

A merry heart doeth good like a medicine,
but a broken spirit drieth the bones.

-- Proverbs 17 : 22



The background of the slide is a solid pink color, decorated with numerous small, white, irregular shapes that resemble confetti or streamers, scattered across the entire surface.

LAUGHTER:

Bio-Psycho-Social-Spiritual Benefits

Theresa A. Yuschok, MD
yuschok@gmail.com

Disclosure statement

- I have no conflicts of interest.
- (I don't even have laughing stock.)

Learning Objectives

By the end of the session, learners should be able to:

- List three medical conditions which may present with symptoms of pathological laughter;
- Describe four evidence-based health benefits of laughter;
- Describe two behavioral strategies to increase daily laughter;
- **...and learn new words.**



GELOTOLOGY

- ▶ The study of laughter—psychologically and physiologically.

GELOS- Greek Spirit of Laughter

GELASTIKOS - <Greek> laughter

Gelotophobia - fear of being laughed at

Katagelasticism - enjoy making fun of others

Gelastic seizure - hypothalamus, TL, mFL
fits of laughter

Gelastic syncope - cerebellar vermis tumor vs
+ head tilt vasodepressor syncope vs CV disease

Pathological Laughter

- Alcohol, THC, LSD, N₂O, drug intoxication,
- Hebephrenic Schizophrenia (disorganized)
- Pseudobulbar Affect
 - Stroke, ALS, MS, TBI, Alzheimer's, Parkinson's
 - Progressive Supranuclear Palsy (PSNP)
- Hypothalamic hamartoma
- Angleman Syndrome “*Happy Puppet*”
- Kuru (from eating human brains)
- Manganese poisoning-*masque manganique*
- Psychogenic Nonepileptic Seizures (PNES)

Laughter observed

- 1. Face and eye muscle contract, show upper teeth, exhale
- 2. Diaphragm/abd. muscles spasm, larynx vocalizes, irregular breathing
- 3. Tear ducts and sweat glands.

Duchenne's Display or "Play Face"

EMG for zygomaticus major
The Mechanisms of Human Physiognomy, 1862



Martin, Rod A. , (2001)
“Humor, Laughter, and Physical Health:
Methodological Issues and Research Findings”,
American Psychological Assn, 127: 504-519.

Review of Psych Lit 1960-2000

“More rigorous and theoretically informed research is
needed before firm conclusions can be drawn
about possible health benefits of humor and laughter.”

Methodology Issues

- Clarify humor vs mirth vs laughter
 - Different parts of brain: cognitive, emotion, behavior
- Experiments cannot be blind studies.
 - Only short term effects
 - Rate humor stimulus or allow choice
- Self-report scales of humor and illness
 - Control for optimism vs neuroticism
 - Correlation is not causation
- Moderation of stress response
 - Try to not rely only on self-reports

Laugh Tracks

- Cognitive processing – Pre-frontal cortex
- Assess pleasure- nucleus accumbens, reward circuit
- Emotional induction - limbic system
- Emotional expression—motor/premotor cortex
- Mirth from incongruity – pre-genual ACC
- Autonomic responses – Hypothalamus (4 Fs)
- Inhibition of laughter— corticobulbar tract
- Modulate intensity/duration – cerebellum?

Laughter involves both sides of the brain

- EEG –less right/left discordant activity during mirth.

• fMRI

- If right hemisphere damage, fail to get a joke with nonverbal picture.

Right Frontal Lobe integrates cognition & emotion.

- If left hemisphere damage,
- aphasia but perceive incongruity



Laughter and Biological Benefits

- ▶ Pain reduction?

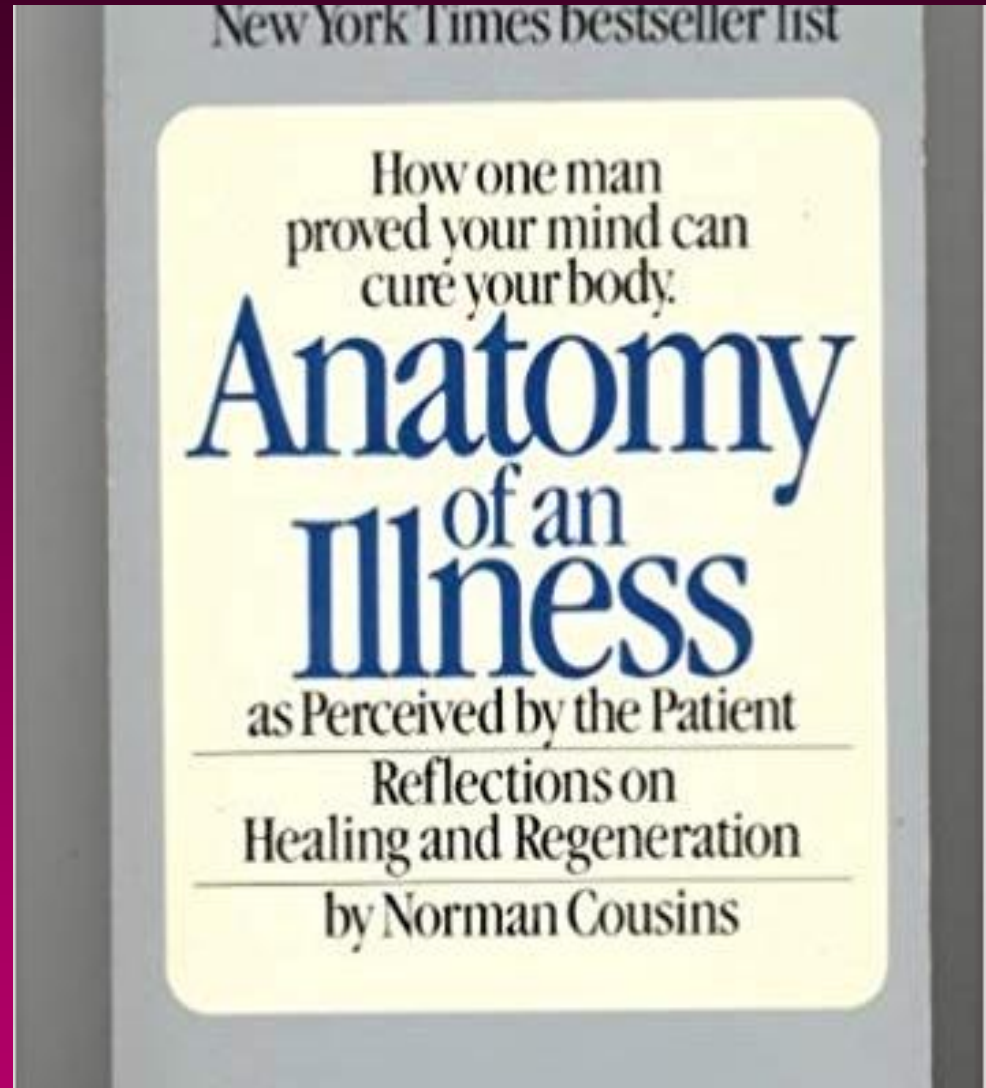
Norman Cousins 1979

Marx Brothers movies
Candid Camera sketches

Belly Laughs x 10min
=

2 hours Pain Free
And decreased ESR.

How is pain reduced?
Endogenous endorphins?



1. Increase pain threshold

Cogen, R., Cogen, D., et al. (1987)

Effects of laughter and relaxation on discomfort levels.

Journal of Behavioral Medicine, 10 (2) 139-144.

- PAIN THRESHOLD—time to sense pain
- PAIN TOLERANCE—time sustained

n=40

Comedy audio (Lily Tomlin) --increase threshold

Progressive Muscle Relaxation—increase threshold

Dull lecture —same as control

Control

Manninen, S. , et al. (2017)
“Social Laughter Triggers Endogenous Opioid Release
in Humans”, *Journal of Neuroscience*, 37:25, 6125-6131

n = 12 healthy males

- Method: PET Scan with m-opiate receptor (MOR)-specific ligand Carfentanil to quantify opiate release.
 - Baseline scan after 30min sitting alone in room
 - Opioid receptor density in frontal lobes predicted laughter rates
 - Scan after 30min with comedy clips
 - Increased endorphin release from thalamus, caudate nucleus and anterior insula.
 - Increased pain threshold

2. Boost the Immune System

Bennett, MP and Langacher, C. (2007) Humor and Laughter May Influence Health IV. Humor and Immune Function. eCAM 2008;5(1) 37-40. doi:10.1093/3cam/n3m149

- Muscle relaxation
- Increase Urinary Epinephrine and NE
- Increase galvanic skin response, BP stable
- Increase HR, R, oxygen consumption
- Decrease anxiety;
- **Decrease serum cortisol, GH, Dopac**
- **Increase Salivary Ig A**
- **Laughter (not humor alone) increases NK activity.**

Bennet, Mary, et al. (2003)

“The Effect of Mirthful Laughter on Stress and Natural Killer Cell Activity”

Alternative Therapies, 9:2, 38-43

- N=33
- Method: Intervention group view humorous video
Control group: view tourism video
- Measurement:
 - Stress Arousal Check List: decreased w/humor $p=.004$
 - Humor Response Scale: correlated w/dec stress $p=.004$
 - NK cell cytotoxicity assays: $p=.001$
Increased NK activity if humor response scale > 25
- (*Low NK cell activity is linked to decreased disease resistance and increased mortality in persons with cancer and HIV disease*)

3. Reduce the stress response

- Reduce cortisol, growth hormone, dopac
- Reduce plasma and urine epinephrine & NE
- Relax muscles
- Stimulate dopamine reward centers
- Improve endothelial-dependent vasodilation

Improve Cardio-Vascular Health

Tan, Stanley; Tan, Linda, et al (2007)

“Humor as an adjunct therapy in cardiac rehabilitation,
attenuates catecholamines and MI recurrence”

Advances in Mind Body Medicine, 22:3-4, pp 8-12.

n = 48 diabetic patients s/p MI

Divided into two matched group

30min self-selected humor per day vs standard care

One year later, humor group had lower BP, lower urine and plasma epinephrine and norepinephrine, less NTG use, and fewer recurrent MI (2/24) than control group (10/24).

4. Humor and Longevity

Romundstand, S., et al. (2016)

“A 15-year Follow-up Study of Sense of Humor and Cause of Mortality”

Psychosomatic Medicine, 78:3, 345-353

n = 53,556 in Norway

Questionnaire: cognitive, social and affective aspects of sense of humor.

15year follow-up deaths from heart disease, infection, cancer, COPD

Women: high cognitive humor correlated with 43% less risk of all deaths

- 73% lower risk from heart disease,
- 83% lower risk from infection

Men: high cognitive humor 74% lower risk of death from infection



He who laughs, lasts.

-Mary Pettibone Poole



Social Benefits of Laughter

Laughter is an attractive trait

Povine, Robert R. Laughter: A Scientific Investigation, NY: Penguin Books, 2000.

Povine reviewed 3,745 personal ads 4/28/96
478 or 13% mentioned humor

Women sought laughter 13%, offered 5.7%
Men sought laughter 4.9%, offered 6.5%

Laughter is sociable

- Laughter is 30x more frequent in social settings (Povine, studies of journal keeping)
- Contagious -- Mirror neurons?

Social Lubricant

- Decrease friction, dispel aggression
- Enhance social bonds.

Humor influences partner's emotions

Guttman, John, et al. (1998)

Predicting Marital Happiness and Stability from Newlywed's Interactions.
Journal of Marriage and the Family, 60:5-22.

- Wives who use affiliative humor =>
 - Husbands calmer (by heart rate data)
 - Couple engages in more problem solving.
 - Post-6 years,
greater marital satisfaction and stability.

Kurtz, L.E. and Algoe, S. B. (2015)
Putting Laughter in Context: Shared Laughter as
Behavioral Indicator of Relationship Well-being,
Personal Relationships, 22:573-590.

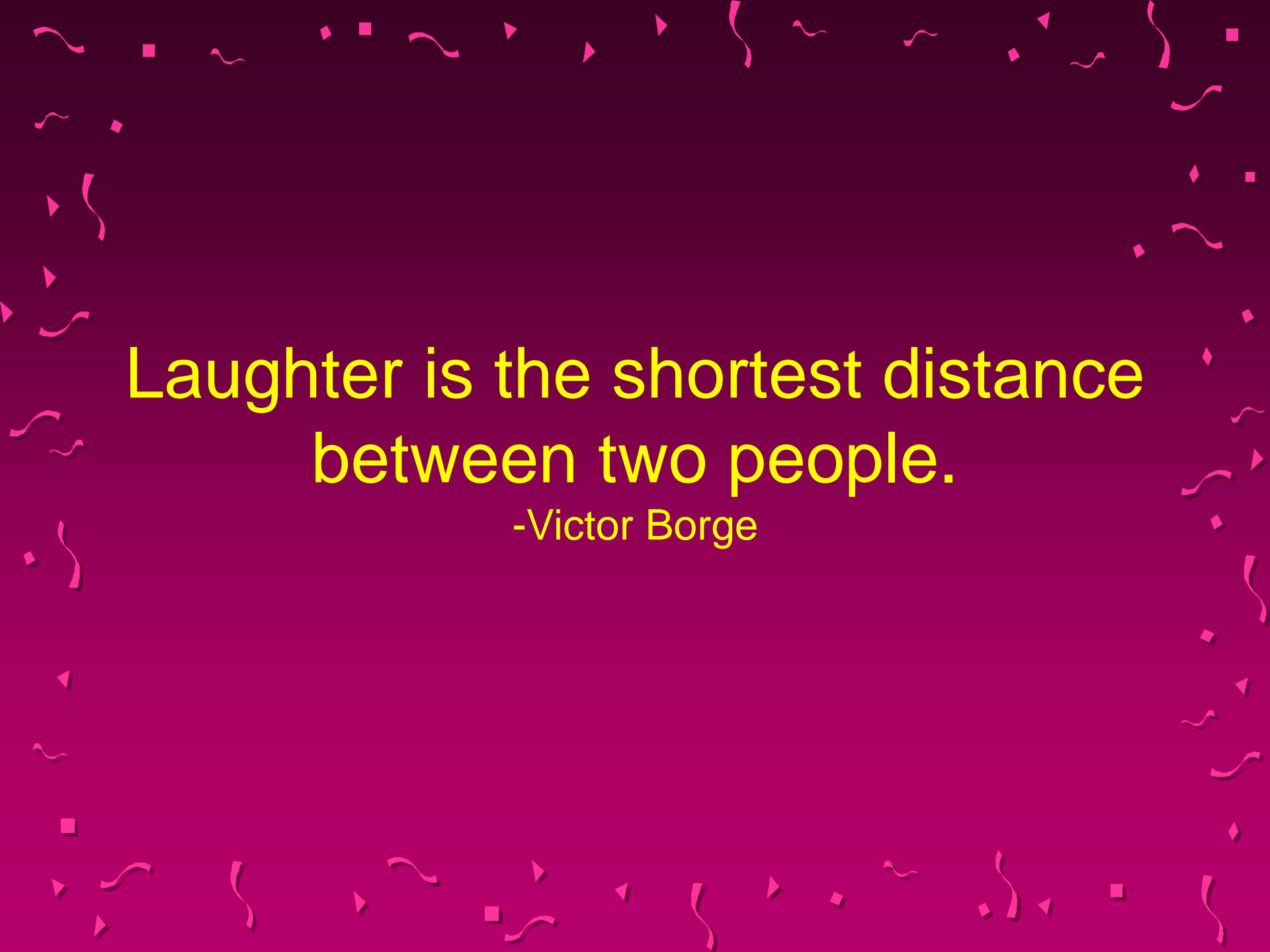
- N = 71 heterosexual couples
- Method: Videorecord conversation about how they first met . Coded separately for laughter events, another judge determined overlapping times for shared laughter.
- Measurement of Relationship Well being:
 - Inclusion of the Other Scale
 - Perceived support
 - Relationship satisfaction
 - Passionate love scale
 - Investment model scale (commitment)
- Shared laughter is correlated with relationship well-being, especially closeness and perceived support.

A decorative border of pink confetti, including wavy lines, squares, and triangles, surrounds the text.

In summary,

Laughter enhances social interaction

1. Identify and initiate social interactions.
2. Develop and maintain relationships
3. Console one another.
4. Work together (collective agency)
5. Influence other's emotions.
6. Shared laughter correlated with relationship well-being.



Laughter is the shortest distance
between two people.

-Victor Borge

Darwin, Charles. (1872)

The Expression of the Emotions in Man and Animals,
Chapter 8: Joy, High Spirits, Love, Tender Feelings, Devotion,
NY: Appleton & C0, pp 196-219.

- “Laughter seems primarily to be the expression of mere joy and happiness.”

“The anthropoid apes, as we have seen likewise utter a reiterated sound, corresponding to our laughter, when they are tickled, especially under their armpits.”

Rats laugh when tickled.

Burgdorf, J., Panksepp, J., & Moskal, J.R. (2011)

Frequency-modulated 50 kHz ultrasonic vocalizations:

A tool for discovering the molecular substrates of positive affect.

Neuroscience and Biobehavioral Reviews, 35 (9): 1831-1836

- Enjoy tickling, follow hand around for more
- Rats laugh 50 kHz
- Rats run mazes to get reward of tickling.
- Rats laugh during social play.
- Naloxone decrease rats' play.

Primate Studies

- Play face
- Panting vocalizations
- Chimps and gorillas learned Sign Language
- and used play face when they made jokes.

Jokes— “All Ball”, “I’m Queen”

Koko asked Robin Williams to tickle him.

Koko took off Mr. Fred Roger’s tennis shoes.

Dogs laugh, but not hyenas

- Hyenas giggle in frustration.
- Dogs smile and panting during play.



Davila-Ross, Marina, et al. (2011).
Aping Expressions? Chimpanzees produce
different laugh elicited by laughs of others.
American Psychological Association, 11:5, 1013-1020

n= 59 chimpanzees in Zambia

466 dyadic play interactions

- Acoustic assessment:
 - Laugh-elicited-laugh has a different structure
 - Prolonged social play, affiliation and cooperation
 - Spontaneous laugh

Evolutionary Psychology

What are the evolutionary advantages of laughter?

Enhance mate selection

Expand social group

Grooming and touch releases endorphins

Laughter expands social network.

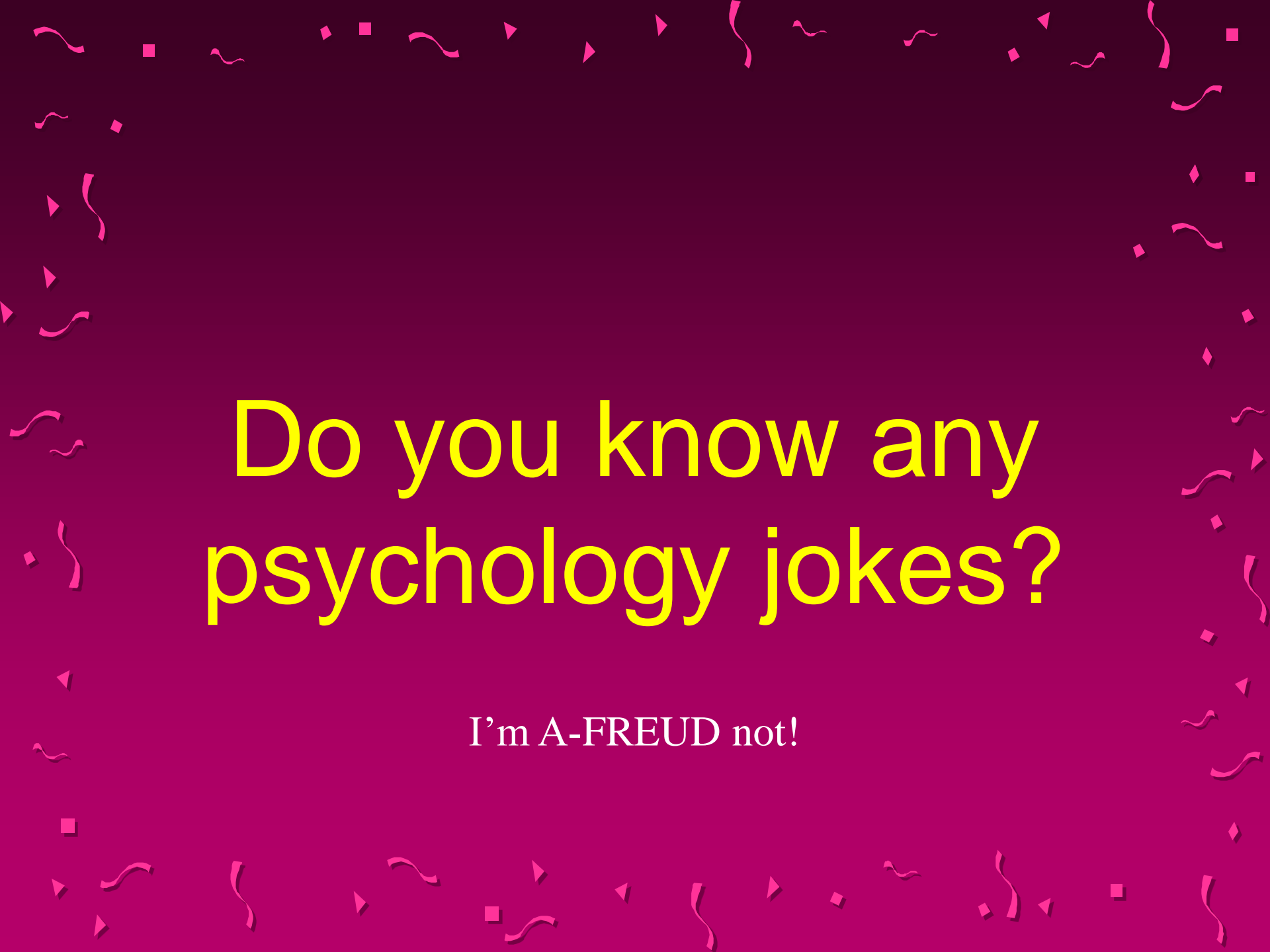
Social Call

Maintain play and cooperation



Laughter and Psychological Well-being

Defense or Deliverance?

A decorative border of pink confetti, including wavy lines, small squares, and triangles, surrounds the central text.

Do you know any psychology jokes?

I'm A-FREUD not!

Sigmund Freud

“Jokes and Their Relation to the Unconscious”, 1905

“The Psychopathology of Everyday Life”, 1901

“Humor”, 1928

- Unconscious contributes to the joke.
- Parapraxis “Freudian Slip”
- Humor is “not resigned, but rebellious”.
- Superego consoles and protects ego,
 - “Look! Here in the world which seems so dangerous! It is nothing but a game for children to jest about.”

Freud:

Jokes express
forbidden thoughts.

SEX

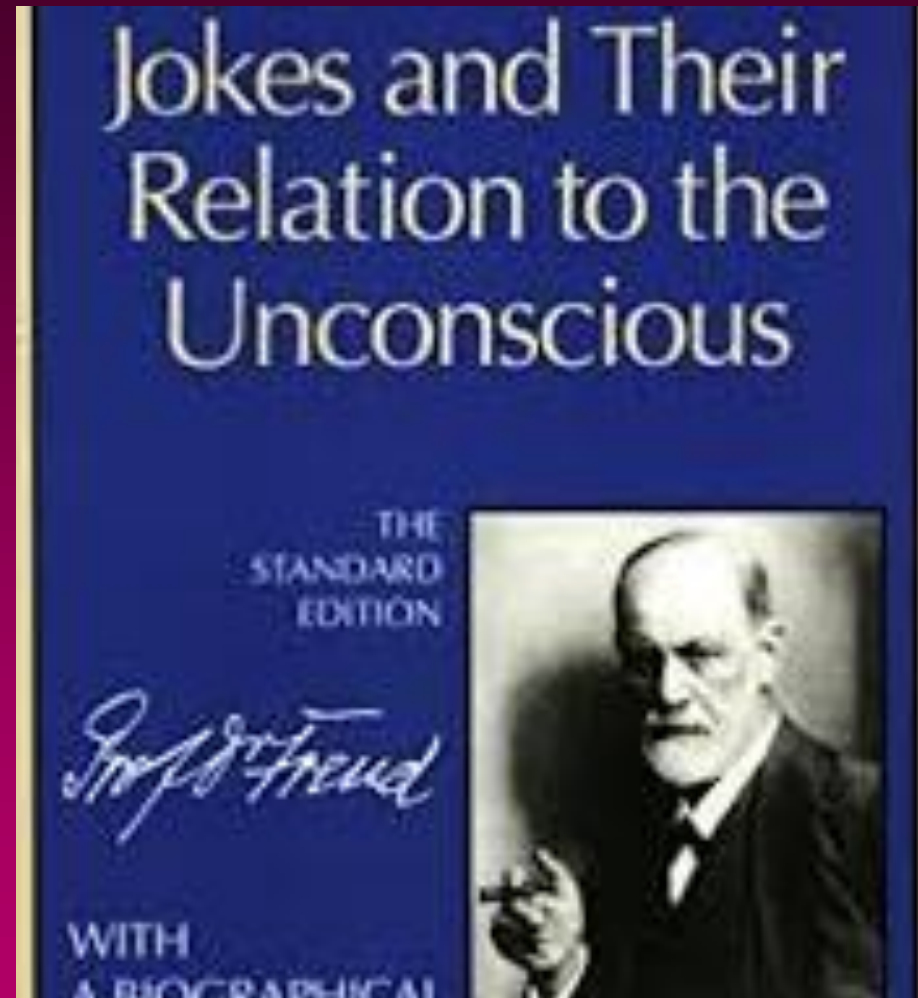
Olympic Sex
Super Sex

AGGRESSION

I won the lottery!
Divorce? No.

CYNICICISM

Bien sur qu'il me pardonnera: c'est son métier.
Pope's infallible rules.
7 Words You Can Never Say on TV



Dreams vs Jokes

DREAMS

- Personal
- Masked—condensation
- Wish fulfillment
- Need to sleep
- Avoid unpleasure

JOKES

- Social
- Intelligible
- Play, word-play
- Need for pleasure
- Diminish suffering

Gallows Humor

- “The ego refuses to be distressed by the provocations of reality, to be compelled to suffer; it insists that it can not be affected by the traumas of the external world;

It shows, in fact, that such traumas are no more than occasions to gain pleasure.”

--Freud

- Eg. Cigarette on firing squad.
- Court jester who told puns.

Comedy laughs at Tragedy

- “I would never had made it if I could not laugh. Laughter lifted me momentarily...out of this horrible situation...just enough to make it liveable...survivable.”

--Viktor Frankel

Eg. Two types of people

Hitler's would-be assassin

“Swine!”

Grace

Humor from POWs

Herman, LD (2001) Humor as a Coping Mechanism:
Lessons from POW's Humor.
International Journal of Humor Research, 14(1)83-84

Joked with one another, not alone.

- Morse code
- Messages scratched in shower

Easy once you “know the ropes”

Maintain morale, rise above torture.

**“A time to weep and a time to laugh,
A time to mourn and a time to dance.”**

--Ecclesiastes 3:1 – 8

9/29/01 TOO SOON!

Gilbert Gottfried



10/1/01 SNL

Can we be funny now?



Frederickson BL, et al (2003)

What good are positive emotions in crisis?

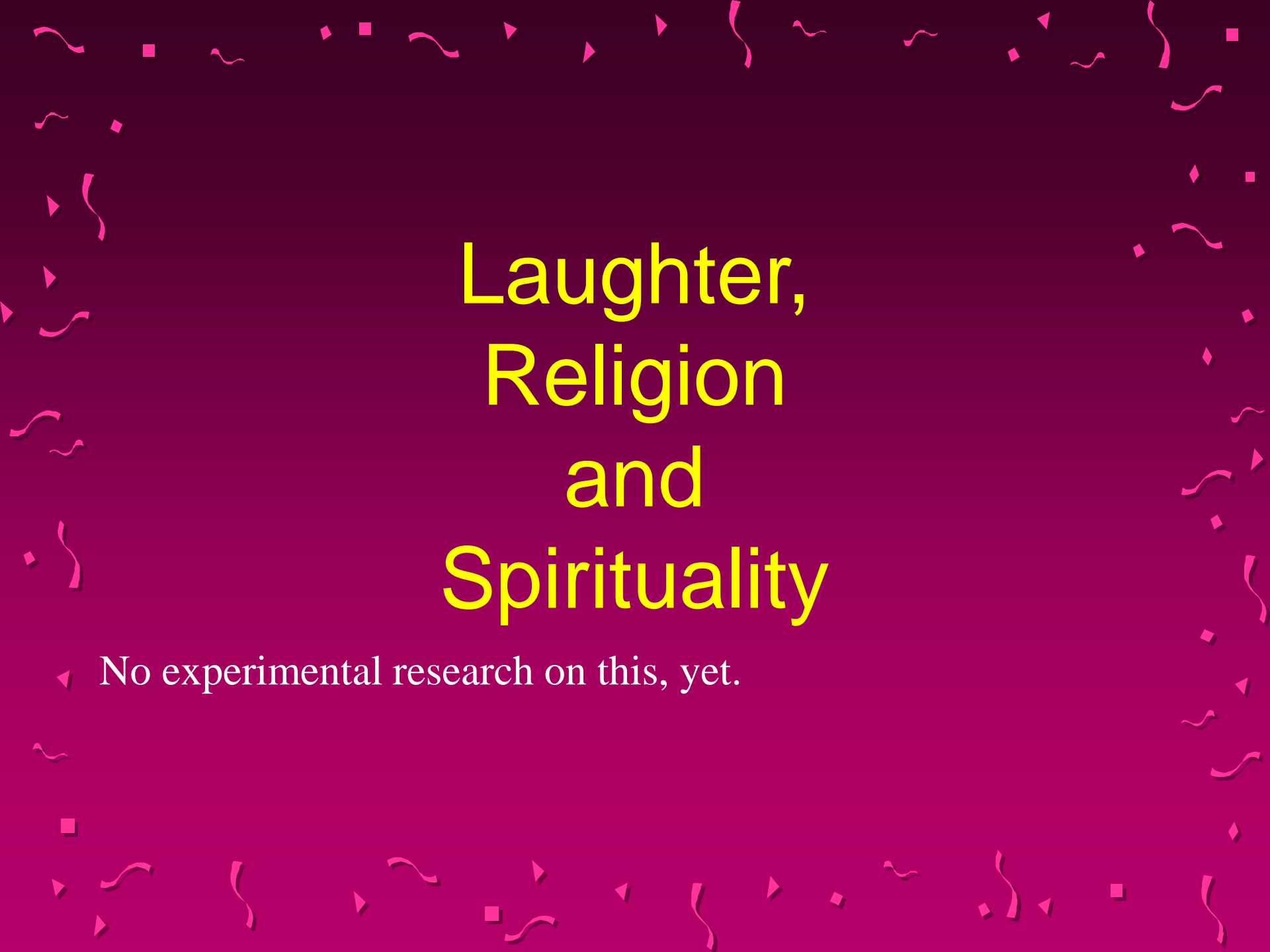
A prospective study of resilience and emotions following the terrorist attacks on the U.S. on Sept. 11, 2001

Journal of Personality and Social Psychology, 84(2),365-376

- N=133 college students in March - June,
- N=47 after 9/11/01
- Pre-crisis Scales: Ego Resiliency, NEO, SWLS, LOT,,
- Post-crisis Scales: Affect grid,, current problems/stress, DES, CES-Depression
- Positive emotions:
 - Quell autonomic stress reactions
 - Broaden attention, thinking, behavioral repetoires
 - Resource building--Broad and Build Theory
 - Upward spiral of emotional well being
- This study supported:
 - Resilient people are buffered against depression by positive emotions.
 - Resilient people thrive through positive emotions.

Psychological Benefits

- Observing ego, rises above
- Resilience, coping strategy, protects ego.
- Overcome inhibitions
- Increase positive emotions:
 - Stress Buffering Hypothesis
 - Broad and Build Hypothesis
 - Upward Spiral of Emotional Well-being



Laughter, Religion and Spirituality

- ▶ No experimental research on this, yet.

Laughter in Religions

- **Egyptian** god of Laughter – Geb with a goose on his head
- **Greek** god of Laughter— Gelos, first joke book
- **Shinto** goddess of mirth and revelry— Ame-no Uzume
- **Native Americans** – Sacred Clowns
- **Hinduism** “ May Lakshmi’s ensuing laughter prove you aid.”
“May the burst of Siva’s laughter protect you.”

The Autobiography of a Yogi by Paramhansa Yogananda

- **Buddhism** Monkey Mind, 6 words for laughter, Hotei, 3 monks.
Upaya—everything is useful to realize and understand true nature
- **Judaism** Gen 18:12 Elderly Sarah laughed when told she would have a baby.
Proverbs 17:22
- **Christianity** Bright Monday (*Risus Pachalas*), Pentacostal “Holy Laughter”
- **Islam** -- conditions of permissible joking, truth not hurtful or blasphemous
- **Sufism** – poets Rumi and Hafiz, jokes about Nasradeen.

Spiritually, we laugh at...

- Our own folly (create an opening for something greater ...)
- Impossibility (open to Divine possibility)
- Comedy of life itself
- Death and other fears
- Illusions (separateness vs Oneness)

Death is just around the corner.

- “O death, where is thy sting?” --I Cor. 15:55
- Everyone is so afraid of death,
but the real sufis just laugh:
nothing tyrannizes their hearts.
What strikes the oyster shell
does not damage the pearl!” --Rumi

Laughing at Illusions

I laugh when I think the fish
in the ocean is thirsty.

You don't grasp the fact that what
is most alive is inside your own house;

-Kabir

The Kabir Book: Forty-four of the most ecstatic poems of Kabir

Is laughter a path or the destination?

Richard Niebuhr

“Humor and Faith”

“Humor is
a prelude to faith,
and laughter is
the beginning of
prayer.”

SAMADHI, poem by Yogananda

Autobiography of a Yogi

Eternity and I,
one united ray.
A tiny bubble of
laughter, I am
become the sea of
mirth itself.

Is the Divine laughing?

- G-d who sits in Heaven, laughs. - Psalm 2:4
- Man plans, and G-d laughs.—Yiddish adage
- “What is laughter? It is God waking up!”
 - --Hafiz, trans by Daniel Landinsky, I Heard God Laughing



Robert Frost

Forgive, O Lord, my little jokes on Thee
And I'll forgive Thy great big one on me.



Rx: Laugh More

How do we add more laughs per day?

Laughing Yoga: *Hasyayoga*

1995 Laughing Yoga Clubs

Dr. Madan Kataria

40 minutes

Author, Laugh For No Reason

Laughter is contagious

Playful warm up

Social interaction

Exercises: Lion face

Humming laughter



World Laugh Day January 11

Morishima, Toshitaka; et al. (2019)
“Effects of Laughter Therapy on Quality of Life
in Patients with Cancer: An Open-label, Randomized Controlled Study”,
PLOS One 0219065

n = 56, ages 40-64 yo with cancer in Japan

Method: control vs four sessions laugh therapy q2 weeks,
then crossover. Laughter yoga and *Rakugo or Manzai*.

Measurement: EORTC QLQ-C30 at week 0, 3, 7.

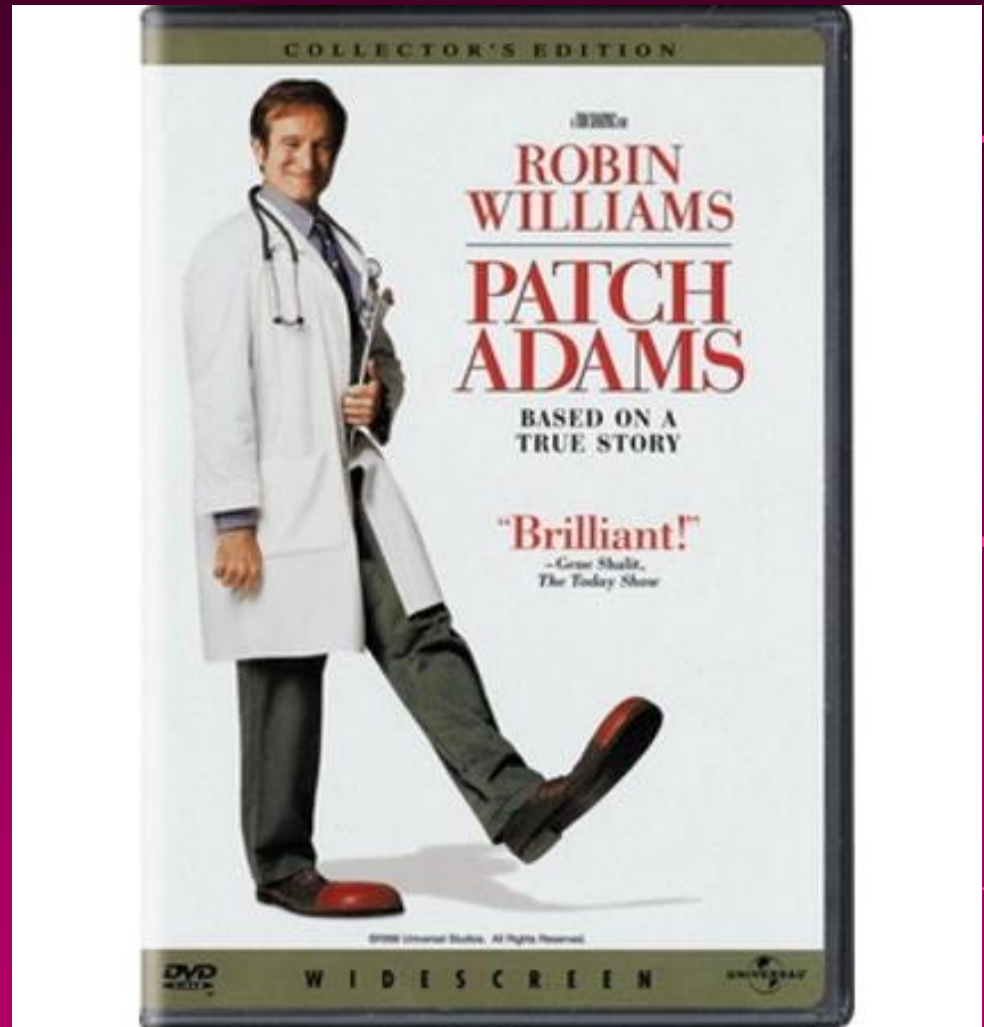
European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30

Results:

1. Early cognitive improvement with laughter group
2. Decreased pain in weeks 3 and 7 of intervention
3. No negative impact of laughter on QLQ-C-30

Patch Adams, MD

“The role of the clown and a physician are the same— it’s to elevate the possible and to relieve suffering.”



Medical Clowns

- Pediatrics
- Dialysis
- Cancer clinics
- Palliative Care
- Nursing Homes

Ben-Pazi, Hilla, et al. (2017)
“Clown Care Reduces Pain in Children with Cerebral Palsy
Undergoing Recurrent Botulinum Toxin Injections—
A Quasi-Randomized Controlled Crossover study”
PLOS One, 12:4

- n=46, 26 clown care, 20 standard,
Method: Visual Analog Scale of Faces, ruler.

Clown care 2.89 +/- 1.6 pain

Standard 3.89 +/- 1.3 pain

p=0.036

With clown care, decreased pain initially and in subsequent
standard injections.

COULROPHOBIA

The fear of clowns

- n=1160 hospitalized children, Haifa, Israel
 - 14=1.2% experienced fear of clowns
 - (12 girls/14 = 85.7%, age 1-15)
-
- Meiri, N., et al. (2017) “Fear of Clowns in Hospitalized Children: Prospective Experience.”
European Journal of Pediatrics, 176:2, 259-272.

Borod, Manuel. (2006)
SMILES—Toward a Better Laughter Life:
A Model for Introducing Humor in the
Palliative Care Setting,
Journal of Cancer Education 21:1, 30-34.

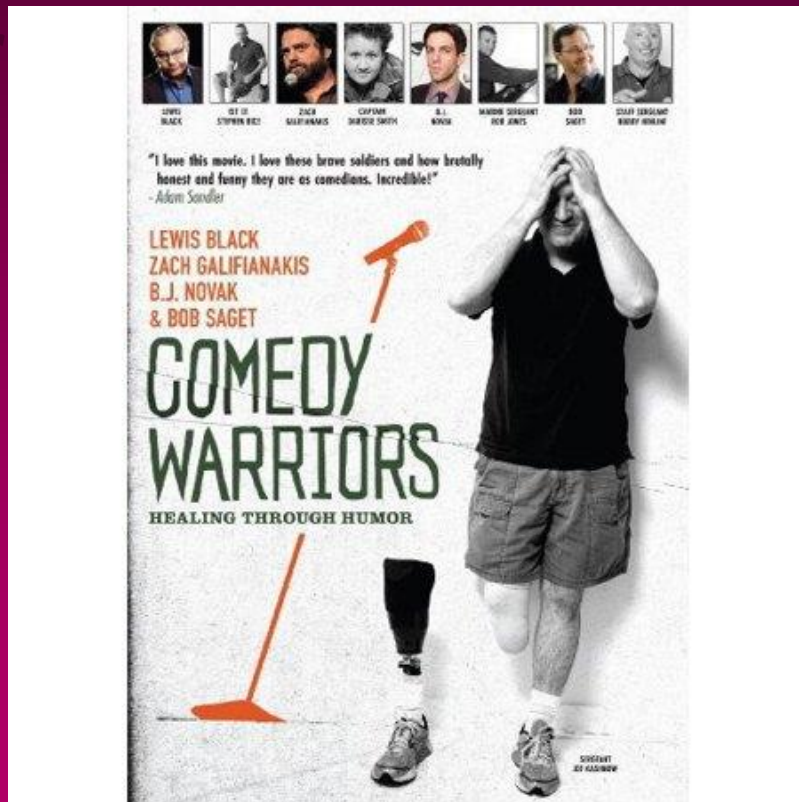
- **S = Smile, contagious.**
- **M = Make Eye Contact, playful twinkle?**
- **I = Intuition and Imagination**
- **L = Look for, Listen to,
Leap at opportunity**
- **E = Elephants never forget**
- **S = Sensitive to the situation**

BEWARE! A RANGE OF THERAPEUTIC HUMOR

Salameh, Waleed. (1987) "Humor in Integrative Short Term Therapy,"
Handbook of Humor and Psychotherapy, pp 195-210
Sarasota, Florida: Professional Resource Exchange.

- 1. Destructive - - hostile, vindictive
- 2. Harmful - - irrelevant, not attuned
- 3. Minimal help - - positive interaction
- 4. Helpful - - attuned, facilitate self-exploration
- 5. Outstandingly Helpful –
 - Deep understanding, well-timed
 - Accelerate client growth and transformation

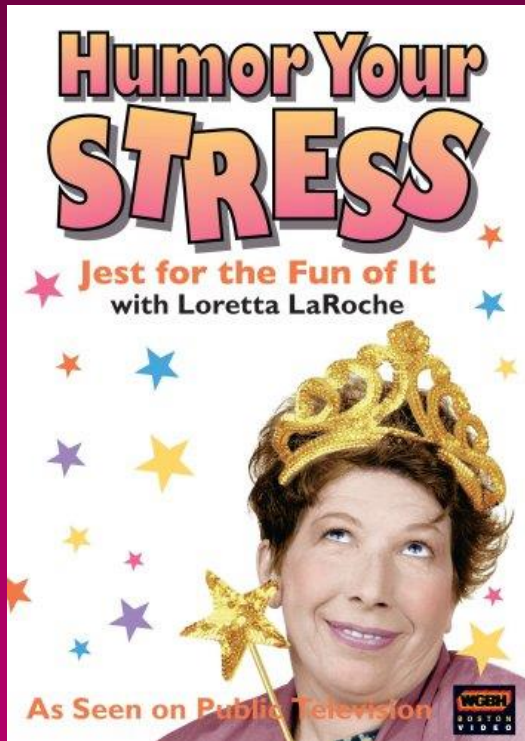
Stand-up Comedy by Vets



- Comedy writer mentors
- Humorous perspective
 - Coping with the truth
 - Social confidence
 - Improved mood
- e.g. Acquired Facial Trauma has 10-70% incidence of depression and anxiety with increased suicide risk.

Stress Management & Beyond at DVAMC MHC

Video learning



Behavioral activation

- Bring a joke to share.
- Bring names of your favorite laugh-out-loud movies, comedians, and sit-coms.
- Laugh more daily.

Add More Laughs Per Day

BIOLOGY	PSYCHOLOGY	SOCIAL	SPIRITUALITY
Tickling	Laugh at Yourself Keep a laugh journal.	Find Funny Buddy	<u>Jewish Humor: What The Best Jewish Jokes Say About the Jews,</u> Rabbi Joseph Telushkin
Face-to-face	Exaggerate Problems, Create your own jokes and stories.	Comedy Movies TV shows, Books, Comedy Clubs	<u>Rumi's Little Book of Love and Laughter</u> Coleman Barks
Contagion— Laugh Yoga	www.jokesoftheday.net Memorize jokes	Comedy Classes	<u>Laugh Your Way to Grace,</u> Susan Sparks
<u>Laughter:</u> <u>A Scientific Investigation</u> Robert R.Provine	Playful attitude: Find Humor in Every Situation	Giggle with children (age 5 laugh 8x/hr)	<u>I Heard God Laughing:</u> <u>Renderings of Hafiz</u> Daniel Ladinsky

Van der Wal, CN; Kok, RN; (2019)
Laughter-inducing therapies:
Systemic Review and Meta-analysis
Social Science and Medicine 232:473-488

1. Simulated laughter > humor-induced laughter for positive effect on depression and anxiety.
2. Laughter reduces perceived stress, reduced cortisol levels.

Van der Waal and Kok continued...

- Future research:
 - RCT trials
 - Increase sample size
 - Standardized form of laughter therapy
 - Recommended “dosage” of laughter

In conclusion,

Benefits of Laughter

BIOLOGIC—reduce pain , boost immune system,
decrease stress response, possibly live longer

PSYCHOLOGICAL—help cope, enhance observing ego,
overcome inhibitions, create positive emotions

SOCIAL—promote, enhance and maintain interactions

SPIRITUAL-Recognize human folly, fear and illusions
and create an opening for Divine.



We are all here for a spell.
Get all the laughs we can.

--Will Rogers

"If you leave a green bough in your heart,
the singing bird will come."—Chinese Proverb

Stained glass by James Hubbell: Between Heaven and Earth

