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INFORMATION SEEKING BEHAVIOR IN
COLLECTIVE SURGES: TESTING ALTERNATIVE
COLLECTIVE BEHAVIOR FORMULATIONS

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Testing Alternative Collective Behavior
Formulations**

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Abstract

This paper tests a set of predictions regarding information seeking behavior in collective surges derived from models of rumors by Shibutani, Knof, and McPhail. Data for the analysis comes from a random sample of 1,042 households in Memphis, Tennessee surveyed by the Disaster Research Center prior to Iben Browning's December 3rd 1990 prediction of an imminent massive earthquake in the New Madrid fault zone. Results support McPhail's hypothesis that the network of relationships available to people is an important determinant of their information seeking behavior in situations of collective preoccupations as well as Shibutani's prediction of a positive association between the use of formal and informal sources of information. The results fail to support Knopf's prediction that information seeking is impacted by pre-existing generalized beliefs. Attention to the logistics of accessibility and micro-participation is a useful supplementation to the emphasis on the use of the mass media for understanding informal information seeking activities during collective preoccupations.

Information Seeking Behavior in Collective Surges: Testing Alternative Collective Behavior Formulations

This paper tests predictions regarding information seeking behavior during collective preoccupations or surges (Tierney 1994; Lofland, 1993). It examines the use of informal sources of information, or rumoring¹ by people concerned with Iben Browning's prediction of an imminent massive earthquake in the New Madrid fault zone.

Rumor is perhaps one of the least understood forms of collective behavior (Miller, 2000; Goode and 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; Farge, 1991; Kaplan, 1996). For those rumors that do, T. Shibutani's (1966) functional model of rumor is perhaps the most well

¹ We make a distinction between rumoring, the search for meaning through informal sources of information, and rumors, the cultural objects (Griswold, 1988) that on occasions emerge and become shared symbolic "currency" in situations of collective preoccupation or surge.

known, emphasizing the relationship of rumoring to the mass media, public opinion, and the news.

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, rumors are conceptualized as collective transactions taking place in situations of relative collective ignorance and ambiguity about an event. Information from established news media sources is not available even as people need to know what happened or will happen. When conditions are such that they cannot satisfy the need to know through institutionalized mass media channels, they engage in rumoring to try to make sense of what's happening. In an often-cited 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. Consistent with that approach, he assumes that there is differential

participation in the rumoring 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 rumoring 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 inventions and speculations are offered and accepted as fact. According to this view, the prevailing emotions underlying rumoring are fear and anxiety.

A central assumption of both Shibutani and Turner is that people's search for information during episodes of collective preoccupation, ambiguity and anxiety in which rumoring occur, take place through both formal, institutionalized mass media channels of information and informal sources such as conversing with friends and neighbors (see also Perry and Pugh, 1978,49). Rather than substituting one source of information for another,

potential participants in rumoring are assumed to use both sources.

Other models have different conceptions of people's search for information during these collective surges (Lofland 1993). The process model (Knopf, 1975) links the information seeking process to the pre-existing hostile beliefs of a community; rumoring is "part of the whole disorder-producing process" facilitating the occurrence of race riots. The process model assumes that in comparison to prevailing generalized hostile beliefs existing in specific social contexts, rumors are 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.

The process approach was initially developed to examine rumors in community conflicts dominated by hostile generalized beliefs. However, it is plausible to extend its prediction and suggest that rumors actualize all types of generalized beliefs and their acceptance as "facts". From this broader interpretation of the process approach it can be predicted that rumoring behavior in situations of collective preoccupations is linked to pre-existing cultural relevancies that are used by people to explain

their situation in moments of crisis and generalized dread and anxiety.

C. The social behavioral interaction approach (McPhail, 1991; see also Miller, 2000, 107, 112) presents yet another model of information seeking behavior in collective surges. It emphasizes the logistics of participation in rumoring. From this perspective, information-seeking behavior in ambiguous and anxiety producing situations is influenced both by the relationships that exist among individuals as well as by their availability to participate in the rumoring process (McPhail, 1991, 93-94). A prediction from this model is that people with flexible time schedules and in dense social networks will participate more often in rumoring than their counterparts.

Apart from these expectations regarding the processes impacting information-seeking in situations of collective preoccupation, we also test the predictions that participation in rumoring increases with the (a) relative importance of the crisis for persons at risk, (b) their lack of crisis-related experience and knowledge, and (c) their inability to judge with accuracy the validity (source

and technical quality) of information that is circulating during a crisis (see Perry and Pugh, 1978, 50, 51).

The Iben Browning Prediction

Our test of predictions derived from Shibutani, Knof and McPhail's theoretical arguments uses an episode of collective ambiguity and fear associated with Iben Browning's prediction of an imminent massive earthquake in the New Madrid fault zone (along the Mississippi River, including communities in the states of Arkansas, Missouri, Tennessee, Kentucky, and Illinois) forecasted for 2 or 3 December 1990. The New Madrid fault zone had experienced earthquakes in the past, most notably massive seismic events in 1811 and 1812, and the public was somewhat aware of the earthquake threat prior to the prediction.

Recent scholarship has established many relevant details about this 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 occurred in the New Madrid zone on September 23, 1990. The official response came in October (*Ad Hoc Working Group*, 1990), too late to ease public

preoccupations.² 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. 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).³ Awareness of the prediction was almost universal, with a large proportion of the local population believing it accurate (Tierney, 1994). 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.

² The National Earthquake Prediction Evaluation Council had been asked earlier to provide a scientific consensus on the prediction, but declined to do so on the grounds that such a pronouncement might actually give credibility to Browning. The rumoring associated with this episode occurs during rumors provoked by an event (see Kapferer, 1990: 37).

³ The Disaster Research Center has an exhaustive collection of newspaper articles on this collective behavior event (DRC, 1995).

A number of rumors circulated during the incident, increasing in frequency as the fateful date drew closer (DRC, 1990). Some of these were that Reelfoot Lake, near the predicted impact area 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. 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 attitudes about the Browning prediction, information sources used by the

respondents and preparation measures adopted by households (for a full description of the sample and design of the survey, as well as the larger DRC study of the Browning prediction see Tierney, 1996, 6-16; Edwards, 1991, 22-29).

Variables. The outcome variable in this research is a count (0-7) of the categories of persons the respondents had exchanged information during the previous year about the earthquake threat (mean=2.98; standard deviation=1.88). It measures their use of informal sources of information about the prediction. Respondents could check all that applied (spouse or partner; child over age 18; child under age 18; other relatives; co-workers or boss; friends or neighbors; pastor or priest).

"Formal sources of information," used to test Shibutani's predictions, is a 19-item scale (standardized item alpha=.79), ranging from 0 to 18 (mean=5.41, std. Deviation=3.38), measuring if respondents obtained information about the earthquake prediction from television news; other television programs; radio programs; newspaper articles; newspaper ads; magazine articles; magazine ads; books; posters; brochures or pamphlets; seminars, classes and workshops; Tennessee Emergency Management Agency; police or fire Department; utility companies; public

library; American Red Cross. The prediction is that it should be positively associated with the dependent variable.

Southern Baptists constitute the majority of the population in Memphis. Many Southern Baptists adopt a fundamentalist, millenarian interpretation of the Bible (Turner, 1993) in which the Second Coming is seen as imminent. For them, Browning's prediction of a massive earthquake and associated tribulations would have been seen as corresponding to their pre-existing "end of the world" expectations and should have influenced their earthquake-related rumoring behavior.

To examine the hypothesized positive relationship posited by the process approach between information seeking behavior and pre existing cultural understandings, the test includes three predictors tapping religiosity. "Baptist Religious Denominational Membership", scored 0 and 1--yes (mean=.63, std. Deviation=.48), measures whether respondents identified with the prevailing religious denomination in Memphis. The second is "Importance of Religion" for the respondents, ranging from 1 to 4--very important (mean=3.65, std. Deviation=.69). The third predictor is a dichotomous variable, scored 0 and 1,

measuring if respondents thought that a "divine plan or God's plan" could cause an earthquake (mean=.30, standard deviation=.46). Thus, the prediction is that Baptists with strong religious commitment or who thought that God could cause earthquakes would be more prone to interpret Browning's earthquake prediction of an earthquake using a religious perspective on catastrophe and would be more likely to use informal sources of information than non-Baptists and the religiously unattached.

The predictions from the social behavioral interaction theory are tested with the use of a predictor measuring the number of organizational memberships of the respondents in the Memphis area. It ranges from 0 to 6 (mean=1.31; std. Deviation=1.18), indicating if the respondents were members of neighborhood or homeowners association; church groups; political organizations; business or professional associations; civic or community groups; hobby or recreational clubs. Another predictor used to test the social behavioral interaction theory is a proxy for the extent of discretionary, non-work related time available to the respondents. It is a dichotomy, scored 0 and 1 if the respondents were unemployed, retired, keeping house, or/and students (mean.28, std. Deviation=.45). Both predictors

should be positively associated with the use of informal channels of information.

The *importance* of the Browning prediction for the respondents is represented in this test by two predictors:

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). It measures the respondents' fear of an 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)"; b. "Seriousness of Threats From Various Hazards", a seven item scale, ranging from 7 to 28 (standardized item $\alpha=.81$, mean=16.1, Std. Deviation=3.95), 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 and 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, pollution episodes, and earthquakes experienced by the respondents. It is also represented by a dichotomous predictor tapping whether they had knowledge of the September 26, 1990 earthquake in the Central States U.S. area (mean=.57, std. Deviation=.49)

Three predictors measure the *Ability to Judge* the source of earthquake-related information. The first measures "Faith in Browning's Prediction", asking respondents: "How much faith do you have in Browning's prediction?" It ranges from 1 to 4-- from no faith at all to a great deal of faith in the prediction (mean=2.09, std. Deviation=.82). The second measures "Trust in Officials." It ranges from 1 through 4 (mean=1.9, std. Deviation=.72). It asked 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 predictor measures "Trust in the Mass Media". It ranges from 1 through 4 (mean=.86, std. Deviation=.59). It asked 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.

Eight statistical controls are also included in the analysis. 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); an index of "Occupational Prestige," ranging from 0 to 82 (mean=34.9, std. Deviation=21.6); "Minority Ethnic Status", scored 0 and 1—yes, most of whom (145) are Black, although there are also American Indian, Asian, and Hispanic/Latino respondents in the category (mean=.33, std. Deviation=.46); whether respondents had "Relatives in the Memphis area," scored 0 and 1 (mean=.81, std. Deviation=.39); respondents' "Residence Rate in Tennessee," or the proportion of their lives lived in the state (mean=.69, std. Deviation=.34); and a three-item scale measuring the respondents' perceptions of the extent of earthquake preparation by government officials, people

in Memphis, and their households (standardized item alpha=.64; mean=7.27, std. Deviation=1.73).

Model. We use multiple least square regression (LSR; Field, 2000) to model the number of persons respondents had exchanged information about the earthquake threat during the previous year. Most of the results presented next are reproduced when binary logistic regression is used (not shown, available upon request)⁴.

Findings

Table One presents the results of the LSR analyses. These results are consistent across the full and reduced regression models. The models produce very similar results. The two models fit the data moderately well by social science standards; their Adjusted R squares are .30 and .32, respectively. In both models the statistically significant predictors are: a. formal sources of information; b. membership in organizations, discretionary time, and an interaction term combining discretionary time and previous victimization; c. knowledge of the September

⁴ Except as indicated, there were no statistically significant interaction terms. Mathematical transformations of the continuous predictors did not strengthen the overall fit of the models. There is also the absence of multi-collinearity. All variance inflation factors are below 1.5. The tolerances of all the predictors are above .70, except age (.58) and faith in prediction (.67). There are 20 cases with standardized residuals greater than 2 standard deviations, or 4.6 percent of the 439 cases in the analysis, within the 5 percent of cases expected to have residuals outside 2 standard deviations. Histograms and normal P-P plots show normally distributed residuals. The Durbin Watson statistic is 1.92, supporting the assumption that the residuals are independent. The Hosmer and Lemeshow coefficient is not statistically significant

26th earthquake; d. size of household, occupational prestige of the head of households, and an interaction term combining minority status and occupational prestige.

T. Shibutani's hypothesis is not rejected by the results of this research. Respondents who used formal sources of information are more likely than respondents who did not use formal sources of information to participate in rumoring, or to talk about the earthquake with more categories of persons. Other things held constant, as the use of formal sources of information increases by one standard deviation (3.34) the number of categories of persons with whom the respondents discussed the earthquake increases by .25 (.14*1.82) in the full model.

The prediction derived from T. Knof's process approach regarding the importance of a generalized belief emphasizing religious beliefs on the search for information is not supported by the results of this research. Neither Baptist religious denominational membership, the importance of religion for the respondents, or their belief that God causes earthquake, are statistically significant predictors of rumoring. This is also true when the second and third order interaction terms combining these three predictors are entered in the equation (not shown).

The hypothesis derived from social behavioral interaction theory, to the effect that the availability and networks of relationships of people is an important determinant of their search for information, is generally confirmed, although there was an unexpected finding. As predicted, membership in organizations is positively related to the number of categories of persons with whom the respondents talked about the earthquake (.60 or $.18 \times 1.82$). This finding supports the prediction that their entrenchment in the community, as measured by their organizational memberships, facilitate their participation in rumoring, increasing the number of different categories of persons with whom they talked about the earthquake threat.

However, contrary to the prediction, the availability of discretionary time is *negatively* related to the dependent variable (-.17). This unexpected finding is robust, constant across different versions of the model (not shown). However, in support of the prediction, as their previous hazard victimization increased, respondents with available discretionary time also contacted a greater number of categories of persons to talk about the earthquake problem (.23 of a category of interactants or

.12*.1.82). These results indicate that participation in rumoring, or the use of informal sources of information is not just a matter of having discretionary time; people must also be interested on the collective concern or topic of discussion, such as having previous personal experiences with hazard victimization!

None of the predictors tapping earthquake concern, seriousness of the earthquake threat, and previous victimization experiences are statistically significant. Jaeger, Anthony, and Rosnow (1988) also reported that respondents' sense of urgency in the crisis did not significantly impact rumoring behavior. However, respondents' knowledge of the 26th September earthquake is positively associated with the dependent variable. Respondents with such knowledge increased the categories of persons with whom they talked about the earthquake threat (by .20 of a category, or .11*1.82). Similarly, none of the predictors measuring respondents' faith on Browning's predictions and their trust in officials and the mass media proved statistically significant.

Size of household and occupational prestige are positively associated with the number of categories of respondents contacted by the respondents. Other things held

constant, as the size of household and the occupational prestige of the head of the household increase by one standard deviation (1.5 and 21.44, respectively), the categories of persons with whom the respondents discussed the earthquake increases by 1.6 ($.20*1.82$) and .25 ($.14*1.82$) in the full model.

Initial findings indicated that minorities were significantly less likely than their counterparts to contact different categories of persons in the search for information about the earthquake (not shown). However, further analysis indicated (see Table 1) the presence of a statistically significant interaction effect in which minorities are less likely to use different categories as their occupational prestige decreases. Other things held constant, as the occupational prestige of minorities decrease by one standard deviation (.40), the number of categories of persons with whom the respondents discussed the earthquake decreases by .31 ($-.17*1.82$) in the full model. Thus, it is not solely a matter of ethnicity but also of social class what is involved in determining participation in rumoring, or the use of informal sources of information about the earthquake.

Conclusion

More research is needed to retest the predictions derived from T. Knopf's process model of rumor, to continue to explore its applicability not just to race riots as it was initially proposed by Knof but also to other collective behavior events in which rumors presumably function as links between mass preoccupations and pre-existing generalized beliefs. In the present study, Baptist denominational membership and importance of religion among Memphis respondents did not increase their use of different categories of persons in their search for information about the earthquake threat. This is only one test, however, and other research is needed before abandoning this line of investigation.

T. Shibutani's view of rumor as improvised news is supported by the results of this research. However, as Turner intuited (1990) it does not offer a comprehensive understanding of information seeking behavior in contexts of rumor. It needs to be complemented by other approaches that emphasize the logistics of accessibility and mobilization.

The results support the predictions from social behavioral interaction theory. C. McPhail's emphasis on

networks of social relations and the availability of people to mobilizing instructions as important determinants of participation in rumoring is another promising line of investigation. Indeed, thinking of rumors and rumoring as both cultural, i.e., parts of the search for meaning, as well as social structural, i.e., the instructions and other requirements that are essential to mobilizing would-be participants in collective behavior events, may be a useful way of integrating rumors and rumoring in the disciplinary understandings of collective behavior.

An emphasis on the mobilization-rumor link may be a useful first approximation, for we have very limited understanding of how the characteristics of collective behavior events impact the production of rumors and rumoring behavior. Assuming that at a minimum collective behavior events are a. suffused with socio-cultural emergence, b. inextricably dramaturgical in nature, c. show a limited range of dominant emotions, d. carried out by five master social units (masses, publics, associational networks, social movement organizations, and small groups), e. located both in time and space as well as in f. social spaces reflecting issues associated with master categories of age, race/ethnicity, class/occupation, gender/sex, and

ethnocentrism/nationalism (citation censored), it is still the case that we do not know how it is that rumors and rumoring take place or fail to take place in them.

Table 1. Modeling the Exchange of Information During the Browning Incident,
Full and Reduced LSR Models@

	Full	Reduced@@
Formal Sources Of Information	.14*	.16*
Baptist Membership	.16	
Importance of Religion	-.11	
Divine Plan Causes Earthquake	.14	
Membership in Organizations	.18*	.18*
Discretionary Time Availability	-.17*	-.19*
I (discretionary time*victimization)	.12**	.11*
Earthquake Concern	.05	
Seriousness of Threat	.04	
Previous Victimization Experience	.00	
Knowledge of the Sept. 26 th earthquake	.11**	.12*
Faith in Browning's Prediction	.00	
Trust in Officials	-.03	
Trust in the Mass Media	.00	
Gender	.03	
Age	-.07	
Size of Household	.20*	.22*
Occupational Prestige	.14**	.14*
Minority Ethnic Status	-.08	
I (minority*occupational prestige)	-.17**	-.20*
Relatives in Memphis Area	.03	
Residence Rate in Tennessee	-.04	
Perception of Earthquake Preparation	.00	
Adjusted R Square	.30	.32
Standard Error of Estimate	1.52	1.50
Durbin-Watson	1.91	1.94
Regression Sum of Squares	492.8	472.9
Residual Sum of Squares	954.6	974.4
F	9.31*	26.1*

@Standardized Coefficients (Beta)

@@Stepwise, backward regression

*p<.001

**p<.05

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