Operationalizing Cultural Theory in Survey Research:
Assessing the Validity of Different Approaches to Conceptualization and Measurement

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Abstract

Cultural Theory (CT) is a social and political theory developed by Émile Durkheim, Mary Douglas, Aaron Wildavsky, and others that has attracted significant attention across the social sciences. This paper explains what CT is and compares various approaches to operationalizing CT in survey research with respect to their face validity, content validity, convergent validity, and predictive validity. The approaches assessed include (1) the worldview measures originally developed by Karl Dake and Wildavsky, (2) the relational ranking and rating measures recently created by Hank Jenkins-Smith and colleagues, (3) the relational cultural cognition measures of Dan Kahan and colleagues, and (4) the relational grid-group measures developed by Jeroen Maesschalck, Joe Ripberger, Brendon Swedlow, and colleagues. We find that all of these approaches lack face and content validity because they at best only operationalize a component of CT. But the worldview measures are particularly lacking because worldviews do not correspond to any component of CT. By contrast, the new relational measures exhibit very good face and content validity with respect to the relational patterns hypothesized by CT… [further results to be added]. Based on these findings, we suggest appropriate uses for these measures and directions for further research to improve the conceptualization and operationalization of CT in survey research.
Introduction

Cultural Theory (CT) is an ambitious general social and political theory developed by Émile Durkheim, Mary Douglas, Aaron Wildavsky, and others (Douglas 1982; Douglas and Wildavsky 1982; Schwarz and Thompson 1990; Thompson, Ellis, and Wildavsky 1990; Wildavsky 1998, 2006). The theory was first operationalized for survey research by Aaron Wildavsky and Karl Dake (1990) and is increasingly being used in surveys.

CT has attracted significant attention across the social sciences and humanities (see 55 page bibliography of applications in Wildavsky 2006) and recently has been the subject of a symposium in PS: Political Science & Politics (“A Cultural Theory of Politics,” 2011), a special issue of The Policy Studies Journal (“Advancing Policy Theory with Cultural Theory,” 2014), and is the focus of a forthcoming symposium in Public Administration (“A Theory of Institutions, Cultural Bias, and Public Administration,” expected 2016). Many of the contributors to these collective publication efforts, including several authors of this paper, used surveys in their research (Gastil et al. 2011; Jones 2011; Ripberger, Jenkins-Smith, and Herron 2011; Jones 2014; Lachapelle, Montpetit, and Gauvin 2014; Ripberger, Gupta, Silva, and Jenkins-Smith 2014; Song, Silva, and Jenkins-Smith 2014). Although there is much common ground in conceptualization and measurement in this and other work, there are also significant differences in operationalizing CT. This paper seeks to take stock of and compare different operationalizations, including new approaches analyzed here for the first time, in order to provide guidance to scholars wishing to operationalize CT in surveys.

For political scientists studying US public opinion and such topics as political culture, the culture wars, ideology, value structure, mass belief systems, partisanship, political sophistication, and political participation, CT provides rich theoretical resources and its operationalization in survey research provides fresh insights and often greater explanatory and predictive power than alternative theories and concepts (Ellis and Thompson 1997; Gastil et al. 2011; Jackson 2014; Jacoby 2012; Jones 2011; Ripberger,
Jenkins-Smith, and Herron 2011; Ripberger et al. 2012; Swedlow 2008; Swedlow and Wyckoff 2009; Trousset et al. 2015). For political scientists interested in these topics in other countries and historical periods, CT provides a theory and concepts that are abstract enough to travel well but concrete enough to prevent undetectable conceptual stretching (as discussed in Swedlow 2001, 2011; for examples of non-US and comparative CT studies relying on surveys, see Grendstad 2000, 2001, 2003a, b; Grendstad and Selle 1995, 1997; Lockhart 2011; Lockhart and Giles-Sims 2010; Maleki and Hendriks 2015; Olli 2012).

Further, for scholars interested in role of rationality and institutions in political decision making and choice, CT specifies cultural boundaries on rationality by specifying types of institutional forms and their accompanying ideologies (Chai 1997; Chai and Wildavsky 1994, 1998; Chai et al. 2011; Grendstad and Selle 1995; Lockhart 1999, 2001; Swedlow 2011, 2015; Wildavsky 1987, 1994).

Finally, for political scientists interested in studying change in any of the public opinion topics listed above as well as change in rational choice and institutions, CT offers a theory of change, unlike most other cultural theories (6 2010, 2011, 2014a, 2014c; Chai and Wildavsky 1998; Coyle and Wildavsky 1987; Ellis 1998; Ellis and Wildavsky 1990; Hammer 1994; Lockhart 1997, 1999, 2001; Malecha 1994; Robinson 2014, 2016; Swedlow 2011b; Wildavsky 1985).

Thus, not only US public opinion researchers but political scientists with many other interests should be interested in operationalizing CT in survey research in the most valid way possible, the subject of this paper.

This paper explains what CT is and compares various approaches to operationalizing CT in survey research with respect to their face validity, content validity, convergent validity, and predictive validity. The approaches assessed include the worldview measures originally developed by Dake and Wildavsky, the relational ranking and rating measures recently created by Hank Jenkins-Smith and colleagues, the relational “cultural cognition” measures of Dan Kahan and colleagues, and the relational grid-group measures developed by Jeroen Maesschalck, Joe Ripberger, Brendon Swedlow, and colleagues. Face
validity and content validity are assessed by comparing the theory with efforts to translate it into survey measures. The worldview measures developed by Dake and Wildavsky provide a baseline for assessing convergent validity, while a common set of policy items is used to assess the predictive validity of these different approaches.

We find that all of these approaches lack face and content validity because they only operationalize a component of CT. But the worldview measures are particularly lacking because worldviews do not correspond to any component of CT. By contrast, the new relational measures exhibit higher levels of face and content validity with respect to the relational patterns hypothesized by CT... [further results to be added]. Based on these findings, we suggest appropriate uses for these measures and directions for further research to improve the conceptualization and operationalization of CT in survey research.

What is Cultural Theory?

At its core, CT is a theory specifying the relational patterns and pressures that influence how and what people think. It is a theory specifying social structures and their accompanying thought styles, ideas and ideologies; a theory specifying institutional types and the kinds of attitudes that go with them (6 2014c; Hood 1998).

CT originated with Durkheim and has been further developed by Douglas, Wildavsky, and others (Douglas 1982; Douglas and Wildavsky 1982). One of Douglas’s students, Michael Thompson, and one of Wildavsky’s students, Richard Ellis, along with Wildavsky, in Cultural Theory, provided what is regarded as the seminal refinement of the theory (Thompson, Ellis, and Wildavsky 1990, hereafter “TEW”; see also Schwarz and Thompson 1990). Douglas (1992, 1999) and Thompson (2008) continued to develop the theory after Wildavsky’s death. 6 (2014c) has returned to Durkheim to develop what he calls a neo-Durkheimian version of the theory. Swedlow has re-cast the theory as a theory of boundaries (2011a, 2015). Kahan and colleagues have developed a variant that they call “cultural cognition theory” (CCT; see
These variants of CT provide rich theoretical resources for scholars interested in developing the theory. But these variants of CT also create challenges for assessing the construct validity of efforts to operationalize CT for survey research. Depending on which variant of the theory one is using, the assessment of construct validity may also vary.

We adopt a pragmatic solution to these challenges. First, we eliminate from our assessment those variants of the theory that have not yet been operationalized in survey research. This excludes all variants except those of TEW and Kahan and colleagues. Second, since TEW is considered the seminal refinement of the theory while some, including Kahan himself, question whether CCT is really still CT (Kahan 2012), we use TEW to assess the validity of CT’s operationalization in survey research.

A further reason to use TEW for purposes of assessing validity is that it was Wildavsky, working with one of his students, Karl Dake, who first operationalized the theory for survey research (Wildavsky and Dake 1990). As a consequence, it seems reasonable to use the seminal refinement of CT that Wildavsky co-authored to assess the content validity of the operationalization that he and one of his students developed. Finally, because all other efforts to operationalize CT for survey research, including CCT efforts, developed from the work of Dake and Wildavsky, their operationalization provides a good baseline for assessing the convergent validity of current efforts to operationalize CT for survey research.

**Definition of Terms: Cultural Bias, Social Relations, and Ways of Life or Cultures.** TEW begin by defining terms: “Cultural bias refers to shared values and beliefs. Social relations are defined as patterns of interpersonal relations. When we wish to define a viable combination of social relations and cultural bias we speak of a way of life” (1990, 1) or culture (1990, 4-5). Figure 1 shows how cultural biases arise from experiences with patterns of social relations.
Dimensions of Social Relations: Group and Grid. TEW build explicitly on Douglas, who “argued that the variability of an individual’s involvement in social life can adequately be captured by two dimensions of sociality: group and grid. Group refers to the extent to which an individual is incorporated in bounded social units…Grid denotes the degree to which an individual’s life is circumscribed by externally imposed prescriptions” (1990, 5).

Egalitarian, Hierarchical, Individualistic, and Fatalistic Social Relations (and Hermits). “Strong group boundaries coupled with minimal prescriptions produce social relations that are egalitarian…When an individual’s social environment is characterized by strong group boundaries and binding prescriptions, the resulting social relations are hierarchical…Individuals who are bound by neither group incorporation nor prescribed roles inhabit an individualistic context…People who find themselves subject to binding prescriptions and are excluded from group membership exemplify the fatalistic way of life… For a few individuals, there is a fifth possible way of life, one in which the individual withdraws from coercive and manipulative social involvement altogether. This is the way of life of the hermit…”

Values. TEW hypothesize that each of these four patterns of social relations is justified by and in turn justify (and make plausible) particular kinds of values and beliefs. However, in a significant omission, they do not specify which values are associated with each relational pattern, although cultural theorists have inferred these values subsequently. Consequently, this is the one place where we depart from TEW’s account of CT and draw on other accounts to fill in the values blank. For example, cultural theorists hypothesize that people in hierarchical institutions value order, people in individualistic institutions value freedom, people in fatalistic institutions value (good) luck, and people in egalitarian institutions value equality (see Figure 2, Coyle 1994 and Swedlow 2008).

Functionalism of Relations, Values, and Beliefs within and between Ways of Life or Cultures. Cultural theorists hypothesize that these values justify and therefore are functional for their associated institutions. Values and institutions cannot be mixed and matched without disrupting this
functional relationship. To live one way and think another is unsustainable, a pathway for cultural change. Changes in values and beliefs are expected to lead to changes in institutions, and vice versa. Thus, institutions constrain values and beliefs, and values and beliefs constrain institutions.

For example, people in hierarchical institutions cannot value freedom or equality more than order without undermining their institution. More surprising are the beliefs regarding human nature, the environment, and economics that are predicted to be associated with (again because they are functional for) each institutional type, providing a lot of explanatory leverage and allowing the prediction of a lot of co-variation (and inverse variation) among institutions, beliefs, and values (Schwarz & Thompson, 1990; Swedlow 2002; Thompson, Ellis, & Wildavsky, 1990).

TEW claim that functionalism operates on two levels: 1) within cultures, between patterns of relations and their functionally related values and beliefs and 2) between cultures, where the cultures are functional for each other. We have been describing the first kind of “within culture” functionalism. As an example, the second “between culture” functionalism looks like this: “For economies to grow…there must be diverse sources of capital and opportunity to bid resources away from existing holders. Evidently competition [promoted by individualists] is the key process. But there must also be sufficient stability [provided by hierarchs] to maintain rules for competition—without collection of debts, for example, there can be no borrowing—and sufficient criticism of inequality [by egalitarians] to prevent the rise of monopolies that would eventually kill competition” (Wildavsky 1994, 146). Between-culture functionalism is part of the basis for the making and breaking of cultural alliances (as discussed in TEW 1990, 83-100; see also Jenkins-Smith, Silva, Gupta, and Ripberger 2014; Ripberger, Jenkins-Smith, and Herron 2011; Ripberger, Gupta, Silva, and Jenkins-Smith 2014; Swedlow 2002; Weare, Lichterman, and Esparza 2014; Wildavsky 2006) and for a normative theory derived from CT that values cultural pluralism (TEW 1990, 96-97; Ney and Verweij 2014; Verweij and Thompson 2006; Verweij et al. 2011; Verweij 2012; Wildavsky 1998; see also Lockhart and Franzwa 1994).
TEW devote significant effort to specifying the myths of nature, constructs of human nature, and ways of economizing that are associated with each pattern of social relations. We recount these briefly here so that the extent to which they are operationalized in surveys using CT can be assessed.

**Ideas and Myths of Nature.** TEW's strategy for identifying myths of nature that are functional for the different patterns of social relations is to specify in a deductive way what kinds of ideas of nature are functional and then to map myths of nature identified by ecologists onto these ideas of nature. The ideas of nature are as follows: “[F]or fatalism to be a viable way of life, nature must be constructed as a lottery-controlled cornucopia. For egalitarianism to be a viable mode of existence, nature must be held strictly accountable. For individualism to be a viable way of life, nature must be a skill-controlled cornucopia. For hierarchy to be a viable way of life, nature must be bountiful within strictly accountable limits (the isomorphic idea of nature). The hermit’s viability depends on nature’s being seen as freely available cornucopia” (1990, 28).

The myths of nature identified by ecologists are these: “Nature Benign gives us global equilibrium. The world, it tells us, is wonderfully forgiving: No matter what knocks we deliver, the ball will always return to the bottom of the basin. The managing institution can therefore have a laissez-faire attitude. Nature Ephemeral is almost the exact opposite. The world, it tells us, is a terrifyingly unforgiving place and the least jolt may trigger its complete collapse. The managing institution must treat the ecosystem with great care. Nature Perverse/Tolerant is forgiving of most events but is vulnerable to the occasional knocking of the ball over the rim. The managing institution must, therefore, regulate against unusual occurrences. Nature Capricious is a random world. Institutions with this view of nature do not really manage or learn: They just cope with erratic events” (1990, 26-27).

“Both the ideas of nature and the myths of nature thus map onto the very same institutional typology. The skill-controlled cornucopia and Nature Benign belong to the individualist; isomorphic nature and Nature Perverse/Tolerant belong to the hierarchist; accountable nature and Nature Ephemeral belong
to the egalitarian; the lottery-controlled cornucopia and Nature Capricious belong to the fatalist; and the freely available cornucopia and Nature Resilient, we will show presently, belong to the hermit” (1990, 28).

**Constructs of Human Nature.** TEW go on to identify constructs of human nature that are functional for the different patterns of social relations: “Egalitarians believe that human beings are born good but corrupted by evil institutions… For individualists, human nature, like physical nature, is extraordinarily stable. No matter the institutional setting, individualists believe, human beings remain essentially the same: self-seeking… (1990, 34). Hierarchists believe that human beings are born sinful but can be redeemed by good institutions…(1990, 35). For fatalists, human nature is unpredictable” (1990, 35).

**Ways of Economizing.** Further, TEW specify ways of economizing, of “making ends meet,” that will be functional for the four patterns of social relations: Egalitarians believe that “you can manage your needs but not your resources.” Hierarchs believe that “you can manage your resources but not your needs.” Individualists believe that “you can manage both your needs and your resources.” Fatalists believe that “you can manage neither your needs nor your resources” (1990, 39-51).

**Preferences for Constructs of Blame, Envy, Economic Growth, Scarcity, Risk, and Apathy.** Moreover, TEW specify various preferences that are functional for the different patterns of social relations. Blame, envy, economic growth, scarcity, risk, and apathy, they claim, are all constructed in ways that are functional for the different patterns of social relations (1990, 55-6). See Table 1 for an overview.

**Cultural Surprises as Causes of Cultural Change.** “But if preferences and perception are socially constructed in such a way as to justify particular patterns of social relations, how does change ever occur?,” ask TEW (1990, 69), identifying a further important component of CT: its theory of change. “Much the same way,” they answer, “as scientific theories lose and gain adherents: the cumulative impact of successive anomalies or surprises.” Anomalies and surprises occur because “nature, for all its accommodating ways, does not meekly accept every cultural construction we try to impose on it, and, in fighting back, it generates a countervailing force: the natural destruction of culture…” In other words,
cultural theorists locate a catalyst for cultural change in surprises generated by encounters with nature in which nature displays properties or reveals characteristics that are at odds with scientifically or culturally generated expectations. Stipulating the world is one way and finding out that it actually appears to be another leads to a variety of predictable consequences, and can lead to such changes CT hypothesizes.4

**Unit of Analysis and Theory of the Individual.** TEW say that their unit of analysis is the “socialized individual” or “social being” (Thompson, Ellis, and Wildavsky 1990). By this they mean that none of us are born into a state of nature (Enzell and Wildavsky 1998), but, rather, we are born into social worlds defined in part by the political cultural types of CT. Thus, the influence of larger units of analysis, like institutions, is in us, shaping us, even as we are in these institutions, shaping them. TEW say that unlike lab rats, we shape the maze (of social and political constraints) while running it (Thompson, Ellis, and Wildavsky 1990, 22). We construct institutions while they construct us.

To the extent that individuals are socialized in culturally pluralized environments, the question becomes whether they simply internalize and reflect this pluralization or whether a particular cultural bias dominates their cultural orientations. “We would expect that individuals will make significant efforts to bring consistency to their social environments,” TEW (1990, 266) write. “This strain to consistency explains why people are not randomly distributed in social contexts. Individuals often seek out social relationships that are compatible with their preferred bias and shun those relations in which they feel less at home.” Still, TEW acknowledge that people may also compartmentalize different cultural biases so that different biases dominate different parts of their lives. “An individual may find himself in cutthroat competition with his business rivals, hierarchical relations in the military, egalitarian relations at home, while treating certain area of life, say inability to carry a tune, with fatalistic resignation” (1990, 265). These different theories of the individual – which have become known as the cultural consistency and cultural mobility theses -- have been tested and the results suggest the strain to cultural consistency is more prevalent than cultural mobility (Olli 2012).
Defining and Assessing Construct Validity of Survey Measures Operationalizing CT

Construct validity has been defined as “the approximate truth of the conclusion that your operationalization accurately reflects its construct.” For our purposes, there are two types of construct validity: what has been called 1) translation validity and 2) criterion-related validity. To assess translation validity “you focus on whether the operationalization is a good reflection of the construct. This approach is definitional in nature -- it assumes you have a good detailed definition of the construct and that you can check the operationalization against it.” There are two kinds of translation validity: 1a) face validity and 1b) content validity. “In **face validity**, you look at the operationalization and see whether ‘on its face’ it seems like a good translation of the construct.” “In **content validity**, you essentially check the operationalization against the relevant content domain for the construct. This approach assumes that you have a good detailed description of the content domain, something that’s not always true.”

To assess the face validity of efforts to operationalize CT for survey research, we will assess the extent to which measures appear to reflect “on their face” the theoretical construct that is CT. To assess the content validity of these efforts, we will assess the extent to which CT’s components are measured in surveys.

Based on the seminal TEW version of the theory outlined above, CT consists of the grid and group dimensions, the four relational patterns generated by them, and the cultural biases associated with those relational patterns. These cultural biases consist of values and beliefs, including ideas and myths of nature, constructs of human nature, ways of economizing, and preferences for particular constructs of blame, envy, economic growth, scarcity, risk, and apathy. Moreover, CT consists of functional relationships both within and between ways of life, a theory of change based on cultural surprises arising from mismatches between myths of nature and actual experiences with nature, and socialized individuals as the units of analysis, who may exhibit tendencies toward consistency in their cultural orientations across social domains but who also
may compartmentalize them. Measures of all of these components of CT should be present in surveys to achieve high face and content validity.

To assess criterion-related validity, "you examine whether the operationalization behaves the way it should given your theory of the construct." There are four kinds of criterion-related validity, two of which will be assessed here: 2a) convergent validity and 2b) predictive validity. In **convergent validity** we examine the degree to which the operationalization is similar to (converges on) other operationalizations that it theoretically should be similar to." "In **predictive validity**, we assess the operationalization's ability to predict something it should theoretically be able to predict."6

To assess the convergent validity of efforts to operationalize CT for survey research, new measures will be compared to the original worldview measures of Dake and Wildavsky, as further developed by Jenkins-Smith and collaborators. To achieve high convergent validity, the new measures should converge on the further-developed original measures. To assess the predictive validity of efforts to operationalize CT for survey research, we assess the ability of the measures to predict constructs of nature, trust in government, and climate change risk perceptions, all of which should vary in predictable ways for respondents with differing cultural orientations.

**The Initial Effort to Operationalize CT in Survey Research:**

**The Dake and Wildavsky Worldview Measures**

The initial effort to operationalize CT in survey research was undertaken by Karl Dake and Aaron Wildavsky (Dake 1990, 1991, 1992; Wildavsky and Dake 1990). They decided to operationalize the cultural biases of CT as worldviews (see Table 2). These were statements about various social and political conditions in the world that were supposed to suggest that certain values were being threatened by those conditions or were needed to remedy those conditions. Respondents were asked to indicate the extent of their agreement or disagreement with these statements on a seven point scale. Three such statements were used to measure each worldview.
As Wildavsky and Dake (1990) explain: “To test the relations among perceptions of danger and world views justifying hierarchy, individualism, and egalitarianism, we developed new measures to assess endorsement of three cultural biases.

“Hierarchy

“The index embodies support for patriotism (‘I’m for my country, right or wrong’), law and order (‘The police should have the right to listen in on private telephone conversations when investigating crime’), and strict ethical standards (‘I think I’m stricter about right and wrong than most people’). It also expresses concern about the lack of discipline in today’s youth and supports the notion that centralization is ‘one of the things that made this country great.’”

“Individualism

“Our index for the cultural bias of individualism expresses support for continued economic growth as the key to quality of life, and private profit as the main motive for hard work. It espouses the view that democracy depends fundamentally on the existence of the free market, and argues that ‘the “welfare state” tends to destroy individual initiative.’ The individualism scale also indicates support for less government regulation of business, and endorses private wealth as the just rewards of economic endeavor: ‘If a man has the vision and ability to acquire property, he ought to be allowed to enjoy it himself.’”

“Egalitarianism

“Our measure of this worldview is based on survey items written to assess attitudes toward equality of conditions. The egalitarianism scale centers on political solutions to inequality: ‘Much of the conflict in this world could be eliminated if we had more equal distribution of resources among nations,’ ‘I support federal efforts to eliminate poverty,’ and ‘I support a tax shift so that the burden falls more heavily on corporations and persons with large incomes.’ The egalitarianism index also covers perceived abuses by other political cultures: ‘Misuse of scientific and expert knowledge is a very serious problem,’ and ‘The
human goals of sharing and brotherhood are being hindered by current big institutions” (Wildavsky and Dake 1991, 139-140).

The face validity of these measures is problematic with the respect to the components of CT, as outlined above. None of these components are measured directly. Wildavsky and Dake claim that they are seeking to measure “the world views justifying hierarchy, individualism, and egalitarianism” by assessing “individual endorsement of the cultural biases” (Wildavksy and Dake 1991, 139). But worldviews are not offered as a justification for the ways of life in CT, cultural biases are, which consist of specific values and beliefs. Worldview measures are not direct measures of values like liberty, equality, order, or luck, nor are they direct measures of beliefs about myths of nature, constructs of human nature, ways of economizing, or preferences for particular constructs of blame, envy, economic growth, scarcity, risk, and apathy. Admittedly, TEW failed to specify the values of cultural bias, instead focusing on beliefs and preferences, so it is impossible and perhaps unfair to assess the validity of their operationalization of values in their survey measures (although others have subsequently filled in the values blank in the theory).

Some measures may tap entailments of the values later specified by others or preferences for grid and group relations (e.g., “I’m for my country, right or wrong,” “I support less government regulation of business,” and “I support federal efforts to eliminate poverty”). Other measures seem to combine statements of value with statements of belief about conditions in the world (e.g., “The human goals of sharing and brotherhood are being hindered by current big institutions and technological growth”) or to describe the effect of changes in behavior entailing values on conditions in the world (e.g., “Much of the conflict in this world could be eliminated if we had a more equal distribution of resources among nations”) or the effect of conditions in the world on changes in behavior entailing values (e.g., “The ‘welfare state’ tends to destroy individual initiative”). Many of the statements express preferences for particular behaviors (e.g. “The police should have the right to listen in on private telephone conversations when investigating crime”) and often, implicitly, a preference for particular relations (ditto). A couple seek to measure perceptions of
rather than preferences for behavior (“I think that I’m stricter about right and wrong than most people” and “There is very little discipline in today’s youth.”) Of course, at least in this influential study, fatalism and hermitude are not claimed to be measured, a face and content deficiency that Dake and Wildavsky remedied in subsequent studies with respect to fatalism.

Neither these survey items nor the design or administration of the survey measure functionalism or cultural surprise and change. However, because the world views are measured on independent scales, it should be possible to assess whether individuals support more than one cultural bias, which would be a test of the tendency toward cultural consistency (or lack thereof).

The content validity of these measures is also problematic because they do not contain any of the components that CT claims are part of the theory. The worldview measures are at best only indirect operationalizations of the content of some aspects of cultural bias and for a couple of measures of perceptions of behavior there is arguably an indirect measure of relations.

Even if the worldview measures were taken to be valid implicit measures of cultural bias, it can hardly be said that they are valid operationalizations of CT as a whole nor even of CT’s core claim that relations are related to values and beliefs, because there is almost no effort to measure group or grid or the resulting relational patterns. Thus, the worldview measures by themselves, even if they were implicitly valid measures of cultural bias, cannot be considered valid measures of CT’s core claim because they only in a very limited way operationalize a key component of cultural theory: the relational patterns.

Thus, the Dake and Wildavsky worldview measures should be seen as incomplete and therefore invalid (both on their face and with respect to content) attempts to operationalize CT. Implicitly, however, they do appear to measure some aspects of cultural bias and/or relations.

A further problem with the face validity of the worldview measures is that Dake and Wildavsky create a scale for each worldview, thus giving us three dimensions of variation (four with fatalism that was not measured here) instead of the two posited by CT. (The theory claims variation of institutions and
cultural bias in two dimensions. The worldview scales operationalize the theory in three or four dimensions.) However, as indicated, the three or four scales allow an assessment of the extent to which there is a tendency toward consistency in worldviews, thus allowing testing of CT’s theory of the individual.

Despite the ways in which the Dake and Wildavsky worldview measures fall short of face and content validity, they do arguably implicitly tap some amalgamation of values and beliefs (and even relations) predicted by the theory. As we will see, this helps explain why the new relational measures developed by Jenkins-Smith and collaborators that have greater face and content validity than the Dake and Wildavsky worldview measures converge on the worldview measures and why the worldview measures also predict policy preferences well.

In fact, it is CT’s ability to predict (that is, the ability of Dake and Wildavsky’s cultural worldviews to predict) that has been the subject of the most testing in survey research, first with respect to predicting risk perceptions and more recently with respect to predicting policy preferences. Wildavsky and Dake (1990) claimed that their worldview measures did a better job of predicting risk perceptions than other available explanations. This led to a great deal of interest in CT and to the translation of the worldview measures into many European languages and their administration in surveys by many risk researchers in Europe. The results were at best mixed and led to a lot of criticism of the theory and its rejection by most researchers who studied risk perception (see Marris, Langford, and O’Riordan 1998; Renn and Rohrmann 2000; Rippl 2002; Sjoeberg 2002). European scholars who used CT in their work but who were not survey researchers and who did not study risk perception bore the brunt of this criticism. This led some to turn away from CT but others retained their interest in CT and instead rejected surveys as valid research modalities for testing CT (Douglas and Ney 1998; Verweij et al. 2011). A few European scholars retain an interest in operationalizing CT in survey research, but their focus is more on questions in mainstream political science than on explaining risk perception (Grendstad 2001, 2003; Olli 2012; Wouters and Maesschalck 2014; but see Grendstad and Selle 1997, 1999).
US scholars have continued to use the Dake and Wildavsky worldview measures to predict risk perceptions. As discussed below, Jenkins-Smith and collaborators have included these measures on an increasing number of surveys since the early 1990s. Paul Slovic also has continued to use these measures (Gastil et al. 2011; Kahan et al. 2010; Peters and Slovic 1996). And, as we will see, Kahan and collaborators have been very active in using worldview scales derived from CT to explain cleavages in risk perception and on other policy, legal, and scientific and technological issues in the US. Though the worldview measures are useful, persistent questions about their theoretical and empirical validity have led a number of scholars to experiment with alternative measurement strategies. We turn next to assessing the face, content, convergent, and predictive validity of these operationalizations.

Current Efforts to Operationalize CT in Survey Research, Part I:
The Relational Measures of Jenkins-Smith and collaborators

Face and Content Validity

Jenkins-Smith and collaborators have refined the Dake and Wildavsky worldview measures over the past two decades, revising and replacing items to achieve greater scale reliability but retaining one scale for each worldview (Jenkins-Smith and Smith 1994; Herron and Jenkins-Smith 2006; Ripberger, Jenkins-Smith, and Herron 2011). Recently, they have made a more significant shift in operationalization. They have developed measures that consist mostly of statements of preferences regarding relations, with an admixture of statements describing experiences with relations and worldviews. And they analyze these measures in new ways by combining a rating approach with a ranking approach (see Table 2).

These new measures and the new ranking and rating approach have greater face and content validity than the Dake and Wildavsky worldview measures with respect to operationalizing CT. First, and very importantly, these measures attempt to operationalize preferences regarding the relational patterns (or institutions) in CT. Second, along with an emphasis on measuring preferences regarding relations, this operationalization of CT includes measures of worldviews and experiences with relations. Thus, these
measures have a high level of face and content validity because they cover both relations and something (worldviews) that has some implicit relationship to cultural bias. Since CT fundamentally is about both, efforts to operationalize CT that include both have higher face and content validity than operationalizations of CT that only include one or the other.

Moreover, the ranking method employed to get respondents to interact with these relational and worldview statements has greater face and content validity than the agree/disagree worldview scales employed by Dake and Wildavsky. By requiring respondents to rank these statements, Jenkins-Smith and collaborators are requiring them to interact with the different cultural orientations in a comparative way that reflects how CT predicts people interact with and experience the cultures in their lives, particularly in social and political environments that are multi-cultural in the CT sense of multi-cultural. That is, CT predicts that people are exposed to the different cultural orientations and choose among them by gravitating more toward some and away from others (Olli 2012).

This ranking process has greater face validity than the Dake and Wildavsky worldview scales because the latter do not require comparison of cultural types. Moreover, the ranking process also arguably has greater content validity than the Dake and Wildavsky worldview measures because, as already discussed, the statements cover both relational patterns and worldviews (some of which are implicitly related to cultural bias, which is what CT covers). So, respondents are ranking cultures against each other not just worldviews or cultural components like cultural bias or relational patterns.

The ranking method also has quasi-good face validity with CT because it implicitly requires respondents to make choices on dimensions. That is, by ranking the ways of life by their affinity for and dislike of these cultures respondents are implicitly making choices on dimensions running from one corner of a 2 x 2 matrix to the other. That is, they are moving themselves around on implicit dimensions that are orthogonal to the grid and group dimensions, i.e., dimensions that represent an X across the 2 x 2 matrix, running at a 45 degree angle to the grid and group dimensions. Greater face validity would be achieved if
respondents were explicitly making choices that moved them along the grid and group dimensions rather than orthogonal to them, but getting respondents to make choices that move them along theoretically-implicit orthogonal dimensions is a step in that direction and an improvement over having respondents make choices on three or four worldview dimensions that are independent of each other, as Dake and Wildavsky do.

The rating way of asking respondents to interact with these items has less face and content validity than the ranking method because the rating method shares the flaws of the Dake and Wildavsky worldview scales, which are also a rating method. Instead of asking whether respondents agree or disagree with worldview statements, this rating method asks if the statement describes their outlook on life completely or not at all on a ten point scale.

A further shortcoming of these measures is that they are not equivalent mixtures of measures seeking to tap the relational and cultural bias aspects of cultures or ways of life. The hierarch statement is mostly about preferences for relations (e.g., “I am more comfortable when I know who is, and who is not, a part of my group, and loyalty to the group is important to me”), with the last sentence being about behavior in actual relations (“Most of the time I trust those with authority and expertise to do what is right for society”). The individualist statement is also mostly about preferences for relations (e.g., “I prefer to make my own way in life without having to follow other people’s rules”), with two sentences focused on behavior in actual relations (“Groups are not all that important to me” and “I respect people based on what they do, not the positions or titles they hold”) and one sentence devoted to worldview (“Everyone benefits when individuals are allowed to compete”). The egalitarian statement, meanwhile, has one sentence devoted to preferences for relations (“Within my group, everyone should play an equal role without differences in rank or authority”); one and a half sentences devoted to behavior in actual relations (“It is easy to lose track of what is important, so I have to keep a close eye on the actions of my group” and “…my most important contributions are made as a member of a group that promotes justice and equality”); and another one and a
half sentences devoted to worldviews (“It is not enough to provide equal opportunities; we also have to try
to make outcomes more equal” and “Much of society today is unfair and corrupt…”). Finally, the fatalist
statement is mostly based on behavior in actual relations (“I have to live by lots of rules, but I don’t get to
make them”), with one sentence blending worldview and actual relations (“Life is unpredictable and I have
little control”).

Although Jenkins-Smith and collaborators’ new measures significantly improve on the Dake and
Wildavsky measures with respect to face and content validity, these new measures have less face validity
than they might because they combine the relational patterns measures (both preferred and actual
relations) and the worldview (implicit cultural bias) measure in a single statement. This prevents the
investigation of the relationship between relational patterns and cultural bias. Since the central hypothesis
of CT is that particular relational patterns and cultural biases are related to each other in particular ways,
efforts to operationalize CT should measure each separately in the same instrument so that this hypothesis
can be tested. Such efforts would have the highest face validity possible. However, as we will see, the
inclusion of the Dake- and Wildavsky-derived worldview measures in the same survey so as to assess
convergent validity effectively puts a predominantly relational measure and an implicit cultural bias measure
into the same instrument and therefore fortuitously somewhat allows the investigation of the central
hypothesis of CT. It may also be noted, consequently, as will be discussed further, that this combination
gives the overall instrument high face and content validity with respect to CT.

Convergent and Predictive Validity

Although there are a number of different ways that one might use responses to the new relational
measures developed by Jenkins-Smith and collaborators when fashioning indicators of egalitarianism,
individualism, hierarchy, and fatalism, most of their work—to date—employs one of two approaches. First,
they create equally weighted zero to ten scales for each of the worldviews by averaging responses to the
two rating questions (generally speaking, responses to the two questions are highly correlated). See
Figure 4 for the distribution of respondents across each cultural type across the three measures. Second, they use responses to the ranking question to create categorical indicators of cultural type based on the statement that respondents ranked the highest. In the sections that follow, we evaluate the validity of these measures by comparing them to traditional indicators of worldview that are based on the 3-item scales introduced by Dake and Wildavsky (as further developed by Jenkins-Smith and collaborators; see Table 4).

To evaluate the convergent and predictive validity of our new measures, we use data from a national survey that was undertaken as part of a larger, on-going project that seeks to delimit and explain US public preferences about energy policy and environmental policy. We use these data because they include responses to the rating and ranking CT questions as well as the traditional set of 12 items that scholars have used to measure individual orientations with respect to the worldviews. The survey itself was administered in June of 2012 on the Internet to a Census-based panel of the US public that was provided by Survey Sampling International (SSI). In total, 2,430 people provided data and it took them an average of 39 min to complete the questionnaire.

Convergent validity gauges the extent to which scores on one set of indicators correspond with scores on a different set of indicators that were designed to measure the same construct. New measures are thought to be valid if they “converge” upon previously used measures of the same construct. In this paper, for example, we attempt to validate our new measures of CT by comparing them to more traditional measures that have proven valid and reliable in repeated studies across multiple contexts. To do this we used two different analytical procedures.

First, we estimated a series of ANOVA models that compare mean scores on the traditional 3-item worldview indices across groups of respondents that categorized themselves into cultural types by indicating the worldview statement that they agree with the most (via the ranking question on the survey instrument). If the measures “converge” we will see a distinctive pattern wherein the respondents that
categorized themselves into the various cultural types score the highest on their respective 3-item index. Respondents who most identified with egalitarian statement will—on average—score higher on the egalitarian index than the other three indices.

A look at Figure 5, which summarizes our ANOVA results, reveals relatively clear evidence of convergence. In panel (a), for example, we see that the Egalitarian group scored significantly higher on the 3-item Egalitarianism Index than did the other three groups. Panels (b), (c), and (d) in Figure 5 demonstrate similar patterns, wherein the Individualist, Hierarch, and Fatalist groups scored significantly higher on the Individualism, Hierarchy, and Fatalism indices, respectively.

Second, we used OLS regression to estimate four different linear models that regressed the traditional 3-item worldview indices on the average rating that respondents assigned to each of the four worldview statements. If our new measures “converge” upon the older measures of CT, the rating measure that was designed to indicate a particular worldview will be positively associated with the traditional indicator of that worldview. Likewise, the partial regression coefficient that characterizes that relationship will be higher than the partial coefficients associated with the other indicators of worldview.

Figure 6 summarizes our results and reveals additional evidence of convergent validity. In panel (a), for instance, the relationship between egalitarianism (as measured by average rating) and egalitarianism (as measured by the traditional 3-item index) is positive and statistically discernable from zero. Moreover, the partial regression coefficient that characterizes this relationship is significantly higher than the partial coefficients associated with the other indicators of worldview. Panels (b), (c) and (d) in Figure 6 demonstrate similar patterns, wherein the coefficients associated with the average individualism, hierarchy, and fatalism rating are positive, statistically different than zero, and significantly higher than the coefficients associated with the other indicators of worldview (respectively).

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1 A table of ANOVA results is available in Appendix 1.
2 A table of OLS results is available in Appendix 1.
Predictive validity gauges the extent to which scores on a new set of indicators correspond with scores on substantively distinctive yet theoretically related set of variables. If our new indicators of the worldviews posited by CT are valid, for example, they will act in a manner that is consistent with our theoretical expectations and previous empirical findings that were based on the use of the traditional 3-item indicators of worldview. For example, people who demonstrate an affinity with individualism will see nature as relatively robust, tend not to trust the government, and brush off risks associated with climate change. Again, we looked for evidence of predictive validity in two different ways.

First, we estimated a series of three ANOVA models to compare beliefs about the fragility of nature, trust in government, and climate change risk perceptions across groups of respondents that categorized themselves into cultural types by indicating the worldview statement that they agree with the most. If our measures achieve predictive validity we will see a distinctive pattern wherein the mean scores on these metrics will be different in the various cultural groups. More importantly, these differences will match our expectations based on the theory.

Figure 7 summarizes the results of this analysis. A comparison of means across the groups and panels in this Figure suggests that this measure achieves predictive validity. As CT predicts and panel (a) corroborates, Egalitarians scored relatively high on the fragility of nature scale whereas the mean score among Individualists was significantly lower. Similarly, respondents who most identified with the individualist statement scored very low on the trust in government scale as well as the risk from climate change scale. Hierarchs, by contrast, opposed self-identified Individualists by trusting the government and Egalitarians opposed individualists by perceiving climate change to a high risk. Again, these findings are exactly what we would expect given our understanding of the theory, which suggests that our indicators of worldview are measuring what we think they are measuring.

3 A table of ANOVA results is available in Appendix 1.
Second, we used OLS regression to estimate a series of six OLS models that regressed individual beliefs about nature, trust in government, and climate change risk perceptions on the four different worldviews posited by CT. In the first three models we used the traditional 3-item indices to measure individual worldviews. In the second set of three models used the average rating that respondents assigned to each of the worldview statements as our measure of cultural orientation. We then compared the two sets of models by standardizing all our results (mean = 0; sd = 1). If our new measures are valid, the standardized coefficient estimates derived from the second set of models will be theoretically explicable and somewhat comparable to the coefficients derived from the first set of models, which relied upon the traditional approach to measurement.

Figure 8 summarizes our results, which reveal additional evidence of predictive validity. In panel (a), for example, we see that people who lean towards individualism believe that nature is relatively robust. Those who gave high ratings to the egalitarian statement believe the opposite—that nature is fragile and easily damaged. By comparison, there was little if any relationship between beliefs about nature and individual ratings of the hierarchy and fatalism statements. This is exactly what CT would predict. At the same time, a quick comparison of the first and second models shows that the standardized coefficients derived from the “traditional” model are quite similar to the standardized coefficients derived by the “new” model that was estimated using our new measures.

A similar pattern is revealed in panels (b) and (c)—with a few minor exceptions. First, the “traditional” and “new” coefficients that characterize the relationship between egalitarianism and trust in government share a common sign, but are significantly different in terms of magnitude. The “traditional” model suggests a strong and positive relationship between egalitarianism and trust in government where as the “new” model that is based on average ratings suggests that this relationship is much more modest (as CT would suggest). Second, several of the partial regression coefficients that fail to achieve statistical

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4 A table of OLS results will be available in the appendix.
significance (are statistically distinguishable from zero) in the “traditional” models achieve statistical significance when we measure the worldviews with our rating scales. The “traditional” coefficient for individualism, for example, is not significantly related to trust in government, whereas the “new” coefficient reveals a significant negative relationship (as CT would suggest). The same is true of the relationship between Fatalism and Hierarchy and perceptions of risk climate change—their coefficient estimates are not significant in the “traditional” model but significant and negative in the “new” model.

All and all, these results suggest that our measures of worldview based individual ratings of the four statements that were introduced at the beginning of this paper meet (or in some cases exceed?) the standards of convergent and predictive validity.

Current Efforts to Operationalize CT in Survey Research, Part II:
The Relational “Cultural Cognition” Measures of Kahan and collaborators

Face and Content Validity

Inspired by CT and the Dake and Wildavsky operationalization of CT as worldviews in survey research, Kahan and his collaborators have developed a conceptualization and measurement of worldviews and their dimensional arrangement in survey research that is both continuous with prior efforts and a significant departure from them (see Table 5). Their operationalization of CT in survey research consequently shares many of the issues of face and content validity discussed for existing measures, while also improving face validity in one respect but significantly weakening face and content validity in another.

Like the new measures developed by Jenkins-Smith and collaborators, the new measures created by Kahan and collaborators incorporate some of Dake and Wildavsky’s worldview-type measures (e.g. “Society works best when it lets individuals take responsibility for their own lives without telling them what to do”) but consist mostly of relational measures, many expressing preferences for relations (e.g., “The women’s rights movement has gone too far” or “It’s society’s responsibility to make sure everyone’s basic needs are met”) and many reporting on experiences of actual relations (“It seems like criminals and welfare
cheats get all the breaks, while the average citizen picks up the tab” or “The government should stop telling people how to live their lives”). Their scales incorporate a number of the Dake and Wildavsky worldview measures but a number of these are really relational measures of one kind or another.

Kahan and colleagues’ scales measure actual relations and preferences for relations. The former correspond to the relations in CT and the latter to the preferences aspect of cultural bias, although not the preferences TEW list. Still, this provides an opportunity to test the core hypothesis of CT, which posits a relationship between experiences of relations and preferences for relations. Because of the high correlation of the items on their scales with each other, i.e., the high scale reliability, Kahan and colleagues in fact effectively test this core hypothesis of CT. They effectively find that experiences with relations and preferences for relations are highly correlated, thereby validating CT. Respondents who experience hierarchy as “bad” and prefer equality agree with items reflecting those views, while respondents who experience egalitarianism as “bad” and prefer hierarchy agree with items reflecting those views. Meanwhile, respondents who experience collectivism as “bad” and prefer individualism agree with items reflecting those views, while respondents who experience individualism as “bad” and prefer collectivism agree with items reflecting those views.

Thus, because Kahan and colleagues’ measures allow an investigation of the relationship between experiences with relations and preferences for relations they potentially are superior in this respect to the measures of Jenkins-Smith and colleagues, because the latter combine experiences and preferences regarding relations in a single statement, preventing the investigation of the relationship between them.

Kahan and colleagues further improve on face validity because they explicitly seek to operationalize CT by requiring respondents to place themselves on dimensions. The deficiency in their approach is that these dimensions are not the dimensions of CT, giving the approach low face validity in this respect. One of Kahan and colleagues’ dimensions seeks to measure the extent of collectivism vs. individualism in respondent worldviews. The second of these dimensions seeks to measure the extent of
hierarchy vs. egalitarianism. The cross-tabulation of these dimensions consequently generates cultural types that are hybrids or compounds of three of the four cultural types in CT: hierarchical collectivists, egalitarian collectivists, hierarchical individualists, and egalitarian individualists. See Figure 3.

The first two types are recognizable types in CT because hierarchs and egalitarians both value collectivism but hierarchs value hierarchically organized collectives while egalitarians value collectives where everyone is equal. However, egalitarians also potentially support a significant amount of individual autonomy. In CT, they value collectivism, equality, and individual autonomy (Swedlow 2002, 2011, 2012). There is no room to support this pattern of values in the measures developed by Kahan and his colleagues.

The second two types, hierarchical individualists and egalitarian individualists, do not correspond to the types generated by the cross-tabulation of dimensions in CT. These are historically contingent hybrids from a CT perspective, not basic CT types. In the US, hierarchical individualists represent a fusion found in the Republican Party coalition of social conservatives and libertarian business interests. Similarly, in the US egalitarian individualists represent a wing of the Democratic Party coalition the other wing of which consists of egalitarian collectivists. Finally, the fourth CT type, fatalists, cannot be derived from the interaction of these dimensions.

The basic problem with CCT from the perspective of face and content validity with respect to CT is that the dimensions of CCT are not those of CT. CCT’s endpoints of hierarchy and communitarianism have fairly good face and content validity with respect to high grid and high group in CT, but the endpoints at the other end of these dimensions in CCT do not. Egalitarianism is not the only manifestation of low grid, which seeks to measure low social regulation, which is also characteristic of individualism. Hierarchy consequently has its theoretical opposites in both egalitarianism and individualism on the grid dimension in CT. Meanwhile and similarly, individualism is not the only manifestation of low group, which seeks to measure social relations that are not strongly bounded by incorporation into a collective, which is also a
characteristic of fatalism. Communitarianism consequently has its theoretical opposites in both individualism and fatalism on the grid dimension in CT.

Thus, the endpoints of hierarchy and communitarianism on CCT’s dimensions have fairly good face and content validity with the endpoints of high grid and high group in CT, but the endpoints of egalitarianism and individualism on CCT’s dimensions do not have good face and content validity with the endpoints of low grid and low group in CT.

This points toward a significant shortfall in Kahan and colleagues’ approach with respect to face and content validity. While seeking to operationalize CT on dimensions is an improvement, the CCT dimensions bear only a distant relationship to those in CT, and because they entirely dispense with one of the cultural types generated by CT while turning the remaining three CT types into hybrids, the face and content validity of their approach is extremely low.

Convergent and Predictive Validity

[analysis to be added]

Current Efforts to Operationalize CT in Survey Research, Part III:
The Relational Grid-Group Measures of Maesschalck, Ripberger, Swedlow, and collaborators

Face and Content Validity

Several scholars have been working independently to operationalize the grid-group relational patterns of CT for survey research. Until recently, the conventional wisdom among CT scholars was that this could not be done. It was said that surveys could only be used to measure what was in people’s heads, their values, beliefs, and preferences, not their relational patterns. CT scholars thought that relational patterns would have to be studied by some other means, typically through observational case studies or through analysis of primary or secondary sources that described relational patterns.

Curiously, this conventional wisdom persists even while, as we have seen, the new measures developed by Jenkins-Smith and colleagues and Kahan and colleagues have shifted significantly in the
direction of measuring preferred and even actual relations. This shift in measurement and this successful measurement of relations in CT has occurred apparently imperceptibly to all involved, since these scholars and others continue to characterize their measures as worldview measures.

However, several CT scholars have explicitly challenged the conventional wisdom, maintaining that surveys can be designed to measure relational patterns by getting respondents to self-report on their experiences with relational patterns. This approach has in fact proved to be viable not just for operationalizing CT but for multi-nation cross-cultural studies conducted by scholars testing other cultural theories and hypotheses, as will be discussed.

Jeroen Maesschalck and his collaborators (Wouters and Maesschalck 2014) have been the first self-consciously and deliberately to operationalize the grid-group relational measures for survey research in order to study organizational culture. They have tested a whole battery of grid-group relational measures (see Appendix 1), demonstrating that it is possible to measure the relational patterns of CT. These measures have good face validity with respect to measuring relational patterns in CT, but lesser face validity with respect to CT as a whole because cultural bias measures were not included in the same survey instrument. The content validity of these grid-group measures is also good with respect to studying organizational culture, but because CT claims that relational patterns are enacted at different levels of analysis and in different units of analysis, the focus on organizational relations is a bit restricted. Ideally, relational patterns should be measured in a range of units and levels of analysis. So, for example, in addition to work organizations, one might want to measure relational patterns in the family, in societal organizations in which a person participates, and in politics (e.g., see Olli 2012).

This has been the approach taken by Ripberger, Swedlow, and their colleagues. Building on the measures of relational patterns developed by Jenkins-Smith and colleagues, Ripberger, Swedlow, and others have sought to develop a leaner, smaller set of items that operationalize the grid-group relational dimensions. Swedlow and colleagues have been pursuing the same goal, developing measures that ask
respondents to self-report experiences with relational patterns operationalized as patterns of who decides (Duerk 2012; see Appendix 2). Ripberger, Swedlow, and colleagues collaborated to develop the grid-group relational measures in Table 4. These measures demonstrate a high degree face and content validity with respect to measuring the grid-group relational patterns since they require respondents to place themselves on the grid-group relational dimensions and since they ask about relational patterns at home, work, and in politics.

Like the grid-group relational measures developed by Maesschalck, however, these relational measures do not have great face or content validity with respect to CT as a whole, since they are not as well seeking to measure cultural biases. However, as with the relational/worldview statements developed by Jenkins-Smith and colleagues, our effort to assess the convergence of these grid-group relational measures on the Dake- and Wildavsky-derived worldview measures effectively tests the central hypothesis of CT that relational patterns and an implicit measures of cultural biases (worldviews) will be related in particular ways. Moreover, this inadvertent test of CT’s central hypothesis is cleaner than our parallel inadvertent test of the measures developed by Jenkins-Smith and collaborators because their relational measures are muddied with worldview statements, as will be discussed further.

Convergent and Predictive Validity

[analysis to be added]

Discussion

All efforts to operationalize CT in survey research lack face and content validity in that all efforts operationalize at best only a part of CT. But some efforts are more lacking than others and the defects in some operationalizations can be remedied more easily than others.

The worldviews approach to operationalizing CT developed by Dake and Wildavsky and used by most scholars who have operationalized CT in survey research is particularly lacking in face and content validity because worldviews do not correspond very well to any component of CT. Worldviews do not, for
the most part, measure social relations. They do not measure values, with some exceptions, and perhaps implicitly in other cases. They do not measure ideas or myths of nature or constructs of human nature or preferences for particular constructs of blame, envy, economic growth, scarcity, risk, and apathy – again, for the most part, with some exceptions. Perhaps the best that can be said of the worldview measures is that occasionally they measure or come close to measuring a given component of CT and that they sometimes implicitly measure a component or some mash-up or amalgamation of components of CT.

The Dake and Wildavsky and Kahan and collaborators’ scaling of measures lacks face and content validity with respect to operationalizing the dimensions of CT. Dake and Wildavsky create one scale for each worldview, i.e., four scales, four dimensions, whereas CT is based on two dimensions of social relations, grid and group. Meanwhile, Kahan and collaborators put relational measures on two dimensions, but these are not the dimensions of CT, and they lose one cultural type in the process. As such, it is difficult to say which operationalization has less face and content validity.

Kahan and collaborators make much of the fact that their dimensions achieve higher reliability than the Dake and Wildavsky dimensions in survey research (Kahan 2012 reports that the Cronbach’s alpha for their “longform” CCT questionnaire “consistently exceeds .70” and that their “short form” CCT questionnaire does even better with the individualism-communitarianism items achieving .76 and the hierarchy-egalitarianism items achieving .84 Cronbach’s alpha). But this does not change the fact that the face and content validity of these scales is low with respect to CT for the reasons given above, as Kahan (2012) recognizes.

What the high reliability of Kahan and colleagues’ scales tells us is that when the US public is given the set of items in Kahan and colleagues’ questionnaires, they will with high reliability respond to these items in ways that suggest that they consider individualism and communitarianism as opposites and hierarchy and egalitarianism as opposites. This finding does not invalidate CT. To the contrary, it shows that the US public thinks about social relations in ways predicted by CT because communitarianism and
hierarchy, respectively, have good face and content validity with respect to high group and high grid in CT. And, moreover, it shows that the US public thinks that one manifestation of low group is individualism and one manifestation of low grid is egalitarianism. Again, this is consistent with CT.

The deficiencies in face and content validity lie with CCT. Had Kahan and colleagues included items in their surveys that measured the other theoretically expected manifestation of low group (fatalism) and the other such manifestation of low grid (individualism) in ways that applied to both low group patterns of relations (i.e. to both fatalism and individualism) and to both low grid patterns of relations (i.e., to both egalitarianism and individualism), then CCT would have good face and content validity with CT. As things stand, however, CCT does not have good face and content validity with respect to CT for the reasons given.

Another way to state the way CCT falls short of achieving good face and content validity with respect to CT is to say that it restricts the range of variation in responses from the perspective of CT, by not providing items in its surveys that measure both sets of opposites of hierarchy and communitarianism. When researchers do this, as Kahan and colleagues have done with their refinements of the Dake and Wildavsky worldview scales, they are able to achieve a Cronbach’s alpha of .60 (Ripberger, Jenkins-Smith, and Herron 2011). This suggests that when the public is allowed to express more variation in its worldviews than permitted by Kahan and colleagues’ measures, the public does so. The lower but still acceptable Cronbach’s alpha score in Jenkins-Smith and colleagues’ surveys suggests that the when the public is confronted with a greater palette of items than in CCT surveys, it struggles more to respond in ways that are consistent with CT, but that it nevertheless does so, validating CT. Thus, the refined relational/worldview measures of Jenkins-Smith and colleagues are, from the perspective of face and content validity with respect to CT, preferable to the CCT measures; the former have good face and content validity and acceptable scale reliability, while the latter have poor face and content validity and achieve higher scale reliability by restricting the range of variation predicted by CT in their CCT survey items.
While the new measures developed by Jenkins-Smith and collaborators, Kahan and collaborators, and Maesschalk, Ripberger, Swedlow, and collaborators are also lacking in face and content validity in that they do not measure most of the components of CT, they improve on the worldview measures in that they at least measure one or two components with good face and content validity. All of these new measures are promising efforts to operationalize the social relations of CT. One of the approaches also tries to measure values.

Jenkins-Smith and collaborators seek to measures social relations with statements describing four patterns of social relations, which respondents are asked to rate and rank. The ranking approach in particular has good face and content validity because it mimics the comparison of relational patterns that CT claims occurs in real life. In all cases, however, the statements are not pure measures of the relational component, because they contain statements of worldviews. However, because the relational component dominates in these measures and aspects of cultural bias dominant in the worldview measures used to assess convergence and because convergence occurs, these measures serve as decent tests and validations of the core hypothesis of CT that relations of particular kinds will be related to cultural biases of particular kinds.

Kahan and collaborators solve the confounding problem found in Jenkins-Smith’s measures by separating items that measure relations from those that measure worldviews. They also separate items measuring preferences for relations from items measuring experiences with relations, providing high face and content validity for the components of the core hypothesis of CT. The further fact that they have put the items in scales on two dimensions also is promising on its face. Moreover, the high correlation of a number of these items in the scales goes a significant way toward validating CT. Unfortunately, the good news ends here because the dimensions of their scales do not correspond well to the dimensions in CT, thus lacking face validity and creating problems for content validity because the types generated are either hybrids of CT types or dispense with a CT type (fatalists).
The measures of organizational relations developed by Maesschalck and collaborators also have good face and content validity with respect to the four organizational patterns generated by grid and group, although the four patterns are measured independently rather than along dimensions corresponding to grid and group. Meanwhile, the relational measures developed by Ripberger, Swedlow, and collaborators do seek to operationalize them as the dimensions of grid and group, and so have very good face and content validity. The relational measures of Maesschalck, Ripberger, Swedlow, and collaborators also have good face and content validity in that they are pure measures of the relational components, not mixed with other components, or a dollop of worldviews.

**Summary, Conclusion, and Suggested Use of Measures and Further Research**

This paper has assessed the validity of different approaches to operationalizing CT in survey research. The face, content, convergent, and predictive validity of four different approaches have been assessed: (1) the worldview measures of Dake and Wildavsky, (2) the relational measures of Jenkins-Smith and collaborators, (3) the relational “cultural cognition” measures of Kahan and collaborators, and the (4) relational grid-group measures of Maesschalck, Ripberger, Swedlow, and collaborators.

Using the cultural theory (CT) developed by Douglas, Wildavsky, and others as expressed in the seminal refinement of the theory in *Cultural Theory* (Thompson, Ellis, and Wildavsky 1990), aka TEW, the face and content validity of the worldview measures developed by Dake and Wildavsky was found to be poor because worldviews do not correspond very well to any element of CT. The dimensions along which these measures are assessed do not correspond to the grid-group dimensions of CT, and worldviews do not measure the patterns of relations, values, myths of nature, constructs of human nature, ways of economizing, or preferences regarding constructs of blame, envy, economic growth, scarcity, risk, or apathy. Nor do these measures operationalize the functional relations hypothesized between relations and cultural biases either within cultures or between them. Nor do they operationalize CT’s theory that cultural surprises cause cultural change. Nor are these measures designed to allow clear tests of CT’s theory of the
individual and the cultural consistency versus cultural mobility hypotheses, although they do permit some limited inferences to be made.

By contrast, the new relational measures of Jenkins-Smith and collaborators, Kahan and collaborators, and Maesschalck, Ripberger, Swedlow, and collaborators, while not having good face or content validity with respect to all the elements of CT, do exhibit very good face and content validity with respect to relational patterns hypothesized by CT. The Jenkins-Smith measures use ranking and rating methods to assess respondents’ experience of relational patterns. The ranking methods mimic the way CT hypothesizes that respondents choose among relational patterns and ways of life, adding further to their face and content validity. But the Jenkins-Smith and collaborator relational measures unevenly combine relational measures of preference and experience and worldviews and so are not pure measures of the relational element in CT. Meanwhile, the relational measures developed by Kahan and collaborators and by Ripberger, Swedlow, and collaborators, achieve still greater face and content validity – the former by having separate items measuring preferences for and experiences with relations; the latter by seeking to measure relations on the grid-group dimensions of the theory and are pure measures of relations.

While the Dake and Wildavsky worldview measures lack face and content validity as operationalizations of CT, they can continue to be used as valid proxies for cultural biases because the new relational measures developed by Jenkins-Smith and collaborators converge on them and because the Dake and Wildavsky worldview measures also predict policy preferences that are consistent with the cultural biases hypothesized by CT. That is, even though the Dake and Wildavsky worldview measures lack face and content validity, they perform like cultural bias measures would be expected to perform and so are valid proxies for cultural biases.

However, while continued use of the worldview measures is possible and interpretable, we would advise phasing them out and instead substituting for them measures of the elements of CT that have good face and content validity. The new relational measures of Jenkins-Smith and colleagues are currently the
most tested of the face and content valid measures we have of any CT component. If they perform as well without the dollop of worldviews, they should be used to operationalize CT until even better relational measures can be developed. The relational measures of Kahan and colleagues are also very promising in this regard, although lacking measures of fatalism, and although currently analyzed as part of dimensions that lack good face and content validity with respect to CT.

The relational measures of Maesschalck, Ripberger, and Swedlow, particularly to the extent they operationalize the grid-group dimensions, appear to be especially promising. The Ripberger, Swedlow, and colleagues’ measures not only operationalize grid-group but do so across different domains, and so achieve even greater face and content validity. We should also note that their “neither agree nor disagree” response option, positioned at the midpoint of their scales, appears to be a good operationalization of the hermit’s attitude of disengagement from social life. If these grid-group measures are validated in future studies, they or their progeny could become standard measures of the grid-dimensions and relational patterns in CT.

Going forward, researchers wishing to operationalize CT in survey research should seek to develop measures of cultural bias that have good face and content validity. Existing efforts to operationalize values, such as the value trade-off measures already developed by others (Duerk 2012; Jacoby 2012; Jacoby and Sniderman 2006; Swedlow 2008; Swedlow and Wyckoff 2009), look highly promising. Existing efforts to operationalize CT’s myths of nature, as in this paper (or in Grendstad; Steg and Sievers 2000), and different preferences for risk or perceptions of risk (Kahan 2012; Lachapelle, Montpetit, and Gauvin 2014; Ripberger, Herron, and Jenkins-Smith 2011; Ripberger, Gupta, Silva, and Jenkins-Smith 2014), also appear promising.

However, efforts need to be made to operationalize CT’s constructs of human nature and ways of economizing in surveys, as well as the preferences for different constructs of blame, envy, economic growth, scarcity, and apathy. More, to operationalize CT fully in survey research, one would need to
find a way to measure cultural surprise and cultural change, as well as within-culture and between-culture
functionalism, and whether individuals tend toward cultural consistency or cultural mobility.

A variety of survey modalities could be used to operationalize CT for survey research in these latter
areas where it has not yet been used in surveys. For example, panel surveys could be used to measure
stability and change in cultural orientations. To the extent that events occurred during the administration of
panels with CT measures that fit the definition of cultural surprises, one could examine the extent to which
these surprises affected respondents with different cultural orientations in expected ways. Panel surveys
interrupted by such cultural surprises would in effect be natural experiments. In general, experimental
research designs could be exploited to study the hypothesized effects of cultural change, with treatment
groups being exposed to cultural surprises and control groups not being exposed to them.

Panel surveys and experiments could also be used to study tendencies toward cultural consistency
versus so-called cultural mobility. Panel surveys that asked about experiences with relations in different
settings – e.g., in the family, at work, or in national, state, and local politics – over time as well about
cultural biases in these different settings over time could determine the extent to which respondents were
living in different patterns with different justifications in different places and times in their lives. This in turn
would allow one to determine whether these respondents acted in culturally consistent ways across
settings and across time or whether their cultural orientations changed with the relations of the setting.
Experiments could manipulate cultural settings to see how much this changed the cultural orientations of
treatment groups as compared to controls.

Initial studies should focus on assessing predicted relationships between relations and cultural
biases based on a within-culture conception of these relationships being functional for each other. For
example, CT predicts that people in high group, low grid settings will value equality because valuing
equality is functional for people in this pattern of relations. But people in such egalitarian cultural settings
may also benefit from the presence of people with individualistic, hierarchical, and/or fatalistic cultural
orientations. In fact, CT predicts the existence of this second-order, between-culture functionalism. So, one way to test if necessary conditions are present for between-culture functionalism would be to measure through surveys the extent to which all cultural orientations are present in the survey population. Surveys could also be used to measure the extent to which respondents of one cultural orientation reported benefiting from the “cultural services” provided by those of another cultural orientation. For example, egalitarians may report that clashes with individualists and hierarchs are significant parts of their lives. They may experience these clashes as horrific and attach no value to them consciously, but, for the analyst, the existence of such clashes would conform to CT predictions that the CT types need the other cultures to help define themselves against. Some egalitarian respondents may recognize the function that these clashes play in creating and maintaining solidarity (high group cohesion or boundaries) for egalitarians, others may not recognize this. For the form of functional explanation to which CT subscribes, it does not matter whether the functionalism is explicit and recognized or latent and unrecognized, or if respondents who recognize the functionalism are consciously choosing to do the behavior that is functional or not. It is just important that the functional relationship exists.

The general point here is that surveys, including panel surveys and experiments embedded in surveys, are research modalities that can and should be used to operationalize and test CT. Dake and Wildavsky’s operationalization of CT as worldviews measured on separate scales for each cultural type as further refined by others has been an important initial effort to operationalize CT in survey research (despite lacking in face and content validity) because the best of these worldview measures predict other attitudes as expected. Current efforts that have shifted more to measuring the relations of CT exhibit good face and content validity with respect to operationalizing relations in CT, converge on the worldview measures, and predict other attitudes successfully. These measures may be sufficient for those who are only interested in predicting attitudes or behavior from relations. However, for those interested in further testing the core claims of CT about correlation between relations and cultural biases, including values and beliefs about
nature and human nature, they will want to push on to operationalize the values in CT and beliefs in CT and investigate whether these are correlated with relations as hypothesized. This is where further efforts to operationalize and test CT in survey research should focus now.

In conclusion, it should be noted that there are studies in addition to those that have been the focus here that can provide resources for those interested in operationalizing CT for survey research. One kind of study that could be helpful are efforts to identify items in existing surveys and to use them and the results of those surveys to operationalize CT. For example, some scholars have used items and results from the General Social Survey (Boyle and Coughlin 1994; Lockhart and Coughlin 1992) or World Values Survey (Grendstad and Selle 1997, 1999; Lockhart 2011; Lockhart and Giles-Sims 2010), or the GLOBE project (Maleki and Hendriks 2015) to operationalize CT. Others use the World Values Survey items in their own original surveys to operationalize CT (e.g. Chai et al. 2011). These studies will be particularly useful for researchers wishing to compare research programs on culture, social and political relations, and value and belief structure and for researchers lacking the resources to field their own surveys.

References


Jackson, Natalie M. 2014. “A Theory of Preference Formation Among Ideologues and Nonideologues.” Social Science Quarterly (96)1:


Figure 1. The Relationship between Social Relations and Cultural Biases in Cultural Theory

Experience with > Preferences for > Cultural Biases > Attitudes & Social Relations Social Relations (Values & Beliefs) Behaviors

Figure 2. Cultural Theory’s Grid and Group Dimensions of Social Relations and Resulting Cultural Types

Figure 3. Cultural Cognition Theory’s Dimensions
**Figure 4:** Distribution of cultural worldviews in our sample by approach to measurement; E = egalitarianism, F = fatalism, H = hierarchy, and I = individualism.

**Figure 5:** Estimates from ANOVA models that compare mean scores on the traditional 3-item worldview indices across groups of respondents that categorized themselves into cultural types by indicating the worldview statement that they agree with the most.
**Figure 6:** Estimates from OLS models that regress the traditional 3-item worldview indices on the rating that respondents assigned to the worldview statements.

![Graphs showing estimated coefficients for 3-item indices](image1.png)

**Figure 7:** Estimates from ANOVA models that compare mean scores on the Fragility of Nature, Trust in Government, and State of the Environment indicators across groups of respondents that categorized themselves into cultural types by indicating the worldview statement that they agree with the most.

![Graphs showing mean scores across cultural types](image2.png)
Figure 8: Estimates from OLS models that regress the traditional 3-item worldview indices and the rating that respondents assigned to the worldview statements on the Fragility of Nature, Trust in Government, and State of the Environment indicators.
Table 1 Preferences for Constructs of Blame, Envy, Economic Growth, Scarcity, Risk, and Apathy

[to be added]
Table 2 Worldview Measures of Dake and Wildavsky

**Hierarchy**
- I support greater military preparedness.
- I’m for my country, right or wrong.*
- I think I am stricter about right and wrong than most people.*
- The police should have the right to listen in on private telephone conversations when investigating crime.*
- The increased efficiency brought about by centralization of production is one of the things that makes this country great.
- The law is the true embodiment of eternal justice.
- There is very little discipline in today’s youth.*
- Compulsory military training in peace-time is essential for the survival of this country.

**Individualism**
- I support less government regulation of business.*
- Continued economic growth is the key to improved “quality of life”—living space for privacy, adequate food, leisure time available from work, education, income for comfortable retirement, and adequate medical care.*
- If a man has the vision and the ability to acquire property, he ought to be allowed to enjoy it himself.*
- Private profit is the main motive for hard work.*
- In this country, the most able rise to the top.
- The “welfare state” tends to destroy individual initiative.*
- Democracy depends fundamentally on the existence of free business enterprise.*
- It is just as well that the struggle of life tends to weed out those who cannot stand the pace.

**Egalitarianism**
- I support intensified federal efforts to eliminate poverty.*
- I support a tax shift so that burden falls more heavily on corporations and persons with large incomes.*
- The human goals of sharing and brotherhood are being hindered by current big institutions and technological growth.*
- What this world needs is a “fairness revolution” to make the distribution of goods more equal.
- Much of the conflict in this world could be eliminated if we had more equal distribution of resources among nations.*
- U.S. interference in foreign affairs is a very serious problem in society today.
- Misuse of scientific and expert knowledge is a very serious problem in society today.*
- Racial injustice is a very serious problem in society today.

**Fatalism**
- There is no use in doing things for people—you only get it in the neck in the long run.
- Cooperating with others rarely works.
- The future is too uncertain for a person to make serious plans.
- I have often been treated unfairly.
- A person is better off if he or she doesn’t trust anyone.

* These items appeared in Wildavsky and Dake (1990), as discussed in this paper.
Table 3 Relational and Worldview Measures of Jenkins-Smith and collaborators

Note: To date, Jenkins-Smith and his collaborators have used these statements in two different types of survey question. First, they employ a battery of questions that simply ask respondents to rate the degree to which each one of these statements describes their outlook on life (using a scale from zero to ten, where zero means not at all and ten means completely). Second, they ask the respondents to rank all four statements in descending order, starting with the one in which they most agree to the one with which they least agree. After that, they offer respondents a second chance to rate each statement.

1. Hierarch Statement: I am more comfortable when I know who is, and who is not, a part of my group, and loyalty to the group is important to me. I prefer to know who is in charge and to have clear rules and procedures; those who are in charge should punish those who break the rules. I like to have my responsibilities clearly defined, and I believe people should be rewarded based on the position they hold and their competence. Most of the time, I trust those with authority and expertise to do what is right for society.

2. Individualist Statement: Groups are not all that important to me. I prefer to make my own way in life without having to follow other peoples’ rules. Rewards in life should be based on initiative, skill, and hard work, even if that results in inequality. I respect people based on what they do, not the positions or titles they hold. I like relationships that are based on negotiated “give and take,” rather than on status. Everyone benefits when individuals are allowed to compete.

3. Egalitarian Statement: Much of society today is unfair and corrupt, and my most important contributions are made as a member of a group that promotes justice and equality. Within my group, everyone should play an equal role without differences in rank or authority. It is easy to lose track of what is important, so I have to keep a close eye on the actions of my group. It is not enough to provide equal opportunities; we also have to try to make outcomes more equal.

4. Fatalist Statement: Life is unpredictable and I have little control. I have to live by lots of rules, but I don’t get to make them. My fate in life is determined mostly by chance. I can’t become a member of the groups that make most of the important decisions affecting me. Getting along in life is largely a matter of doing the best I can with what comes my way, so I focus on taking care of myself and the people closest to me.
Table 4 Worldview Measures of Dake and Wildavsky as further developed by Jenkins-Smith and collaborators; used to assess convergent validity

**Hierarchy**
Society should be much better off if the people in charge imposed strict and swift punishment on those who break the rules.
Society is in trouble because people do not obey those in authority.
The best way to get ahead in life is to work hard to do what you are told to do.

**Individualism**
We are all better off when we compete as individuals.
Even the disadvantaged should have to make their own way in the world.
Even if some people are at a disadvantage, it is best for society to let people succeed or fail on their own.

**Egalitarianism**
Society works best if power is shared equally.
What society needs is a fairness revolution to make the distribution of goods more equal.
It is our responsibility to reduce differences in income between the rich and the poor.

**Fatalism**
No matter how hard we try, the course of our lives is largely determined by forces beyond our control.
For the most part, succeeding in life is a matter of chance.*
The most important things that take place in life happen by chance.

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*This item has been replaced in more recent surveys (e.g., Jones 2011) by: “It would be pointless to make serious plans in such an uncertain world.”
Table 5 Worldview “Cultural Cognition” Measures of Kahan and collaborators

Hierarch-Egalitarianism Scale Items
It seems like the criminals and welfare cheats get all the breaks, while the average citizen picks up the tab.
We have gone too far in pushing equal rights in this country.*
Society as a whole has become too soft and feminine.*
Nowadays it seems like there is just as much discrimination against whites as there is against blacks.
It seems like blacks, women, homosexuals and other groups don’t want equal rights, they want special
rights just for them.*
A lot of problems in our society today come from the decline in the traditional family, where the man works
and the woman stays home.
The women’s rights movement has gone too far.
Discrimination against minorities is still a very serious problem in our society.*
It’s old-fashioned and wrong to think that one culture’s set of values is better than any other culture’s way of
seeing the world.
We need to dramatically reduce inequalities between the rich and the poor, whites and people of color, and
men and women.*
Parents should encourage young boys to be more sensitive and less “rough and tough.”
Our society would be better off if the distribution of wealth was more equal.*
We live in a sexist society that is fundamentally set up to discriminate against women.

Individualism-Solidarism Scale Items
People who are successful in business have a right to enjoy their wealth as they see fit.
If the government spent less time trying to fix everyone’s problems, we’d all be a lot better off.
Government regulations are almost always a waste of everyone’s time and money.
The government interferes far too much in our everyday lives.
Free markets—not government programs—are the best way to supply people with the things they need.
Too many people today expect society to do things for them that they should be doing for themselves.
It’s a mistake to ask society to help every person in need.
The government should stop telling people how to live their lives.*
Private profit is the main motive for hard work.
It’s not the government’s business to try to protect people from themselves.*
Society works best when it lets individuals take responsibility for their own lives without telling them what to
do.
Our government tries to do too many things for too many people. We should just let people take care of
themselves.
Sometimes government needs to make laws that keep people from hurting themselves.*
Government should put limits on the choices individuals can make so they don’t get in the way of what’s
good for society.*
It’s society’s responsibility to make sure everyone’s basic needs are met.
The government should do more to advance society’s goals, even if that means limiting the freedom and
choices of individuals.*
People should be able to rely on the government for help when they need it.

* Denotes items used on “short-form” versions of this survey, with the exception of a new item measuring
Individualism: IINRSTS [put item here].
Table 6 Grid-Group Relational Measures of Ripberger, Swedlow, and collaborators

<table>
<thead>
<tr>
<th>Grid</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>In my family, the people in charge decide what we do and how and when we do it; everyone else follows along.</td>
<td>In my family, we try to advance family goals rather than the goals of individual family members.</td>
</tr>
<tr>
<td>At my current (or most recent) place of work, managers encourage employees to make their own rules, schedules, and decisions.</td>
<td>At my current (or most recent) place of work, individuals pursue their own aspirations rather than the aspirations of the organization as a whole.</td>
</tr>
<tr>
<td>In the U.S., residents have little influence on governmental action; instead, governmental officials or other powerful people decide what government does.</td>
<td>In the U.S., governmental officials and other powerful people try to serve the common good rather than the interests of a few.</td>
</tr>
</tbody>
</table>
Appendix 1 Model Results

Estimates from ANOVA models that compare mean scores on the traditional 3-item worldview indices across groups of respondents that categorized themselves into cultural types by indicating the worldview statement that they agree with the most.

<table>
<thead>
<tr>
<th></th>
<th>Egalitarianism</th>
<th>Individualism</th>
<th>Hierarchy</th>
<th>Fatalism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatalist-Egalitarian</td>
<td>-0.43</td>
<td>&lt; 0.01</td>
<td>0.19</td>
<td>0.01</td>
</tr>
<tr>
<td>Hierarch-Egalitarian</td>
<td>-0.63</td>
<td>&lt; 0.01</td>
<td>0.31</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Individualist-Egalitarian</td>
<td>-1.13</td>
<td>&lt; 0.01</td>
<td>0.54</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Hierarch-Fatalist</td>
<td>-0.2</td>
<td>0.01</td>
<td>0.12</td>
<td>0.13</td>
</tr>
<tr>
<td>Individualist-Fatalist</td>
<td>-0.7</td>
<td>&lt; 0.01</td>
<td>0.35</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Individualist-Hierarch</td>
<td>-0.5</td>
<td>&lt; 0.01</td>
<td>0.23</td>
<td>&lt; 0.01</td>
</tr>
</tbody>
</table>

Estimates from OLS models that regress the traditional 3-item worldview indices on the rating that respondents assigned to the worldview statements.

<table>
<thead>
<tr>
<th></th>
<th>Egalitarianism</th>
<th>Individualism</th>
<th>Hierarchy</th>
<th>Fatalism</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef</td>
<td>Std. Error</td>
<td>Coef</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Fatalism</td>
<td>0.05</td>
<td>0.01</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Hierarchy</td>
<td>0.00</td>
<td>0.01</td>
<td>0.09</td>
<td>0.01</td>
</tr>
<tr>
<td>Individualism</td>
<td>-0.07</td>
<td>0.01</td>
<td>0.15</td>
<td>0.01</td>
</tr>
<tr>
<td>Egalitarianism</td>
<td>0.27</td>
<td>0.01</td>
<td>-0.08</td>
<td>0.01</td>
</tr>
<tr>
<td>Intercept</td>
<td>3.15</td>
<td>0.07</td>
<td>3.15</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Estimates from ANOVA models that compare mean scores on the Fragility of Nature, Trust in Government, and State of the Environment indicators across groups of respondents that categorized themselves into cultural types by indicating the worldview statement that they agree with the most.

<table>
<thead>
<tr>
<th></th>
<th>Fragility of Nature</th>
<th>Trust in Government</th>
<th>Climate Change Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difference</td>
<td>Adj. P-Value</td>
<td>Difference</td>
</tr>
<tr>
<td>Fatalist-Egalitarian</td>
<td>0.43</td>
<td>&lt; 0.01</td>
<td>0.16</td>
</tr>
<tr>
<td>Hierarch-Egalitarian</td>
<td>0.44</td>
<td>&lt; 0.01</td>
<td>0.63</td>
</tr>
<tr>
<td>Individualist-Egalitarian</td>
<td>0.97</td>
<td>&lt; 0.01</td>
<td>-0.38</td>
</tr>
<tr>
<td>Hierarch-Fatalist</td>
<td>0.01</td>
<td>1</td>
<td>0.48</td>
</tr>
<tr>
<td>Individualist-Fatalist</td>
<td>0.54</td>
<td>&lt; 0.01</td>
<td>-0.53</td>
</tr>
</tbody>
</table>
Estimates from OLS models that regress the traditional 3-item worldview indices and the rating that respondents assigned to the worldview statements on the Fragility of Nature, Trust in Government, and State of the Environment indicators.

<table>
<thead>
<tr>
<th></th>
<th>Fragility of Nature</th>
<th>Trust in Government</th>
<th>Climate Change Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egalitarianism</td>
<td>0.737</td>
<td>0.677</td>
<td>0.158</td>
</tr>
<tr>
<td>Individualism</td>
<td>-0.431</td>
<td>-0.225</td>
<td>-0.06</td>
</tr>
<tr>
<td>Hierarchy</td>
<td>0.117</td>
<td>-0.02</td>
<td>0.157</td>
</tr>
<tr>
<td>Fatalism</td>
<td>0.054</td>
<td>-0.048</td>
<td>0.072</td>
</tr>
<tr>
<td>Intercept</td>
<td>6.092</td>
<td>6.102</td>
<td>-0.007</td>
</tr>
</tbody>
</table>
Appendix 2 Grid-Group Organizational Culture Measures of Maesschalck and collaborators

Hierarchy
In my organization, when employees break the rules there is an extensive inquiry about what happened and why.
My organization emphasises clear lines of accountability.
My organization believes success depends on a clear and authoritative system of rules being in place and respected.
In my organization not behaving according to one’s status or role in the organization is not tolerated.
In my organization, it is expected that clients follow proper procedures.
In my organization, the relationships we have with other organizations are based on rules and operating procedures which are proscribed for that organization.
The glue that holds this organization together consists of a sense of duty and respect for the distinct roles of each of the professions and tiers of management.

Individualism
In my organization, employees are promoted on the basis of individual performance.
In my organization, when employees break the rules a mix of incentives and sanctions is used in order to prevent it in the future.
The top executive of my organization emphasizes that it is important to evaluate every employee’s performance individually.
My organization defines success on the basis of good individual performance.
In my organization promotions that are given on the basis of tenure alone are resented.
In my organization, we consider the relationship between clients and professionals important.
The glue that holds this organization together is the fact that it is useful for everybody to work together in the same organization.

Egalitarianism
In my organization the shared opinion of the staff is taken into account when promotions are given.
The top executive of my organization emphasizes consensus on all levels of the organization.
My organization emphasises teams within which all members are equally important.
My organization defines success as promoting the organization’s values.
In my organization decisions are made by consensus.
In my organization exploiting one’s personal power or influence, or ‘pulling rank’ is not tolerated.
The glue that holds this organization together are shared values and commitment to our common principles.

Fatalism
In my organization, short-term thinking often compromises the long-term vision.
It is difficult to know what is important for the top executive of my organization.
My organization is characterised by the fact that we constantly have to react to things over which we have no control.
My organization defines success on the basis of dealing with each months or years problems as they come.
In my organization, clients have to satisfied with what they get.
In my organization, we deal with other organizations only when it is necessary, otherwise there is no reason to.
There is nothing holding this organization together and binding its members to one another except for the fact that the law or the management has decided that this organization should exist.
Appendix 3 Grid-Group Relational and Value-trade-off Measures of Swedlow (see Duerk 2012)

Social and Political Relations Questions

**Household Decision-making**
Instructions: Please think about households of which you have been a part, even if only for a brief time, beginning with your childhood. Please list members of each household and the amount of time you were a part of that household on one line.

Note: Only fill in as many boxes as necessary. So, if you only lived in four households, then only use four lines. If you lived in eight, then please use eight.

Example:
Married biological parents (3 kids) 10 years
Mother (divorced but got custody) 4 years
Mother and Stepdad (still 3 kids) 4 years
Room-mate 1 year
Girlfriend .5 years
Single, no kids 5 years
First marriage, no kids 1 year
Second marriage, 2 kids 10 year

1) ________________________ ______

…..

20) ________________________ ______

Instructions: For each household listed above (1 through however many you shared), please indicate below which pattern of decision-making was/is most common in that household.

Don’t worry if you don’t use all twenty rows (i.e. households). Remember, if you only had eight households, then you will only indicate eight patterns of decision-making.

In this household, important decisions were made by…

<table>
<thead>
<tr>
<th>Pattern of Decision-Making</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>The same adult on most matters</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The adults together and equally</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The adults and kids together and equally</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Each person individually for themselves</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No one; things just happen(ed)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Don't know</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ideally, important decisions in a household should be made by:

a. The same adult on most matters
b. The adults together and equally
c. The adults and kids together and equally
d. Each person individually for themselves
e. No one; things should just be allowed to happen
f. Don't know

**Decision-making at Work**

Instructions: Please think about your work history, and list all jobs here, even
those of short duration, beginning with the most recent and working your way back in time. Distinct jobs for these purposes include doing different kinds of work for the same employer or the same kinds of work for different employers. If you only had four jobs, then only use four lines. If you have had eight, then use eight lines.

Job type (Please describe briefly) Duration (years)

Example:
Assistant Manager, Local Market 5 years
205
Checker, Local Market 2 years
Clerk, Convenience Store 2 years
Sales Associate, Retail Clothing 4 years
Waitress, Family Restaurant 2 years
1) ______________________ ______
....
20) ______________________ ______

Instructions: For each job listed above, please indicate below which pattern of decision-making was/is most common for that job. Remember, if you only had eight jobs, then only provide information for eight jobs. For this job, important decisions were made by…

1 2 3 4 5 6 7 8 9 10

My boss(es)  _ _ _ _ _ _ _ _ _ _
Me  _ _ _ _ _ _ _ _ _ _
Each person individually for themselves  _ _ _ _ _ _ _ _ _ _
Everyone together, equally  _ _ _ _ _ _ _ _ _ _
No one; things just happen(ed)  _ _ _ _ _ _ _ _ _ _
Don’t know  _ _ _ _ _ _ _ _ _ _

Ideally, important decisions on the job should be made by:

a. My boss(es)
b. Me
c. Each person individually for themselves
d. Everyone together, equally
e. No one; things should just happen
f. Don’t know

**Political Decision-making**

Instructions: Please think about the contemporary United States, and please indicate below which pattern of decision-making you believe to be most common these days.

In the United States, important decisions are made by…

a. Only a few people, organizations, or institutions
b. Almost all people, organizations, or institutions
c. Each individual in their private lives
d. Others, but not me
e. Don’t know
Ideally, important decisions in the United States should be made by...

a. Only a few people, organizations, or institutions
b. Almost all people, organizations, or institutions
c. Each individual in their private lives
d. Others, but not me
e. Don’t know

Instructions: Please use the following descriptions to characterize the distribution of power in the United States.

In the United States, power is:

a. Concentrated in a few hands
b. Widely distributed and equally shared
c. Exercised by individuals in their private lives
d. Arbitrarily distributed and exercised
e. Don’t know

Ideally, in the United States, power should be:

a. Concentrated in a few hands
b. Widely distributed and equally shared
c. Exercised by individuals in their private lives
d. Arbitrarily distributed and exercised
e. Don’t know

Value Trade-off Questions

Directions: Please read the following before you answer the questions on this page.

Liberty, equality, order, and luck are all important values, but sometimes we have to choose between what is more important and what is less important.

By LIBERTY I mean a guarantee of the widest freedom possible for everyone to act and think as they consider most appropriate.
By EQUALITY I mean narrowing the gap in wealth and power between the rich and poor.
By ORDER I mean being able to live in a structured and peaceful society where the laws are respected and enforced.
By LUCK I mean hoping for the best outcomes under existing circumstances and leaving everything to chance.

In your opinion, as things stand right now, which should be the more important value for our country?

a. Liberty
b. Equality

In your opinion, as things stand right now, which should be the more important value for our country?

a. Liberty
b. Order

In your opinion, as things stand right now, which should be the more important value for our country?
   a. Liberty
   b. Luck

In your opinion, as things stand right now, which should be the more important value for our country?
   a. Equality
   b. Order

In your opinion, as things stand right now, which should be the more important value for our country?
   a. Equality
   b. Luck

In your opinion, as things stand right now, which should be the more important value for our country?
   a. Order
   b. Luck
As we will discuss, no effort to operationalize CT in survey research has so far tried to identify hermits and they are often excluded from non-survey uses of CT as well. Nevertheless, they are included in TEW and so are included here. In discussing directions for further research, we suggest a way to operationalize their withdrawal from social relations and their accompanying lack of cultural biases in survey research.

For a survey of the psychological mechanisms that complement and reinforce the social ones producing these cultural dynamics, see Kahan 2012.

As Gary King, Robert O. Keohane, and Sidney Verba elaborate, “Good social science seeks to increase the significance of what is explained relative to the information used in the explanation. If we can accurately explain what at first appears to be a complicated effect with a single causal variable or a few variables, the leverage we have over a problem is very high. Conversely, if we can explain many effects on the basis of one or a few variables we also have high leverage” (King, Keohane, & Verba, 1994, 29; italics in original).

See Figure 4 in Thompson et al 1990, 71, for a typology of cultural changes; see also Wildavsky 1985 and Lockhart 1997.


The two types of criterion-related validity not assessed here are 2c) concurrent validity and 2d) discriminant validity. “In concurrent validity, we assess the operationalization’s ability to distinguish between groups that it should theoretically be able to distinguish between.” “In discriminant validity, we examine the degree to which the operationalization is not similar to (diverges from) other operationalizations that it theoretically should be not be similar to.”
One issue that has not been fully developed in CT is whether more specific, concrete constructs, such as these, should be considered part of a culture or way of life for theoretical purposes, as they were in TEW, or whether only more general, abstract constructs, such as those about nature or human nature, should be accorded that status. If even the most specific, concrete constructs and attitudes are endogenous to culture, then culture a) becomes increasingly difficult to predict because the more highly specific and concrete constructs and attitudes are, the more localized and historically contingent they are likely to be and b) becomes increasingly unable to predict anything, because there is very little that would be left exogenous to culture to predict. Perhaps one way to prevent these apparent paradoxes from arising is to recall that for purposes of operationalizing CT for survey research, we are operationalizing specific elements of culture, not culture itself. Thus, as survey researchers, we are operationalizing relations, values, and beliefs, and trying to assess correlations among them, at various levels of generality and specificity, abstractness and concreteness.