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Somatoform Epidemics as Emergent Collective Behavior

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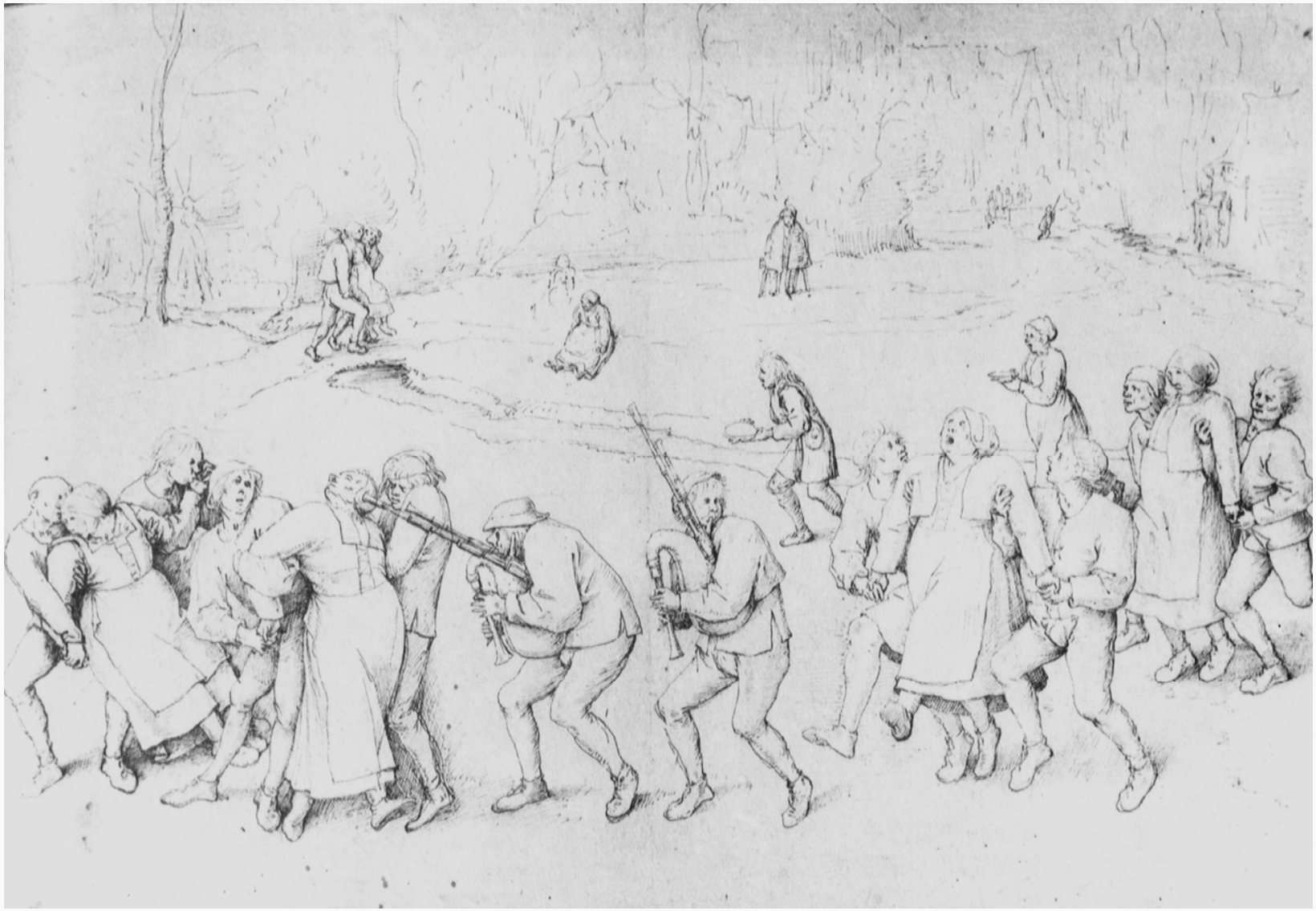
Section A

Historical Examples and Outline

Breughel, Dance at Molenbeek, 1564



Hondius, Woodcut of Breughel's Drawing

Continued

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

Continued

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  - 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

Continued

Social Transmission of Bizarre Behaviors

- Group-based mechanisms—influence
  - Autokinetic effect
  - Group conformity
  - Perception of unanimity
- RESCITE model

Continued

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

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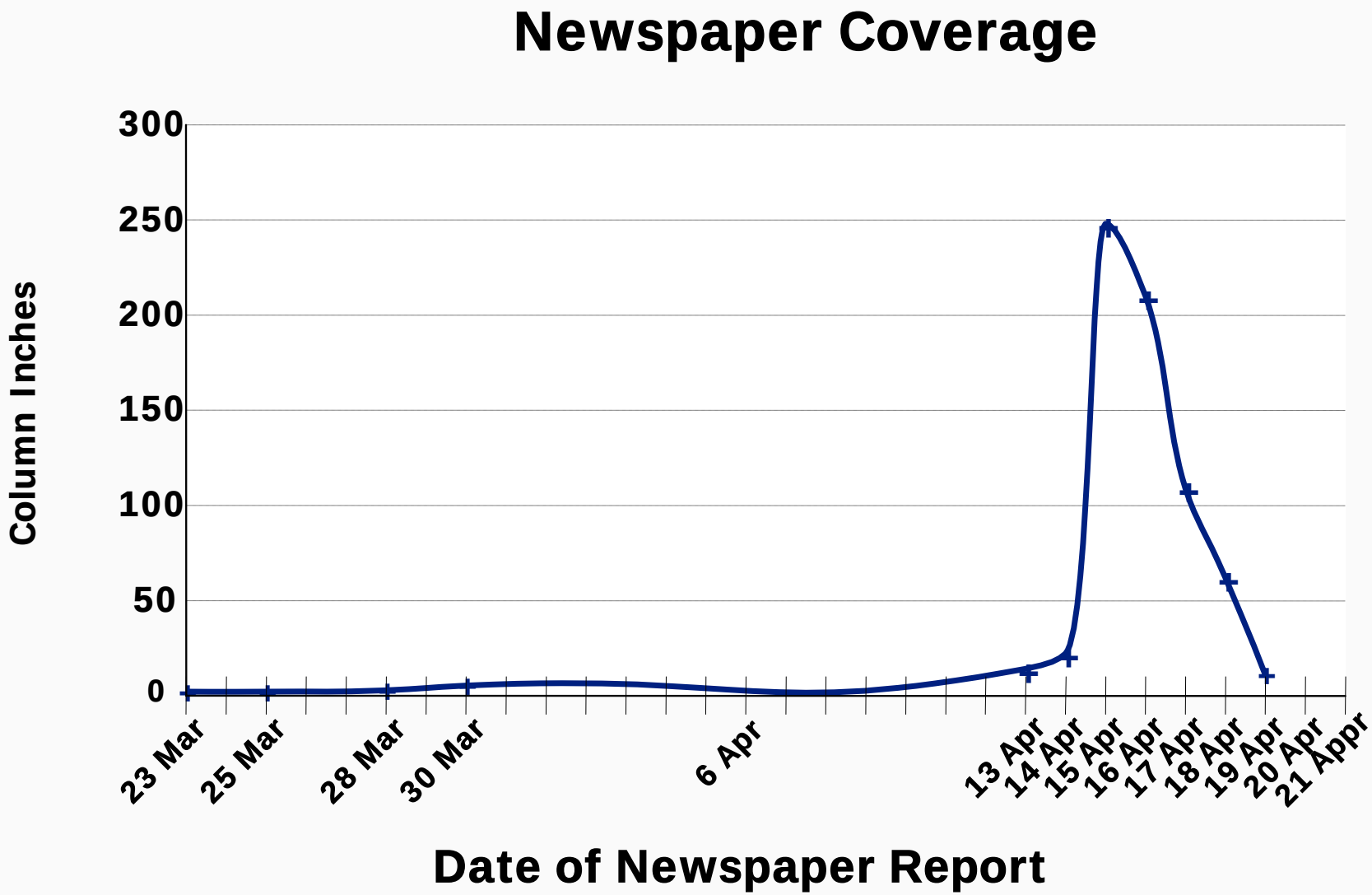
Section B

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

Seattle Windshield Pitting Epidemic



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%

Why Did the Epidemic Die Out?

- 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 . . .

Continued

News Reports about the June Bug

- 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

June Bug Epidemic Friendship Status by Time

Friendship Status of Cases	Period of Occurrence for Cases Percentages (n)			
	Takeoff Period	Day 1	Day 2	Resolution Period
Isolated (n = 56 cases)	83 (6)	21 (24)	23 (22)	25 (4)
Choosing Cases (n = 83 choices)	46 (11)	61 (41)	54 (28)	33 (3)
Chosen by Cases (n = 78 choices)	0 (2)	61 (41)	67 (30)	20 (5)

Source: Data from Kerckhoff and Back, The June Bug, 1968

Review of 140 Short-Term Emotional, Delusional, or Somatoform Epidemics, 1872-1993

	Number of Epidemics	Percent
Location		
School	69	49
Town or Village	24	17
Factory	28	20
Hospital or Institution	10	7
Other	9	6
Number of People Ill		
< 10 People	29	21
10-30 People	38	27
> 30 People	63	45
Unknown	7	5
Gender of Ill People		
All Female	68	48
Males and Females	60	43
All Males	4	3
Unknown	7	5
Age of Ill People		
< 20	65	46
20-40	17	43
All Ages	28	3
Unknown	29	5
Duration		
< 3 Days	30	21
3-14 Days	45	32
15-30 Days	16	11
> 30 Days	28	20
Unknown	21	15

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

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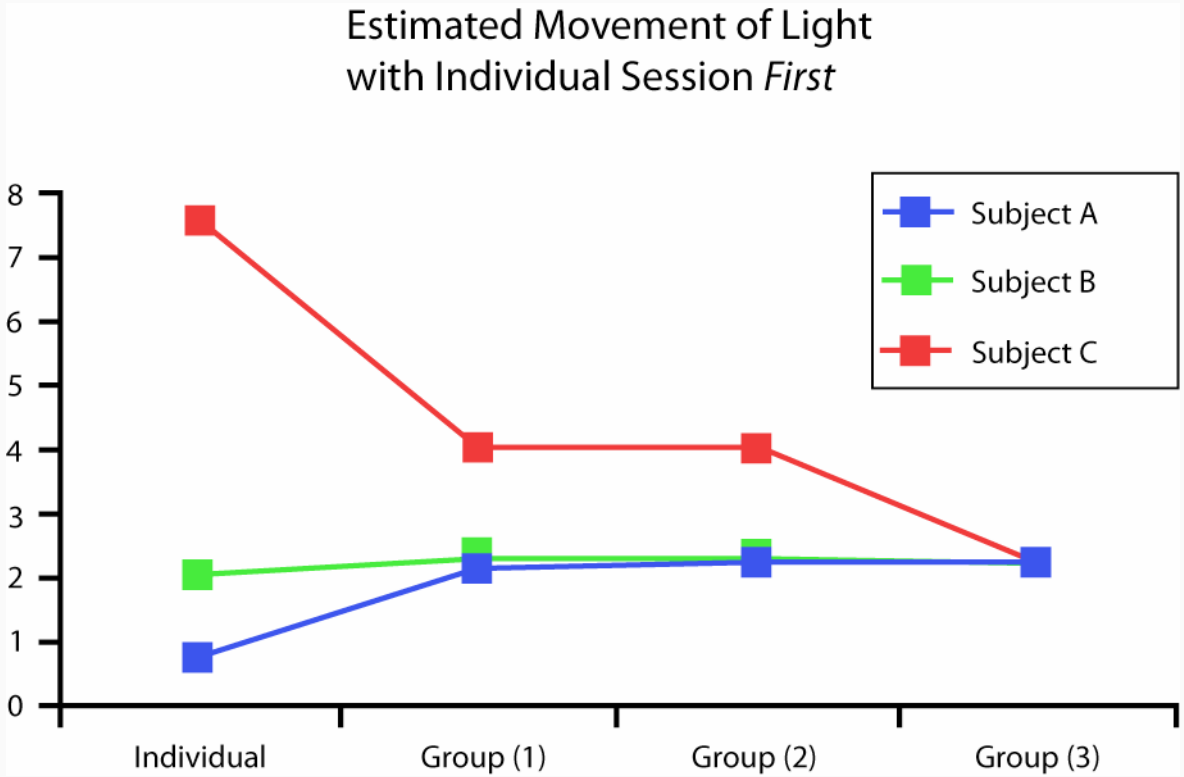
Section C

Experimental Data on Group Influence

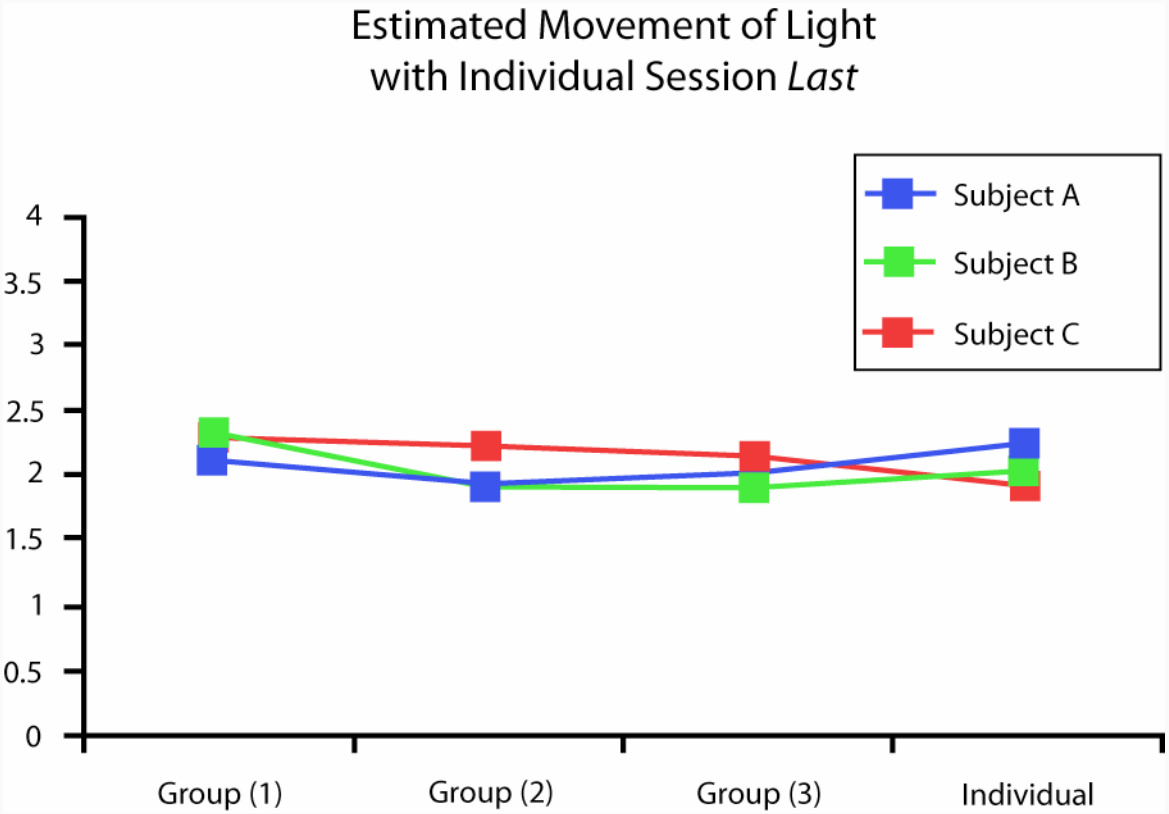
Sherif—Autokinetic Effect

- 1. Enter the classroom
- 2. Very, very dark
- 3. A light appears
- How far did the light move?

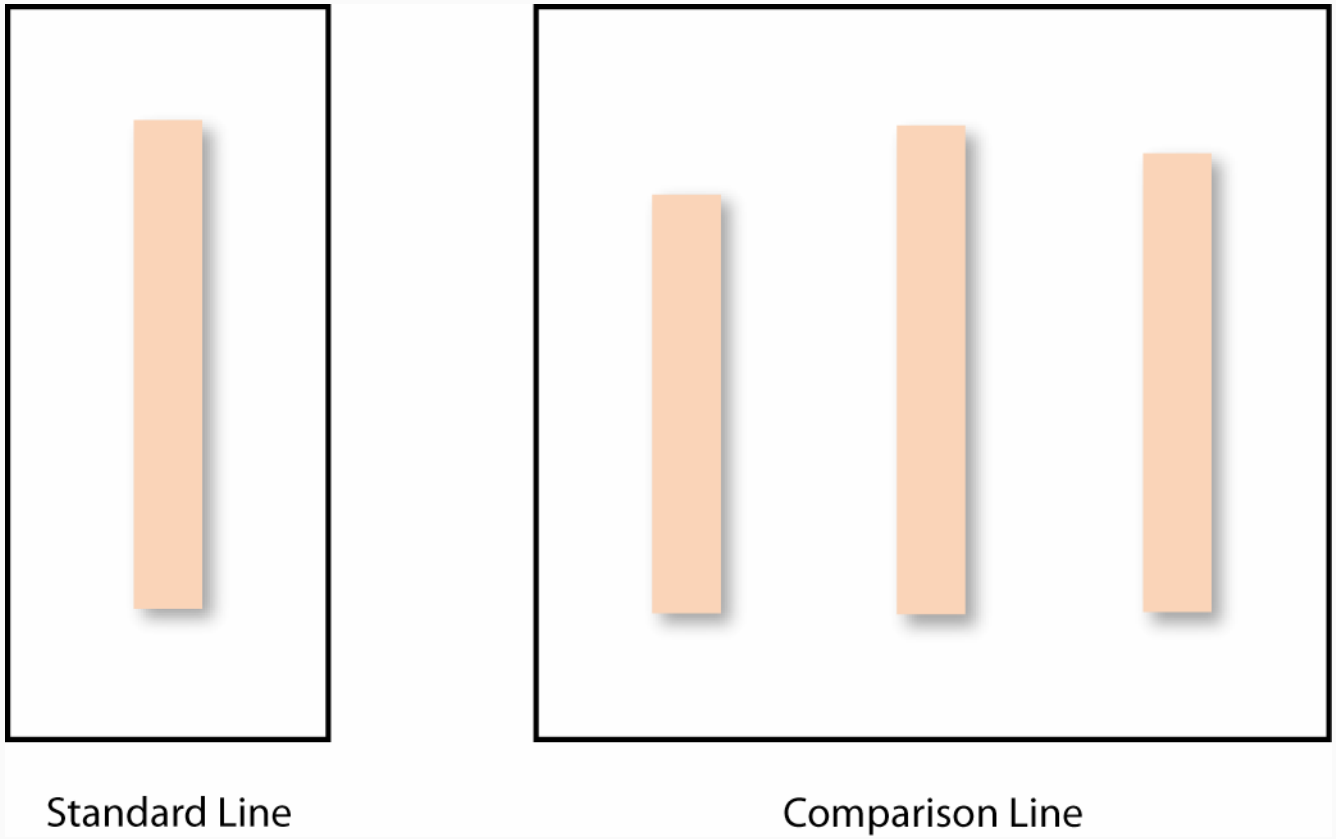
Social Influence on Formation of a Norm: How far did the light move?



Social Influence on Formation of a Norm: How far did the light move?



Asch Group Conformity Experiment



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
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  - 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

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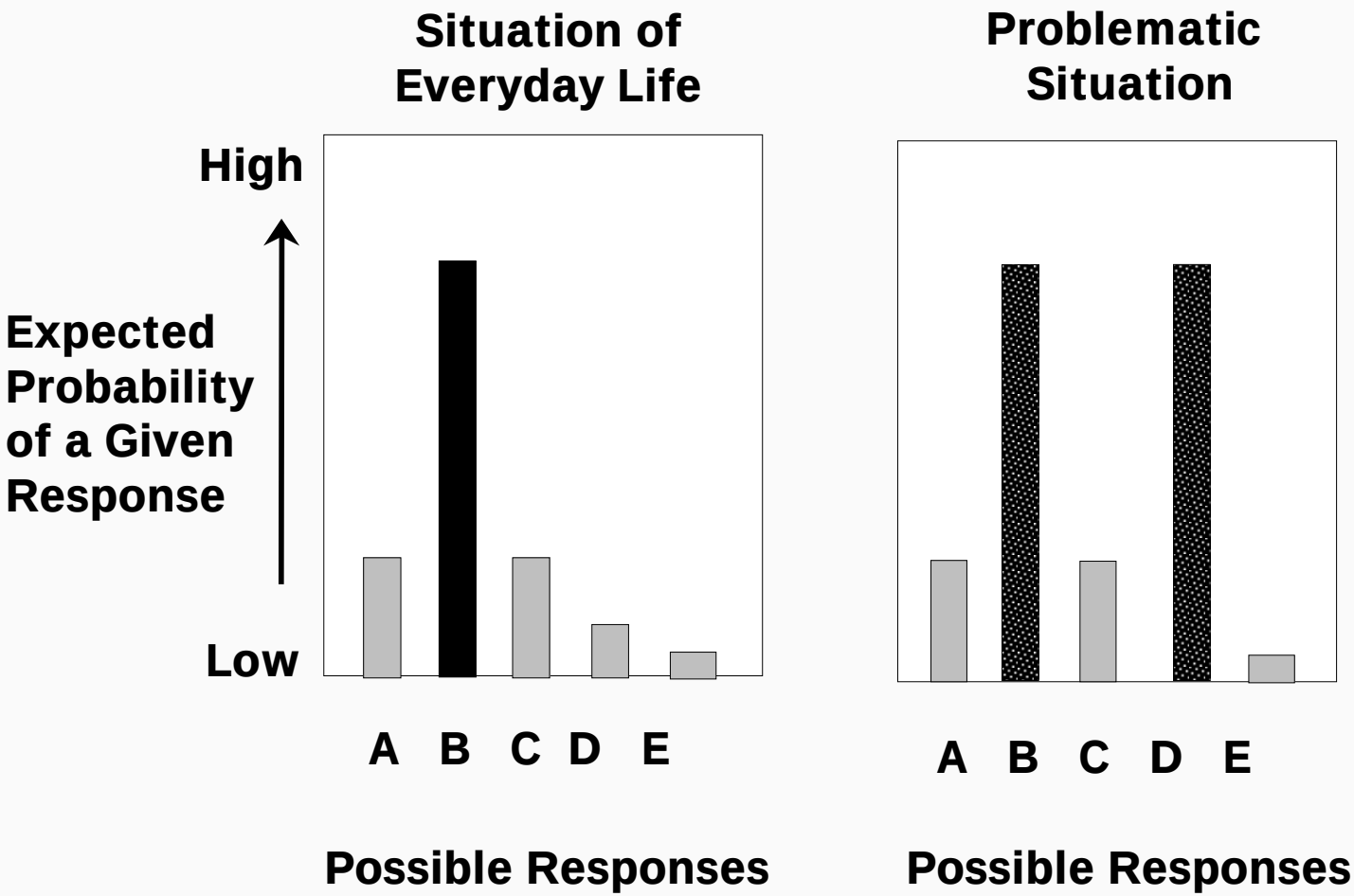
Section D

The RESCITE Model

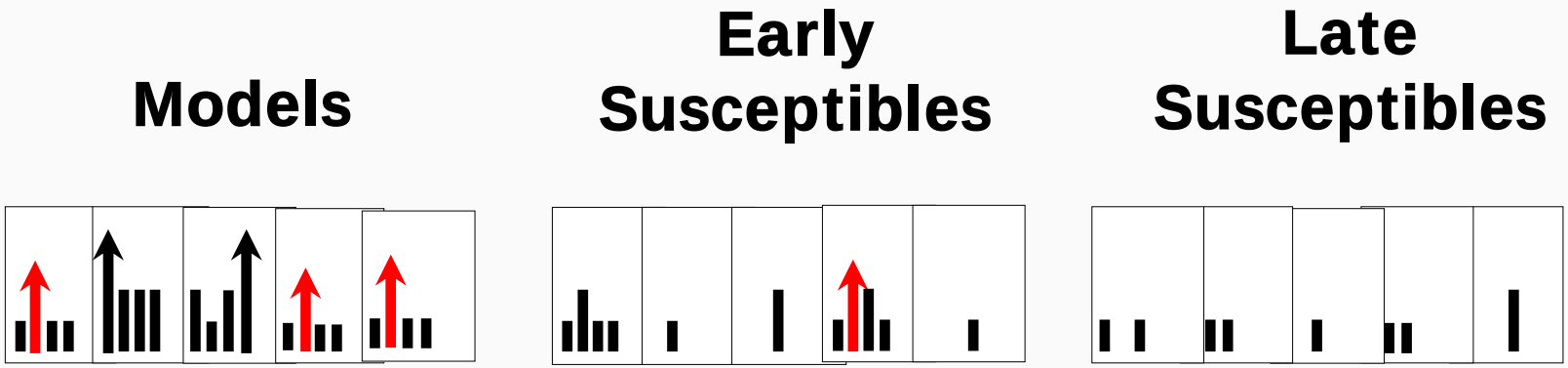
The Problem of Directing Behavior



Rescite Model

- **R**esponsive **E**motional **S**chemata
- **C**onvergence of Models and susceptibles
- **I**nitiation of Problem Solving
- **T**ransmission to susceptibles
- (Resolution or)
- **E**ndurance

Convergence 4/15

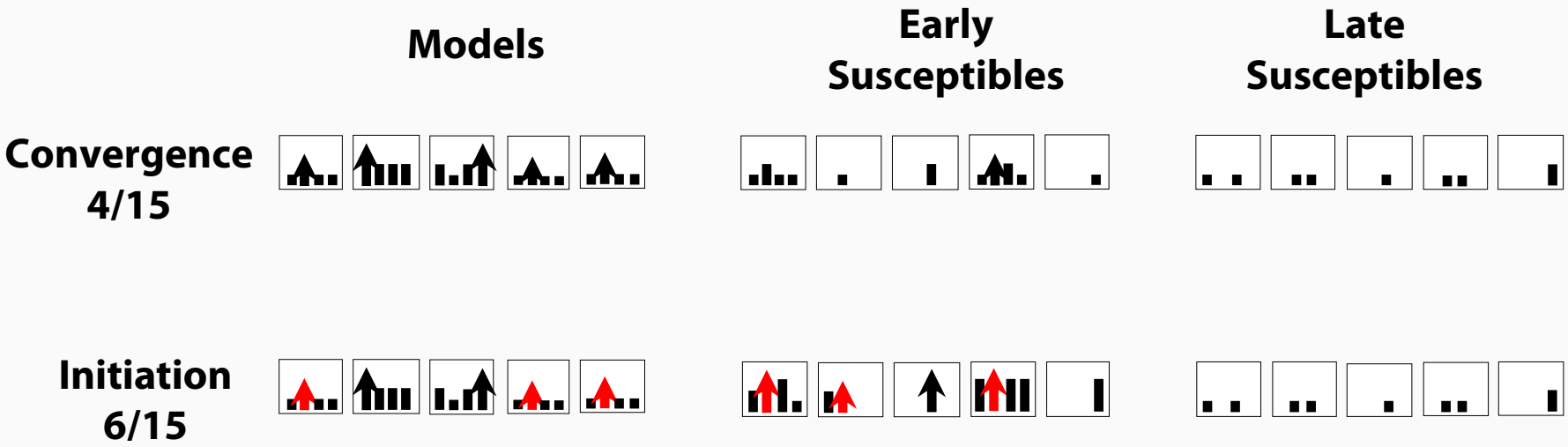


Arrow = individual behavior

Red Arrow = individual behavior is the RES

Continued

RESCITE Model of Somatoform Epidemics



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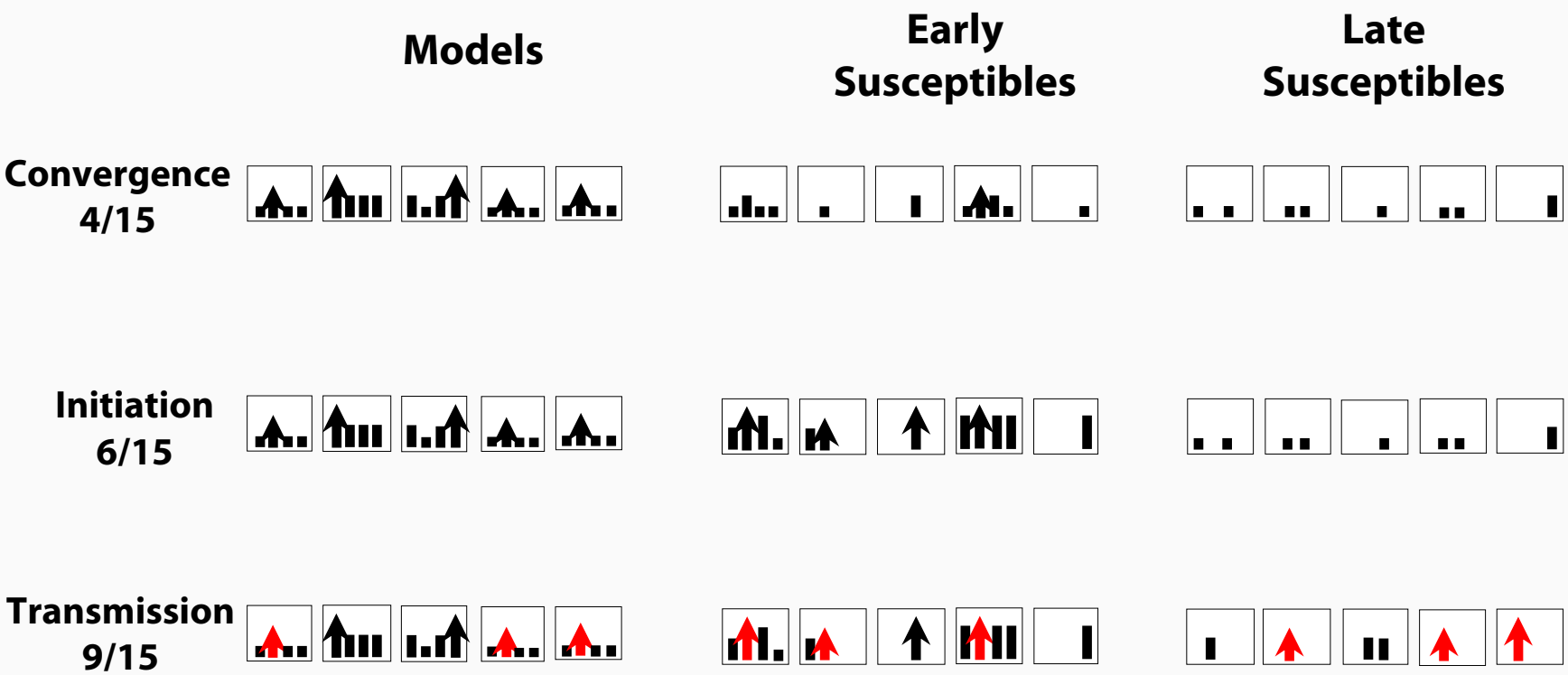
RESCITE Model of Somatoform Epidemics



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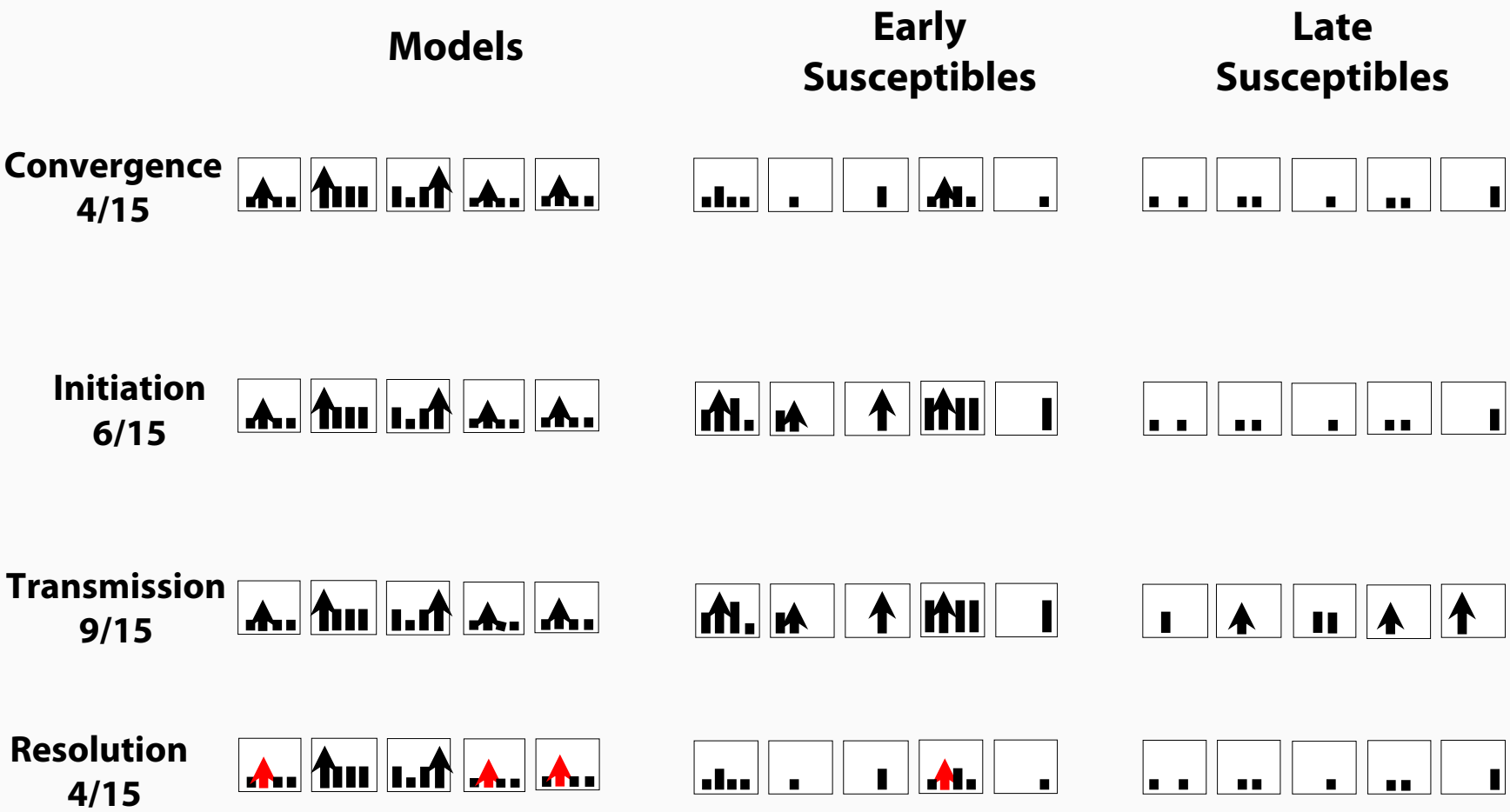
RESCITE Model of Somatoform Epidemics



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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

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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

Chronic Fatigue—Early Examples

- 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

ECA 13,538 Respondents at Four Sites Lifetime Prevalence in Percent	
Symptom	**Prevalence (%)**
Persistent Fatigue	23.7
Not Explained by Illness or Drugs	13.9
Which Disrupts Normal Activities	2.6
General Muscle Weakness	8.7
Muscle Discomfort	18.0
Headache	20.5
Joint Pain	29.2
Sleep Problems	25.6

Source: Data from Price et al, PHR, 1992

What Predicts Chronicity of Fatigue?

- 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

Source: Strauss, Br Med J., 1996

Continued

Why Doesn't the Epidemic Stop?

- 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"

Indiana 123rd ARCOM as the Seed Epidemic

INVESTIGATION OF A SUSPECTED OUTBREAK OF AN UNKNOWN DISEASE
AMONG VETERANS OF OPERATION DESERT SHIELD/STORM
123d 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

Continued

Indiana 123rd ARCOM as the Seed Epidemic

MEDICAL SURVEY FOR DESERT SHIELD/STORM TROOPS

NAME ____ GRADE ____ DOB ____ 68 MOS IN SWA 711

HOME PHONE ____ WORK PHONE ____

PLACES OF DUTY IN SWA Log Base A+E, Port of Dammam

PRESENT UNIT OF ASSIGNMENT 300th

UNIT OF ASSIGNMENT IN SWA 300th

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/TO WHAT DEGREE? No

5. DO YOU HAVE ANY HAIR LOSE/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 DEGR No

Continued

Indiana 123rd ARCOM as the Seed Epidemic

35. HAVE YOU SUFFERED FROM FEELING OF ANXIETY OR FEELING OF PHOBIA (SUI
PANIC, SUDDEN FEAR, SUDDEN OUT BURST, UNABLE TO CONTROL YOUR TEMPER, LA
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 SWA/APPROXIMATE DATE? Yes / Jan

38. WHERE ENCAMPED NEAR (WITHIN A 4 MILE RADIUS OF A) COMMUNICATIONS C
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 GOVERNM
MANY/HOW LONG? Yes / 3-4 pills / Two Days

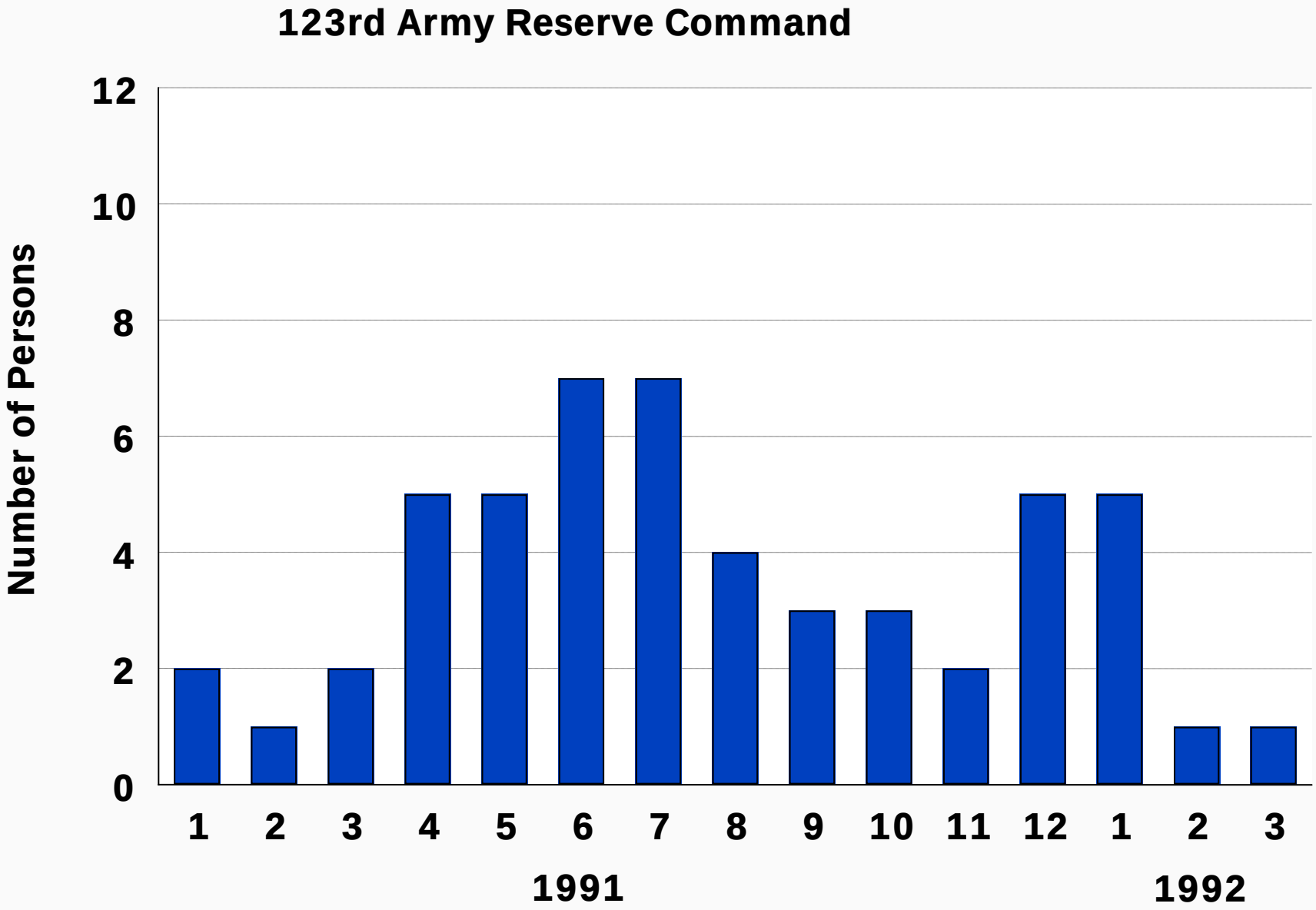
Symptoms Reported by Reservists of 123rd ARCOM

Fatigue (in percent)	**70.9**
Sleep disturbance	**57.0**
Forgetfulness	**54.4**
Pain in any joint	**54.4**
Dental complaint	**47.4**
Easily irritated	**46.8**
Difficulty concentrating	**43.0**
Depression	**41.8**
Difficulty thinking	**39.2**
Headache	**37.2**
Rash	**35.4**
Cough	**34.6**
Abdominal pain	**34.2**
Joint pain in upper extremity	**32.9**
Diarrhea	**32.1**
Joint pain in lower extremity	**30.4**
Pain in back of neck	**26.9**
Ringing or pain in ear	**24.1**
Loss of hair	**21.5**
Fever	**12.8**

n = 79

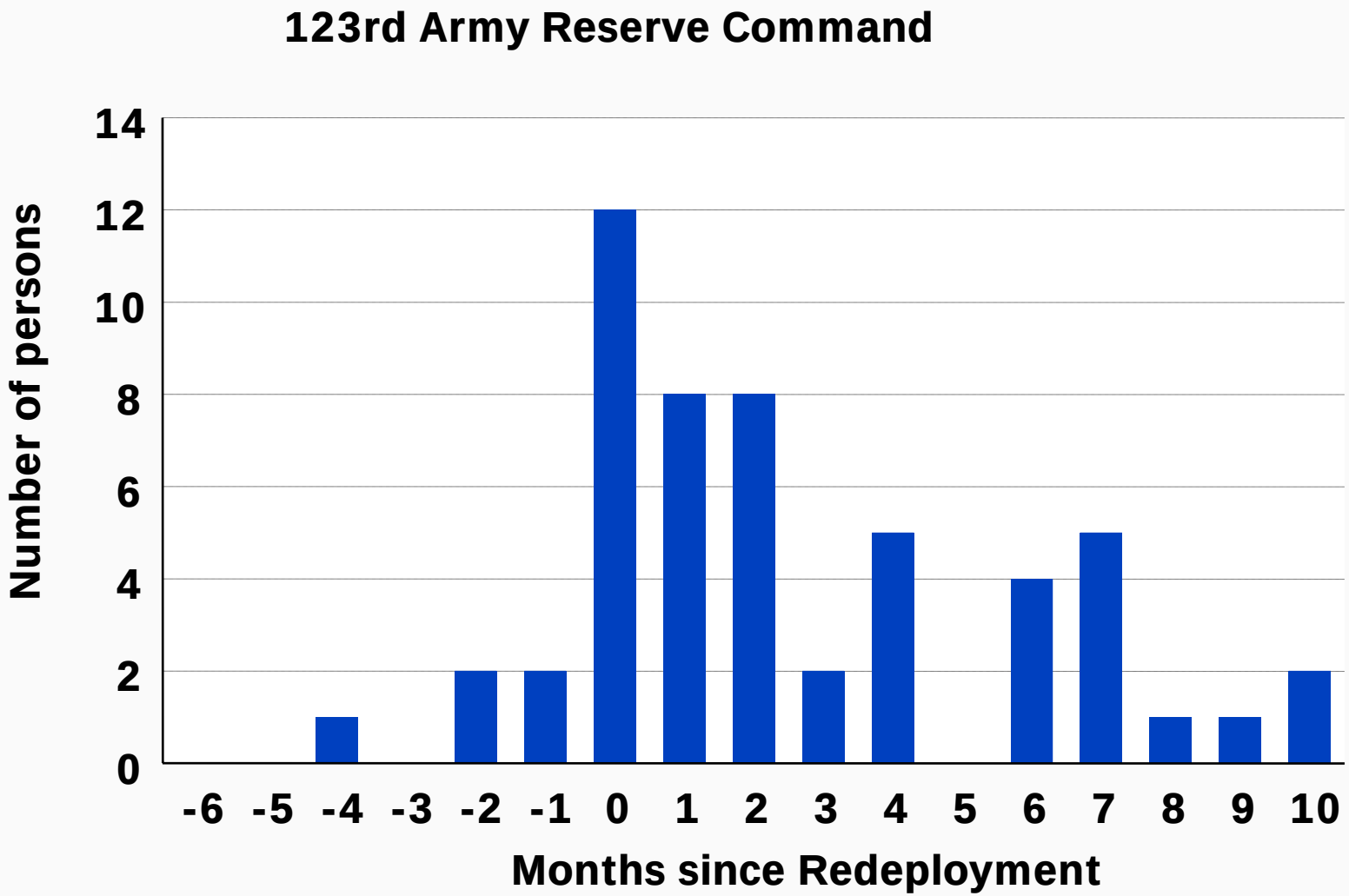
Source: Data from DeFraites et al, 1992

Onset of Fatigue by Calendar Month



Source: redrawn from DeFraites et al, 1992

Onset of Fatigue by Months since Return



Source: redrawn from DeFraites et al, 1992

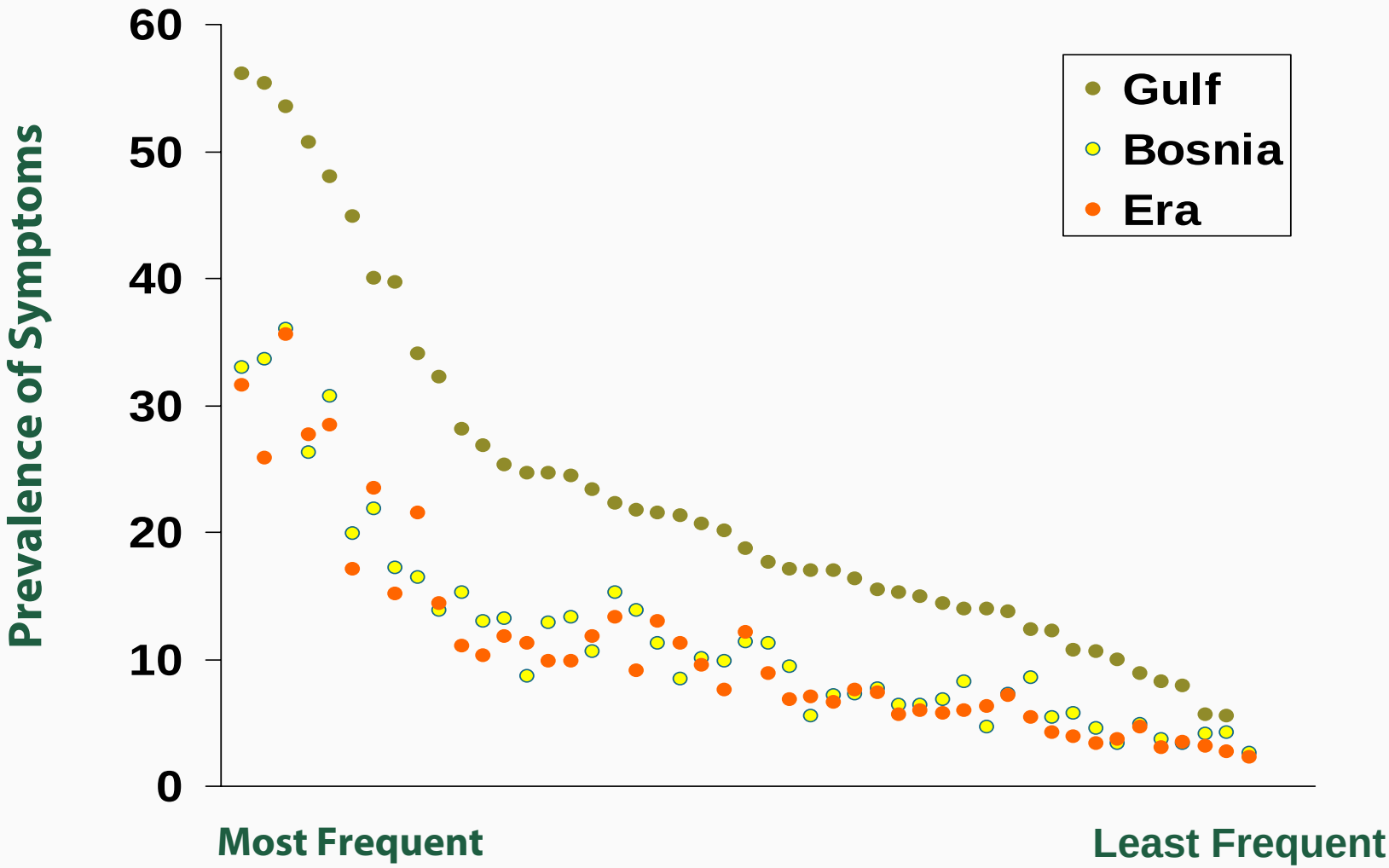
Lieutenant General Dale Vesser on Gulf War Illnesses—1997*

- "…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

Source: Gulflink, 1997: http://www.dtic.mil:80/gulflink/news.

The Gulf War "Syndrome" in British Soldiers



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

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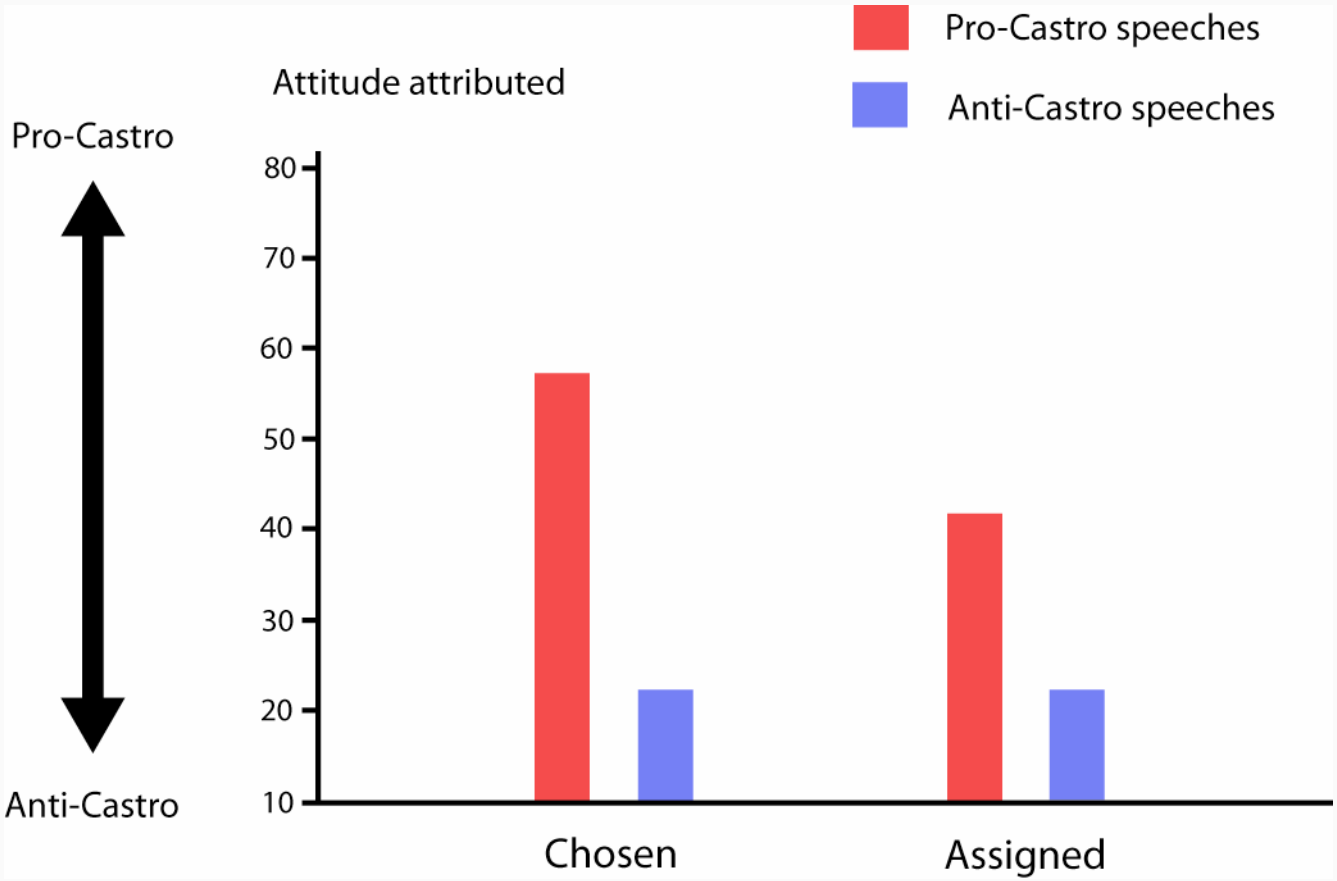
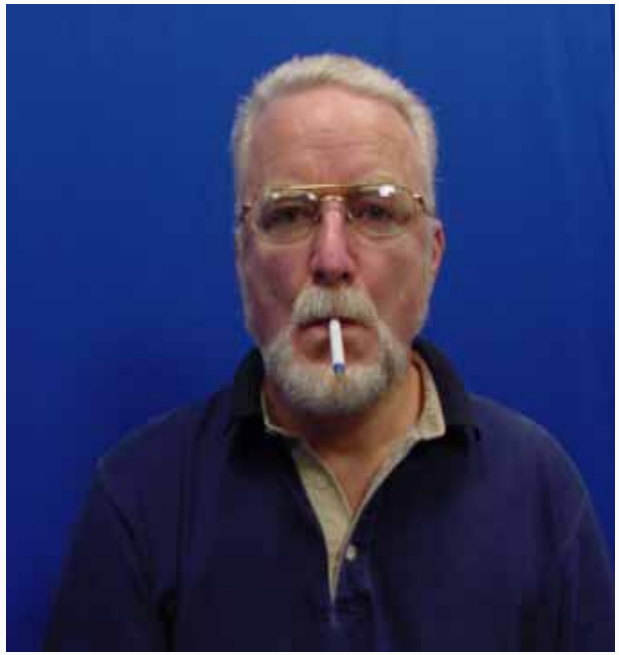
Section F

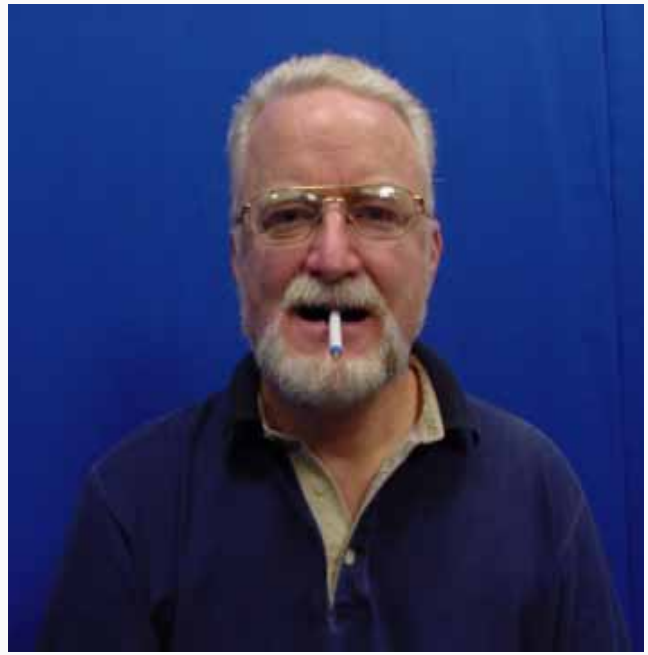
Attribution Theory

The Fundamental Attribution Error

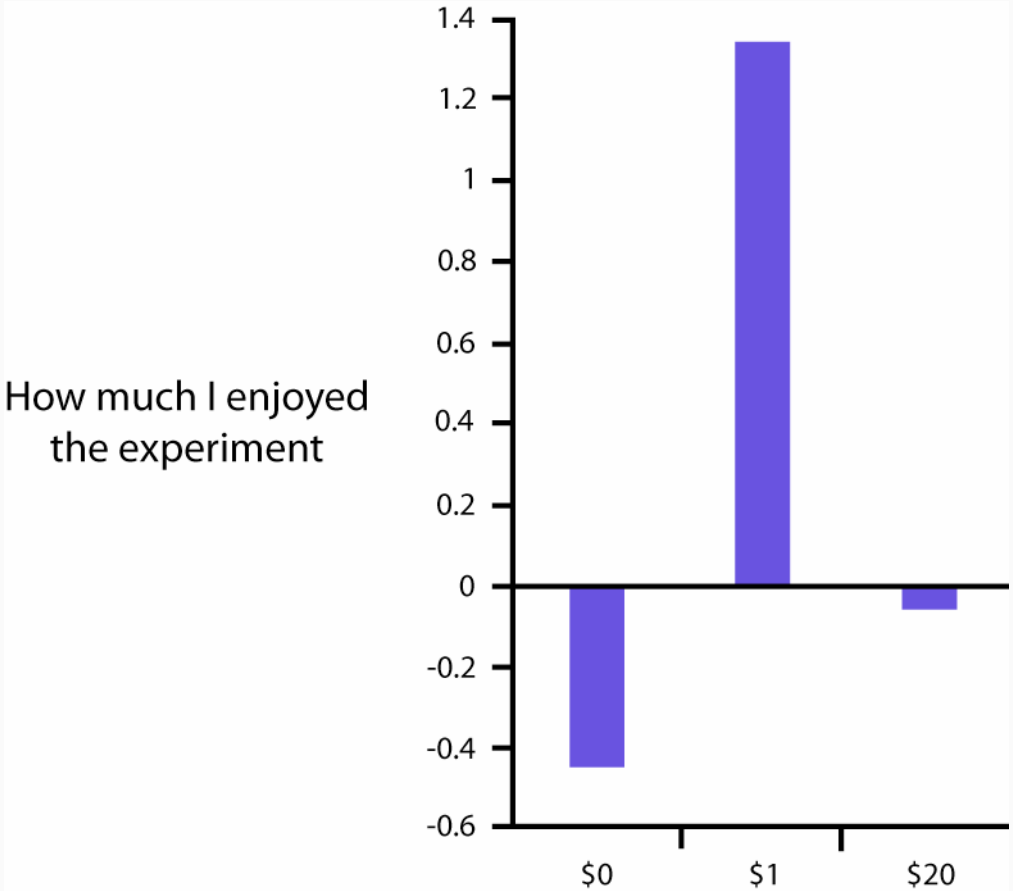


Self Attribution





Insufficient Justification Effect



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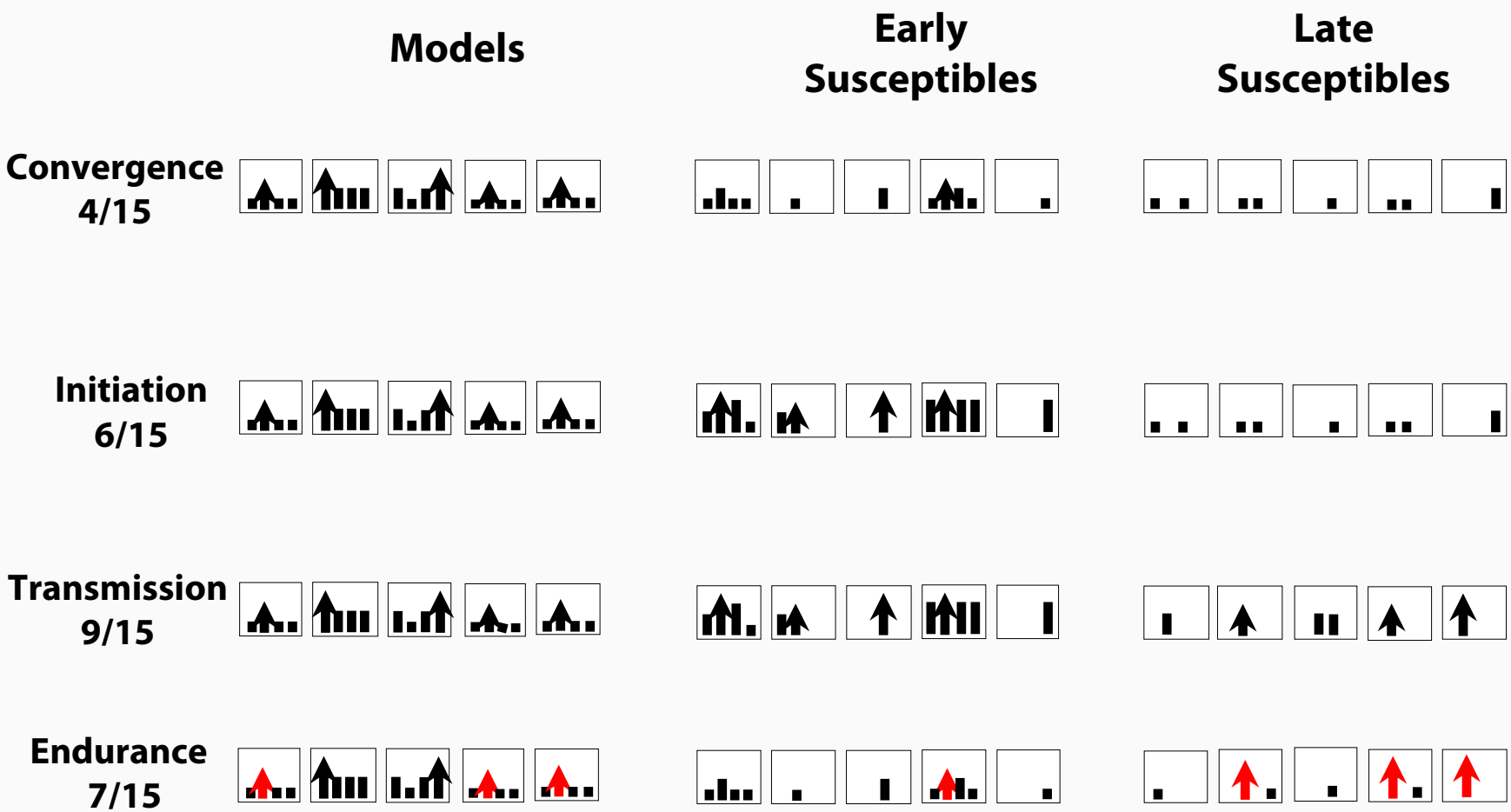
RESCITE Model of Somatoform Epidemics



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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