



HUMAN HEALTH AND SOCIOECONOMIC SYSTEMS

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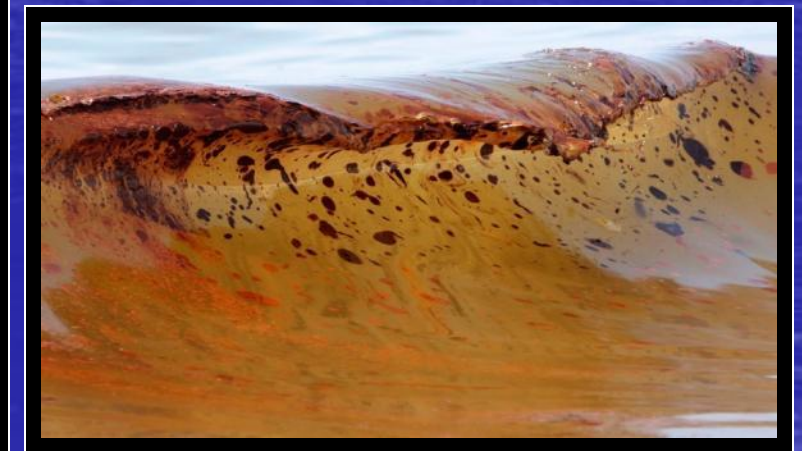
Deepwater Horizon Oil Platform Explosion

- **April 20, 2010**
- **11 killed**
- **5 month spill**
- **206 million gallons**
- **88,522 mi Gulf**
- **950 mi shoreline**





Economic Losses

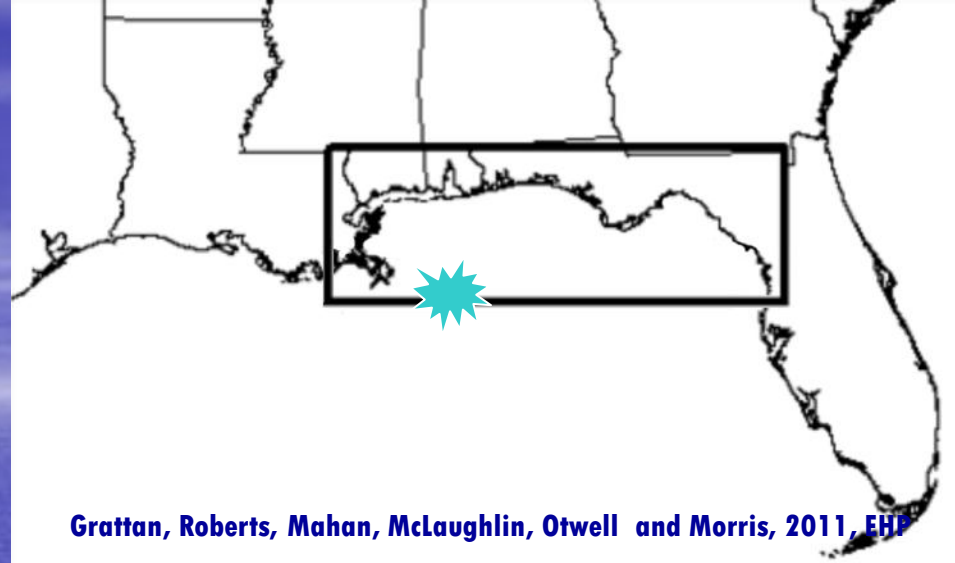


Declining Work

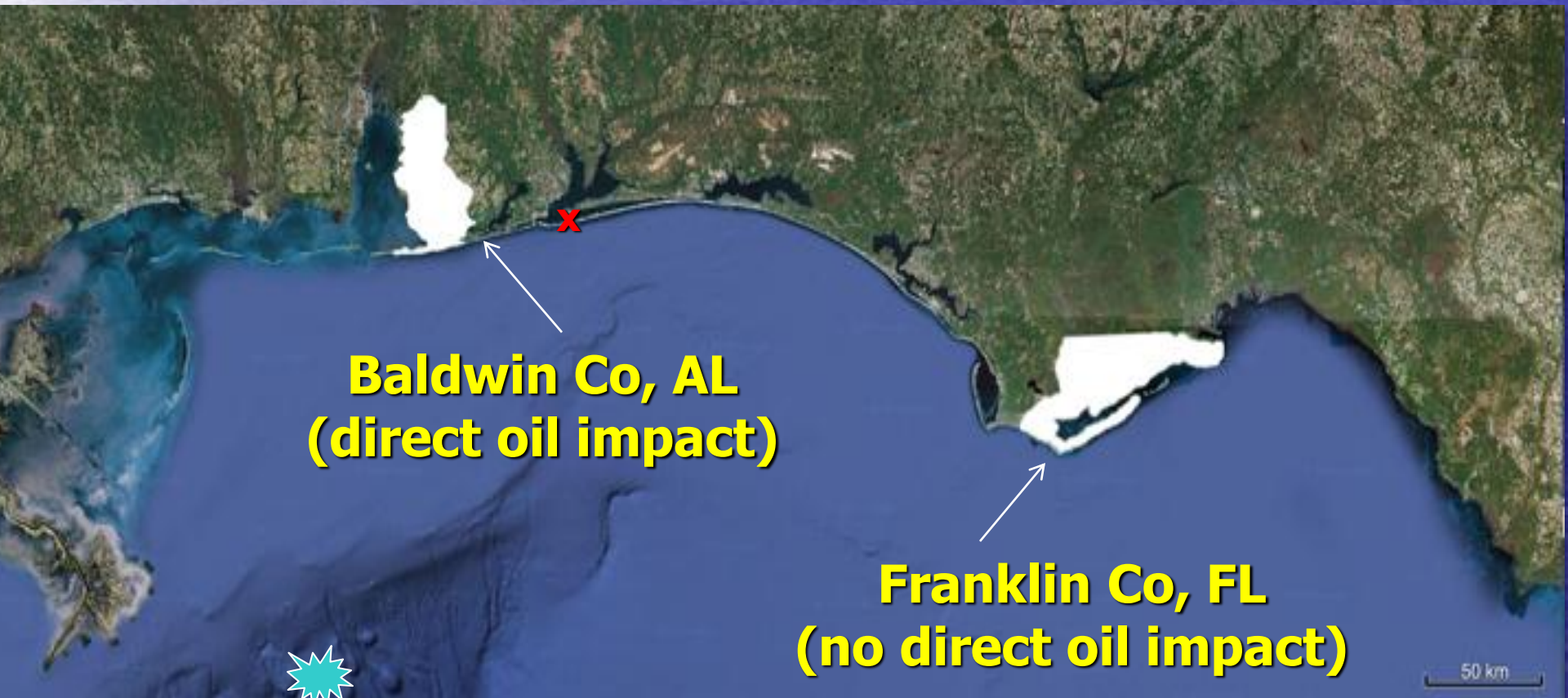




Participating Communities



Grattan, Roberts, Mahan, McLaughlin, Otwell and Morris, 2011, EHP



**Baldwin Co, AL
(direct oil impact)**

**Franklin Co, FL
(no direct oil impact)**

50 km

Demographic Summary

(n= 76, Grattan et al., EHP, 2011)

- **Age: Mid 40's**
- **Education: 10-12**
- **Gender: Males > Females**
- **Race: 95% Caucasian**
- **Occupations: Fishing, Tourism**
- **Hx Depression/Anxiety (6%)**
- **Hx Alcohol Problem (9.5%)**

Key Variables

GEOGRAPHY EXPOSURE

- **Oil Exposed
(direct exp)**
- **No Oil
(indirect exp)**

ECONOMIC STATUS

- **Financial Loss**
- **Financially Stable**

Potential Human Health Impacts

- **Neurotoxic Exposures**
- **Major Depressive Episodes**
- **Anxiety Disorders**
- **Alcoholism**
- **Drug Abuse**
- **Domestic Violence**
- **Post Traumatic Stress Disorder**
- **Medical Symptoms**

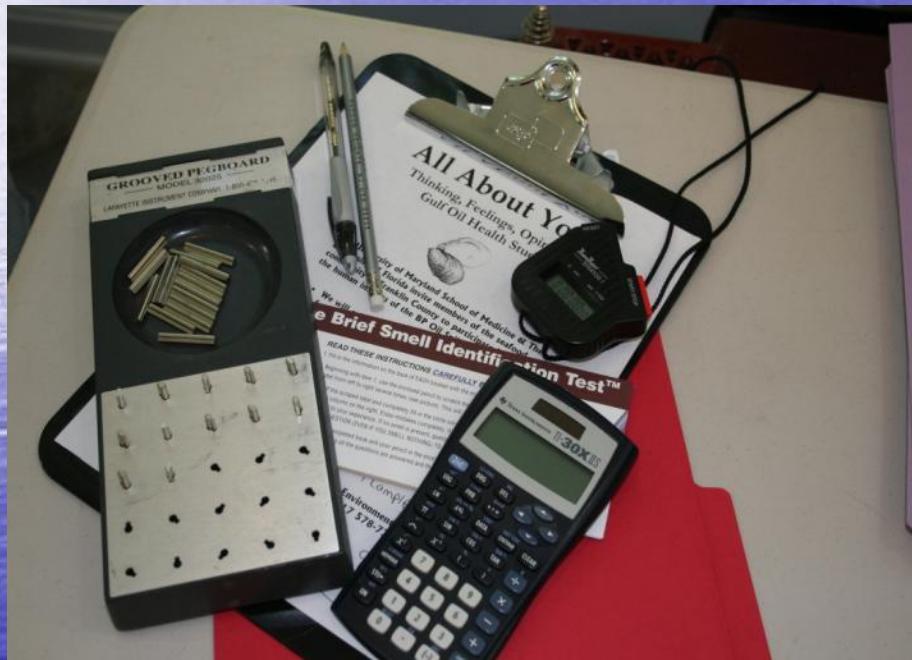
Field Assessments

(July, 2010)

- **Neurocognitive**
- **Anxiety**
- **Depression**
- **Coping**
- **Resilience**
- **Medical Symptoms**



Neurocognitive Assessment



- Attention
- Concentration
- Memory
- Construction
- Psychomotor
- Clerical speed
- Olfaction
- Malingering

Field Assessments

(July, 2010)

- **Neurocognitive**
- **Anxiety**
- **Depression**
- **Medical Symptoms**
- **Coping**
- **Resilience**



Measured Resilience

Connor Davidson Resilience Scale

- 1. Stay focused under pressure**
- 2. Maintain stable level of function**
- 3. Handle unpleasant feelings**
- 4. Achieve goals despite obstacles**
- 5. Not easily discouraged by failure**

Coping

Self-distraction

Active coping

Denial

Substance Use

Emotional Support

Instrumental Support

Behavioral Disengagement

Venting

Positive Reframing

Planning

Humor

Acceptance

Self-blame

Religion

Exposure Group Cognitive Scores

Cognitive Measures	Indirect Exposure (n = 71)	Direct Exposure (n =23)	p -value
Digit Span	45.54 (21.61)	42.09 (7.93)	0.11
Stroop	49.33 (7.73)	50.09 (7.37)	0.68
Symbol Digit Modalities	44.49 (12.01)	41.91 (10.35)	0.36
Trails A	47.40 (11.65)	48.35 (11.65)	0.70
Trails B	47.06 (10.92)	45.48 (7.59)	0.52
Grooved Pegboard dominant hand	46.76 (10.83)	42.04 (10.61)	0.07
Grooved Pegboard non-dominant	45.27 (9.76)	39.83 (10.60)	0.02*

(Grattan et al., 2011, Environmental Health Perspectives)

Exposure Group Psychosocial Scores

Psychosocial Measures	Indirect Exposure (n = 71)	Direct Exposure (n =23)	p -value
Profile of Mood States			
Tension/Anxiety	56.89 (17.97)	62.44 (11.33)	0.17
Depression	55.70 (20.22)	57.70 (12.99)	0.66
Anger	56.13 (20.63)	59.91 (13.24)	0.41
Fatigue	49.41 (16.87)	55.83 (12.95)	0.10
Confusion	54.92 (20.16)	60.78 (11.62)	0.19
Vigor	40.44 (13.94)	41.61 (10.16)	0.71
Total Mood Disturbance	55.66 (20.07)	61.13 (11.71)	0.22
POMS suspected clin. Impairment			
Tension/Anxiety	44	48	0.76
Depression	50	35	0.21
Connor Davidson Resilience	29.07 (6.16)	29.87 (5.86)	0.59

(Grattan et al., 2011, Environmental Health Perspectives)

Exposure Group Psychosocial Scores Cont.

Brief COPE	Indirect Exposure (n = 71)	Direct Exposure (n =23)	p -value
Self-distraction	4.60 (2.10)	4.40 (1.70)	0.72
Active coping	4.70 (2.10)	6.10 (2.00)	0.01*
Denial	4.00 (2.20)	3.40 (2.00)	0.25
Substance use	2.80 (1.40)	2.70 (1.60)	0.81
Use of emotional support	3.80 (1.70)	3.60 (1.70)	0.71
Use of instrumental support	3.80 (1.90)	3.90 (1.80)	0.82
Behavioral disengagement	3.20 (1.50)	2.80 (1.40)	0.28
Venting	4.00 (1.70)	4.50 (1.60)	0.18
Positive reframing	4.60 (1.90)	5.10 (1.90)	0.21
Planning	5.10 (1.90)	5.80 (2.00)	0.13
Humor	3.00 (1.50)	4.00 (2.30)	0.08
Acceptance	5.60 (1.90)	6.30 (1.50)	0.09
Religion	4.60 (2.30)	5.60 (2.40)	0.11
Self-blame	2.80 (1.30)	2.80 (1.50)	0.77

(Grattan et al., 2011, Environmental Health Perspectives)

Health Symptoms or Complaints

**No difference from baseline
in either exposure group**

Economic Loss Group Demographics

Characteristics	Stable Income (n = 47)	Economic Loss (n = 47)	p-value
Gender	32 (68)	25 (53)	0.14
Age Range	49.32 (16.92) 19—88	45.19 (13.97) 22—79	0.20
Education Range	12.26 (3.21) 5—20	11.59 (2.56) 5—18	0.27
Race			0.40
Caucasian	(41) 89	45 (96)	
African American	4 (9)	2 (4)	
Native American	1 (2)	0 (0)	

(Grattan et al., 2011, Environmental Health Perspectives, in press)

Economic Loss Group Cognitive Scores

Cognitive Measures	Stable Income (n = 47)	Economic Loss (n = 47)	p -value
Digit Span	43.92 (10.24)	45.48 (7.92)	0.42
Stroop	49.21 (7.48)	49.86 (7.80)	0.69
Symbol Digit Modalities	42.36 (12.10)	45.31 (11.03)	0.23
Trails A	45.63 (9.65)	49.69 (10.36)	0.09
Trails B	45.13 (9.38)	48.22 (10.80)	0.15
Grooved Pegboard dominant hand	43.54 (11.17)	47.48 (10.40)	0.10
Grooved Pegboard non-dominant	42.60 (10.82)	44.98 (9.58)	0.29

(Grattan et al., 2011, Environmental Health Perspectives)

Economic Loss Group POMS

Raw Mean Scores

Profile of Mood States	Stable Income (n = 47)	Economic Loss (n = 47)	p -value
Tension	10.36 (8.85)	16.70 (8.85)	0.00
Depression	11.80 (10.96)	20.62 (13.62)	0.00
Anger	10.96 (9.57)	18.18 (12.11)	0.00
Fatigue	7.68 (6.41)	11.11 (7.52)	0.02
Confusion	8.11 (5.38)	11.36 (7.52)	0.01
Vigor	15.77 (6.65)	14.33 (6.24)	0.30
Total Mood Disturbance	33.16 (38.43)	63.69 (48.09)	0.00

(Grattan et al., 2011, Environmental Health Perspectives)

Depression Results

- 1.** Depression/Anxiety were not associated with the *presence or absence of oil* ($p=.66$, $p=.17$)
- 2.** Depression/Anxiety were associated with *income loss* ($p=.02$, $P=.01$)
- 3.** Clinically significant depression was found *all groups* (35% - 55%) *and* exceeded base rates (9.8-13%)

Coping Results

- 1.** Coping strategies *was not* impacted by the presence or absence of oil.
- 2.** Income loss group was more likely to use *behavioral disengagement* as a coping strategy than the stable income group.

Resilience Results

- 1.** Most people were resilient (65%)
- 2.** No difference between exposure groups ($p=.59$)
- 3.** People with stable income were more resilient ($p=.04$) than those with income loss

Health Symptoms or Complaints

**No difference from baseline
in either economic group**

Acute Phase: Study Conclusions

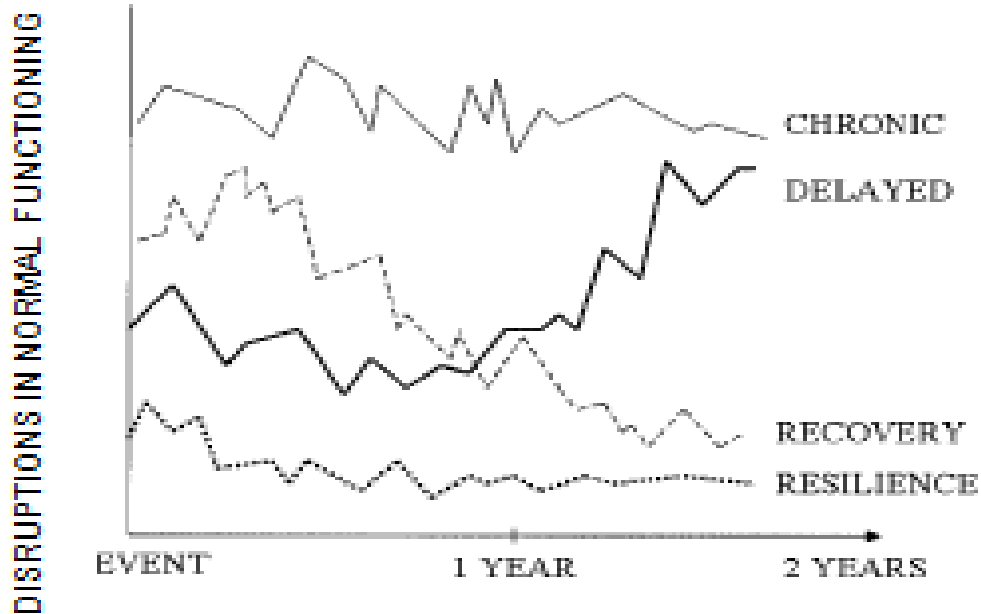
- 1. *Psychological impact*** to E Gulf communities was the most significant health impact.
- 2. Psychological impact extended *beyond*** areas of direct oil exposure
- 3. *Income loss*** after the spill may have a greater psychological health impact than the presence of oil on immediately adjacent shore.

Gulf Residents at Risk of Mental Health Problems

- **Job Security**
- **How will I support my family**
- **Is the fish and seafood safe to eat?**
- **Health Symptoms**
- **Future of the Gulf ecosystem**



Patterns of Psychological Adjustment to Trauma (Bonanno, 2004)



2011

JAN

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28	29	30	31			

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MAR

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JUN

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JUL

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SEP

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OCT

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NOV

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28	29	30				

DEC

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28	29	30	31			

Bon Secour Grocery
MEATS  DELI

STORE CLOSED

FOR SALE OR LEASE

Baldwin Trophies

Hair Salon

Harbour Food

OPEN 24 HOURS

FRESH SHRIMP



Seafood
Pizza
Burgers

**CLOSED DUE
TO BP**

OIL CLEANUP WORKERS: IF YOU EXPERIENCE ANY SYMPTOMS...

- Breathing Difficulties • Skin or Eye Irritation
- Nosebleeds • Headaches • Other Health Issues

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READY



LASERlipo
GULF COAST

6 Month Follow Up-Studies of Initial Cohort

- There was a significant **decline** in **Total Mood Disturbance** in the economically stable group.
- There was a significant **decline** in **denial** for the economic loss group
- There was a significant **decline** in use of **emotional support** in the economic loss group.

Study 1 and Study 2 Conclusions

1. Biggest impact: *Psychological*
2. Driven by: *Economic loss*
3. Recovery Pattern:
 - Depression/Acute Adjustment Reaction evolved to **Anxiety** and **Anger**.
 - Less **Denial** and use of **Emotional Support**

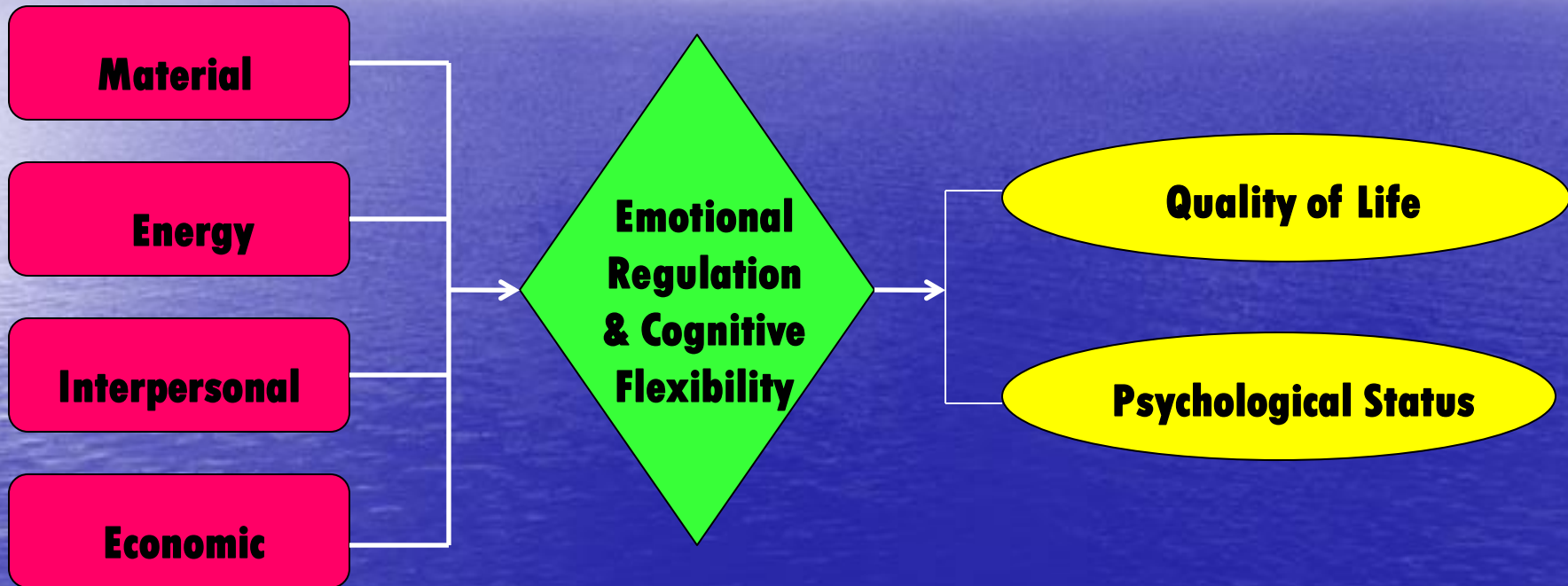


FUTURE DIRECTIONS

Resources
(Hobfoll, 1989)

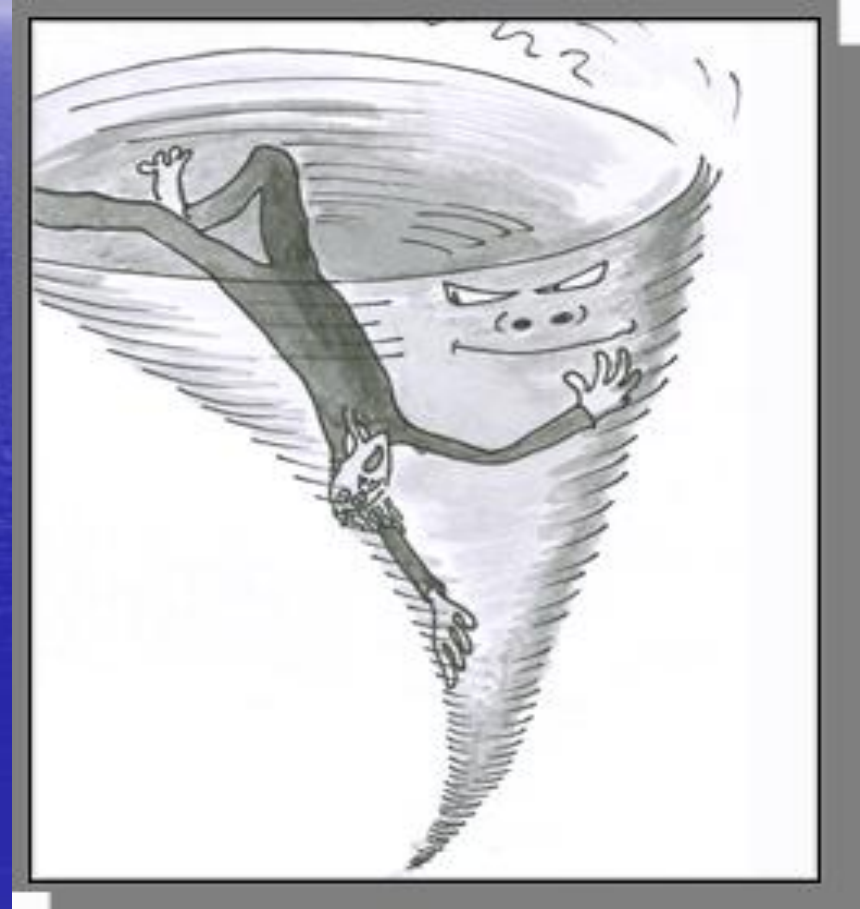
**Moderating
Variables**

Outcome
(positive or negative)



Conservation of Resources Stress Model (Hobfoll, 1989)

- **Material**
- **Energy**
- **Interpersonal**
- **Economic**



COMMUNITY PARTNERS

- ❖ **Franklin's Promise Coalition, Joe Taylor**
- ❖ **Franklin Community Wellness and Mental Health Workgroup**
- ❖ **Bill Mahan, Franklin UF IFAS Extension Program**
- ❖ **Christy Crosby, Franklin County IFAS**
- ❖ **W. Stephen Otwell, Dept of Food Science and Human Nutrition, University of Florida**
- ❖ **Trinity Episcopal Church Eastpoint Church of God, FL**
- ❖ **Carrabelle City Hall, FL**
- ❖ **Darla Jones, Alabama Seafood Association**
- ❖ **Fisherman's Baptist Church, Foley AL**

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