Somatoform Epidemics

as Emergent Collective Behavior

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Section A

Historical Examples and Outline
Breughel, Dance at Molenbeek, 1564
Hondius, Woodcut of Breughel’s Drawing
Hondius, Woodcut of Breughel’s Drawing
Brouillet, Clinical Lecture at the Salpetriere
Social Transmission and Collective Behavior

- Transmission—reproduction of a behavior after social interaction
- Collective behavior—coordinated interaction not based on pre-existing norms, roles, or institutions
- Examples—riots, panics, fads, social movements

Continued
Social Transmission and Collective Behavior

- Transmission—reproduction of a behavior after social interaction
- Collective behavior—coordinated interaction not based on pre-existing norms, roles, or institutions
- Examples—riots, panics, fads, social movements
- Social theories for collective behavior
  - Strain
  - Contagion
  - Structure
  - Emergent norm
Social Transmission and Collective Behavior

- Transmission—reproduction of a behavior after social interaction
- Collective behavior—coordinated interaction not based on pre-existing norms, roles, or institutions
- Examples—riots, panics, fads, social movements
- Social theories for collective behavior
  - Strain
  - Contagion
  - Structure
  - Emergent norm
- The somatic reservoir of non-specific complaints and behaviors
Social Transmission of Bizarre Behaviors

- Short term epidemics
  - Dancing manias
  - Fainting
  - Ideas—windshield pitting
  - Fear—harbor city
  - Somatic complaints—June bug
  - Review of 140 epidemics
  - Recent examples—Coca Cola, itching
Social Transmission of Bizarre Behaviors

- Group-based mechanisms— influence
  - Autokinetic effect
  - Group conformity
  - Perception of unanimity
- RESCITE model
Social Transmission of Bizarre Behaviors

- Chronic epidemics
  - Chronic fatigue
    - Germs or beliefs?
  - Gulf War
    - Indiana outbreak
    - Questionnaire and responses
    - Onset
    - CCEP
  - Other possible examples
    - Multiple chemical sensitivities
    - Sick building syndrome
- Group effects—attribution theory
  - Fundamental attribution error
  - Self attribution
  - Insufficient justification
- RESCITE model
Section B

Three Exemplar Epidemics: Windshield Pitting; Harbor City; June Bug
Seattle Windshield Pitting Epidemic

Newspaper Coverage

Source: Adapted from Medalia and Larson (1958)
Beliefs about Windshield Pitting

- Unsure
- Ordinary road wear
- Atomic test
- Vandalism
- Industrial air pollution
- Hysterical beliefs
- Meteor dust
- Cosmic rays
- Sand fleas
How Many Actually Observed Windshield Pitting?

- Percent who actually observed windshield pitting damage
  - Males—8%
  - Females—3%
Interest versus belief

Atomic cloud as transient cause

“Acute outbursts of mass delusion are not necessarily self-limiting. Interest and belief in a phenomenon for which no scientific basis can be found may well persist for periods of time even in a culture presumably committed to science as the ultimate test of reality.”

Source: Medalia and Larson, ASR, 1958
Harbor City School Epidemic

- Headache—57%
- Nausea—52%
- Dizziness—51%
- Abdominal pain—51%
- Other < 30%

Continued
Harbor City School Epidemic

- Headache—57%
- Nausea—52%
- Dizziness—51%
- Abdominal pain—51%
- Other < 30%

- Any = Transmission completion rate—77%
News Reports about the June Bug

- Wednesday 6 pm—officials at Montana Mills shut down their Strongsville plant this afternoon because of a mysterious sickness... severe nausea and a breaking out over the body... Some kind of insect...

- Wednesday 11 PM—200 employees... apparently an insect...

- Thursday—the mill opened after a night of debugging... diagnosis is still hanging fire...

- Friday—two experts from the U.S. Communicable Disease Center... searched the plant...
Saturday—among the specimens was a small chigger-like bug. . . . The press has played the “mystery malady angle too much. . . .” State Health official—“we don’t question that some of these people have been bitten . . .”

Sunday—nervous disorder, publicity, and lastly, a bug’s bite caused the outbreak of a “very real” sickness

Monday—business is back to normal . . . as one exterminator put it—“what has been here ain’t here now.”
Evidence of Strain among Cases in the June Bug Epidemic

- Cases were more likely to . . .
  - Be working overtime
  - Avoid their supervisors
  - Notice variation in output between individuals
  - Be the major breadwinner in the family
  - Have small children
<table>
<thead>
<tr>
<th>Friendship Status of Cases</th>
<th>Period of Occurrence for Cases Percentages (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Takeoff Period</td>
</tr>
<tr>
<td>Isolated (n = 56 cases)</td>
<td>83 (6)</td>
</tr>
<tr>
<td>Choosing Cases (n = 83 choices)</td>
<td>46 (11)</td>
</tr>
<tr>
<td>Chosen by Cases (n = 78 choices)</td>
<td>0 (2)</td>
</tr>
</tbody>
</table>

Source: Data from Kerckhoff and Back, The June Bug, 1968
**Review of 140 Short-Term Emotional, Delusional, or Somatoform Epidemics, 1872-1993**

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Epidemics</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>69</td>
<td>49</td>
</tr>
<tr>
<td>Town or Village</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>Factory</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>Hospital or Institution</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

**Number of People Ill**

<table>
<thead>
<tr>
<th>Number of People</th>
<th>Number of Epidemics</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10 People</td>
<td>29</td>
<td>21</td>
</tr>
<tr>
<td>10-30 People</td>
<td>38</td>
<td>27</td>
</tr>
<tr>
<td>&gt; 30 People</td>
<td>63</td>
<td>45</td>
</tr>
<tr>
<td>Unknown</td>
<td>7</td>
<td>5</td>
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</table>

**Gender of Ill People**

<table>
<thead>
<tr>
<th>Gender of Ill People</th>
<th>Number of Epidemics</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>All Female</td>
<td>68</td>
<td>48</td>
</tr>
<tr>
<td>Males and Females</td>
<td>60</td>
<td>43</td>
</tr>
<tr>
<td>All Males</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Unknown</td>
<td>7</td>
<td>5</td>
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**Age of Ill People**

<table>
<thead>
<tr>
<th>Age of Ill People</th>
<th>Number of Epidemics</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>&lt; 20</td>
<td>65</td>
<td>46</td>
</tr>
<tr>
<td>20-40</td>
<td>17</td>
<td>43</td>
</tr>
<tr>
<td>All Ages</td>
<td>28</td>
<td>3</td>
</tr>
<tr>
<td>Unknown</td>
<td>29</td>
<td>5</td>
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</table>

**Duration**

<table>
<thead>
<tr>
<th>Duration</th>
<th>Number of Epidemics</th>
<th>Percent</th>
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<tbody>
<tr>
<td>&lt; 3 Days</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>3-14 Days</td>
<td>45</td>
<td>32</td>
</tr>
<tr>
<td>15-30 Days</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>&gt; 30 Days</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>Unknown</td>
<td>21</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: Data from Eaton, Sociology of Mental Disorders, 2001.
Section C

Experimental Data on Group Influence
1. Enter the classroom
2. Very, very dark
3. A light appears
How far did the light move?
Social Influence on Formation of a Norm: How far did the light move?

Estimated Movement of Light with Individual Session *First*

- **Subject A**
- **Subject B**
- **Subject C**

Chart showing movement of light for individual and group sessions.
Social Influence on Formation of a Norm: How far did the light move?

Estimated Movement of Light with Individual Session Last

- **Subject A**
- **Subject B**
- **Subject C**

Group (1)  | Group (2)  | Group (3)  | Individual
---|---|---|---

0  | 0  | 0  | 0
0.5 | 0.5 | 0.5 | 0.5
1  | 1  | 1  | 1
1.5 | 1.5 | 1.5 | 1.5
2  | 2  | 2  | 2
2.5 | 2.5 | 2.5 | 2.5
3  | 3  | 3  | 3
3.5 | 3.5 | 3.5 | 3.5
4  | 4  | 4  | 4
Asch Group Conformity Experiment

Standard Line

Comparison Line
Theoretical Summary So Far

- **From Sociology**
  - Strain
    - External problem
    - Event leader
  - Contagion
    - Imitation/suggestion
  - Structure
    - Schools!
  - Emergent norm

- **From Social Psychology**

Continued
Theoretical Summary So Far

- **From Sociology**
  - Strain
    - External problem
    - Event leader
  - Contagion
    - Imitation/suggestion
  - Structure
    - Schools!
  - Emergent norm

- **From Social Psychology**
  - Definition of group
  - Autokinetic effect and creation of a norm
  - Influence of strong majority
  - Perception of strong majority
Section D

The RESCITE Model
The Problem of Directing Behavior

Problematic Situation

Expected Probability of a Given Response

High

Low

Situation of Everyday Life

Possible Responses

A  B  C  D  E

Possible Responses

A  B  C  D  E

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**Rescite Model**

- Responsive Emotional Schemata
- Convergence of Models and susceptibles
- Initiation of Problem Solving
- Transmission to susceptibles
- (Resolution or)
- Endurance
Convergence 4/15

Models

Early Susceptibles

Late Susceptibles

Arrow = individual behavior
Red Arrow = individual behavior is the RES

Continued
### RESCITE Model of Somatoform Epidemics

#### Models

<table>
<thead>
<tr>
<th>Convergence 4/15</th>
<th>Early Susceptibles</th>
<th>Late Susceptibles</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="chart1.png" alt="Chart" /></td>
<td><img src="chart2.png" alt="Chart" /></td>
<td><img src="chart3.png" alt="Chart" /></td>
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#### Initiation 6/15

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<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Initiation</strong>&lt;br&gt;6/15</td>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Transmission</strong>&lt;br&gt;9/15</td>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
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*Continued*
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<td>![Diagram]</td>
<td>![Diagram]</td>
</tr>
<tr>
<td><strong>Resolution</strong> 4/15</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
</tr>
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</table>

*Continued*
How to Stop an Epidemic

- Dismember the group
  - Behavioral
  - Mental
- Generate a counter-norm
Acute Epidemics—Summary

- Somatoform epidemics are rare but regular
- Somatoform epidemics often involve young women
- Populations are heterogeneous, consisting of models and reactive susceptibles
- The social structure of the epidemic evolves
- The behavior or complaint is non-specific and subjective
- Only a small proportion actively demonstrate the target behavior or complaint
- The science of group behavior is relevant
- Usually the epidemics are self-limiting
Section E

Examples of Chronic Epidemics
Defining Chronic Fatigue Syndrome

For various reasons, including overwork, insufficient rest, and the presence of physical illness, millions of people suffer from chronic fatigue, but only a minority of these have what has come to be called chronic fatigue syndrome. To aid physicians at arriving at a diagnosis of C.F.S., in 1994 the United States Centers for Disease Control and Prevention outlined these criteria:

**Severe unexplained fatigue for over six months that is:**

- Of a new or definite onset.
- Not due to continuing exertion.
- Not resolved by rest.
- Functionally impairing.

**And the presence of four or more of the following new symptoms:**

- Impaired memory or concentration.
- Sore throat.
- Tender lymph nodes.
- Pain in several joints.
- New pattern of headaches.
- Unrefreshing sleep.
- Post-exertional malaise lasting more than 24 hours.

Source: The CDC
Fatigue as most subjective of symptoms
19th–20th century—nervous exhaustion, soldier’s heart, neurasthenia
Myalgic encephalitis (ME) and polio as symbolic template
Epidemics in Los Angeles, U.K., South Africa, Malaysia, etc.
Absence of ME epidemics in U.S. for 20 years
Chronic Fatigue—Recent History

- Lake Tahoe as the “seed” epidemic
- New interest in immune system in medicine
- Interest from Congress
- CDC as verifier of disease status
### Selected Symptoms of the Chronic Fatigue Syndrome

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistent Fatigue</td>
<td>23.7</td>
</tr>
<tr>
<td>Not Explained by Illness or Drugs Which Disrupts Normal Activities</td>
<td>13.9</td>
</tr>
<tr>
<td>General Muscle Weakness</td>
<td>8.7</td>
</tr>
<tr>
<td>Muscle Discomfort</td>
<td>18.0</td>
</tr>
<tr>
<td>Headache</td>
<td>20.5</td>
</tr>
<tr>
<td>Joint Pain</td>
<td>29.2</td>
</tr>
<tr>
<td>Sleep Problems</td>
<td>25.6</td>
</tr>
</tbody>
</table>

Source: Data from Price et al, PHR, 1992
Despite extensive research, no germs are connected to chronic fatigue

Despite extensive research, no genes are connected to chronic fatigue

Despite extensive research, no kinesiologic characteristics connected to chronic fatigue

Repeated findings of belief in a physical cause predicting chronicity of fatigue

Caution—in individuals, fatigue is caused by many things!
Why Doesn’t the Epidemic Stop?

- Dismembering the group?
  - CFIDS Association, ME Associations
  - CFIDS Honor Roll of Physicians
  - Psychiatrists as the enemy

Developing a counter norm?

- “It will prove difficult to totally dispense with this [immune function] model because negative studies are never viewed as conclusive, because periodically we discover new candidate microbes, and because technology affords ever more sensitive means of detecting and studying them, but the concept will languish for lack of rigorous support, as have so many other earlier models of chronic fatigue”
INVESTIGATION OF A SUSPECTED OUTBREAK OF AN UNKNOWN DISEASE
AMONG VETERANS OF OPERATION DESERT SHIELD/STORM
123rd ARMY RESERVE COMMAND
FORT BENJAMIN HARRISON, INDIANA, APRIL, 1992

15 June 1992

MAJ Robert F. DeFraites MC*
MAJ E. Robert Wanat II MC**
MAJ Ann E. Norwood MC†
MAJ Stephen Williams DC††
MAJ David Cowan MS*
SPC Timothy Callahan†

Epidemiology Consultant Service (EPICON)
Division of Preventive Medicine
Walter Reed Army Institute of Research
Washington, DC 20307-5100

*Division of Preventive Medicine, Walter Reed Army Institute of Research
**Occupational and Environmental Medicine Division, U. S. Army Environmental Hygiene Agency
†Department of Psychiatry, Uniformed Services University of the Health Sciences
††Department of Oral Pathology, Armed Forces Institute of Pathology
MEDICAL SURVEY FOR DESERT SHIELD/STORM TROOPS

NAME: ______________________  GRADE: ______________________  DOB: ______________________

68 DAYS IN SWA 711

PLACE OF DUTY IN SWA: ______________________

PRESENT UNIT OF ASSIGNMENT: ______________________

UNIT OF ASSIGNMENT IN SWA: ______________________

1. DO YOU SUFFER FROM HEADACHES/HOW OFTEN/TO WHAT DEGREE? No

2. DO YOU HAVE NOSE BLEEDS/HOW OFTEN/TO WHAT DEGREE? No

3. DO YOU HAVE EARACHES/HOW OFTEN/TO WHAT DEGREE? No

4. DO YOU HAVE ANY HEARING LOSS/HOW OFTEN/TO WHAT DEGREE? No

5. DO YOU HAVE ANY HAIR LOSE/HOW OFTEN/TO WHAT DEGREE? No

6. DO YOU HAVE PAINFUL OR ACHY JOINTS/HOW OFTEN/TO WHAT DEGREE? No

7. HAVE YOU SUFFERED FROM DIARRHEA/HOW OFTEN/TO WHAT DEGREE? Yes!

Bacteria of Colon | 4 days | Moderate

8. HAVE YOU SUFFERED FROM NAUSEA/HOW OFTEN/TO WHAT DEGREE? No

9. HAVE YOU SUFFERED FROM CONSTIPATION/HOW OFTEN/TO WHAT DEGREE? No

10. HAVE YOU SUFFERED FROM INTESTINAL DISCOMFORT/HOW OFTEN/TO WHAT DEGREE? No
35. HAVE YOU SUFFERED FROM FEELING OF ANXIETY OR FEELING OF PHOBIA (SU
PANIC, SUDDEN FEAR, SUDDEN OUT BURST, UNABLE TO CONTROL YOUR TEMPER) OR TOLERANCE FOR LOVED ONES) / EXPLAIN WHAT APPLIES TO YOU / HOW OFTEN / TO WHAT DEGREE? Daily / No Known Cause

36. FEMALES ONLY. HAS YOUR MENSTRUAL CYCLE CHANGED ANY / TO WHAT DEGREE? N/A

37. DID YOU TAKE THE ANTHRAX SHOT IN SHA / APPROXIMATE DATE? Yes / Jan

38. WHERE ENCAMPED NEAR (WITHIN A 4 MILE RADIUS OF A) COMMUNICATIONS CENTER AND MICROWAVE DISHES / WERE THE DISHES ON A GROUND LEVEL OR SET UP ON TO LONG / WHERE WERE YOU ENCAMPED? ____________________________

39. DID YOU HAVE DOGS, CATS, CAMELS, SHEEP, DESERT RATS, OR ANY OTHER ANIMAL AROUND YOU / HOW OFTEN / WHAT WAS (WERE) THE ANIMAL (S)? Yes / Dog / Camels / Sheep / Desert Rats / Daily

40. DID YOU TAKE THE NERVE AGENTS PILLS THAT WERE GIVEN BY THE GOVERNMENT / MANY / HOW LONG? Yes / 3-4 pills / Two days
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue (in percent)</td>
<td>70.9</td>
</tr>
<tr>
<td>Sleep disturbance</td>
<td>57.0</td>
</tr>
<tr>
<td>Forgetfulness</td>
<td>54.4</td>
</tr>
<tr>
<td>Pain in any joint</td>
<td>54.4</td>
</tr>
<tr>
<td>Dental complaint</td>
<td>47.4</td>
</tr>
<tr>
<td>Easily irritated</td>
<td>46.8</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>43.0</td>
</tr>
<tr>
<td>Depression</td>
<td>41.8</td>
</tr>
<tr>
<td>Difficulty thinking</td>
<td>39.2</td>
</tr>
<tr>
<td>Headache</td>
<td>37.2</td>
</tr>
<tr>
<td>Rash</td>
<td>35.4</td>
</tr>
<tr>
<td>Cough</td>
<td>34.6</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>34.2</td>
</tr>
<tr>
<td>Joint pain in upper extremity</td>
<td>32.9</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>32.1</td>
</tr>
<tr>
<td>Joint pain in lower extremity</td>
<td>30.4</td>
</tr>
<tr>
<td>Pain in back of neck</td>
<td>26.9</td>
</tr>
<tr>
<td>Ringing or pain in ear</td>
<td>24.1</td>
</tr>
<tr>
<td>Loss of hair</td>
<td>21.5</td>
</tr>
<tr>
<td>Fever</td>
<td>12.8</td>
</tr>
</tbody>
</table>

Source: Data from DeFraites et al, 1992
Onset of Fatigue by Calendar Month

123rd Army Reserve Command

Number of Persons

Source: redrawn from DeFraites et al, 1992
Onset of Fatigue by Months since Return

123rd Army Reserve Command

Number of persons

-6  -5  -4  -3  -2  -1  0  1  2  3  4  5  6  7  8  9  10

Months since Redeployment

Source: redrawn from DeFraitas et al, 1992
“...The Gulf War illnesses are especially frustrating because we lack answers for basic questions. So many of our troops have been struck down, not by the enemy on the field of combat, but by something we don’t understand. They ask ‘what have I got and how did I get it?’ They deserve answers. But we haven’t provided them. I hope I’ll be able to find some of those answers.”

* Deputy Special Assistant Secretary of Defense

The Gulf War “Syndrome” in British Soldiers

Source: Data from Simon Wessely, presentation at American Psychopathological Association Conference, March 2004, New York City.
Section F

Attribution Theory
The Fundamental Attribution Error

Pro-Castro

Attitude attributed

Anti-Castro

Pro-Castro speeches

Anti-Castro speeches

Chosen

Assigned

59
Insufficient Justification Effect

How much I enjoyed the experiment
## RESCITE Model of Somatoform Epidemics

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<th>Early Susceptibles</th>
<th>Late Susceptibles</th>
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<tr>
<td><strong>Convergence</strong> 4/15</td>
<td><img src="image" alt="Convergence" /></td>
<td><img src="image" alt="Early Susceptibles" /></td>
</tr>
<tr>
<td><strong>Initiation</strong> 6/15</td>
<td><img src="image" alt="Initiation" /></td>
<td><img src="image" alt="Early Susceptibles" /></td>
</tr>
<tr>
<td><strong>Transmission</strong> 9/15</td>
<td><img src="image" alt="Transmission" /></td>
<td><img src="image" alt="Early Susceptibles" /></td>
</tr>
<tr>
<td><strong>Endurance</strong> 7/15</td>
<td><img src="image" alt="Endurance" /></td>
<td><img src="image" alt="Early Susceptibles" /></td>
</tr>
</tbody>
</table>

*Continued*
Chronic Somatoform Epidemics—Summary

- Chronic epidemics may endure for decades
- Seed epidemics may resemble acute somatoform epidemics
- Chronic epidemics are more likely to involve adults
- Beliefs about cause and about the self may be central to understanding the epidemics
- Attacking the group may be counterproductive