AN IPSATIVE APPROACH TO NORM CRYSTALLIZATION

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Abstract

The structural characteristics of norms have prompted a considerable amount of research. One of these characteristics, norm crystallization, has received comparatively little attention in the literature. This paper proposes an ipsative form of norm crystallization and presents results from a wildland fire policy study to illustrate the approach. The results highlight the utility of continued work on the ipsative crystallization measure in terms of both methodology and application for natural resource management decision-making.

1.0 Introduction and Background

Public acceptance of natural resource policies is often driven by what individuals or society believes is appropriate for a given context (Shelby et al. 1996). Norm theory offers a paradigm for understanding why the public judges management actions as acceptable or unacceptable. Over the past two decades, at least 75 studies have applied norm theory to natural resource management issues (see Donnelly et al. 2000; Manning 1999; Shelby et al. 1996; Vaske & Donnelly 2002 for reviews). In these studies, norms are defined as evaluative standards regarding acceptable behaviors or conditions in a given context (Vaske & Whittaker 2004). Such evaluative standards can refer to either individual or institutional (e.g., an agency's policy regarding fire management) behaviors.

1.1 Characteristics of Norms

Norms have been analyzed for various structural characteristics: 1) the range of acceptable management actions; 2) intensity or strength of the norm; and 3) level of agreement or norm crystallization. Most empirical attention has concentrated on measures of central tendency (e.g., means, medians) when describing the intensity of a group norm (e.g., the average evaluation made by individuals within a group or subgroups). Normative agreement can refer to variations in a group's evaluations and is typically calculated using the standard deviation, coefficient of variation, or percentage of respondents rating a particular situation as acceptable or unacceptable. A high level of agreement (high norm crystallization) for a given situation indicates a high level of acceptability (or unacceptability) for a proposed action (e.g., management policy). Lower levels of agreement (low norm crystallization) signal potential conflict. Most studies have emphasized differences between groups and implied similarity/consistency within individuals. Less attention has focused on the extent to which variation exists within an individual's normative responses.

Examination of response variability for an individual necessitates repeated measures across a series of situations that vary on dimensions considered important to managers or researchers. Researchers (Kneeshaw et al. 2004a, 2004b), for example, have examined the acceptability of different wildfire management actions (e.g., contain or totally suppress a wildfire) under different conditions (e.g., human versus lightening caused) and levels of human impact (e.g., damage to private property, impact on air quality). Similarly, researchers (Wittmann et al. 1998; Zinn et al. 1998) have asked respondents to evaluate different wildlife species (e.g., beaver, coyote, mountain lion), the actions of the animal (e.g., ate vegetation, killed a pet, injured a person), and the appropriateness of actions taken by a wildlife agency (e.g., frighten the animal away, destroy the animal). Results from these investigations have primarily emphasized between-group differences using analysis techniques such as t-tests and ANOVAs. This paper focuses on the intra-individual (or ipsativity) of an individual's norms regarding wildland fire policy.

1.2 Ipsative Measurement

Between-group approaches concentrate on differences among subgroups and imply similarity or consistency within individual respondents in a group. Little attention has focused on the extent to which there is variation within each individual's normative responses. The consistency with which a group of individuals responds to different evaluation contexts does not necessarily account for the variation that exists within each individual. Some individuals may give responses that are often greater than the group mean; others consistently report evaluations below the group mean. An ipsative

approach to norm crystallization (agreement) examines these patterns of individual responses (Greenleaf 1992). That is, some variation is expected due to an individual's own personal set of beliefs, attitudes or values and their reaction to a given situation. Such variation is, by definition, ipsative, or "within the individual himself or herself," and requires some sort of repeated measure to assess.

Moreover, an intra-individual variation approach to crystallization can directly influence support for management actions. Norms that are highly ipsatively crystallized, for example, are difficult to change regardless of the amount or type of persuasion. Persuasion attempts need to account for this ipsative property of an individual's personal norm (Beaman & Vaske 1995).

Two individual (ipsative) aspects of norm responses have been noted (see Beaman & Vaske 1995 for a review). The first concerns an individual's mean level of acceptable / unacceptable ratings on a set of items. The second refers to narrow or wide swing patterns in the responses. Some people, for example, may consistently indicate that a wildfire should be suppressed regardless of the context, and express this belief as "highly acceptable" on all rating scales in the survey. The average score for these individuals is expected to be greater than the group mean. Others may hold their beliefs toward management actions just as strongly ("highly acceptable" or "highly unacceptable"), but vary their responses depending on the specific situation. The response pattern for those who are less sure of what is an appropriate management action may only vary between "slightly acceptable" and "slightly unacceptable."

2.0 Study Objective

This paper develops an ipsative measure of norm crystallization based on each respondent's standard deviation from a set of wildland fire related questions. We then examine how this response pattern variability (low to high norm crystallization) is related to support for wildland fire management actions across demographic and geographic characteristics.

3.0 Methods

Data were obtained from a mail survey of visitors to three national forests: 1) Arapaho-Roosevelt, Colorado (n = 469); 2) Mt. Baker-Snoqualmie, Washington (n = 498); and 3) San Bernardino, California (n = 321). Respondents' evaluated eight scenarios that described the potential effects of a wildland fire. The scenarios varied the source of fire ignition (lightning vs. unintentionally caused by humans) and the effect of the fire on air quality, private property, forest recovery, and outdoor recreation. Following each scenario, three possible actions that the U.S. Forest Service might take were presented: 1) immediately put the fire out (full suppression); 2) let the fire burn, but contain it so that it does not get out of control; and 3) let the fire burn out on its own without trying to contain it. Respondents rated each of the 24 management actions (8 scenarios x 3 management actions) on a 7-point scale ranging from "highly unacceptable" (-3) through "no opinion" (0) to "highly acceptable" (3). We treated these measures as three sets of repeated ratings of the same general phenomenon (support for fire management policies). These raw scores were then transformed into a measure of each individual's standard deviation from the scenario items. Based on this variation measure, we assigned each individual to one of three groups corresponding to low, medium, or high crystallization. These three groups were then compared across the three management actions (suppression, containment, let burn), demographic indicators (age, gender, education, income, race / ethnicity), and use-related variables (forest visited).

4.0 Results

The three crystallization groups were defined based on each individual's ipsative standard deviation. These standard deviations ranged from 0 to 3.21. Because a low ipsative standard deviation equates to high crystallization, the three groups were defined as 0 - .99 = high crystallization, 1.00 - 1.99 = medium crystallization, and 2.00 - 3.21 = low crystallization.

Between 41% (let the fire burn policy) and 53% (contain the fire policy) of the respondents were in the high crystallization group (Table 1). Approximately one-third were in the medium crystallization group. The low crystallization group contained the fewest number of respondents (17% to 24%). These findings suggest that individual respondents in this sample varied on the extent to which they agree on acceptable wildland fire management policies. Because norms are context specific, such variability is expected and needs to be accounted for in analyses.

Table 1.—Crystallization groups by wildland fire policy.[1]

Policy	High	Medium	Low
Put the fire out	45	33	22
Contain the fire	53	31	17
Let the fire burn	41	36	24

[1]Cell entries are row percents

Table 2.—Overall summary statistics (p-values) for 15 norm crystallization analyses: Forest use and demographic variables for each wildland fire policy

	Norm crystallization for management policies		
	Put the fire out	Contain the fire	Let the fire burn
Forest[1]	< .001	< .001	.002
Education[2]	< .001	.002	< .001
Sex[3]	.188	.076	.023
Age[4]	.030	.013	.115
Ethnicity / race[5]	.092	.019	.062

[1]Three forests: Arapaho-Roosevelt, Colorado; Mt. Baker-Snoqualmie, Washington State; and San Bernardino, California.
[2]Three levels of education: High school diploma or less, technical degree or some college, and college degree or more.
[3]Sex: males and females.
[4]Three levels of age: 18-34, 35-54, and 55+.
[5]Ethnicity / race: Hispanic, white, other.

The three crystallization groups were compared for each management policy against forest use and demographic variables (Table 2). Ten of the 15 chi-square tests were statistically significant, suggesting that crystallization influences the relationship between forest locale, education, gender, age, ethnicity, and support for management actions. The geographic location of the forest, for example, was affected by norm crystallization for all three management policies.

To illustrate the norm crystallization relationships in Table 2, Table 3 displays the detailed results for three chi-square analyses, one for each policy variable: "put the fire out" by forest, "contain the fire" by age, and "let the fire burn" by education. The forest variable showed a range of policy support by crystallization and suggests geographic variation in crystallization effects. Respondents from San Bernardino forest were the most crystallized and visitors to Arapaho–Roosevelt Forest were the least crystallized group. Second, education revealed a distinct pattern by crystallization for "let the fire burn." Those with lower education tended to be in the high crystallization group, whereas those with the highest education were the least crystallized. Finally, the containment policy is differentiable through crystallization across age groups, with older respondents holding higher levels of crystallization.

5.0 Conclusions / Implications

This paper extends the discussion of norms by considering one ipsative form of crystallization. The ipsative standard deviations from a series of questions related to wildfire management actions identified three crystallization groups (low, medium, high). Comparing these groups against demographic and use-related variables suggested preliminary evidence for the validity of this approach.

Results revealed that an ipsative approach to crystallization facilitates understanding the patterns of responses in the data. Each of the three wildland fire policy support variables had a similar pattern of crystallization. The norm crystallization groups, however, varied in terms of their demographic profile (e.g.,

Table 3.—Sample norm crystallization distributions for three analyses

	Crystallization group[1]				
Support for…	High	Medium	Low	χ^2	p-value
"Put the fire out" by forest				16.72	.002
Arapahoe-Roosevelt	39	37	24		
Mt. Baker- Snoqualmie	46	32	22		
San Bernardino	53	27	20		
"Contain fire" by age:				12.73	.013
18 – 34	50	35	15		
35 – 54	53	28	19		
55+	56	33	11		
"Let fire burn" by education:				44.81	< .001
HS degree or less	61	28	11		
Tech degree, or some college	49	28	23		
College degree or more	34	40	26		

[1]Cell entries are percents.

education, age, gender) and the forest visited. For natural resource managers, these findings imply that norm crystallization could substantially inform their ability to persuade recreationists, homeowners, or other key stakeholders.

The data also supported continued investigation of an ipsative approach to norm crystallization. Several avenues for further research should be explored. First, our analyses concentrated on ipsative standard deviations. Equally important is consideration of the ipsative means (i.e., how strongly to individuals hold their norms toward alternative management actions). Second, we classified individuals into three crystallization groups (low, medium, high). A respondent-defined approach (e.g., cluster analysis of ipsative transformed data) is an alternative categorization procedure worthy of examination.

Overall, this study should be viewed as an initial step in broadening the understanding of norm crystallization. Our methodology and findings are suggestive rather than definitive. We encourage other researchers to explore and enhance this measurement approach and apply the technique to other natural resource and wildland fire management situations.

6.0 Citations

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