this is linked to a pessimistic view of how safe people will be from fire.

Discourse Z: Irresponsibility Regulators Like Skeptical Neighbors, Irresponsibility Regulators see fire policy as falling short, and individualistic action as rampant. On the other hand, they believe that some policies are in place to try to deal with the problem.

New South Wales descriptive discourses

Discourse R: Official Managers Official Managers think that risk is present, but is well-managed by the actions of the authorities. They highlighted statements about the role of the Rural Fire Service in fighting fires and of laws in enforcing fire safe practices. Their confidence in ordinary residents is somewhat lower. Overall, Official Managers are optimistic about the effectiveness of current fire policy.

Discourse S: Risky Residents Risky Residents put the role of the public in the foreground. They see residents as highly involved in fire planning as well as making individualistic decisions about their own practices, though there are laws in place. Fire management is hampered by politicization and bureaucratic barriers. Risky Residents thus think that overall, fire policy is not as successful as it could be.

Discourse T: Equal-Opportunity Skeptics Equal-Opportunity Skeptics take the most pessimistic view of current fire policy. They see irresponsible individualistic action by residents as central. Effective fire safety laws and strong management by the RFS are also nowhere to be seen.

Discourse U: Cooperative Citizens Cooperative Citizens think that current fire management is relatively successful. They highlight the importance of official policy that enforces fire safety. At the same time, they believe that residents are in compliance with the practices that policy requires of them.

Evaluating GGCT

A qualitative evaluation of the discourses shows GGCT to be a poor lens for understanding the differences among NJ and NSW residents' perspectives. No discourse strongly resembles the GGCT stereotypes briefly described above, and discourses resembling Fatalism and Individualism in any substantial way are wholly absent. In the normative discourses, there were three key cleavages: 1) a big-picture planning perspective versus a focus on residents' actions, 2) bottom-up or community-based action versus top-down control by the law and fire service, and 3) concern for nature versus a desire to manipulate it in the interests of fire safety. While point 2 bears some resemblance to GGCT's grid dimension, the other two are not effectively captured by the theory.

The descriptive discourses are somewhat closer to GGCT. The pessimistic discourses tend to see the status quo as relatively Individualist or Fatalist. The optimistic ones are divided between viewing the current situation as a Hierarchist or Egalitarian utopia. Nevertheless, the similarities exist at a fairly general level.

In order to directly test how well GGCT would discriminate between the discourses, an average rating for the items assigned to each worldview was calculated for each discourse.[2] If GGCT were a perfect description of the views of people about fire, then the graph of the worldview ratings would look like Figure 1. To create this figure, a hypothetical Q sort for each GGCT worldview was assembled, in which the statements associated with that worldview were placed in the top spots, followed by the worldview's coalition partner (according to Douglas and Wildavsky (1982), Individualism-Hierarchy and Egalitarianism-Fatalism

[2]Two statements (42 and 45) were entered reversed, because for phrasing reasons they were stated in a form the opposite of what an adherent of the specified worldview would believe. In addition, statements 53-56 were not included, since they do not match GGCT worldviews. For this reason the worldview scales do not sum precisely to zero.

are natural coalitions, though other GGCT writers contend that any pair of worldviews can form a coalition), then a mixture of the remaining two worldviews.

The key feature of Figure 1 is that each hypothetical discourse is rated high on one GGCT worldview, and that different discourses favor different GGCT worldviews. Compare Figure 1 with the data from the Q-based discourses, shown in Figures 2 (normative) and 3 (descriptive).

Visual inspection of Figure 2 reveals that GGCT does not effectively discriminate between the normative discourses. The general similarity of the discourses is striking – every one except C and D exhibits a pattern of disagreement with Individualism and Fatalism, and agreement with Hierarchy and Egalitarianism. Thinking only in GGCT terms, these discourses (particularly A, B, E, F, and I) would seem to be essentially the same – yet the Q analysis clearly showed that they are distinct ways of looking at the issue of wildfires.

In the descriptive discourses, there are more differences between discourses visible in the GGCT scales. In New Jersey, V holds to a pattern similar to the common Hierarchist-Egalitarian viewpoint from the normative discourses. W blends Fatalism and Hierarchy, X and Y are nearly identical in being slight Egalitarians, and Z combines Individualism and Egalitarianism. In New South Wales, three discourses show a clear (albeit weak) favorite GGCT worldview – R is Hierarchical, T is Fatalist, and U is Egalitarian. The remaining discourse favors all worldviews except Individualism. Nevertheless, these distinctions are far weaker than would be present in the ideal case (as shown in Figure 1), and the GGCT labels do not fully capture the content of the discourses.

Surveys

Methodology

The second phase of this study employed a mail survey sent to a random sample of the general public in each case study area. There were significant differences between the survey instruments due to other aims of the research project not covered in this article. Nevertheless, the surveys aimed at the same two goals: first, to test whether general worldviews (a la Dake) predict views of fire management, and second, to test whether social structure predicts worldviews or views of fire.

In New South Wales, the sample of respondents was drawn from the electoral rolls and the phone book. Because voting is compulsory in Australia, the electoral rolls provide a comprehensive list of every adult in the country. However, at the time of this study (2006), the most recent publicly available electoral rolls had been printed in 2003, meaning that individuals who had recently moved or recently come of age would not be included. The most recent phone book, on the other hand, was only a year old, but of course individuals with unlisted numbers are excluded, and each household has only a single entry. Names were randomly drawn from the electoral rolls and phone books for three randomly selected electoral districts located wholly or mostly within the study area – Blue Mountains, Menai, and Riverstone.

The New Jersey survey was sent out to households drawn from the property tax records for four randomly selected municipalities in or bordering the Pinelands National Reserve (Bass River Township, Egg Harbor City, Lakehurst, and Waterford Township). Using property tax records is a standard practice in US wildfire surveys (e.g Brunson and Shindler 2004), and focuses the survey on individuals who have greater freedom to make fire safety modifications to their homes, since they own them.

The survey technique followed Dillman's "Tailored Design Method" (Dillman 2000). The initial mailing went out to 400 people in New Jersey and 398 in New South Wales. After removing those that turned out to be invalid addresses, the true sample sizes were 375 and 345. The overall response rates were 47.2% and 56.2%, or 177 and 195 completed surveys, a reasonable response rate for a general public survey on an environmental topic (Connelly, Brown and Decker 2005).

Results

The survey employed the version of Dake's scales used by Grendstad and Sundbeck (2003), consisting of five Likert items for each of the four worldviews. The most basic test of these scales is a factor analysis – that is, do the items intended to measure each worldview correlate with each other? (Note that this is a "regular" factor analysis that examines the relationships between items, not a Q factor analysis that examines the relationships between people.)

A factor analysis on these items for the New Jersey survey was imperfect but in the right ballpark. Using Principal Components Analysis and a Varimax rotation, all but four items grouped as GGCT would intend[3]. This allowed the generation of the four intended ("a priori") GGCT worldview scales, as well as revised scales ("FA") for each worldview (labeled Indiv.-2, Fatal.-2, Hier.-2, and Egal.-2 in the tables).

In New South Wales, Principal Components Analysis and Varimax rotation resulted in a three-factor solution (similar results were obtained from other extraction and rotation methods). The items for Individualism, Fatalism, and Egalitarianism were clustered basically as expected. However, the Hierarchy items were split between the Individualism and Fatalism factors. Extracting a fourth factor did not resolve the confusion, as the new fourth factor was a mix of all four worldviews. Results will thus be presented for the four worldview scales as originally designed ("a priori"), as well as for three scales created on the basis of the relationships demonstrated in the factor analysis ("FA"). These new scales are labeled Conservatism (Individualism and Hierarchy), Authoritarianism (Hierarchy and Fatalism), and Egalitarianism-3.

[3]The four anomalous items were "The world would be a more peaceful place if its wealth were divided more equally among nations," an Egalitarian item that ended up on the Fatalist factor; "Everyone should have an equal chance to succeed and fail without government interference," an Individualist item that ended up on the Egalitarian factor; "It seems that whichever party you vote for things go on pretty much the same," a Fatalist item that ended up on the Egalitarian factor; and "Different roles for different sorts of people enable people to live together more harmoniously," a Hierarchist item that did not load on any factor. This last is unsurprising, as a number of respondents noted in the margin that they did not understand this item, and it had the highest nonresponse rate of any question in this section of the survey.

Since the first major claim of GGCT was that it could explain risk perception, the worldview scales were correlated with measures of perceived risk from fire to the respondent's community and the respondent's own household, shown in Table 1. Neither the intended nor the revised worldview scales correlated significantly with perceived risk, with the exception of a weak negative relationship between risk to the community and Hierarchy in New South Wales.

GGCT would be most useful in fire management if general worldviews predicted specific discourses about fire policy. This was tested differently in the two case study areas because different ways of measuring the discourses about fire were used.

The New Jersey survey presented the five normative factors as short narratives, about which respondents were asked four questions: a) do you agree with this view, b) is it reasonable, c) would you trust this person if he or she were your neighbor, and d) how many people in your community think this way? The narratives used in the survey can be found in Appendix B. Table 2 presents the correlations between the worldviews and discourses.

In general, correlations with all four questions about a given discourse are present or absent together, though judgments about the prevalence of the discourse occasionally diverge. Discourse A (the Responsible Residents) shows a strong negative correlation with both forms of Fatalism. This makes sense, as this discourse emphasizes personal responsibility whereas Fatalists think that little they do matters. Discourse B (the Community Planners) correlates mildly with Individualism and strongly with Egalitarianism in their intended forms, but strongly with Individualism and mildly with Egalitarianism in their revised forms. This makes some sense given Discourse B's more participatory approach. The first two questions about Discourse C (the Populists), agreement and reasonableness, correlated with Fatalism. This too makes sense, as Fatalists would see the appeal in this discourse's concern about the excessive costs of fire safety and desire for the authorities to leave well enough alone. Discourse D (the Accountable Citizens) is correlated with Hierarchy,

particularly in its revised form. Presumably this discourse's no-nonsense safety-first approach is congenial to those with a more generalized disposition to want strong authority running the show. Finally, Discourse E (the Scientific Environmentalists) did not correlate significantly with any GGCT worldview. These relationships suggest some modest predictive utility for GGCT.

In New South Wales, the 26 Q statements that most significantly distinguished among the discourses were presented in the survey as Likert items (see Appendix A for the text of the statements). When comparing the worldview scales to the Q items, a large number of significant correlations were present (as shown in Table 3), but they did not match the predictions of GGCT. Items that had been a priori associated with Egalitarianism tended to correlate with Individualism, items a priori assigned to Hierarchy correlated with Egalitarianism, and items a priori assigned to Fatalism and Individualism were correlated across the board. Averaging the Q items together based on their a priori worldview assignment led to correlations between more than half of the variable pairs, most of which cannot be explained by GGCT.

GGCT further proposes that the four worldviews are related to forms of social relations, specifically the four combinations of high and low scores on the grid and group dimensions. A handful of studies (Dake and Thompson 1999, Olli 2006) have attempted to demonstrate such a relationship. In this study, the social relations that were most important to shaping views of fire management were hypothesized to be those within the household. A set of ten questions about household structure were developed to test this aspect of GGCT (based mostly on Rippl 2002 and Olli 2006). Factor analyses run on these variables produced different results in each case study area. In New Jersey, the factor analysis found three factors. Two of these factors are combinations of high grid and low group. I term them "Isolate-1" and "Isolate-2." The third factor is just the opposite – low grid and high group – and hence is termed "Enclave." In New South Wales, the first factor was a combination of positive group and positive and negative grid variables, but the second and third represented positive grid and negative group, respectively. The composition of these scales is shown in Table 4.

Correlations between the GGCT worldviews and household structure – shown in Table 5 – give a picture that is once again mixed yet more positive toward GGCT in New Jersey than in New South Wales. Relationships between the a priori scales and the worldviews were weak to nonexistent. Using the factor-analysis-based scales, however, several partially confirming relationships turn up. Individualism correlates with both Isolate variables, while Hierarchy correlates with Isolate-1. This is not precisely the result that would be expected according to GGCT, but the combination of high grid and low group does share one characteristic each with Hierarchy and Individualism. More satisfying for GGCT is the strong correlation between Enclave and Egalitarianism.

In New South Wales, Hierarchy and Fatalism correlated significantly with high household grid, while Egalitarianism correlated *negatively* with high household group. Conservatism and Authoritarianism correlated with grid, while Egalitarianism-3 correlated negatively with group. Using scales based on the factor analysis, all worldviews (both original and revised) correlated significantly with grid, while Egalitarianism also correlated with anti-group. Clearly, these correlations at times directly violate the predictions of GGCT.

Finally, we can test the relationship between the household structure variables and views of forest fires, shown in Table 6 for New Jersey and Table 7 for New South Wales.

In New Jersey, relationships between household structure variables and the discourses are spottier than was the case for GGCT worldviews, but still present. Discourse B correlates strongly with grid and Isolate-2, whereas Discourse D correlates with grid, Isolate-1, and Enclave. None of these correlations are especially well explained by GGCT.

In New South Wales, the number of significant correlations was small, and showed no consistent relationship with the Q items' a priori assignment to GGCT worldviews. The overall a priori Fatalism and Hierarchy scales created from the Q items did correlate properly with grid, but no correlations were present between a priori Q item scales and group, or anti-group or mixed-group from the household structure factor

analysis. Overall, the relationship between household structure and views on fire management is weak and poorly described by GGCT.

Discussion

Having examined the Q and survey data, we can now assess, on a pragmatic basis, how well GGCT serves the three goals of prediction, comprehension, and inclusion. In general, GGCT performed poorly. While this paper is not a "disproof" of GGCT, it at least shows is that GGCT is not universal – it "specifies and differentiates [GGCT's] claim to generality" (Bourdieu and Wacquant 1992). One cannot approach an environmental management question with the assumption that one's interlocutors will sort out into the four worldviews. Doing so may indeed be harmful, leading to the collapsing of important distinctions, if the issue – like wildfire in New Jersey and New South Wales – is one that GGCT describes poorly.

GGCT's ability to *predict* people's views of wildfire was remarkably poor. Both GGCT worldviews and household structure showed inconsistent and quite weak relationships to views about fire, whether conceptualized as risk perception, management ideas, or trust in various stakeholders. With the partial exception of Fatalism in New Jersey, GGCT seems to offer little help to a fire manager wanting to foresee how different segments of the public will see a management question.

The Q results give a clear demonstration that GGCT gives little help in *understanding* the content of the various perspectives that residents of New Jersey and New South Wales hold about wildfire. Though the four worldviews were built into the Q sample, the resulting factors are not well-described in GGCT terms – particularly in the case of the normative discourses, even though one would expect (due to their lack of direct constraint by the facts on the ground) that they would be the more GGCT-compatible of the two sets of discourses. Looking at the inductively-derived discourses through a GGCT lens fails to adequately distinguish

them or highlight the key points of difference. Thus, much would be lost if one tried to understand people's views of wildfire as reflections of the four GGCT worldviews.

Because the discourses do not line up with GGCT's categories, using GGCT to ensure broad and equal *inclusion* of viewpoints on wildfire is unlikely to succeed. It is, of course, difficult to declare conclusively that some perspective is absent (particularly in Q method), but it is notable that the New Jersey and New South Wales results lacked any perspective that could be called even roughly Individualist or Fatalist. Meanwhile, the divide between Hierarchy and Egalitarianism does not capture the real divides among people in either case study area.

A final point, relevant to all three pragmatic criteria, is the difference in the structure of the discourses between the two case study areas. This research found not a cross-nationally applicable set of viewpoints, but rather debates whose outlines are substantially locally-specific.

Conclusion

GGCT claims to offer people involved in risk controversies a powerful lens through which they can predict what types of positions other actors will take, understand the thinking of people working from different premises than their own, and ensure inclusion of all viewpoints. However, before using GGCT it is important to know whether it accurately describes the situation. With respect to wildfire management in New Jersey and New South Wales, this research has shown that it does not. GGCT does a poor job of allowing us to predict, understand, or include the various discourses that residents and key stakeholders have with respect to wildfire. The differences noted between the two case study areas further suggest that no such universal typology is likely to emerge, at least in a way that is pragmatically applicable out-of-the-box. Rather, it is important for fire managers to assess the particular discourses that exist in their own region.

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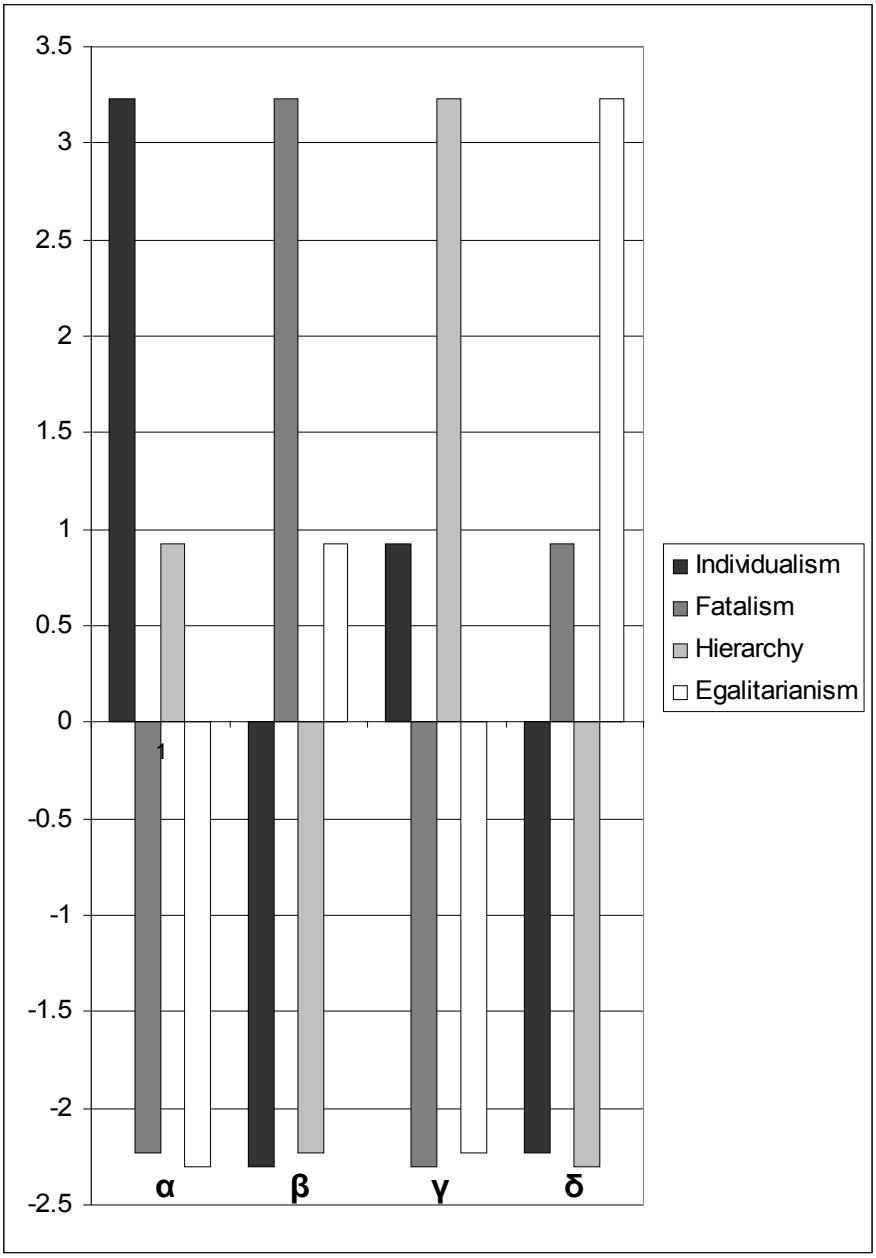

Figure 1: GGCT components of hypothetical ideal confirmation of GGCT

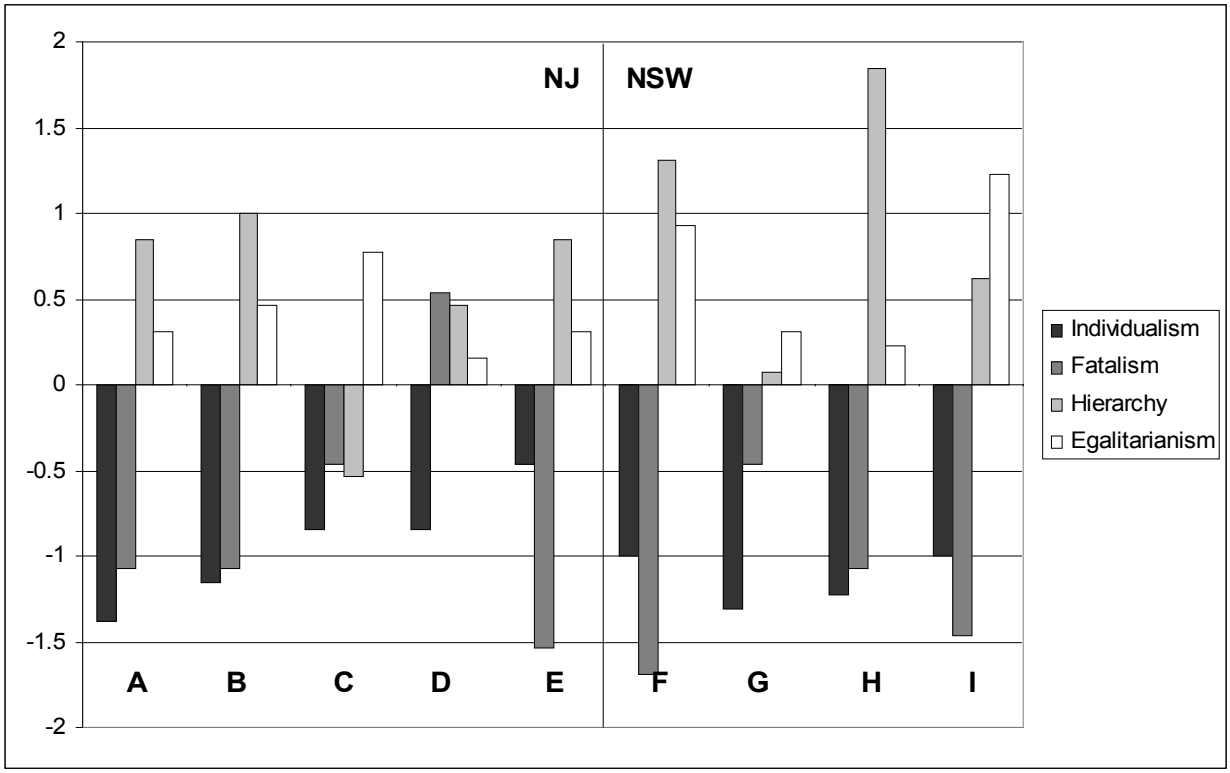

Figure 2: GGCT components in normative discourses

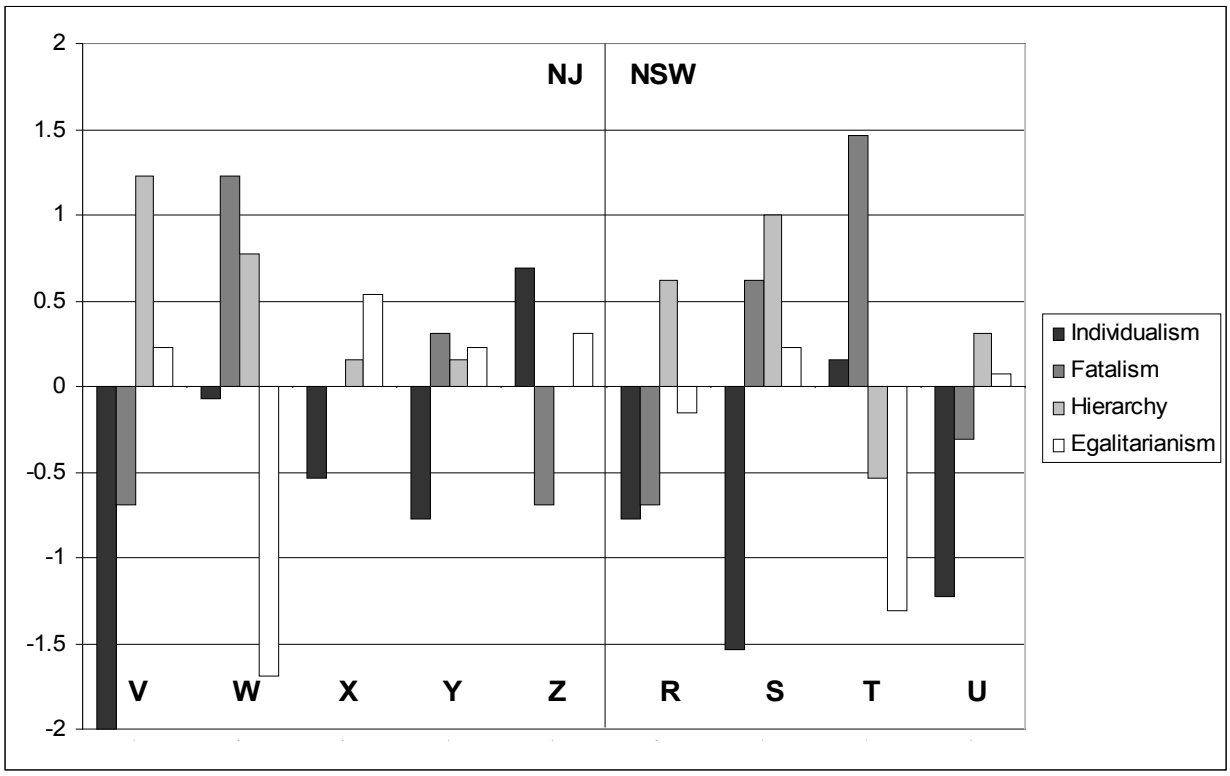

Figure 3: GGCT components in descriptive discourses

	Ind	Fat	Hie	Ega	Ind2	Fat2	Hie2	Ega2	Con	Aut	Ega3
NJ: Risk to community	.031	-.016	.015	.050	.010	-.004	-.019	.005			
NSW: Risk to community	.026	-.005	-.202*	.065					-.070	-.112	.065
NJ: Risk to self	.003	-.056	.050	.066	-.011	-.010	.026	.014			
NSW: Risk to self	.069	.077	-.132	.084					-.022	-.007	.100

Table 1: Correlations of GGCT worldviews with risk perception

* $p < .05$
** $p < .005$

Discourse	Indiv.	Fatal.	Hier.	Egal.	Indi.-2	Fatal-2	Hier-2	Egal-2
A: a	.021	**-.222	-.016	.009	.014	**-.220	.000	.046
b	-.024	**-.217	.030	-.013	-.040	**-.245	.054	.031
c	-.006	**-.276	.034	-.013	-.001	**-.259	.086	-.017
d	.031	**-.232	-.048	.009	.031	*-.186	-.019	.016
B: a	*.169	.078	.108	**.246	*.203	.116	.073	*.161
b	.137	.064	.113	**.237	*.165	.087	.108	*.163
c	.141	.060	.058	*.177	*.212	.095	.042	.085
d	.114	.065	.055	*.191	.137	.084	.009	.087
C: a	-.060	*.160	*-.156	.026	-.063	*.184	*-.187	.006
b	-.056	*.188	-.148	.056	-.059	*.208	-.146	.017
c	.083	*.163	-.063	.059	.097	.138	-.110	.037
d	.050	.019	-.014	.073	.056	.066	-.072	.002
D: a	.005	-.083	*.177	.063	.006	-.089	**.230	.023
b	.025	-.054	*.168	.092	.029	-.058	*.217	.053
c	.036	-.083	.142	.126	.044	-.098	*.212	.110
d	.048	*-.172	.099	.011	.031	*-.160	*.169	.040
E: a	-.055	-.032	-.027	-.048	-.090	-.038	-.042	-.041
b	-.030	-.057	-.039	-.062	-.063	-.058	-.057	-.066
c	-.015	-.151	.054	-.062	-.037	-.144	.026	-.098
d	.093	-.132	.142	*.154	.084	-.142	.133	-.146

Table 2: Correlations of GGCT worldviews with normative discourses, NJ. For each discourse, the questions asked were:
(a) How much do you agree or disagree with [person]'s viewpoint?
(b) Is [person]'s view reasonable or unreasonable?
(c) If [person] was your neighbor, would you trust him or her?
(d) Do you think there are many people in your community, or few people, who think the way [person] does?
Question (a) for each discourse is lightly shaded as an aid to reading across the chart.

* $p < .05$
** $p < .005$

Q item	Indiv.	Fatal.	Hier.	Egal.	Cons.	Author.	Egal. 3
21	**.223	.144	.132	.060	**.241	.107	.074
33	*.147	.071	-.070	.004	.115	-.036	.067
9	.149	*.182	**.224	*.17	*.198	*.182	*.197
29	.089	.115	*.148	-.027	.131	*.150	-.018
13	**.351	**.288	**.283	.075	**.366	**.362	.096
34	.105	*.177	**.254	**.243	*.169	**.241	*.175
6	**.29	**.348	**.316	.150	**.315	**.344	*.172
22	-.018	*-.157	-.044	-.011	-.010	*-.156	-.060
14	.023	.014	.049	.012	.061	.060	-.017
46	**.272	*.207	**.225	.052	**.242	**.267	.060
2	.111	**.345	**.324	.122	**.232	**.381	.138
35	.073	.064	.141	**.352	.063	.135	**.245
11	.006	-.017	.145	.081	.081	.023	.063
7	.016	-.073	-.099	*.184	-.014	-.098	*.184
43	*.161	.131	*.201	**.261	*.171	.143	**.208
27	.027	.077	.124	.096	.091	.082	.047
15	.016	.070	.128	*.199	.016	.081	*.168
23	.109	.046	**.273	*.179	*.163	*.168	.084
32	.071	-.079	-.039	.034	.033	-.099	.051
12	.135	.154	.123	*.217	.109	.125	*.211
48	*.192	.111	*.174	*.190	**.235	.130	*.174
36	**.244	-.112	.091	.078	**.227	-.019	.019
52	**.224	*-.169	-.029	.041	*.147	*-.167	.033
28	**.228	.142	.091	*.172	*.181	*.172	.144
16	.107	.010	.108	.122	.118	.001	.121
44	**.287	-.031	.035	.100	**.21	-.047	.061
All I	**.329	**.263	**.239	.060	**.363	**.237	.095
All F	**.279	**.358	**.405	**.228	**.352	**.436	*.199
All H	.108	.070	**.247	**.384	.132	.122	**.261
All E	**.364	.019	.132	**.238	**.309	.036	**.204

Table 3: Correlations of GGCT worldviews with Q statements, NSW. Gray cells indicate a priori assignments of statements to worldviews. The text of the Q statements can be found in Appendix A.

* $p < .05$
** $p < .005$

Statement	a priori grid	a priori group	FA Isol-1	FA Encl	FA Isol-2	FA mixed	FA grid	FA anti-group
I consider my household to be very orderly.	X		X			X		
Each person in my household has their own individual hobbies.		-X	X					X
My household has a lot of traditions that we try to preserve.	X		X				X	
My household has a lot of routines and activities that we do at scheduled times.	X		X				X	
My household does a lot of activities together as a group.		X		X		X		
Who does what chores in my household mostly depends on who has the time and is better at it.[a]	-X			X				
In my household, people mostly try to solve their own problems.[b]		-X						X
My household is very "tight-knit."		X		X		X		
When there's an important decision to be made, everyone in the household gets to have an equal say.	-X			X		X		
Each member of my household has their own friends -- we don't all socialize with the same people.		-X			X			X
There's one person who's clearly the "head of the household."	X				X		X	

Table 4: Household structure questions and their membership in overall scales

a. Item used only in New Jersey survey

b. Item used only in New South Wales survey

	Ind	Fat	Hie	Ega	Ind2	Fat2	Hie2	Ega2	Con	Aut	Ega3
NJ: a priori grid	.136	-.059	*.171	.017	*.186	-.041	.110	-.025			
NSW: a priori grid	.146	**.224	**.309	.124					*.205	**.317	.100
NJ: a priori group	-.095	*-.164	-.014	.013	-.136	-.147	.018	-.011			
NSW: a priori group	-.041	-.102	.014	*-.213					-.018	-.081	*-.192
FA Isolate-1	*.193	-.057	**.267	.018	*.211	-.066	**.248	.059			
FA Enclave	.094	.009	.088	**.257	.073	.003	.133	**.225			
FA Isolate-2	*.219	.090	.144	.115	**.265	.061	.059	.138			
FA mixed	.058	-.096	.129	-.119					.076	-.009	-.149
FA grid	*.193	**.245	**.334	*.177					**.224	**.296	*.153
FA neg group	.093	.055	.097	*.170					.093	.093	.120

Table 5: Correlations between GGCT worldviews and household structure. Shaded boxes are ones where GGCT would predict significant positive correlations. Lighter shading in the Conservatism and Authoritarianism columns indicates contradictory predictions by GGCT due to the scale's mix of worldviews.

* $p < .05$
** $p < .005$

Discourse	a priori grid	a priori group	FA Isolate-1	FA Enclave	FA Isolate-2
A: a	.111	*.184	.069	.044	-.047
b	.138	.114	.053	-.011	.048
c	.060	.082	.043	.065	.006
d	.043	.058	.039	.086	-.031
B: a	*.233	.038	.066	.073	*.227
b	**.257	.064	.058	.036	*.180
c	*.193	.031	.056	.125	**.242
d	.056	.095	-.032	*.170	.140
C: a	.096	-.036	-.047	-.002	.156
b	-.006	.012	-.088	-.031	.084
c	.024	.027	-.010	.042	.109
d	.122	-.049	.108	.045	.092
D: a	*.227	.010	**.305	*.199	.157
b	.159	.044	**.255	*.175	.104
c	*.174	.036	**.237	*.188	.130
d	.155	.108	**.261	**.237	.077
E: a	.004	-.033	.012	.132	.083
b	.009	-.029	.046	.119	.086
c	.025	-.044	.036	.036	.062
d	*.184	.037	*.208	.130	.073

Table 6: Correlations of household structure with normative discourses. See caption to Table 2 for text of the discourse questions. Question (a) for each discourse is lightly shaded as an aid to reading across the chart.

* $p < .05$
** $p < .005$

Q item	a priori grid	a priori group	FA mixed group	FA grid	FA anti-group
21	.006	.039	.091	.010	-.024
33	.003	-.115	.116	-.002	*.167
9	.029	-.136	.051	.090	**.233
29	*.181	.012	.080	*.180	.030
13	**.246	-.010	.035	*.183	.031
34	**.234	-.007	-.122	**.236	-.067
6	.141	-.159	.011	.125	*.193
22	.033	-.097	.072	.011	*.165
14	.045	-.034	.053	.023	.064
46	.015	-.115	-.029	.037	.105
2	.144	.010	.055	*.179	-.001
35	.153	-.092	-.091	*.209	.062
11	.014	-.026	.057	-.013	.070
7	-.051	-.027	.018	-.022	.040
43	.051	-.002	.109	.085	.094
27	**.239	.019	.075	**.252	.019
15	*.170	-.041	.142	**.240	*.175
23	*.219	-.097	-.060	*.162	.068
32	-.137	-.118	-.023	-.107	.144
12	.022	-.068	-.081	.077	.026
48	.007	-.026	*.17	.064	.109
36	-.058	.035	.112	.028	.060
52	-.146	-.007	.003	-.097	.002
28	-.024	-.039	-.015	.054	.026
16	.003	.110	*.197	.054	.000
44	.022	-.002	.143	.065	.060
All I	.139	-.045	.130	*.147	.139
All F	*.203	-.111	.010	**.216	.115
All H	**.239	-.070	.050	**.274	.131
All E	-.078	-.048	.109	.024	.105

Table 7: Correlations of household structure with Q statements Gray cells indicate a priori assignments of statements to worldviews. The text of the Q statements can be found in Appendix A.

* $p < .05$
** $p < .005$

Appendix A: Q Statements and Factor Scores

Values in the tables represent the placement of each statement in an idealized Q sort representing that factor. Letters in parentheses after each statement represent the a priori assignment of each statement to a GGCT worldview (I = Individualist, F = Fatalist, H = Hierarchist, E = Egalitarian). Words in parentheses within the statement show wording changes between New Jersey and New South Wales. Shaded columns are the New South Wales discourses, unshaded columns are New Jersey discourses.

Statements were sorted into a quasi-normal distribution as follows:

Value:	+5	+4	+3	+2	+1	0	-1	-2	-3	-4	-5
Statements:	3	3	4	6	8	8	8	6	4	3	3

Statement No.	A	B	C	D	E	F	G	H	I
1. Insurance (rates/premiums) should be higher for people whose homes are not fire safe (I)	-2	0	-2	4	-1	-1	0	0	-2
2. The media should sensationalize (forest/bush)fires a bit, in order to get people's attention (F)	-4	-3	-5	2	-4	-5	2	-3	-5
3. The (Forest Fire Service/Rural Fire Service) should hold educational programs (H)	2	2	1	3	1	0	2	4	3
4. The (Forest Fire Service/Rural Fire Service) should talk to residents to get their knowledge and perspective (E)	0	1	3	1	1	0	3	0	3
5. Scientific information about (forest/bush) fires should be easily available, so that people can make up their own minds about the risks (I)	0	0	0	-1	-1	-2	2	-1	1
6. Science will never fully understand (forest/bush)fires (F)	-2	-2	-4	1	-2	-2	1	-2	-2
7. Fire policy should be based on the best science available (H)	2	4	3	1	5	1	-1	4	4
8. We should learn from (Native Americans/Aborigines) how to manage fire (E)	-3	0	1	2	-2	1	-3	-4	0
9. People who do controlled burns responsibly should not be able to be sued if there is an accident (I)	0	-2	1	-5	2	3	-4	-1	-1
10. Controlled burning should be avoided because burns often escape from control (F)	-3	-4	2	-3	-5	-4	-5	-3	-4
11. Controlled burning should only be done under the safest conditions (H)	4	0	-1	2	0	2	5	1	-1
12. Controlled burning should try to mimic the natural fire regime of the area (E)	0	-1	-1	-2	4	0	0	-2	2
13. Farming, logging, and other land use can be relied on to reduce the fire danger (I)	-1	-3	-2	-4	-3	-3	-2	-5	-2

Statement No.	A	B	C	D	E	F	G	H	I
14. I shouldn't be expected to spend all my time worrying about fire, because I'm busy with other things that are important to me (F)	-4	-1	0	2	-1	-2	-4	-2	-5
15. There should be building codes that require homes to be fire-safe (H)	1	2	1	2	2	3	-2	2	0
16. People have a responsibility to the community to reduce the fire risk on their property (E)	2	3	2	3	0	5	1	3	5
17. Fire safety shouldn't come at the expense of lowering the value and beauty of my home (I)	-2	-4	-1	-2	-4	-3	-1	-1	-3
18. I shouldn't have to spend so much time and money on making my home fire-safe (F)	-4	-2	2	-2	-4	-5	-2	-2	-4
19. If someone's property presents a fire risk to their neighbors, the authorities should make them fix it (H)	1	1	-1	5	0	4	0	0	1
20. The (Forest Fire Service/Rural Fire Service) should inform the public about what they're doing and why they're doing it (E)	3	1	2	1	2	2	2	3	1
21. Individual property owners should have the right to decide how to balance the risks and costs of fire safety (I)	-2	-2	-1	-5	-3	-4	0	-4	-3
22. It's smart to prepare your own home and family for a fire, rather than relying on other people (F)	5	2	-1	4	1	4	4	2	4
23. Fire management in this state should be centralized (H)	-1	-1	-2	-5	0	-1	-3	2	-4
24. Fire management should be coordinated at the neighborhood or town level (E)	0	1	0	-2	-3	0	0	3	-1
25. Measures to reduce the fire risk should focus on areas closest to people's homes (I)	1	-1	2	-1	3	0	2	1	1
26. Nobody in this region should assume that because of where they live, they're safe from fire (F)	3	1	3	1	-1	2	0	1	-1
27. Some parts of the environment should be protected from any fires (H)	-2	1	0	-4	-2	-1	-4	-1	1
28. Controlled burning should be done in small patches, rather than burning large areas all at once (E)	2	2	-3	-2	-2	0	-4	0	1
29. People should be able to build houses wherever they want (I)	-5	-5	-4	-3	-5	-5	-2	-5	-5
30. If you live in this area, you just have to accept a certain level of risk from fires (F)	-1	2	0	-1	0	-1	1	1	2
31. New housing developments should be restricted in order to reduce the fire risk (H)	-1	0	3	-1	2	-1	1	-1	0
32. People should understand the fire risk before moving to this region (E)	0	-2	0	1	0	2	-2	0	1
33. You should stay in your house when a fire is nearby to help to save it (I)	-5	-5	5	0	-5	1	-5	-2	0
34. When a fire is approaching, you should evacuate quickly (F)	5	1	5	2	0	-4	3	-1	-3
35. Once a fire breaks out, the (Forest Fire Service/Rural Fire Service) should have complete command of the situation (H)	1	-1	-5	0	1	2	-2	5	-1

Statement No.	A	B	C	D	E	F	G	H	I
36. Trust between firefighters and the rest of the community should be encouraged (E)	1	4	0	0	1	3	5	2	2
37. Fire management should not be political (I)	1	4	-1	5	5	4	-1	2	1
38. Even with the best policies and practices, it's impossible to stop a really bad fire once it's burning (F)	-2	-2	-2	-1	-2	-2	-1	1	0
39. Unplanned fires should be quickly suppressed (H)	0	3	-5	3	-1	1	1	0	0
40. Nature should be allowed to take its course without human interference where it's feasible (E)	-3	-5	4	1	4	-2	-2	-3	-2
41. Bureaucratic and legal barriers that inhibit fire management should be lowered (I)	-1	3	-3	-2	3	0	-1	1	-1
42. People should be able to rely on the (Forest Fire Service/Rural Fire Service) to protect their home and the environment (F)	1	1	1	0	0	-1	1	-1	-2
43. The state should provide lots of money for fire management (H)	-1	-3	-3	-1	-1	-1	-2	2	-1
44. All stakeholders should be involved in making decisions about local fire management (E)	-3	2	0	-1	-1	-2	1	0	3
45. Off-road vehicles should be restricted, because they can cause fires (I)	-1	0	-3	0	-1	-3	-5	-4	-2
46. There's no way to stop arsonists – they're just crazy (F)	-5	-4	-1	-3	-3	-3	-3	-5	-3
47. During fire season, activities that might start a fire should be banned or require a permit (H)	3	0	-2	0	1	5	3	1	2
48. We should be able to count on people in this region to be pretty responsible when it comes to handling things like campfires that could start a (forest/bush) fire (E)	3	-3	1	0	-2	1	3	-3	-1
49. It's important to gather data on the condition of the land and the success of fire management (I)	0	0	-2	3	2	0	0	3	3
50. People should change their lifestyles to accommodate our naturally fire-prone environment (F)	-1	-1	-4	5	1	-1	-1	-2	0
51.Detailed fire management plans should be in place for all large wild areas, such as (State Forests/National Parks) (H)	2	5	4	1	3	3	3	5	4
52. Fire management should be tailored to the specific local situation (E)	2	3	1	0	2	2	0	4	2
53. Protecting human life should be a priority	5	5	5	4	5	5	5	5	5
54. Protecting property should be a priority	4	-1	4	-4	1	1	0	1	0
55. Protecting the environment should be a priority	4	-1	2	-1	4	1	4	0	5
56. Human safety and environmental health should not be at odds in fire management	1	5	1	-3	3	1	2	-1	2

Table A-1. Normative discourses.

Statement No.	R	S	T	U	V	W	X	Y	Z
1. Insurance (rates/premiums) are higher for people whose homes are not fire safe (I)	-3	-3	-3	-1	-2	-3	-1	-1	2

Statement No.	R	S	T	U	V	W	X	Y	Z
2. The media sensationalizes (forest/bush) fires (F)	5	3	3	-1	-3	4	2	0	-3
3. The (Forest Fire Service/Rural Fire Service) holds good educational programs (H)	-1	0	-1	1	0	0	2	2	0
4. The (Forest Fire Service/Rural Fire Service) talks to residents to get their knowledge and perspective (E)	-1	0	-3	1	-1	-1	-2	-4	1
5. Scientific information about (forest/bush) fires is easily available, so that people can make up their own minds about the risks (I)	-4	-1	-4	-2	-4	-1	0	0	-1
6. Scientists do not fully understand (forest/bush) fires (F)	0	1	1	-1	-2	1	1	-1	4
7. Fire policy is based on the best science available (H)	-1	2	-1	1	0	-1	1	4	0
8. Our current fire policy is based on the way (Native Americans/Aborigines) use fire (E)	-2	-2	-5	-5	-3	-5	-1	-2	-4
9. People who do controlled burns responsibly cannot be sued if there is an accident (I)	2	-2	2	0	-2	-3	0	-1	-2
10. Controlled burns often escape from control (F)	-2	1	5	-4	-4	-5	-3	-3	-5
11. Controlled burning is only done under the safest conditions (H)	1	1	1	0	1	4	3	2	-1
12. Controlled burning mimics the natural fire regime of the area (E)	0	-2	-1	-1	1	-4	2	-1	1
13. Farming, logging, and other land use reduce the fire danger (I)	-1	2	3	-4	-1	0	1	-5	1
14. I don't spend all my time worrying about fire, because I'm busy with other things that are important to me (F)	-2	0	0	3	-3	1	-1	3	1
15. There are building codes that require homes to be fire-safe (H)	3	1	0	3	5	2	1	5	0
16. People recognize that they have a responsibility to the community to reduce the fire risk on their property (E)	-2	0	1	2	0	-2	0	1	2
17. Fire safety can be achieved without lowering the value and beauty of my home (I)	1	2	1	3	2	3	4	2	2
18. Making my home fire-safe is too expensive and time-consuming (F)	-5	-3	0	-5	-5	1	-3	-3	-5
19. If someone's property presents a fire risk to their neighbors, the authorities will make them fix it (H)	-2	4	-5	-1	0	-3	0	-2	-1
20. The (Forest Fire Service/Rural Fire Service) informs the public about what they're doing and why they're doing it (E)	1	3	-1	0	0	-1	0	0	-2
21. Individual property owners are able to decide how to balance the risks and costs of fire safety (I)	-4	-1	1	-2	-4	0	1	-1	-2
22. You can't rely on other people to keep you safe from fire (F)	-3	5	3	1	-3	2	2	2	-2
23. Fire management in this state is centralized (H)	3	0	1	1	-1	2	-2	-2	3
24. Fire management is coordinated at the neighborhood or town level (E)	0	-1	-1	0	1	1	4	4	0
25. Measures to reduce the fire risk focus on areas closest to people's homes (I)	4	3	4	2	0	2	2	1	0
26. A major fire could strike anywhere (F)	2	0	3	5	5	4	-1	5	5
27. Some parts of the environment are protected from any fires (H)	-2	-1	-2	-3	-1	0	-2	3	-4

Statement No.	R	S	T	U	V	W	X	Y	Z
28. Controlled burning is done in small patches, rather than burning large areas all at once (E)	2	1	4	1	1	3	3	0	2
29. People are allowed to build houses wherever they want (I)	-5	-5	0	-4	-5	5	-4	-5	5
30. People in this area recognize that living here brings a certain level of risk from fires (F)	3	1	4	2	2	1	-1	1	2
31. New housing developments are restricted in order to reduce the fire risk (H)	0	-1	1	-3	2	-2	-2	-5	0
32. People moving here from other places understand the fire risk (E)	-3	-4	-3	-1	1	-4	-4	0	-2
33. Most people stay in their houses when a fire is nearby (I)	4	-2	2	-2	-5	1	-3	1	-3
34. When a fire is approaching, I would evacuate quickly (F)	-5	-5	-4	0	4	3	5	3	4
35. Once a fire breaks out, the (Forest Fire Service/Rural Fire Service) has complete command of the situation (H)	1	1	-2	2	1	3	1	-4	-1
36. There is a lot of trust between firefighters and the rest of the community (E)	4	5	2	5	5	1	5	2	0
37. Fire management is not political (I)	1	-5	-5	-3	-1	0	-5	-1	2
38. The way fires are currently handled, it's impossible to stop a really bad fire once it's burning (F)	0	3	-2	-5	-1	1	-2	-1	-5
39. Unplanned fires are quickly suppressed (H)	1	-1	0	-2	4	2	2	-1	-4
40. Nature is allowed to take its course without human interference where it's feasible (E)	-1	2	-2	-1	-1	-3	-2	3	-1
41. There are few bureaucratic and legal barriers that inhibit fire management (I)	-1	-4	2	-1	-2	-2	-1	-2	-1
42.People can rely on the (Forest Fire Service/Rural Fire Service) to protect their home and the environment (F)	3	-1	1	4	3	0	-4	2	1
43. The state provides lots of money for fire management (H)	0	-2	-2	-2	0	-2	-5	-4	3
44. All stakeholders are involved in making decisions about local fire management (E)	-3	2	-4	-2	-2	-5	-5	-3	3
45. Careless use of off-road vehicles is a major cause of fires (I)	-4	-4	0	-3	-2	-1	0	1	5
46. Arson is a major cause of fire (F)	2	4	5	4	1	5	-3	0	-1
47. During fire season, activities that might start a fire are banned or require a permit (H)	5	5	5	4	3	5	3	4	1
48. People in this region are pretty responsible when it comes to handling things like campfires that could start a (forest/bush) fire (E)	2	-1	-3	0	2	-1	3	-2	3
49. Lots of data is gathered on the condition of the land and the success of fire management (I)	0	0	-1	1	0	-2	-1	1	1
50. People in this area have adapted to living in a naturally fire-prone environment (F)	-1	-3	2	1	3	-2	0	0	-3
51. Detailed fire management plans are in place for all large wild areas, such as (State Forests/National Parks) (H)	0	4	-2	3	2	0	0	0	4
52. Fire management is tailored to the specific local situation (E)	1	0	-1	2	-1	-1	4	5	1

Statement No.	R	S	T	U	V	W	X	Y	Z
53. Human life is well protected	5	2	2	5	4	2	5	1	-1
54. Property is well protected	2	-3	0	0	2	0	-1	-3	0
55. The environment is well protected	-1	-2	-1	0	3	-4	1	-2	-2
56. Human safety and environmental health are not at odds in fire management	1	1	0	2	1	-1	1	1	-3

Table A-2. Descriptive discourses.

Appendix B: Narratives from New Jersey survey

The first initial of each hypothetical New Jersey resident is the same as the letter of the discourse that narrative represents.

A. R. says:

"When it comes to forest fires, I try to just use common sense and be responsible. Everybody has to keep their own house in order -- cleaning up the yard and so forth. It's really important, too, to make sure that people don't carelessly start a fire by, say, letting a campfire burn unattended. I think we ought to have good communication with firefighters, since they've got the experience to know what to do about fires. If the fire company came around and said we needed to evacuate, I'd definitely get out of there."

B. K. says:

"What we really need is good, detailed planning for how to handle forest fires. We need to make our decisions based on the best scientific information. I think the public should also be involved in deciding what to do, since it's our homes and backyards that are affected. If regular people get educated about how fires happen, we'll be able to take care of our own neighborhoods. That way firefighting won't get politicized or bogged down in red tape. I'm also worried that some people want to take too much of a "hands off" approach to nature, because I don't think that good plans for keeping people safe are going to hurt the environment."

C. J. says:

"I worry sometimes that the people in charge, like the Forest Fire Service, aren't really in tune with what regular people living in this region want. We need to make sure that they're listening to our concerns --

like how expensive and time-consuming it can be to follow all the recommendations for fire safety -- and letting us know what they're doing and why they're doing it. I also worry that we interfere with nature too much when we try to control fires.**"**

D. M. says:

"Forest fires are a big risk in this area. We need to focus on keeping people safe, even if that means sacrificing someone's property or doing something that environmentalists might not like. I know people have other things to worry about too, but it's still really important for everyone to make sure they're not creating a fire risk to their neighbors. Otherwise the authorities might have to step in, or maybe their insurance rates should go up. The main thing, though, is to make sure that every fire -- whether it's a natural one, an accident, or a controlled burn -- is under control."

E. B. says:

"The environment in this region is naturally fire-prone, and that's got to be the main consideration. We should use the best science at our disposal in order to figure out what kind of impacts we're having on the landscape, and to create good plans. That way we can mimic the natural fire regime, while still reducing the risk to areas where there are homes. We also have to be concerned about unrestricted development -- if people are out there building houses without thinking about fire safety, it makes it tougher to protect them without sacrificing the ecology of this area."