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Social Time and Disaster

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Abstract

Time permeates the disaster process. Yet, few scholars have integrated various notions of time in their disaster studies. In this paper, I introduce the ideas of event time, clock and calendar time, social time, and rhythm of life within the context of the pre-impact, impact, and post-impact phases. Simply, day-to-day life in industrialized society is based upon a series of schedules, calendars and routines on a daily, weekly, and yearly basis. Events that we call disasters and catastrophes upset our normal rhythm of life, creating degrees of social disruption from the individual up through the community units of analysis. Social units in impacted areas move from clock and calendar time (doing what is scheduled) to event time (doing what is needed now) when disaster strikes. The process of recovery is reflected in attempts to reestablish these same (or similar) clock and calendar time patterns as before the disaster.

Key Words: Social time; Event time; Clock time; Life cycle of disasters

Introduction

In this theoretical paper, I advocate the use of social time in order to obtain a clearer understanding of disaster. Key concepts related to time used throughout this paper include, event time, clock time, calendar time, and rhythm of life. Although disaster researchers have used the notion of social time in disaster research, at best they have generally relegated the concept to a sentence or small (e.g., Neal 1997; Quarantelli 1998; CDRSS 2006). Specifically, I draw upon general works on social time that related to the idea the patterns of everyday life or the rhythm of time (e.g., Zerubavel 1981; Hall 1983), which in turn serves as a point of comparison when events lead to social disruptions (Fritz 1961). In addition, I draw upon related theoretical and empirical studies disaster studies and some of my own disaster fieldwork for further illustrations. In short, these

and other studies noted in this paper demonstrate an underlying interest and further need in exploring the relationship between disaster and social time.

To punctuate the importance of time in this field, consider how the general notion of time serves as the defining component of our two main approaches to our field – disaster and hazard (CDRSS 2006). In essence, hazards are events waiting to occur. By contrast, disasters are the actual events. As a result, the hazards tradition has focused upon pre-impact type of activities (i.e., mitigation, some preparedness). By contrast, the disaster tradition initially looked at response (i.e., impact) issues and to a lesser degree preparedness activities (Phillips, Neal and Webb 2011, pp. 40-42).

In organizing this paper, I draw upon a specific notion of social time – disaster phases. Going back to Carr's (1932) early work on disaster phases, researchers have used a wide range of possible approaches and categories to reflect the disaster life cycle (Neal 1997). Since the recommendation by the National Governor's Association (1978) to organize hazard and disaster events under the categories of preparedness, response, recovery, mitigation, the four phases of emergency management have received extensive support and use by disaster professionals and academics. For these two groups, the "four phases" provide an excellent heuristic devise for organizing data, information, or activities (Neal 1997).

Yet, these and other life cycle configurations present analytical problems (Neal 1997). First, these categories are not mutually exclusive. Put another way (and demonstrated below), the phases of disaster overlap. Thus, the four phases (and other life cycle configurations) are at best a "heuristic device" rather than a concept for scientific analysis. Second, in part related to the first point, the use of any set of disaster phases force both professionals and researchers to look at disasters in a way that really does not exist (Neal 1997). Finally, various disaster phase categories draw upon the use of everyday language rather than being grounded in any type of empirical reality or conceptual/theoretical framework. Thus, these categories come with the baggage of meanings attached to everyday life. Such simple terms as pre-impact or preparedness, for example, may have multiple meanings amongst multiple actors. As Quarantelli and Dynes (1977) show, the concept *disaster* has similar problems, being a "sponge" concept that has soaked up multiple everyday life and scientific meanings.

Using some form of disaster phases makes some sense to organize an initial paper on disaster and social time. I will use the stages of pre-impact, impact, and post-impact to organize the structure of this paper. Yet, by using this type of configuration, I recognize that I will encounter the problems I have already noted above. For example, some of my discussions on pre-impact topics slide into impact issues. Or, some illustrations regarding impact patterns cross into post-impact activities. Until we devise better social time and disaster concepts, these three stages will serve as my mechanism to order this discussion. In short, I hope to invoke new ways we can understand the social process of disaster with the use of time.

Event Time

For thousands of years, cultures throughout the world have operated on event time. Event time occurs when people perform activities based on necessity. For example, people ate when they became hungry. They awoke when the sun rose and went to sleep when the sun set (which, except in the tropics, varies from season to season). Farmers planted and harvested crops when it was time. Even the flooding of the Nile River thousands of years ago was an event that would set the stage for the start of a new agriculture cycle in Egypt. Based upon the region and irregularities of weather (e.g., temperatures, rain), the planting and harvesting of the crops could vary greatly based upon a calendar (Landes 1983; Steel 2000).

Religious practices created the need for activities during specific times of the day (i.e., "clock time"), week, or year (i.e., calendar time). For example, in about the 12th century, religious practices by monks in Europe demanded the need for clocks, calendars and schedules. Monks would rise the same time every day, and throughout the day engage in various tasks (e.g., praying, copying texts, eating, attending mass). Each day would also have a different set of tasks driven by the clock and the calendar. Of course, the culmination of these activities occurred on Sunday, in which a rigid schedule of mass occurred. In short, the clock and calendar, not events based on need, activated specific behaviors (Landes 1983).

The use of "clock time" later facilitated the emergence of industrialization. Rather than following the rules of event time, industrialization demanded clocks, schedules and calendars for production and management reasons. Urban areas, the centers of industrialization, adapted to clock time. By comparison, agrarian areas stayed with event time, which in turn created a further schism between urban and rural settings. Thus, clock time drove modern industrial societies and those living in such settings. Zerubavel (1981, p. 7) states this quite nicely:

> In general, most of our routine daily activities are scheduled in a fairly rigid manner for particular times of the day and for the particular days of the week. Thus, we usually eat not necessarily when we are hungry, but, rather, during officially designated eating periods such as "lunchtime" or "dinner time." Similarly, we usually go to bed not necessarily when we get tired, but rather, when it gets "late." Cleaning one's home is another activity which typically takes place not necessarily when things get dirty, but, rather, on particular days of the week that are designated as "cleaning days" in a standard fashion.

In short, many societies today, especially industrialized societies, operate on clock and calendar time.

Social Time and the Rhythm of Life

Both event time and clock/calendar time take on social meaning, thus creating the notion of social time. Social time influences how we perceive events, what we to do within a specific period (e.g., clocks, calendars and schedules), and how we may perceive the pace of time (e.g., fast or slow). Simply, social time drives many of our collective actions and activities. Some components (e.g., minutes, hours, days) originate from measures of objective time since they rely upon astronomy or consistent pulsing of radiation. Yet, these objective measures take on social meaning and are used to create schedules. For example, hours, days, specific dates and even years serve as important socially defined markers or take on special meanings for specific activities. As a result, *social meanings based upon objective measures of time emerge*. Schedules and calendars reflect socially defined institutionalized rituals among and within societies, organizations, institutions, families, groups and subgroups. A wide range of events or time markers, such as holidays, work schedules, times for worship, sleeping, eating, waking, vacation and recreation may all occur annually, monthly, daily and at certain times of the day.

The intermeshing of these activities based upon social time generates patterns of behavior at both on the macro and micro sociological level. When we combine social time markers with the macro and micro socially defined activities, we build connected and institutionalized social cycles that create a rhythm of live. These cycles and rhythms produce some degree of predictability to our lives, which in turn helps to maintain some form of social order (Zerubavel 1981, p. 8-12). Similarly, Hall observes (1983:153) "individuals are dominated in their behavior by complex hierarchies of interlocking rhythms." Although beyond the scope of this paper but appropriate for later investigation, integrating social time and disaster allows us to explore key theoretical issues in sociology related to units of analysis, social order, and social change—along with the central topics of deterministic and voluntaristic behavior (e.g., Alexander 1982).

Cultural Influences of Time

Culture influences how individuals perceive and interpret time (i.e., pace of time, power, expectations of everyday life). Let's look first at the pace of time. Generally, individuals may perceive the passage of time quickly or slowly, depending upon the circumstances or event. For children, the days or weeks before a major holiday may seem to take "forever." For a new couple madly in love, their first six hour dinner and movie date may feel like one hour's worth of time. Broader cultural influences also impact the pace of time (e.g., Sorokin 1943; Lauer 1981; Hall 1983; Levine 1997). As Zerubavel

(1981) documents through his extensive observations of different regions and peoples, Latin cultures operate within a slower, less precise notion of time. By comparison, Northern European cultures have a faster, more precise meaning and use of time. He also demonstrates that in the United States, geography influences different versions of time. One living in the South experiences a much more leisurely pace of time than those living in the North. Certainly, urban areas operate at a quicker and more precise pace than most slower rural settings (Zerubavel 1981).

Consider for a moment how a culture's pace of social time could influence the expectations (and perceptions) of disaster response and the transition to recovery. One could theorize that in northern Europe, social expectations would be quite high for a quick, or "on time" response. Even in the United States following Hurricane Andrew, the local disaster coordinator was exclaiming "People are dying. Where is the cavalry?" when in fact FEMA had already arrived. Gleick (1999) describes how in American society individuals try to do as many tasks as possible, and as fast as possible. Perhaps his notion of "faster" is worth exploring regarding citizens' expectations of federal, state and local response and recovery activities. For example, one could compare cultural expectations in the United States to those in other geographical regions. Would, using an objective measure of time, response be slower than in the United States or Northern Europe, or Central and South America? Would expectations and perceptions in countries of these regions be different than under their own "normal" conditions? Perhaps an analysis of disaster archives, such as at the Disaster Research Center at the University of Delaware (with about 50 years worth of data) would reveal "faster" expectations in disaster. Put another way, how "fast" is an effective and efficient disaster response and recovery, and what influence may culture have upon these collective expectations?

The use and pace of time is also interwoven with power. In designing new societies, both Comte and St. Simone created calendars in part to maintain social order by controlling time amongst the populace (Coser 1977). Certainly, we are all familiar with the relationship between the length of time a person waits to see another person and power or prestige. The speed of recovery activities following disaster provides a unique perspective to understand issues related to increased vulnerability and power. For example, ethnic minorities, those in lower social classes, and women and children appear to move thorough the recovery process slower than others (Neal 1997; Phillips 2009; Dash, McCoy and Herring 2010; Blinn-Pike 2010).

Next, by drawing upon the ideas of social time, the rhythm of life, and social order, I argue that we can think of disasters as occasions that disrupt our socially defined routinized activities or "rhythm of life." Such social disruptions can occur whether a society operates within event time or clock time. However, those societies that have much more rigid ties to clock time will incur much more social disruption. Furthermore, during more extreme cases of social disruption (which we may call a "disaster"), we would see that different units of analysis (e.g., individuals, groups, communities) would

operate on event time (e.g., tending to activities that need to be done) rather than clock or calendar time (i.e., following a predetermined schedule). Later in the paper, I also show that part of the process of recovery from disaster and a return to "normalcy" specifically hinges on (re)creating a similar or even new predictable rhythm of life. For the purposes of this paper, my discussion will focus upon social disruption of highly routinized settings normally driven by clock time (which would represent most if not all industrialized societies).

Social Time and Social Disruption

Social disruption plays a central role in many definitions of disasters. A traditional starting place for understanding disaster is Fritz's (1961, p. 655) adaptation of Endleman's definition:

> an event, concentrated in time and space, in which a society, or relatively self-sufficient subdivision of a society, undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfillment of all or some of the essential functions of society is prevented.

Two ideas from this definition, although not necessarily in the exact meaning as used above, become key components for this section: time and social disruption. Since I have already discussed the notion of social time related to social order (or the rhythm of day-to-day life), next I will elaborate on social disruption.

Bates and Peacock (1989, 1992) and Stallings (1998) discuss the general notion of social disruption in relation to disaster, but in a slightly different context than this paper (i.e., social time is not a key factor). Yet, their logic, which relates to varying degrees of social disruption and different units of analysis, provides an excellent foundation for my discussion. In addition, I note the idea of "post disaster rituals" as a mechanism for communities to consider the past while moving forward to their new normal (Thornburg, Knottnerus and Webb 2007).

While focusing specifically on the issue of disaster recovery, Bates and Peacock (1989) contend that events in the social environment lead to the organizational or systematic failures. As a result, daily normal patterns of system or organizational behavior become disrupted. Thus, new, *ad hoc* patterns develop to manage the event and assist in bringing matters back to normal. As a result, recovery becomes "the process by which a system which has experienced a structural failure . . . reestablishes a routine, organized, institutionalized mode of adaptation to its post-impact environment (Bates and Peacock 1989, p. 353)." In addition, they stress that researchers must also consider the impacts at different units of analysis. For example, a few households impacted by an

event will not create broader social disruption within a community. However, a much larger scale of impact among many more households will generate much more social disruption—hence an event that we call disaster (Bates and Peacock 1989, 1992).

Although not couched in such ideas as "social time" or rhythm of life explicitly, Stallings (1998) provides additional insight into the relationship among social time, social disruption and disaster. Stallings grounds his discussion in the classical sociological theoretical foundations of Marx, Durkheim and Weber, focusing on the key issues as social order, social change and emergence. Rather than use the word "disruption" due to the multiple meanings it has, he uses the concepts of routines, exceptions and exception routines. Stallings (1998, p. 137) talks about routines as "Actions and interactions repeated routinely provide structure for individual's lives and, in the aggregate, constitute the structure of social systems." His ideas of routines do reflect what social time scholars refer to as the rhythm of life. In relation to disaster, his notion of routines reflects everyday life activities. His second category, "exceptions," reflects patterns of behavior that must change due to a specific event. Units of analysis may be impacted differently by such events. Stallings notes that, at an organizational level, fire departments handle fires and courts handle divorces on a "routine" basis. However, at the individual or small group level, a house fire or divorce are exceptions to daily action. Events that disrupt the routine at the macro level then become "exceptions," resulting in what we may describe as a response to disaster. Stallings' notion of "routine exceptions" reflects a social unit's attempt to handle events that may occasionally occur. As a result, fire departments develop to handle house fires, while local, state and federal emergency management organizations develop to handle disasters (Stallings 1998). Thus, the logic behind Stallings' ideas of routines, exceptions, and exception routines within various units of analyses influences my rationale throughout this paper.

Ritual is another component of the rhythm of life. These rituals help to further provide meaning to day-to-day life, including stability (or social order). When disaster strikes, many rituals may disappear (i.e., "deritualization)." As a result, social participants begin socially constructing new meanings and rituals to provide new meaning and structure to life (Thornburg, Knottnerus and Webb 2007).

Drawing upon the work noted above, in my next section (i.e., Pre-Impact), I describe in more detail the rhythm of life in the context of daily or everyday life, and how macro level entities (e.g., communities, cities) can absorb social disruptions that occur at the micro level. Next, looking at the impact period, I provide empirical examples how occasions can create disruptions at the micro and macro level, resulting in major social disruptions and throwing the rhythm of life out of synchronization. Finally, I discuss the role of social time in understanding the post-impact (or recovery) process.

Pre-Impact

As noted above, social time creates a rhythm of life. This rhythm makes predictability or social order possible on a daily, weekly, monthly and yearly basis among individuals, households, families, groups, organizations and communities. Consider our own daily, weekly and yearly patterns. During the week, we generally awake at the same time and then follow through with the same morning rituals (e.g., use of the bathroom, eating) before we begin our work. We may take the same mode of transportation and the same route to work every day. These similar patterns continue through the week. For many academics, due to our teaching schedules, Mondays, Wednesday, and Fridays may be more similar while Tuesdays and Thursdays may be more similar. At the end of the semester, we settle into another (predictable) set of routines until the start of the next semester. Planned disruptions to these routines, such as holidays (e.g., birthdays, Thanksgiving) or business travel occur. However, we have plans for these events. In short, we can see our daily, weekly, monthly and yearly activities as part of a rhythm of life—a rhythm we generally count on to help manage our lives.

Within this context, certain events may disrupt individual lives. For example, we may lose electricity or water, which interrupts our morning activities. A car accident may interrupt the drive home. On a more personal level, a family member may have a heart attack or a neighbor's house may catch on fire. For a while, the victim's or victims' own daily patterns of activity will change (i.e., are disrupted). Also, those closely associated with the victim(s) may make temporary changes in their daily patterns of behavior. Such events could put a strain on the victim(s) and even victims' primary group's (i.e., family and friends) resources. In some cases, the victim(s) may even die, perhaps creating broader changes for the family and friends of the victim(s). However, outside of the sphere of family and friends, in most cases life goes on normally in the neighborhood, community or society.

Indeed, communities and societies prepare for these types of events that may impact individuals, families or small groups. Various organizations within the public and private sector handle these types of events on a daily basis. For example, fire departments in the United States design their organizations to respond to fires, traffic accidents, small hazardous materials incidents, heart attacks, and similar incidents. Predictable trends help to budget resources and personnel activities. Data show that on a daily basis, the times between 3:00pm and 5:00pm result in the most fire runs. More broadly, mid-afternoon is the busiest time, whereas pre-twilight has the fewest number of runs (Topical Fire Report Series 2007). Certain days of the year also have fire peaks. Holiday events such as the 4th of July and New Year's Day are associated with fireworks and lead to two of the three highest peaks of fire runs on a yearly basis. Warm weather brings people outdoors in the spring, leading to another spike in fires (FEMA 2004). For firefighters, March and April are the busiest months, whereas November is the least busy (Tropical Fire Report Series 2007). In short, the fire community has a strong idea of fire trends on an hourly, daily,

weekly, monthly and yearly basis. These patterns fit a much broader rhythm of life, and are in part tied into holidays, celebrations and the weather.

Other local organizations such as police departments, public works departments, and the utilities all assist handling such emergencies when called upon. Local volunteer organizations (e.g., the Red Cross, Salvation Army) may help feed emergency responders or assist a family affected by the event. Hospitals, especially emergency room staff, also plan for and expect a certain number of patients on a daily basis. At some times (e.g., Saturday nights) they may have additional staff on hand, knowing that the medical needs will be greater than at other times (e.g., Wednesday mornings). Local citizens would express anger if local government and other organizations that participate in emergency response activities could not handle such routine accidents and events.

The types of events noted above do not disrupt the operation of a community. In fact, these emergencies actually become part of the rhythm of life since they too often take place on a generally regular and predictable basis. At the macro level, organizations or communities expect and absorb the disruptions at micro levels. As a result, the micro disruptions have little if any impact upon the rhythm of life at a more macro level (e.g., community). The cold harsh reality is that although individuals or small groups may experience emergencies and specific organizations respond to these events, for the rest of the people within a neighborhood, community, or society, the rhythm of life beats on.

Yet, if an occasion occurs that disrupts social time and the rhythm of life at a more macro level (e.g., such as a community), the normal routine for the community (including individuals, families, groups, and organizations within the community, or put another way, both micro and macro levels) changes dramatically. In fact, such a broad change in the rhythm of life would result in an event that we know of as a disaster or catastrophe. The distinction of social disruption at the micro versus the macro level also highlights a key sociological component of disaster. For example, Mills (1959) differentiates between a "trouble" and an "issue." Let's apply Mills' concepts to this context. If one family's house burns down it is a routine event for emergency response organizations and related businesses (e.g., insurance, clean-up companies, construction companies). For the family, it is a "trouble" or problem, but life continues within the sphere of the community. However, when an event such as a wildfire, tornado, or earthquake destroys 500 homes and a wide range of lifelines (e.g., water, sewage, electrical power, transportation) within a community, an "issue" emerges. The patterns of hundreds of victims are disrupted, but so are the patterns of the complete community. Victims and members of the community must face a much larger set of social problems – problems that impact the whole community and perhaps beyond.

By integrating the ideas of social time, the rhythm of life, units of analysis, and social disruption, I set the stage to then differentiate among the commonly used terms "emergency," "disaster," and "catastrophe" by looking at how various institutionalized routines may become disrupted. When these disruptions are minor and/or are actually

part of the predicted routine within a community, then such events are emergencies. They are part of everyday life. As I show below, when both macro and micro units of analysis become socially disrupted, the occasion then becomes some degree of a disaster. If the level of disruption expands to beyond the community, such as in the cases of Hurricanes Andrew or especially Katrina, then a transition occurs from disaster to catastrophe. Others (e.g., Britton 1986; Quarantelli 2005; Fischer 2008) have already suggested that some form of a "continuum of disaster" exists. Here, I am suggesting that an empirically derived measure of social disruption can capture one dimension of a continuum of disaster.

Thus, this discussion highlights the importance of understanding the pre-impact setting when studying how disasters impact various social units with a community (or even higher units, such as a region or even nation). Specifically, one must understand the pre-impact rhythms of life, including how people and organizations use social time, calendars and schedules, before one can assess the actual impact of a disaster or catastrophe, and how a community then strives toward recovery.

Impact

In the section above, I showed how perturbations impacting the rhythm of life of a few individuals or other small social units (e.g., families, small groups) are part of everyday life and can be called emergencies. Although such daily events may be "troubles" at the macro level, organizations and communities generally are well prepared to manage these events. As a result, the overall rhythm of life continues. In this section, I show how macro social disruptions (coupled with micro social disruptions) in the rhythm of live create situations that lead to what could be considered a degree of disaster or catastrophe.

General Examples

Consider what we may call a disaster of any type in any major community. Before the event, a wide range of interlocking schedules, calendar time and clock time guides behaviors and creates a predictable social order for individuals, families, groups, organizations and communities. Yet, when a disaster occurs, the hourly, daily, weekly, monthly, and yearly schedules for many no longer matter. The situation demands that individuals, families, groups, organizations and communities move from clock time to event time. The event creates a situation that different and/or new sets of tasks and/or social organization (aided by the emergence of new roles and norms) must develop now (i.e., event time) to deal with a new set of demands generated by the event (Dynes and Quarantelli 1968; Dynes 1970). In short, these new activities are not based upon a calendar, schedule or clock (i.e., clock or calendar time). Rather, immediate needs drive

activities such as clearing debris, searching for the living, delivering victims to the hospital, establishing shelters, and providing food for victims and responders (i.e., event time). City officials may cancel other scheduled activities, such as the enforcement of parking tickets, garbage pickup, and recreation league sporting events. These activities become of minor importance since they divert resources needed for the response. As a result, authorities may minimize or cancel these scheduled activities during the initial response. They will direct their personnel and resources to event based needs (e.g., debris clearing, search and rescue, restoration of utilities, setting up shelters, providing food for victims) rather than calendar or clock time activities.

Compare the various events of car accident, medical emergency, or house fire with the social impact I observed during field trips of Hurricanes Andrew or Katrina. As already noted above, in the cases of the car accident, medical emergency, or house fire, the rhythms of life for the community continue with little if any disturbances or problems. By contrast, individuals, families, groups, organizations and various communities impacted in the Miami, Florida, or New Orleans, Louisiana, areas faced enormous disruptions with their rhythm of life. For example, most if not all commerce stopped within these and nearby cities. Jobs vanished. And victims went without shelter and food. People moved from their residences to other abodes. Following Hurricane Andrew in Homestead, Florida, some survivors lived in tent cities for months. In the case of Hurricane Katrina, many survivors relocated out of state. The hurricane's destruction of lifelines also changed totally the rhythm of life. Ruined vehicles coupled with damaged or flooded roads made transportation virtually impossible for days. Some victims and responders went weeks with no electricity, phone service, water, and sewage. As a result, the lack of an infrastructure further disrupted the normal, typical every day routines of the residents. The pre-impact clock time, social calendars and schedules of simple normal activities such as sleeping, eating, drinking water, or using the toilet became major chores. Ironically, in order to establish a new form of social order, or new rhythm of life, victims had to make new schedules for some of these activities. With commerce stopped and schools closed, people had "new time" on their hands to manage.

Not only were individuals' daily routines dramatically altered, the consequences of the storms stripped local emergency response organizations from any type of effective response. Each city and surrounding areas needed large amounts of outside resources to meet the basic needs (e.g., food and shelter) of the victims. Therefore, cities changed their initial priorities to the main provisions of life—food and sheltering. The survival of the communities, the welfare of homeless victims, and the re-establishment of infrastructure highlight just a few of the major priorities. With a lack of resources, and community goals shifting to basic survival, many day-to-day local government and business operations ceased to exist. In some cases, the personnel and equipment were not available. Due to the destruction, some people could not get to their jobs right away. Even if people could travel, jobs did not exist.

When disaster strikes, those in the impacted area, whether individuals, families, groups, organizations or other configurations, transition from social time to event time. These entities no longer engage in actions based upon a calendar, schedule or clock. Rather, behavior becomes focused on a completely new set of tasks generated by the disaster—and the sooner (i.e., the pace quickens) those tasks are accomplished, the better. *When disaster strikes, event time trumps clock time*.

To summarize, two interrelated social time events occur when disaster strikes. First, the rhythm of life becomes disrupted at both a micro (e.g., individual, household) and macro (e.g., organizations, community) levels. Second, the generation of unmet needs and new social priorities creates a major change from clock time to event time. In order to meet the immediate needs generated by the unmet needs (e.g., search and rescue, sheltering victims, clearing road debris), day-to-day and weekly schedules become irrelevant during disaster. Yet, as the event proceeds, new schedules emerge, combining both event time activities and emerging new schedules during the response in order to manage the event. The search to mobilize new resources (and the creation of emergent groups to assist with this and other processes) eliminates pre-impact schedules, calendars and rhythms of life which, in turn, creates a whole new—albeit temporary—rhythm of life. Then finally, as I discuss in the post-impact section, a community strives to transition back to a semblance of its pre-impact rhythms.

Some Empirical Examples of Social Time during Disaster

Social time has generally not been a part of theoretical or empirical discussion regarding disasters. However, a few studies have integrated the idea of the rhythm of life, time, and social disruption to understand disaster. Below, I discuss these few empirical studies that look at the notion of social time and social disruption. One looks at how citizen populations adjust to war and potential bombings, while two others describe the transition from social disruption to a reacquisition of a pre-impact rhythm of life during post impact or recovery phase following a tornado and volcano.

War and the Interrupted System. Kimmerling (1985) looked at the unique situation in Israel and how civilian society responds to the "interruption" of war. While primarily focusing upon the 1973 war, he also integrated observations and data from the 1967 and 1982 Israeli conflicts. Since much of disaster research was initially grounded in preparedness and response to war (e.g., Quarantelli 1987), Kimmerling's observations fit well with the theme of this paper. Specifically, Kimmerling (1986, p. 84) looked at how the 1973 war influenced individuals' and families' routine activities. A few of the routine activities continued or increased over time (e.g., prayer, listening to the news, taking medication smoking, reading the newspaper). However, a large number of activities (often associated with a specific time of day) significantly decreased (e.g., sleep, studying, handicrafts, traveling) during the war. A few specific activities had rather large

decreases (e.g., regular eating, meeting friends, cleaning one's home, care for personal appearance, reading books). Kimmerling's (1985, p. 113-114) detailed analysis led to the following conclusion:

> In times of social interruption, most of the activities (except for going to work and prayer) become marginal – even in terms of the complementary goal-and indeed there was a general tendency in the system to appeal for a moratorium (to a differential extent) from the fulfillment of various routine roles, which indeed aided in maintaining the individual's "cosmic order," but whose contribution to the systems upkeep seems to have been perceived as marginal.

Social Disruption and Disaster Phase Transition. Perry and Lindell's (1986) analysis of the volcano threat around Mt. Saint Helens touched upon household routine and disruption. The community of Toutle, Washington, suffered more damage from the volcano than did Lexington, Washington. As a result, only 24% of the Toutle residents believed that the volcano did not impact their household routine. On the other hand, almost 56% of the Lexington residents believed the volcano did not disrupt their household routine. In fact, not one Lexington resident responded that their routine was significantly disrupted, whereas almost 13% in Toutle believed so. The authors suggested that the volcano threat created a situation where new behaviors and beliefs were needed to cope with the new threat. As a result, what had been a disruptive situation had become a way of life.

While also documenting that response and recovery phases are not discrete events, I drew upon social disruption and the time it took for "normal" services to return to a community following a tornado (Neal 2004). In describing the transition from response to recovery, I used a wide variety of activities and events to "mark time" in understanding when response started and ended, and when recovery began. Some examples of these events and activities include:

- the opening and closing of a command post
- the sheltering of victims
- the beginning and ending of search and rescue activities,
- the disruption and restoration of electricity, phones, gas, water and sewer service
- establishment and demise of a curfew
- beginning and ending of volunteer organizations assisting the community

This paper has notions of social time and event time embedded within its findings. First, I showed suggested that some events must finish (e.g., road debris cleared) before other events (e.g., re-establishment of electrical power) can begin. Thus, how well or

poorly authorities manage one issue can affect following events. Second, my data documented clearly that response and recovery activities overlap. Put another way, we cannot pinpoint the exact time when response ends and recovery begins. As a result, I contend that asking questions such as "how long will it take to recovery" may not be appropriate.

Improvisation, Role Conflict and Social Time. The concepts of improvisation and role conflict also relate to social time, disruption and, disaster. Social schedules define the day's activities for people. Within these schedules, people take on specific roles. For example, 6:00 a.m. to about 8:00 a.m., one could have the role of parent. From 8:00 a.m. until noon, one would have a professional role (e.g., professor). Lunchtime could mean a planned lunch with one's significant other. Such schedules and calendars may diminish opportunities for spontaneous behavior (Zerubavel 1981, p. 47-49). Yet, as research shows, when disasters strike, people and individuals must abandon their pre-disaster schedules and roles to deal with the new tasks. Put another way, they must improvise (Webb 1998; Kendra and Wachtendorf 2003; Mendonça and Wallace 2004). Whereas rigid schedules and a lack of spontaneity drive everyday life, disasters destroy scheduled events and force spontaneous behavior and improvisation based upon newly developing needs.

Role conflict and abandonment in disaster emerged as a controversial issue regarding the development of nuclear power plants following the Three Mile Island incident in 1979 (Dynes 1986). The issue still arises at times in regard to disaster planning and response. Although grounded in a long line of sociological research, role conflict is actually another example showing how schedule, social time and social disruption all intersect (McGrath 1988). For example, emergency responders cannot be at different places at the same time look after their families and do their professional jobs. Not only is this a matter of role conflict, but actually time conflict. Their schedules during disaster suddenly overlap, and as Dynes (1986) clearly demonstrates, the professionals tend to their jobs. Yet, these professional do not abandon their jobs, or their families. Informal mechanisms and networks keep families and responders in touch. In summary, the management of role conflict in disaster is actually another example of how social disruption and the use of social time can be used to understand what occurs during disaster impact.

Post-Impact

For this paper, I define the post-impact period as the process of various social units moving back to the new normal rhythm of life in part through clock and calendar time (rather than event time). Post-impact research has generated some of the more explicit examples of (social) time, generally under the rubric of "recovery." In the first part of this section, I will discuss how research on the recovery phase has shown that sub-stages of recovery appear to go through different (and overlapping) steps, and that these steps

may appear at different rates of speed. Thus, using objective time, one type of event may move through recovery more quickly or slowly than others. Furthermore, different segments of society or individuals (based such factors as social class or ethnicity) may move more quickly or slowly through various phases of recovery than others. Second, I apply a term from the social time field, *entrainment*, to provide additional insight on how social time is useful for understanding post-impact events. In this case, when events may shake or shatter the rhythm of time or an individual, group, or community, these entities have a natural tendency to return to pre-event patterns.

Post-Impact Empirical Studies

Trainer and Bolton (1976) compared the recovery process following the Managua earthquake and Rapid City flood. In my view, their analysis is one of the first that explicitly touches upon the importance of social time and social disruption. They noted that during recovery, daily routines may be difficult to reestablish based upon strong norms to assist other family members. In addition, they discussed "temporal constraints" that further disrupt the efforts to return to a normal routine. For example, attempts to repair or clean one's home, find new housing, search for a job, and travel further for a job all prevent victims from quickly returning to their pre-disaster rhythm of life.

A practical question often asked is, "How much time does it take to recover from a disaster?" Although some may toss around certain figures in weeks, month, or even years, that is not the real question to ask. Rather, recovery appears to have a specific sequence or processes of events that must occur. Depending on the case or situation, recovery can literally last from a few weeks to years. For example, Kates and Pijawka (1977) discussed not the time of overall recovery, but the pace of recovery. They devised a "period of response" with four stages: emergency, restoration, reconstruction I and reconstruction II. Simply, for recovery to begin and end, these stages must occur in this order (while also noting that some overlap will occur between each stage). Drawing upon four disasters (1906 San Francisco Earthquake, 1964 Alaskan Earthquake, 1972 Nicaragua Earthquake, 1972 Rapid City Flood), they made some relevant observations regarding the pace of recovery (and by implication the response). The authors noted that the time each phase takes is in part contingent upon how large the disaster is, but other factors do intervene. Specifically, Kates and Pijawka (1977, p. 20-21) stated:

> Reconstruction for functional replacement will be 100 times the emergency period – for most disasters it takes between two and eight years. Monumental commemorative, betterment, or development construction might lead to a doubling of the required time. It is not entirely clear why this is so, except that the length of the emergency period serves

> as both a measure the magnitude of damage and the potential social response.

By implication, their data suggests that the life cycle of disaster has further embedded within it, its own "rhythm."

Although a disaster interrupts the rhythm of life, what occurs when and after disaster strikes has its own rhythm. As noted above, Kates and Pijawka (1977) showed this notion associated to recovery. Quarantelli (1982) observed these patterns (i.e., emergency shelter, temporary shelter, temporary housing, permanent housing) regarding the different types of shelter and housing patters that cut across the response and recovery phases. Studies by Bolin (1982) and Phillips (1993) documented these general sheltering and housing patterns during other disasters, and that these stages or phases cut across what we would call impact and post-impact (or response and recovery) phases. In addition, these studies also suggested that different groups of people, based upon such factors as class or ethnicity, move through these categories at different rates of time. In short, the process of sheltering and housing has its own life cycle and these cycles exist within the broader context of recovery, which in turn exists with the broader cycle of the four phases of disaster. I find it quite suggestive that the phases of sheltering and housing cut across the impact and post-impact (or response and recovery) categories. Perhaps other sub-categories may exist within (or across) the impact and response categories that we have not yet uncovered. Or, even consider the notion of "warning," that begins during the end of the pre-impact phase in some cases (e.g., hurricanes, tornadoes), while in other circumstances does not begin until just after the actual impact (e.g., earthquakes, explosions). That disasters may have their own life cycle, and that they may then move back to a "pre-disaster" rhythm, leads to the next section of this paper.

Returning to "Normal"

Eventually, almost all communities recover from disaster. Members of communities orient their tasks and activities toward getting back to a (new) normal. Below, I discuss two processes that assist with the process toward normal—entrainment and disaster anniversary events.

Entrainment A term borrowed originally from the and still salient within the biological sciences, entrainment involves different entities getting their own particular rhythms in synch. In biology, entrainment occurs when "one cyclic process becomes captured by, and set to oscillate in rhythm with, another process" (McGrath and Kelly 1986, p. 80). The authors use the example of jet lag, and how the body's cells and functions get out of synch with the new time zone, but then slowly adjust.

Generally, scholars have used entrainment in microbiology, animal behavior, and even individual human patterns of behavior getting synchronized again. However, it

appears that except for McGrath, scholars have not focused upon entrainment regarding broader human social behavior. Let me describe how social entrainment may help us understand the process of returning to pre-event patterns. Various social units (e.g., individuals, groups, communities) all have different rhythms. These rhythms can be social (e.g., work, rest, regeneration) or biological (e.g., birth, maturation, puberty, etc.), ranging from micro (e.g. cellular) to macro (e.g., community yearly cycles). Some event can last for just a few seconds, to a month, if not longer. When two units are together, key rhythms often synchronize with each other. One social example is communication patterns. A key part of entrainment is that these social rhythms or cycles can be disrupted. At a micro level this may include, talking, motor capabilities, gaze and body movements. At the macro level, this could be how social systems stay in synch with other systems. As a result, the rhythm or cycle for that event becomes disrupted, and an attempt to return to a rhythm occurs. What is of interest here, is the idea that an "occasion" can disrupt or jolt the system, knocking it out of synchronization. Afterwards, the system attempts to return a cycle or pattern similar to earlier ones (Hall 1983; McGrath and Kelly 1986). Certainly, these illustrations could present a wide range of conceptual and empirical areas of exploration. However, taking such an approach comes with a warning. Early attempts at understanding society and "social systems" first adopted a biological model. Yet, as social scientists and others discovered later, using a strict biological model presents a static and rather conservative view of human and systems behavior and should not be applied to human organized settings. Thus, if one draws upon the notion of entrainment for this line of research, one must also be aware of and avoid the strict biological metaphor.

Certainly, one can make an argument that entrainment occurs following disaster. Once recovery begins, the goal often seems to be to "get things back to normal." Such activities may include the mundane (but actually quite important) such as getting the garbage picked up on a regular basis, to businesses and schools operating on their regular pre-disaster schedule. Overall, I believe that entrainment should be used to further understand the recovery process of disaster, and be used as a means to understand when recovery is complete. One would look for the rhythm of life returning to some degree of normalcy while also coming as close as possible to the pre-disaster rhythm of life. The amount of social change from the disaster would be a comparison of "normalcy" of the rhythm and patterns of life before and after the disaster.

Disaster Anniversaries. Over the past 20 years or so, we have seen that communities often have one week, one year or even five-year "celebrations" to commemorate a disaster. Some suggest that these anniversaries reveal more than just a marking of time. Forrest (1993) argued that, although disaster anniversaries may mark the date of an event, they become important when these anniversaries create a social time perspective of disasters. During these events, people share memories and experiences. Disaster anniversaries, he shows, help to create a collective memory. Anniversaries also produce a

sense of community among members that survived the event. As a result, the past (i.e., the disaster event) may actually become redefined. Studying the five year anniversary following the Loma Prieta Earthquake, Phillips and Hutchinson-Ephraim (1995) suggested that disaster anniversaries provide a signal that it is time to "move forward" rather than staying stuck on the consequences of the disaster.

Typically, we do not see these commemorative events after five years time (obvious exceptions of course exist, especially with major events such as the 10-year anniversary September 11 terror attacks). Calendar time (i.e., the same month and day, and on some occasions the exact time of the event) marks the event, rather than how far the community has progressed in the recovery or back to normal process. Yet, such events give people time to think to what degree they have recovered, and how much further they have to go. Perhaps these disaster anniversaries are part of the entrainment process to demonstrate that the rhythm of life is headed back to normal. Disaster anniversaries force various publics to look into the past and future regarding risk, hazards, disasters, mitigation. Finally, both in its own right and within the context of disaster and time, the aspect of disaster anniversaries is a topic worth additional study.

Some Final Implications

In this paper I have shown that the application of social time and social disruption to disaster settings (i.e., pre-impact, impact, post-impact) along can provide a unique way to understand disasters. First, by integrating the ideas of event time, social time, and social disruption, we can develop a foundation for creating an empirically based continuum of everyday life/emergency, disaster, and catastrophe. An implication of this approach is that we use specific social criteria (based upon social disruption via the various time concepts) to define the event. As a result, drawing upon social time and social disruption casts a rather wide net in understanding events what we call disaster. Occasions such as tornadoes, chemical disasters or other similar events would fall under these categories, but so could political assassinations, riots, and other events. Consider Friday, November 22, 1963, in the United States. Time metaphorically stood still from early Friday afternoon (following the reports of the initial shots and the President's death) through Monday evening (with the end of the funeral). Most people sat in front of the television waiting for new bits of information. Almost all other weekend events and activities ceased. The use of social time may also give us a unique view on understanding slow moving disasters (e.g., environmental events, famines and droughts) when compared to sudden impact events. Social time and social disruption provides tools to define disaster without making assessments (i.e., good/bad) of the event.

As previously noted, the word disaster has become a "sponge concept" in that it soaks up many different meanings—from the vernacular to the scientific (Quarantelli and Dynes 1977). However, the use of clock and calendar time with social disruption takes us

beyond everyday language (e.g., disaster, hazard, tornado, flood, explosion, terrorist attack, war, riot, deaths, economic loss) and provides a means to put such occasions a continuum. Thus, we can use the "degree of social disruption" (i.e., emergency, disaster, catastrophe) as a variable to better understand the social impacts of these types of events.

Second, I believe that the concept of entrainment could open new doors for understanding post-impact behavior, or the transition from post-impact to pre-impact (or everyday) behavior. This may include how an impact "shocks" a wide array of social units (e.g., individuals, groups, families, organizations, communities, societies), how new definitions of time are used during recovery, and how these units attempt to revert back to their pre-impact patterns and rhythms of social time. Rather than using economic, demographic, familial or other measures of social change, entrainment could be a key measure in understanding social change and disaster. For example, one could determine and compare pre-impact and post-impact social time rhythms among various units of analysis to determine social change. Drawing upon such variables as age, social class, ethnicity, and gender, once could further hypothesize and analyze which groups return to their pre-impact rhythm of life.

Third, in order to capture the complete disaster process, researchers need to focus more on obtaining data during the pre-impact or "everyday life" periods. Otherwise, we cannot pinpoint the actual degree of social disruption when an event occurs, or even make an accurate comparison to determine when different groups or categories of people complete the recovery process. Asking respondents about their pre-impact patterns of behavior certainly is one step in the right direction. Yet, I believe finding existing non-obtrusive measures could yield further insight into the relationship between disaster and social time.

Drawing upon Perry and Lindell's (1986) work, one could also determine how such shocks to the system then become routinized or institutionalized—or just ignored. Although I cannot find the original citation, I remember sitting in my undergraduate collective behavior class hearing my professor (Joseph B. Perry, Jr.) describe how during World War II, London residents became used to the bombings by the Germans. After the initial series of bombings, when the air raid sirens went off, the population stopped what they were doing, went to the shelters, then remerged from the shelters, engaged in fire fighting and search and rescue work, and then went back to their other routine. Put another way, behavior that initially was new and disruptive, later became routinized and institutionalized during times of crisis.

Finally, I need to point out and address a conundrum noted at the beginning of this paper. In order to create an organized structure to present these ideas, I drew upon a rather simple set of categories to represent disaster stages (i.e., pre-impact, impact, post-impact). Yet, the use of these (or other life cycle of disaster categories) failed to provide a good analytical basis for understanding the process of time and disaster. Probably the

most salient issue is that events cross categories (or put another way, the categories are not mutually exclusive for specific events). The organization of this paper encountered this problem. Thus, as I pointed out over a decade ago (Neal 1997), it is time for us to devise a new set of categories or a new way to look at time and disasters. In short, perhaps we need to look beyond the use of "life cycle" stages. Or, using a grounded theory approach (rather than march into a research setting with a pre-existing notion of ideas and concepts), enter communities or the field asking questions about activities, priorities and having those impacted and/or participating in the disaster event provide their own notion of time and events. From such work, we could then devise empirically derived notions of social time direct from the field. Such a fresh approach possibly improves a wide range of conceptual issues in disasters and hazards. In addition, such an approach would give us insights on how disaster managers, emergency responders, and disaster victims (recognizing that these "roles" may overlap in some cases) see, use and experience time. This, in turn, could assist with a number of applied issues (e.g., warning, effective "response," priorities in "recovery") throughout the process of disaster.

Overall, I have made this broad conceptual paper on disaster and social time suggestive rather than definitive. Hopefully, I have successfully sensitized those in the field of disasters, hazards and risk to consider including a wide array of social time issues in their analysis. Previously, scholars have generally ignored any notion of time. Now, we need to make *explicit* our use of time in understanding disaster. Such an application, I believe, will give us a much deeper understanding on defining disaster, how and why such events unfold, and how various social entities attempt to return to normal after the event. Finally, the use of social time in disaster can provide sociologists a deeper look into understanding key theoretical issues related to social order, social change and social emergence, along with voluntaristic versus deterministic patterns of behavior among various units of analysis.

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