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TESTING SHIBUTANI'S PREDICTION OF INFORMATION SEEKING BEHAVIOR IN RUMOR

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Abstract

The paper tests a set of predictions regarding information seeking behavior in rumors derived from models of rumors by Shibutani and others. Data for the analysis comes from a random sample of 1,042 households in Memphis, Tennessee surveyed by the Disaster Research Center prior to December 3rd 1990 in connection with the Iben Browning prediction of an imminent massive earthquake in the New Madrid fault zone. The results support Shibutani's prediction of a positive association between the use of formal and informal sources of information; Knopf's prediction that rumors are part of pre-existing generalized beliefs in a community; and McPhail's hypothesis that the network of relationships available to people is an important determinant of their search for and use of informal information. These findings indicate that Shibutani's model of rumors should be supplemented by attention to the importance of cultural context and the logistics of accessibility and micro-participation. Unexpectedly, a large number of respondents did not use either formal or informal sources of information about the earthquake threat.

Testing Shibutani's Prediction of Information Seeking Behavior in Rumor

Rumor is perhaps one of the least understood forms of collective behavior (Miller, 2000; Goode Ben-Yehuda. 1994, 105-106; Marx and McAdam, 1994). All rumors are mass behavior, but not all of them involve the operation of the mass media (for the importance of rumors in the occurrence of ethnic riots in third world countries see Horowitz, 2001; for their presence in periods before the advent of the mass media see Rosnow and Kimmel. 1979). For those rumors that do, T. Shibutani's (1966) functional model of rumor is perhaps the most well known, emphasizing the relationship of rumor to the mass media, public opinion, and the news.

Shibutani's Model

Shibutani, working within the sociological tradition of symbolic interactionism and pragmatism (Baldwin, 1990), establishes the origin of rumors in a symbolic, collective transaction in which many people participate in multiple ways--from offering information to evaluations, comparisons, predictions, and interpretations--and from which collective definitions of what is happening emerge. Rather than conceptualizing rumors as inaccurate messages, Shibutani writes that rumors are collective transactions

taking place in situations of relative collective ignorance and ambiguity about an event. Relevant information is not available and yet people need to know what happened or will happen. They cannot satisfy the need to know through institutionalized mass media channels. Thus, they engage in rumor creation to try to supplement "official" information. In a celebrated phrase Shibutani writes that rumors are "improvised news."

Turner (1990, p. 6; see also Turner, Nigg, Paz, 1986), links Shibutani's view of rumors to the emergent norm approach to collective behavior, assuming the presence of differential participation in the rumor process. For Turner the key characteristic of rumor is the "crystallization of accounts and the intensification of affect (23)." He hypothesizes that rumors occur at "the upper end of a continuum of normal collective information-seeking" containing four stages. First, people read the mass media accounts of extraordinary events. Second, they discuss these media accounts with kin, friends, co-workers, and neighbors. It is here that the rumor process starts. Third, amplification of the second stage takes place, in which "large numbers of people become impatient and pursue information" both official and unofficial which is then widely shared with others. Fourth, the demand for news is

so intense that wild invention and speculation take place and are accepted as fact. The prevailing emotions are fear and anxiety.

A central assumption of both Shibutani and Turner, among others (Perry and Pugh, 1978,49) tested in this research, is that people's search for information under conditions of collective ambiguity and anxiety in which rumors occur will use both informal as well as formal, institutionalized mass media channels of information. Rather than substituting one source of information for another, potential participants in rumors are hypothesized to use both.

Other Models

Other models of rumor with different conceptions of people's search for information in rumor contexts are included in this test. The psychological model of rumor, best represented by Allport and Postman (1947), emphasizes the neurotic and pathological bases for individuals' participation in rumors. The planted or conspiratorial model or rumor assumes that people are duped by malicious creators of rumor bent in causing injury to specific organizations, groups, and individuals. In one version of this approach (Koenig, 1985, 19-20), the targets are business corporations; rumors allege something bad about

their practices and products; the sources of information in the rumors are represented as knowledgeable and credible; the creators of the rumors are always anonymous. The conspiratorial model assumes that the origin, and search for, pertinent information is carried out mostly through informal channels of communication (Knopf, 1975).

Yet another approach is the process model of rumor, developed by Knopf (1975) to understand the function of rumor in race riots. It places the information seeking process in rumors in the context of pre-existing hostile beliefs of a community. The rumor is seen as "part of the whole disorder-producing process," facilitating the occurrence of riots. In comparison to the generalized belief, rumors are said to be more explicitly applicable to the situation at hand; they reflect chronic, long-standing hostilities in a community and actualize them, making them immediately relevant to current situations. Rumors confirm and intensify the hostility.

From our perspective, however, it is unnecessary to limit rumors to situations of collective hostility. Instead, Knopf's view has broader implications for testing, for it is plausible to suggest that rumors close the gap between all types of generalized beliefs and their acceptance as facts. From this broader interpretation of

the process approach it is possible to predict that information seeking behavior in rumors are linked to pre-existing cultural relevancies that are used by people to explain their situation in moments of crisis, such as the relative strengths of religious ideologies (see below).

Yet a fourth model of rumor is social behavioral interaction theory (McPhail, 1991; see also Miller, 2000, 107, 112). It emphasizes the logistics of participation in rumor. From this perspective, information seeking behavior in ambiguous and anxious situations is impacted by the availability of free time. Categories of people with large blocks of free time will be more likely to search for information and participate in rumor and associated convergence behavior (McPhail, 1991, 93-94). Another prediction of this model is that the social density experienced by potential participants in rumors—their social location and the number of people present in these locations-- is an important determinant of the information they receive and their participation in rumor.

Apart from these expectations regarding the operation of information-seeking processes in rumor, there is also widespread consensus that information seeking increases with the a. relative *importance* of the "events and rumored

information to persons (Perry and Pugh, 1978, 50),” with b. their *lack of experience and knowledge*, and with c. their *inability* to judge with accuracy the qualifications of the originators and sources of rumors (51).

The Iben Browning Prediction

Our test of predictions derived from Shibutani and the other theoretical arguments previously identified uses an episode of collective fear and rumor associated with the Iben Browning prediction of an imminent massive earthquake in the New Madrid fault zone on 2 or 3 December 1990. Recent scholarship has established many relevant details about the Iben Browning prediction and its societal impact. Farley (1998) shows that the prediction created widespread uncertainty, ambiguity, and fear, occurring in the context of an un-skeptical mass media and of a recent minor earthquake that had impacted the New Madrid zone. The response of the scientific community came in October (*Ad Hoc* Working Group, 1990), too late to ease public preoccupations. Overall, the official response was indecisive and did not clarify things for the public, instead letting people wonder what was happening (on the official response see William, Herrmann, Johnston, and Reagor, 1993). Many assumed that the scientists and the authorities were hiding something.

The mass media response was massive. The first article on the Browning prediction was published by the Arkansas Democrat on November 29, 1989, projecting a 50 percent probability that an earthquake would occur on or around December 3, 1990 in the New Madrid, Missouri Seismic Zone (along the Mississippi River including the states of Arkansas, Missouri, Tennessee, Kentucky, Illinois). Between November 29, 1989 and December 3, 1990 more than 300 articles about the forecast appeared in more than 45 national and local publications (Sands Showalter, 1991, iv; the Disaster Research Center (DRC, 1995) has an exhaustive collection of newspaper articles on this collective behavior event). Awareness of the prediction was almost universal (Tierney, 1994), with a large percent (44) of a sample of respondents believing it accurate. A first-hand account (Spence, Herrmann, Johnston, and Reagor, 1993, 16-22) of the final days before December 3rd. describes the "carnival atmosphere" prevailing in the small town of New Madrid.

A number of rumors circulated during the Browning incident, increasing in frequency as the fateful date drew closer (DRC, 1990). Some of these were that Reelfoot Lake was bubbling; that there was increasing seismic activity,

with “seismographs going wild (signaling) that the big one was on the way and being covered up by the authorities” (27); that Browning had changed the date of the earthquake from December 3, 1990 to August 3, 1990; that angels (and in other version hitchhikers “talking in tongue”) were telling motorists not to cross bridges because of they were about to be destroyed by the earthquake.

Methods

Data for the analysis comes from a sample of households in Memphis, Tennessee surveyed by the Disaster Research Center prior to December 3rd 1990. 1,042 households were randomly selected for inclusion in the mail survey. 494 surveys were returned, for a response rate of 47.4 percent. The questionnaire contained items on a wide range of topics, including social and demographic information, household disaster experience, subjective perceptions of risk, knowledge of and attitude about the Browning prediction, information sources used by the respondents, preparation measures (for a full description of the survey design and its questions as well as the larger DRC study of the Browning prediction see Tierney, 1996, 6-16; Edwards, 1991, 22-29).

Variables. The dependent variable in this research is "Informal sources of information" scored 0 and 1, mean=.20, std. Deviation=.40, if the respondents obtained information about the predicted earthquake from films, family, friends and neighbors, and co-workers. 394 respondents did not use these informal sources of information

"Formal sources of information" is the independent variable used to represent Shibutani's predictions. It is a count variable, ranging from 0 to 10, mean=1.49, std. Deviation=2.1, measuring if respondents obtained information about the earthquake prediction from television news, other television programs, radio, articles, newspaper ads, magazine articles, magazine ads, books, posters, brochures, seminars and classes. The prediction is that it should be positively associated with the dependent variable.

To examine the hypothesized positive relationship posited by the process approach between information seeking behavior and pre existing cultural understandings, the test includes two variables tapping religiosity. "Baptist Religious Denominational Membership", scored 0 and 1 (yes), mean=.63, std. Deviation=.48, measures whether respondents identified with the prevailing religious ideology in

Memphis. The second is "Importance of Religion" for the respondents, ranging from 1 to 4 (very important), mean=3.65, std. Deviation=.69. Baptists constitute the majority of the population in Memphis. Many Baptists adopted an "end of the world" perspective that influenced their behaviors and perceptions during the crisis. It is thus possible to assume that Baptists with strong religious commitment will be more prone to interpret Browning's earthquake prediction of an earthquake using a religious perspective on catastrophe. Would they also be more involved in the use of informal sources of information than non-Baptists and the religiously detached?

The predictions from the social behavioral interaction theory are measured by proxy variables representing a. "Number of Groups" from which the respondents obtained information about the earthquake threat, a count ranging from 0 to 7 (church, club, town meetings, American Red Cross, public library, utility company, police and fire department, Tennessee Emergency Management Agency, Memphis State University, Other groups), mean=.52, std. deviation=1.09; and b. "Extent of Discussion" about the Earthquake threat carried out by the respondents, a count variable ranging from 0 to 8, mean=2.97, std.

Deviation=1.88, recording whether respondents discussed the earthquake threat with spouses/partners, children, other relatives, co-workers, friends and neighbors, pastor/priest, someone else. They should be positively associated to the use of informal channels of information.

The *importance* of the Browning prediction for the respondents is represented in this test by a. "Earthquake Concern", a 4-item scale, ranging from not very concerned at all to very concerned, standardized item alpha=.85, mean=11, std. Deviation=2.54, measuring the respondents' fear of earthquake: "In general, how concerned are you about the chance of being in a damaging earthquake in your lifetime (in the next ten years, in the next year, in the next three months)"; and b. "Seriousness of Threats From Various Hazards", a seven item scale variable, standardized item alpha=.81, mean=16.1, Std. Deviation=3.95, ranging from 7 to 28, asking respondents: "How serious (from very serious to not serious at all) a threat you think each of the following hazards (tornadoes, floods, blizzards, nuclear or radiological accidents, toxic waste or chemical spills, water contamination or pollution episodes, and earthquakes) is in the Memphis area?

Experience relevant to the earthquake prediction is measured by "Experience with Hazard Victimization", a count variable ranging from 0 to 56, mean=3.43, std. deviation=6.06, of the number of tornadoes, floods, blizzards, nuclear or radiological accidents, toxic waste or chemical spills, water contamination or pollution episodes, and earthquakes experienced by the respondents,

Ability to Judge the source of information is measured by three variables. The first measures "Faith in Browning's Prediction", asking respondents: "How much faith do you have in Browning's prediction?" It ranged from 1 to 4, mean=2.09, std. Deviation=.82, ranging from no faith at all to a great deal of faith in the prediction. The second measures "Trust of Officials." It ranges from 1 through 4, mean=1.9, std. Deviation=.72, asking respondents whether they strongly agree, agree, disagree, or strongly disagree with the statement that public officials withhold information from the public about the predicted earthquake. The third variable measures "Trust in the Mass Media". It ranges from 1 through 4, mean=.86, std. Deviation=.59, asking respondents whether they strongly agree, agree, disagree, or strongly disagree with the statement that the media accurately informs the public about the predicted

earthquake. The prediction is that respondents who believed Browning's prediction, perceived the officials as withholding information, and distrusted the mass media would be more likely to search for information through informal means.

Five controls are included in the equations. They are "Gender", scored 0 and 1 for males, mean=.45, std. deviation=.50; "Age" in years, ranging from 18 to 96, mean=47.6, std. deviation=16.4; "Size of Households", ranging from 1 through 16 persons, mean=2.58, std. Deviation=1.5; "Number of years of Formal Education", ranging from 2 to 9 for respondents with doctorates or other professional degrees, mean=5.61, std. Deviation=1.7; and "Minority Ethnic Status", scored 0 and 1 (for Black, American Indian, Asian, Hispanic/Latino respondents—most minority respondents were Blacks (145)), mean=.33, std. Deviation=.46.

We use binomial logistic regression (BLR) to model the use of informal sources of information by the respondents in the DRC survey (for a review of BLR see Field, 2000; another excellent discussion is found in http://www2.chass.ncsu.edu/garson/pa765/logistic.htm). BLR is appropriate for the present case, for it is designed to

model a dichotomous dependent variable with categorical and continuous predictors. The results from BLR are presented as the odds of an event taking place (or the probability that it will occur divided by the probability that it will not occur) and are thus easily interpretable.

We conducted tests to ascertain if the assumptions of BLR were met by the analysis. There were no statistically significant interaction terms. A number of mathematical transformations of the continuous predictors did not strengthen the overall fit of the model. There is also the absence of colinearity. Thus, All VIFs are below 1.5 except for Formal Sources (1.91). The tolerances of all the predictors are above .70 with the exception of "Formal sources of information" (t=.52), "Number of Groups" contacted by respondents (t=.52) and "Earthquake Concern" (t=.61). The first two variables are inter-correlated with each other (Pearson's R=-.35). The latter is highly inter-correlated with "Faith in Browning's Prediction." There are 15 cases with standardized residuals greater than 2 standard deviations, or 3 percent of the 494 respondents, well within the 5 percent of cases expected to have residuals outside 2 standard deviations. The Durbin-Watson statistic is 1.93, supporting the assumption that the

residuals are independent. The Hosmer and Lemeshow test is statistically insignificant.

In what follows separate BLR models are presented for the entire set of predictors and for the reduced model.

Findings

Fifty seven percent of the sampled respondents did not obtain information about the Browning prediction either from formal or from informal channels. It seems as if the counterintuitive to sociological theorizing about rumors and people's search for information under conditions of ambiguity and anxiety is a significant option, namely, that large proportions of people who find themselves in episodes of mass fear such as that occasioned by the Browning prediction ignore them and do nothing or very little to learn about what is going on.

Respondents who used informal sources of information had a greater tendency to also use formal sources of information about the earthquake threat than respondents who did not use formal sources: 72 percent of respondents who did not use informal sources of information also did not use formal sources while 98 percent of respondents who did not use formal sources also did not use informal sources.

Table One presents the results of the BLR analyses. The results are nearly consistent across the full and reduced (backward stepwise likelihood ratio) BLR models. In both models *only four* predictors have statistically significant coefficients at the .05 level. The two models fit the data relatively well; their Nagelkerke R squares are .57 and .54, respectively, with 87 percent of the sample correctly classified. The four statistically significant predictors are a. "Formal sources of information;" b. a multiplicative interaction term of "Baptist Religious Denominational Membership" and "Importance of Religion" in respondents' lives; c. "Number of Groups" consulted; and d. "Education". They support the predictions.

Shibutani's hypothesis is not rejected by these results. Respondents who used formal sources of information are 2 times (2.005) more likely than respondents who did not use formal sources of information to also use informal sources.

Knopf's process approach prediction regarding the importance of relevant religious ideology on the information search process is also not rejected by these results. For Baptists in Memphis, Tennessee, the odds of

using informal sources of information go up almost 3 times (2.81) with a one-unit increase in the variable measuring importance of religion in their lives.

Finally, McPhail's hypothesis that the network of relationships available to people is an important determinant of their search for information is not rejected, for the odds of using informal sources of information increased by 1.78 with a one unit increase in the number of groups consulted about the earthquake threat.

Two of the controls proved statistically significant. Consistently in both models, the greater the level of formal education of the respondents is, the lesser they tended to use informal sources of information on the earthquake threat; a one unit increase in education is associated with a decrease of .79 in the odds of using informal sources of information. Also, men have almost twice greater odds (1.85) than women to use informal sources.

Conclusion

More research on rumors is needed to replicate the results of this study using better measures to advance our

understanding of this form of collective behavior. The first is the large number of respondents that did not use either formal or informal sources of information about the earthquake threat during the incident of collective preoccupation occasioned by Browning's prediction. It is a stark reminder that many people go about their business in situations of collective ambiguity and anxiety impervious if not indifferent to the worries that take sway of the imagination of the public. At present they constitute an unknown in our contemporary understanding of rumors.

The second is that none of the indicators tapping previous experiences with hazard victimization, faith in Browning's prediction, distrust of officials, or trust in the mass media predicted the use of informal sources of information. Counter-intuitively, these factors (subjective importance of the impending crisis, previous victimization, ability to judge accurately) are not correlated in this research with the use of informal means of information in rumor situations. Jaeger, Anthony, and Rosnow, 1988, also report that the urgency of the crisis did not significantly impact rumor-seeking behavior.

Shibutani's view of rumor as improvised news is supported by the results of this research. However, it does

not offer a comprehensive understanding of information seeking behavior in contexts of rumor. It needs to be complemented by other approaches that would combine the importance of cultural context and the logistics of accessibility and micro-participation. A useful approach to future studies of rumors would continue to explore their links to local and regional generalized beliefs. The results show the value of expanding Knopf's process model of rumor from race riots to other collective behavior events in which rumors function as links between mass preoccupations and pre-existing generalized beliefs. Cultural relevancies such as strong Baptist religiosity in Memphis facilitated people engaging in information seeking behavior and participation in rumors. Similarly, McPhail's emphasis on networks of social relations and their accessibility as a precondition to participation in collective behavior is a promising line of investigation.

Table 1. Odds of Using Informal Sources of Information During the Browning Incident, Full and Reduced Logistic Regression Models

	Full	Reduced
Formal Source	2.0*	1.98*
	(1.66-2.43)	(1.64-2.38)
Baptist	.96	
Importance of Religion	1.38	
Interaction Term, Religion	2.81***	3.60*
	(1.14-6.94)	(1.92-6.75)
No. Groups	1.78**	1.68**
	(1.28-2.48)	(1.24-2.28)
Extent of Discussion	1.18	
Earthquake Concern	.88	
Seriousness of Threat	.94	
Victimization	1.00	
Faith in Prediction	1.25	
Trust in Officials	1.40	
Trust in Mass Media	.70	
Gender	1.86	
Age	.99	
Size of Household	1.13	1.18***
		(.98-1.43)
Formal Education	.79***	.82***
	(.64-.97)	(.68-.99)
Minority	.73	
Constant	.21	.06*
-2 Log Likelihood	268.3*	280.5*
Initial –2 Log Likelihood	480.88	
Nagelkerke R Square	.57	.54
Percent Cases Correctly Classified	88	87

*p<.000, **p<.005, ***p<.05

Numbers in parentheses are 95% confidence intervals for Exp(B)

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