PainWeek®

# Back to the Basics: The Role of Psychology in Pain

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# Title & Affiliation

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# Disclosures

- None

# Learning Objectives

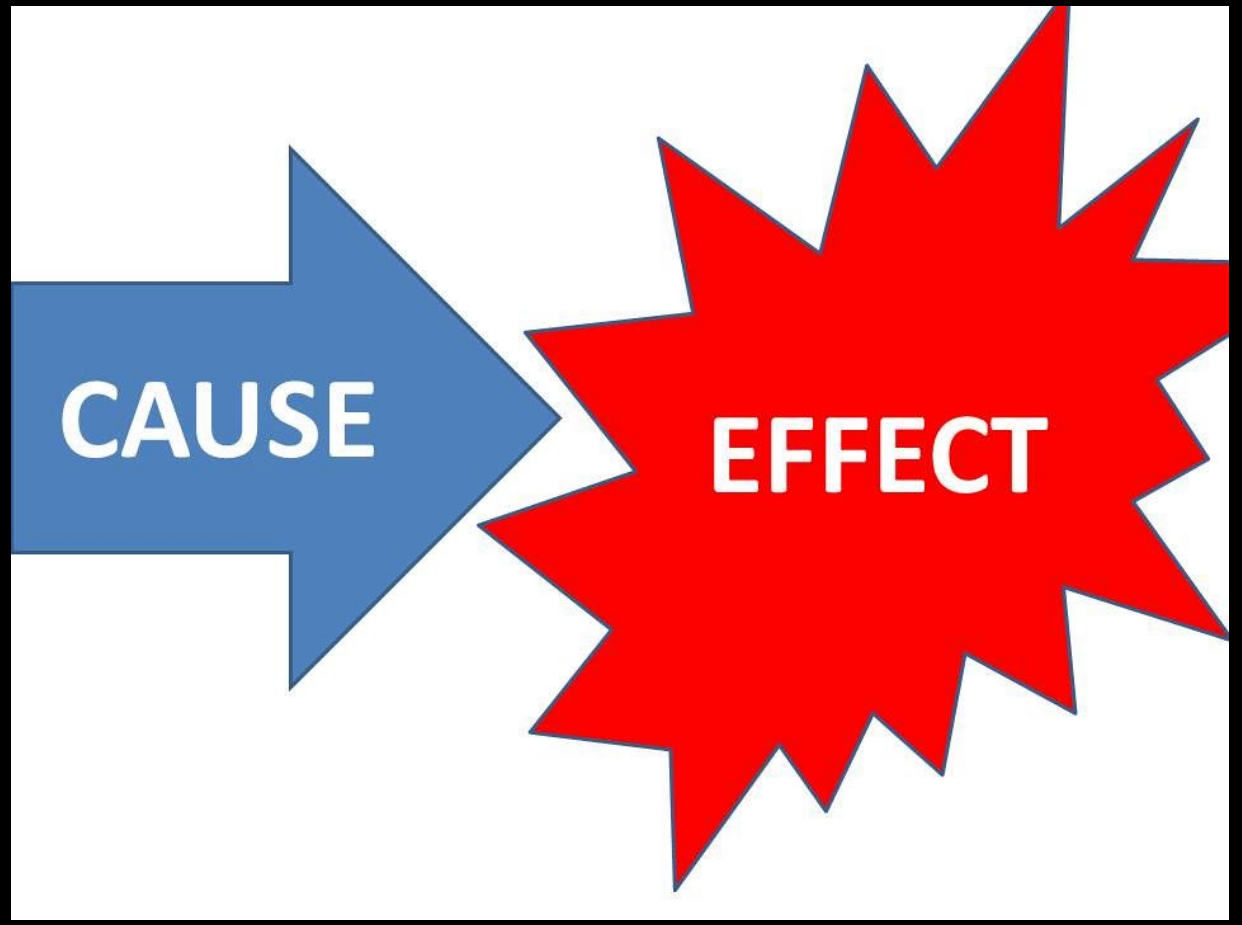
- Explain the differences between acute and chronic pain
- Describe the role of interdisciplinary care in chronic pain management
- Identify evidence-based psychological interventions used to treat chronic pain conditions

# Pain in Context

- US Department of Health & Human Services/CDC (11/2020)
  - 20.4% of the US population has chronic pain
  - 36.4% of these individuals have high-impact chronic pain
  - Chronic pain is most prevalent in women, individuals over 65, and non-Hispanic white adults
  - Prevalence higher in more rural areas

Zelaya CE, Dahlhamer JM, Lucas JW, Connor EM. Chronic pain and high-impact chronic pain among U.S. adults, 2019. NCHS Data Brief, no 390. Hyattsville, MD: National Center for Health Statistics. 2020.

# What Causes Pain?



# Multiple Etiologic Pathways

- Biological factors
- Physical factors
- Psychosocial factors

# Common Psychological Risk Factors Associated with Chronification of Pain

- Mood
- Early life experiences
- Coping mechanisms/other psychological variables

# Mood: The Impact of Depression

- National Population Health Study [Canada]
  - n = 9,909
  - Data set comprised of information on:
    - Mental health status
    - Lifestyle behaviors
    - Healthcare utilization
    - Socioeconomic information
  - 24 months between two data collecting periods
  - Respondents endorsing depression at time 1 three times more likely to report low back pain at time 2

Currie, S., Wang, J. (2005). More data on major depression as an antecedent risk factor for first onset of chronic back pain. *Psychological Medicine, 35(9),* 1275-1282.

# Mood: The Impact of Depression

- Health Outcomes Survey [CMS]
- Data set comprised of information on:
  - SF 36 Health Survey Questionnaire
  - Demographics
  - Mood
  - Health (complications, comorbidities, chronic conditions)
- 24 months between two data collecting periods
- Respondents endorsing depression at time 1 more likely to report low back pain at time 2 when controlling for confounding variables



Meyer, Thorsten PhD; Cooper, James MD, BA; Raspe, Heiner MD, PhD. Disabling Low Back Pain and Depressive Symptoms in the Community-Dwelling Elderly, Spine: October 1, 2007 - Volume 32 - Issue 21 - p 2380-2386.

# Early Life Experiences

- Adverse Childhood Experience (ACE)
  - Collaboration between Centers for Disease Control & Kaiser Permanente
  - Initial data collection started in mid- to late 1990s (n = ~17,000)
  - Primary goal: assess impact of ACEs on long-term health and well-being

# ACEs Variables: Related to Abuse, Neglect, and Household Challenges

- Physical neglect
- Emotional neglect
- Physical abuse
- Emotional abuse
- Sexual abuse
- Household substance abuse
- Household member incarceration
- Household member mental illness
- Mother treated violently
- Separation/divorce of parents

# ACE Preliminary Findings

- 38% of respondents experienced 2 or more ACEs
- Higher number of ACE variables reported associated with higher risk for negative outcomes in:
  - Injury
  - Mental health
  - Maternal health
  - Infectious disease
  - Chronic disease
  - Risky behaviors
  - Life opportunities

# ACE Implications: Pediatric Populations

- National Survey of Children's Health data analysis
- n = ~48,000
- Risk for developing chronic pain higher as the number of ACE variables endorsed increased

Groenewald, Cornelius B.; Murray, Caitlin B.; Palermo, Tonya M. Adverse childhood experiences and chronic pain among children and adolescents in the United States, PAIN Reports: September/October 2020 - Volume 5 - Issue 5 - p e839

# ACE Implications: Adult Populations

- Systematic review & meta-analysis of studies relating to sexual abuse and somatic disorders

- Literature from 1980-2008 included in search

- History of sexual abuse associated with a lifetime diagnosis of:
  - Functional GI disorders
  - Non-specific chronic pain
  - Psychogenic seizures
  - Chronic pelvic pain
  - Endometriosis

Paras et al. (2009). *Sexual Abuse and Lifetime Diagnosis of Somatic Disorders*. JAMA 302(5): 550-561.

Harris HR, Wieser F, Vitonis AF, Rich-Edwards J, Boynton-Jarrett R, Bertone-Johnson ER, Missmer SA. Early life abuse and risk of endometriosis. Hum Reprod. 2018 Sep 1;33(9):1657-1668.

# Coping and Other Psychological Factors

- Surgical Outcomes (lumbar surgery, SCS)
- Review of literature relating to presurgical psychological screening
- Successful outcomes generally defined
  - Decreased pain
  - Increased function
  - Return to work
  - Reduced medical treatment
- Positive relationship between one or more psychological factors and poor treatment outcome in 92% of reviewed studies

Celestin J, Edwards R, Jamison R (2009). *Pretreatment Psychosocial Variables as Predictors of Outcomes Following Lumbar Surgery and Spinal Cord Stimulation: A Systematic Review and Literature Synthesis*. Pain Medicine 10(4): 639-653.

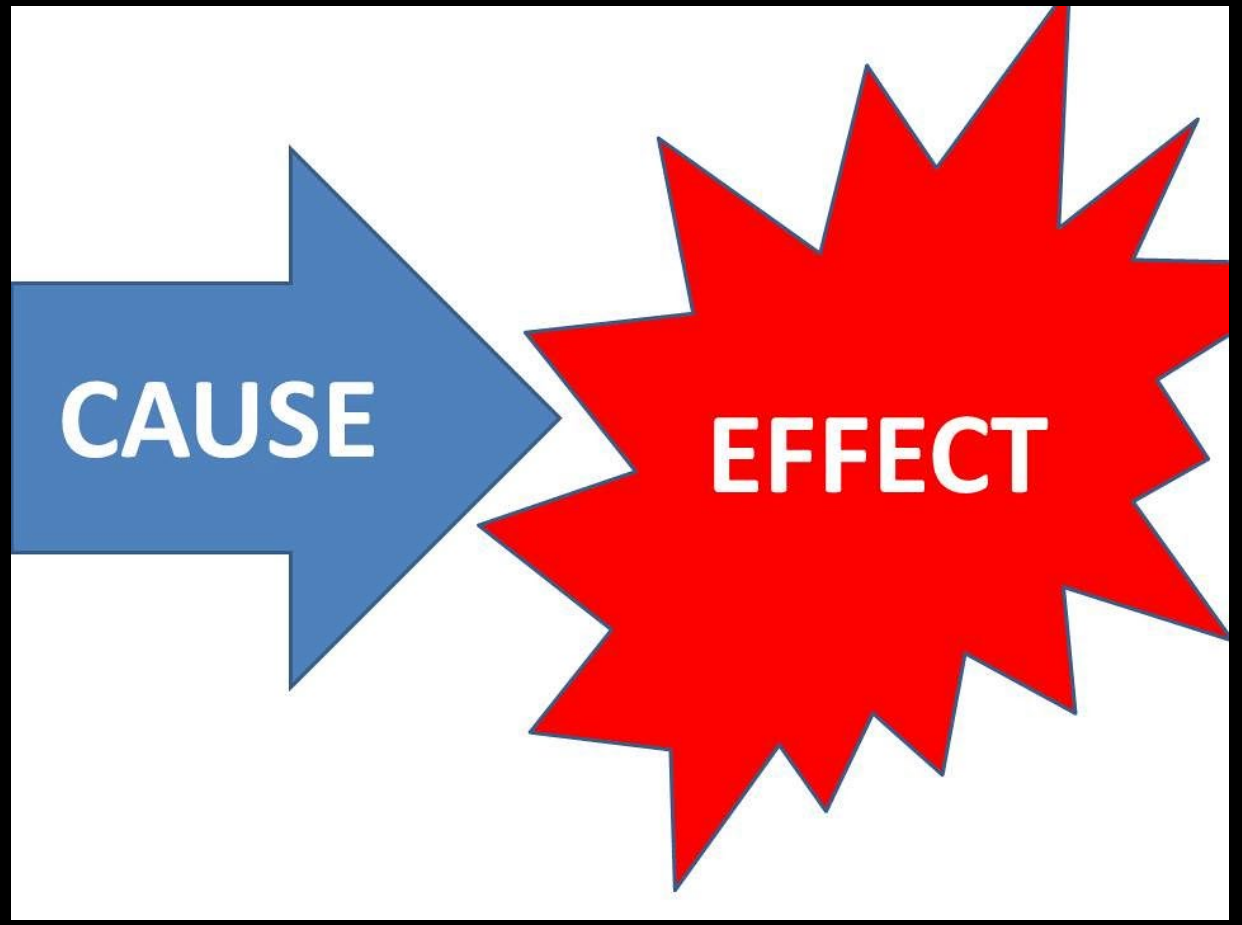
# Coping and Other Psychological Factors

- Most useful predictors of poor outcome:
  - Presurgical somatization
  - Depression
  - Anxiety
  - Poor coping

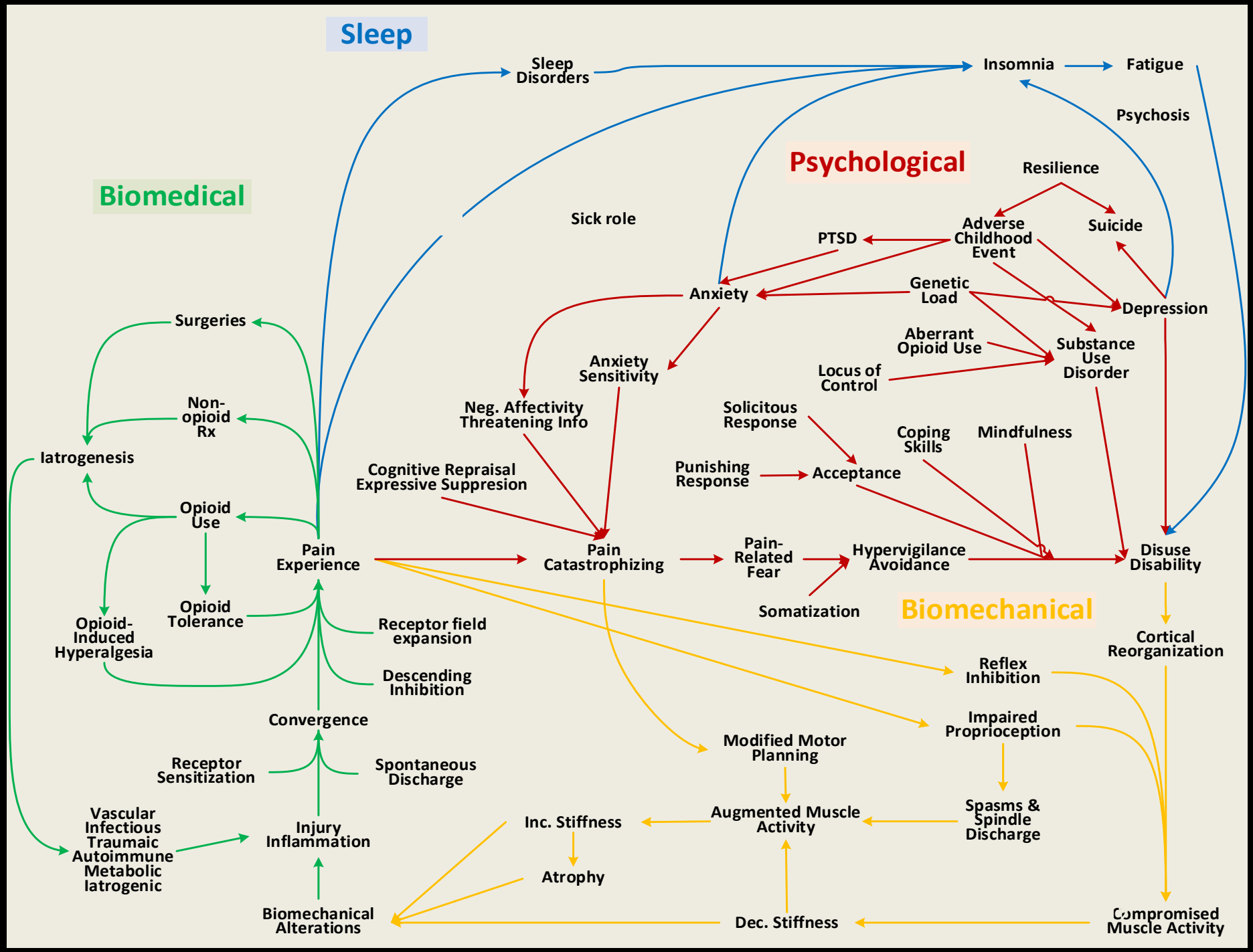
- Minimally predictive factors
  - Pretreatment physical findings
  - Activity interference
  - Presurgical pain intensity

Celestin J, Edwards R, Jamison R (2009). *Pretreatment Psychosocial Variables as Predictors of Outcomes Following Lumbar Surgery and Spinal Cord Stimulation: A Systematic Review and Literature Synthesis*. Pain Medicine 10(4): 639-653.

# What Causes Pain?



# Extended Pain Cycle

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# Pain Treatment

# Does Pain Serve Any Function Or Purpose?




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# Is All Pain The Same?

## Acute Pain

- Hurt = Harm
  - –Avoidance decreases damage
- Etiology:
  - –Clear pathway
  - –Often single cause
- Treatment Course
  - –Fixed end point
  - –Immobilization often essential for recovery
  - –Medications

## Chronic Pain

- Hurt ≠ Harm
  - –Fear-avoidance cycle
- Etiology:
  - –Many unknowns
  - –Multifactorial
- Treatment Course
  - –No fixed end point
  - –Immobilization can worsen condition
  - –Medications: Caution

# Management Approach to Pain

- Similar to other chronic health conditions lacking a cure
- Focus on quality of life & functioning

# Example: Diabetes

- Regulate diet
- Check blood sugars
- Exercise regularly
- Take insulin/medications
- Monitor wounds

# Chronic Pain Management



- Medical optimization
  - Physician, NP, PA
- Physical reconditioning
  - Rehabilitation provider (e.g., PT)
- Integrative therapies
  - Acupuncturist, other clinicians
- Behavioral/lifestyle modification
  - Pain psychologist

# Interdisciplinary Management

Diabetes

- Regulate diet
- Check blood sugars
- Exercise regularly
- Take insulin/medications
- Monitor wounds

Chronic Pain

- Medical optimization
- Physical reconditioning
- Behavioral/lifestyle modification

# The Role of Psychological & Behavioral Interventions

- Provides additional resources to minimize reliance on unimodal care
- Addresses psychological dependence
- Facilitates successful reduction in opioid medication use

FDA identifies harm reported from sudden discontinuation of opioid pain medicines and requires label changes to guide prescribers on gradual, individualized tapering. Available at https://www.fda.gov/Drugs/DrugSafety/ucm635038.htm (accessed June 6, 2021)

# Cognitive Behavioral Therapy (CBT)

- Three primary components:
  - Helping patients understand how thoughts/behaviors can influence their experience of pain and their ability to impact this relationship
  - Teaching patients pain management coping strategies
  - Helping patients apply coping strategies and maintaining use of said skills over time

Keefe FJ. 1996. Cognitive behavioral therapy for managing pain. Clin. Psychol. 49( 3): 4–5.

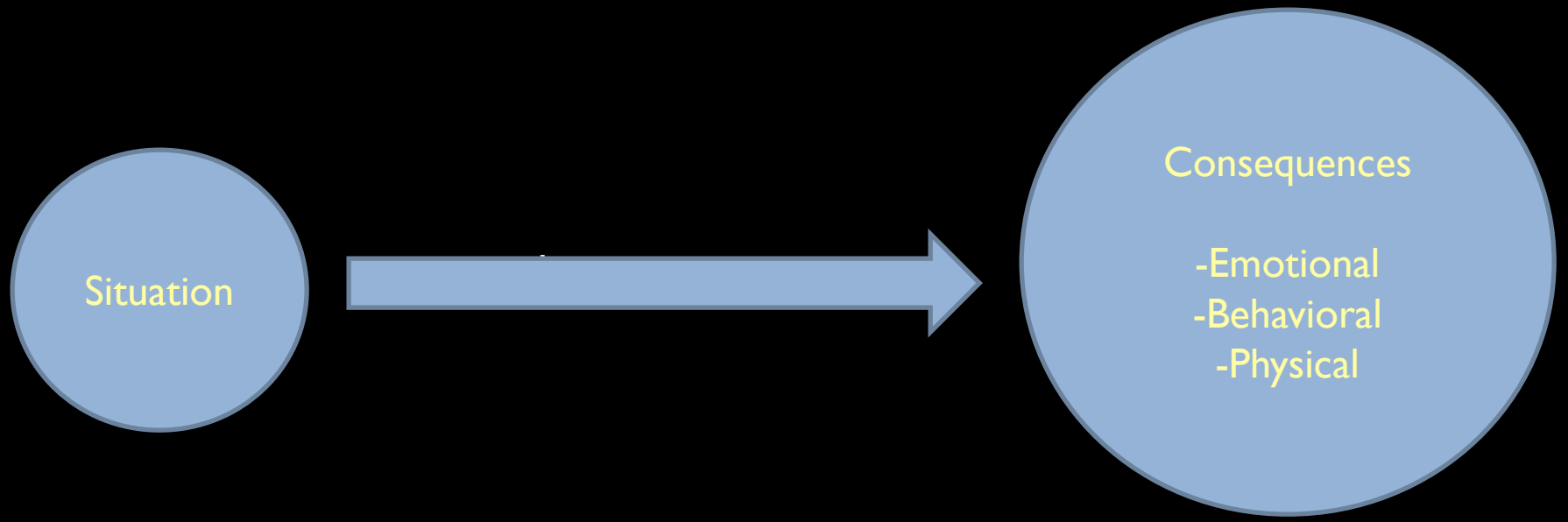
# Common CBT Curriculum Components

- Overview of pain
- Pacing of activities
- Pain & stress physiology
- Relaxation training
- Sleep hygiene

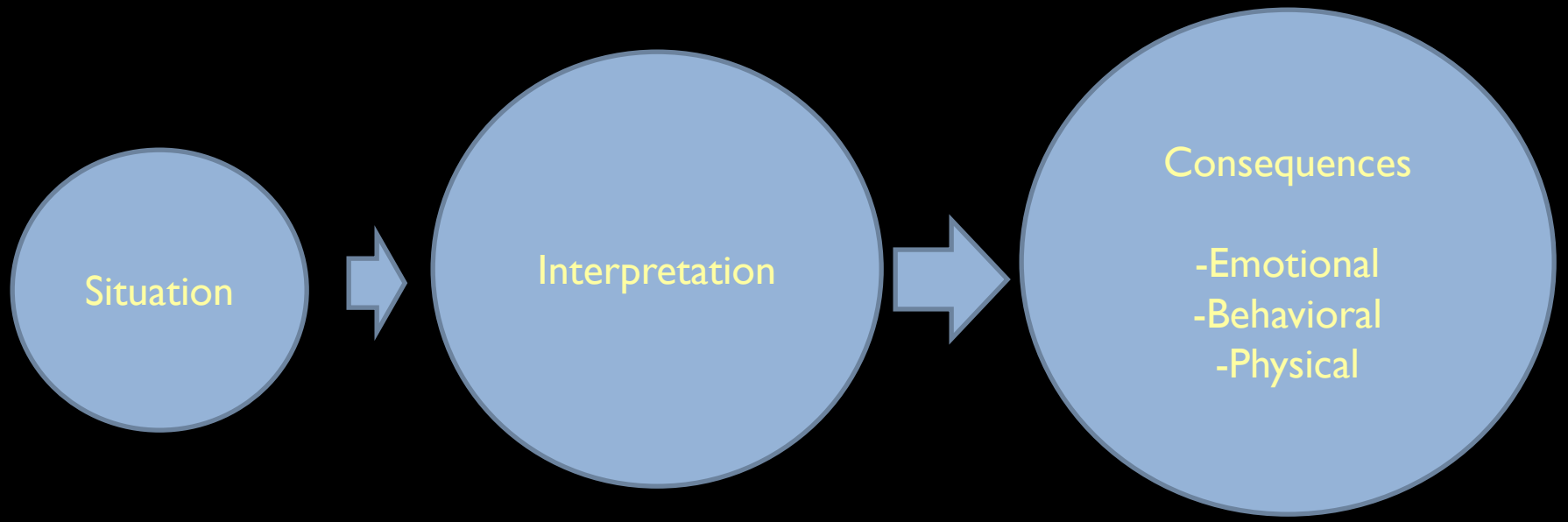
# Common CBT Curriculum Components

- Identifying environmental stressors (work & home)
- Development of stress management techniques (e.g., cognitive restructuring)
- Assertiveness/communication skills development
- Flare contingency planning

# The Role of Cognitions



# The Role of Cognitions



# The Role of Cognitions

- Thought processes are often rooted in our core perception of ourselves and our roles in this world
- Usually shaped by early experiences
- Much of our maladaptive behaviors are rooted in dysfunctional thought patterns
- Can take a significant amount of time and work to alter our automatic thought processes

## Catastrophization

- Exaggerated perception of a situation being worse than it actually is
  - Magnification
  - Rumination
  - Helplessness

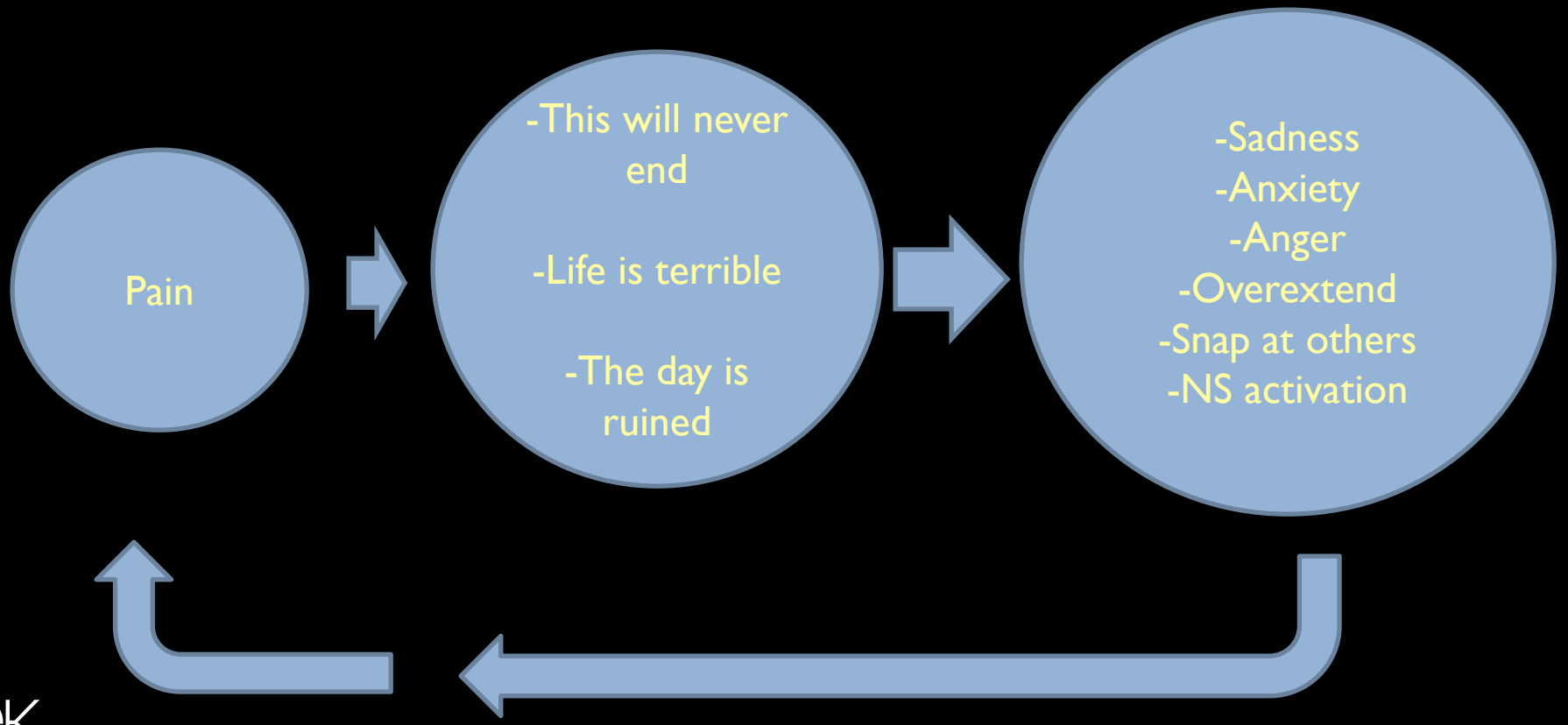
# Catastrophization

- Implications
  - Pain expectations → affective distress
  - Somatic hypervigilance/attention → increased pain perception
  - Activity reduction coping strategy → fear-avoidance cycle
  - Persistent symptoms
  - Disability

# Goal of Cognitive-Behavioral Therapy

- Target maladaptive thought process to achieve healthier outcomes
  - Emotional
  - Behavioral
  - Physiologic

# The Role of Cognitions



# Cognitive Restructuring

- Is this helpful?
- Is this accurate?

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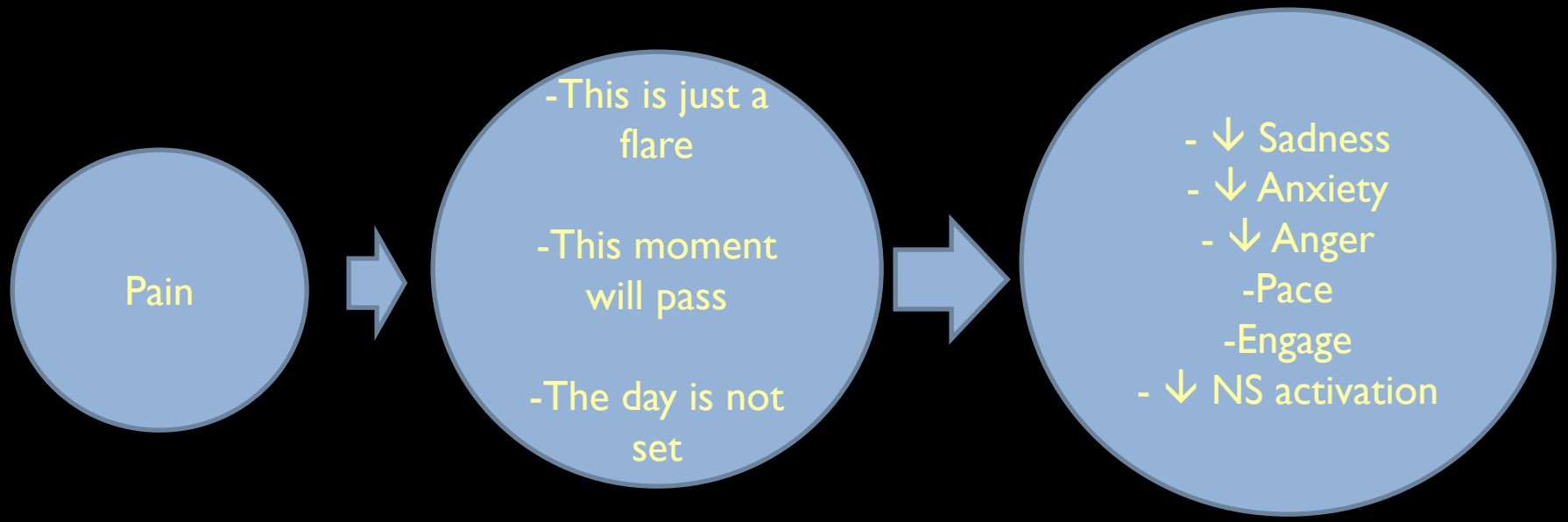
# Cognitive Restructuring

| Previous Thoughts | Modify Thoughts |
| --- | --- |
| ▪ There is nothing I can do to control this<br>▪ Life is terrible<br>▪ Nothing will get done today | ▪ Are these statements helpful?<br>▪ Are these statements accurate? |

# Cognitive Restructuring

| Previous Thoughts | Modified Thoughts |
| --- | --- |
| ▪ There is nothing I can do to control this | ▪ I can practice self-management skills |
| ▪ Life is terrible | ▪ Life may feel terrible now, but I know this flare will end |
| ▪ Nothing will get done today | ▪ I don’t know what the rest of the day will be like but I will make the most of it by pacing |

# The Role of Cognitions



# Empirically Validated Treatment

- Linton & Andersson (2000)
  - Randomized control trial (n=213)
  - All patients received regular primary care tx + Minimal Treatment (information pack, pamphlet) or 6-session CBT treatment.
  - Assessments administered at pretest and 12-month follow-up
  - Risk for developing long-term sick absence decreased 9x in CBT group
  - CBT participants had decreased medical utilization compared to increase in other groups

# Empirically Validated Treatment

- Linton & Nordin (2006)
  - 5-year follow-up of Linton & Andersson (2000) study, also used supplemental records from the National Insurance Authority
  - 97% completed follow-up questionnaire
  - CBT group had significantly less pain, higher activity, better quality of life, and better general health compared to Minimal Treatment Group
  - Risk of long-term sick leave 3x higher in the non-CBT group
  - CBT group had significantly less lost productivity costs

# Empirically Validated Treatment

- Gatchel, Polatin, Noe, Gardea, Pulliam, Thompson (2003)
  - Patients deemed HR for development of chronic disability were randomly assigned to an early intervention FR group (n=22) or a non-intervention group (n=48). Low risk non intervention subjects also evaluated (n=54).
  - Patients tracked at 3 month intervals over the course of a year
  - HR patients in the early intervention group had significantly lower rates of healthcare utilization, medication use, and self-report pain variables

# Empirically Validated Treatment

- [continued]  Gatchel, Polatin, Noe, Gardea, Pulliam, Thompson (2003)
  - HR non-intervention group displayed more symptoms of chronic pain disability compared to low risk subjects
  - Greater cost savings associated with early intervention ($12,721) vs no intervention group ($21,843). Cost variables included healthcare visits, medication, lost wages, early intervention program cost.

# Cochrane Review of Multidisciplinary Programs for Pain

- 41 studies, 6858 participants
- LBP > 3 months with some prior treatment
- MDP vs unimodal care focused on physical factors, standard care with GP
- Moderate quality evidence for improvements in pain and daily functioning
- Increased likelihood of RTW in 6-12 months

# Empirically Validated Treatment

- 373 CPRP participants (3 week)
- ~57% on opioids at admission
- Assessments at admission, discharge, and 6-month (70% return rate; pain severity, depression, psychosocial functioning, health status, pain catastrophizing)
- Pain severity and depression higher in opioid users at admission
- Significant improvement on all variables at discharge, 6-month follow-up regardless of opioid status

Townsend, CO, Kerkvliet, JL, Bruce, BK, Rome, JD, Hooten, WM, Luedtke, CA, Hodgson, JE. (2008). A Longitudinal Study of the Efficacy of a Comprehensive Pain Rehabilitation Program with Opioid Withdrawal: Comparison of Treatment Outcomes Based on Opioid Use Status at Admission. Pain, 140(1): 177-189.

# Empirically Validated Treatment

- 705 (600 completed) outpatient interdisciplinary program participants
- Opioid group tapered with cocktail
- Opioid group improved same as more than non-opioid group (pain severity, catastrophizing, sleep, treatment satisfaction, pain-related functioning domains)

Murphy, JL, Clark, ME, Banou, E (2013). Opioid Cessation and Multidimensional Outcomes After Interdisciplinary Chronic Pain Treatment. Clin J Pain, 29(2): 109-17.

Annals of Internal Medicine

ORIGINAL RESEARCH

# Literacy-Adapted Cognitive Behavioral Therapy Versus Education for Chronic Pain at Low-Income Clinics

## A Randomized Controlled Trial

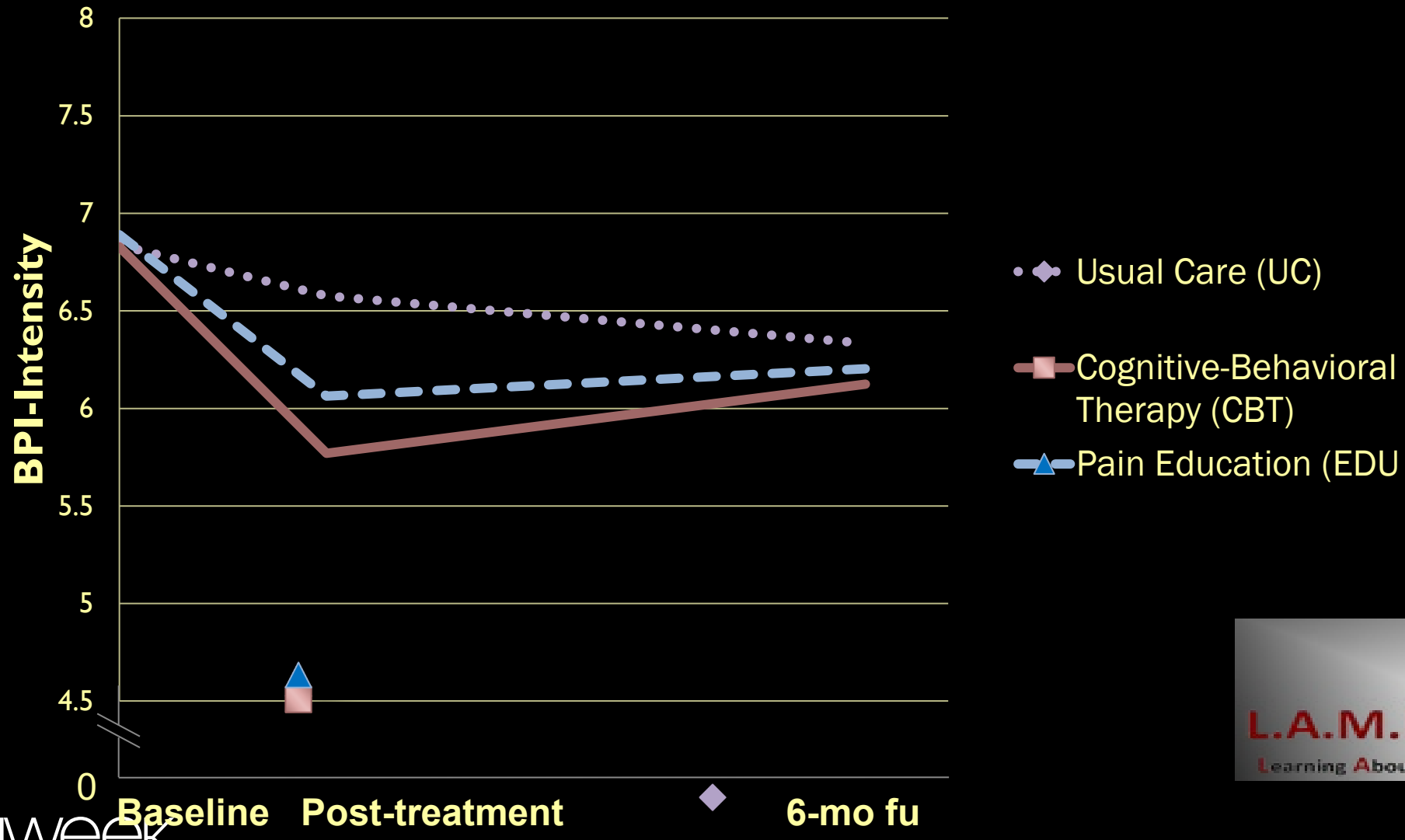
Beverly E. Thorn, PhD; Joshua C. Eyer, PhD; Benjamin P. Van Dyke, MA; Calia A. Torres, MA; John W. Burns, PhD; Minjung Kim, PhD; Andrea K. Newman, MA; Lisa C. Campbell, PhD; Brian Anderson, PsyD; Phoebe R. Block, MA; Bentley J. Bobrow, MD; Regina Brooks; Toya T. Burton, DC, MPH; Jennifer S. Cheavens, PhD; Colette M. DeMonte, PsyD; William D. DeMonte, PsyD; Crystal S. Edwards; Minjeong Jeong, PhD; Mazheruddin M. Mulla, MA, MPH; Terence Penn, BS; Laura J. Smith, BA; and Deborah H. Tucker, MBA*

# Participant Data

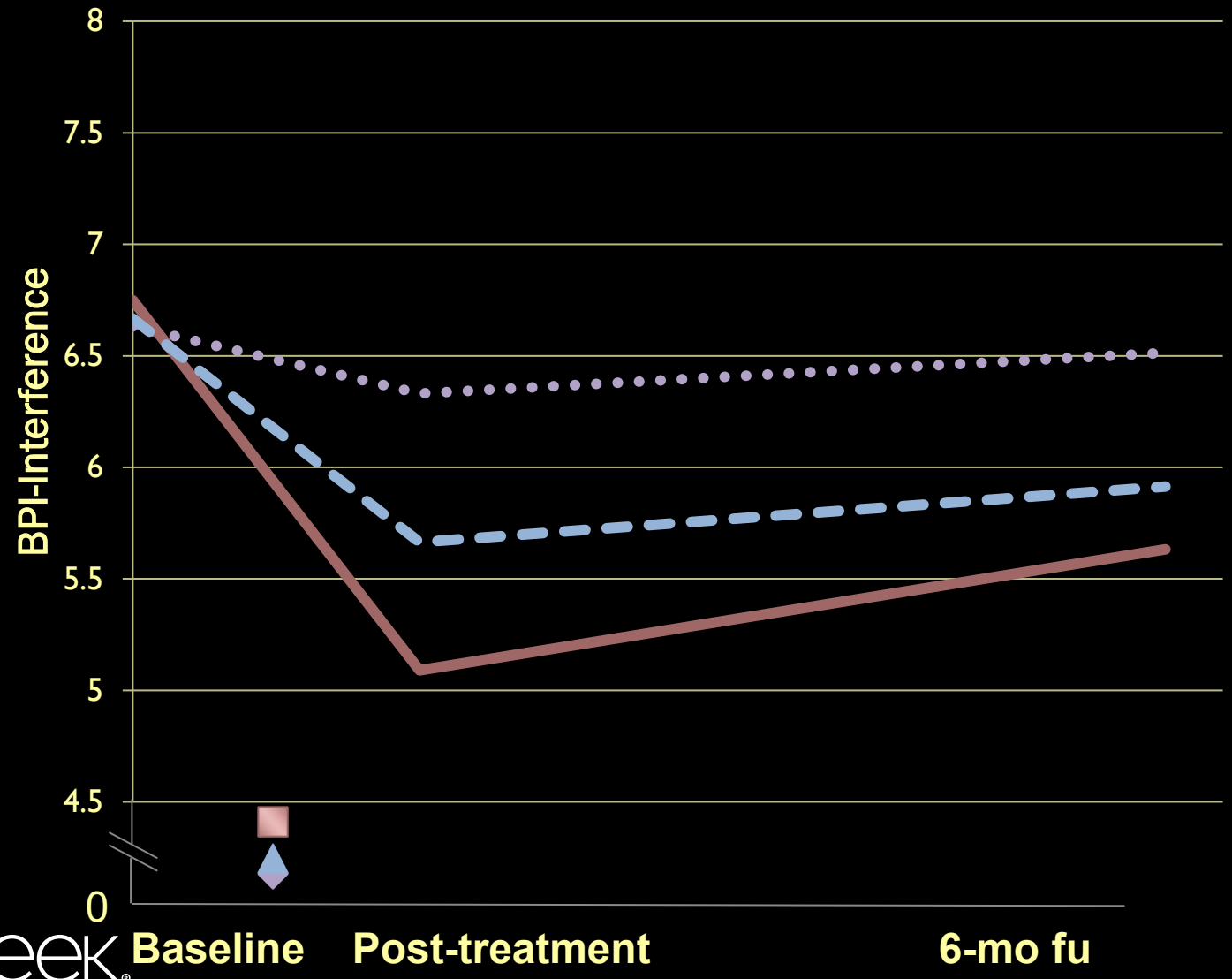
- 290 participants who had on average:
  - Pain in great than 6 sites
  - Greater than 4 pain etiologies
  - Pain present for longer than 15-years

- Other characteristics
  - 67% Black/African American
  - 72% at or below the poverty level
  - 36% reading below the 5th-grade level,
  - 83% living on or seeking disability benefits
  - 43% no health insurance

# Estimated Mean Pain Severity Scores (BPI-Severity) by Condition and Time Point from Mixed Linear Models



# Estimated Mean Physical Function Scores (BPI-Interference) by Condition and Time Point from Mixed Linear Models




- Usual Care (UC)
- Cognitive Behavioral Therapy (CBT)
- Pain Education (EDU)

L.A.M.P.
Learning About My Pain

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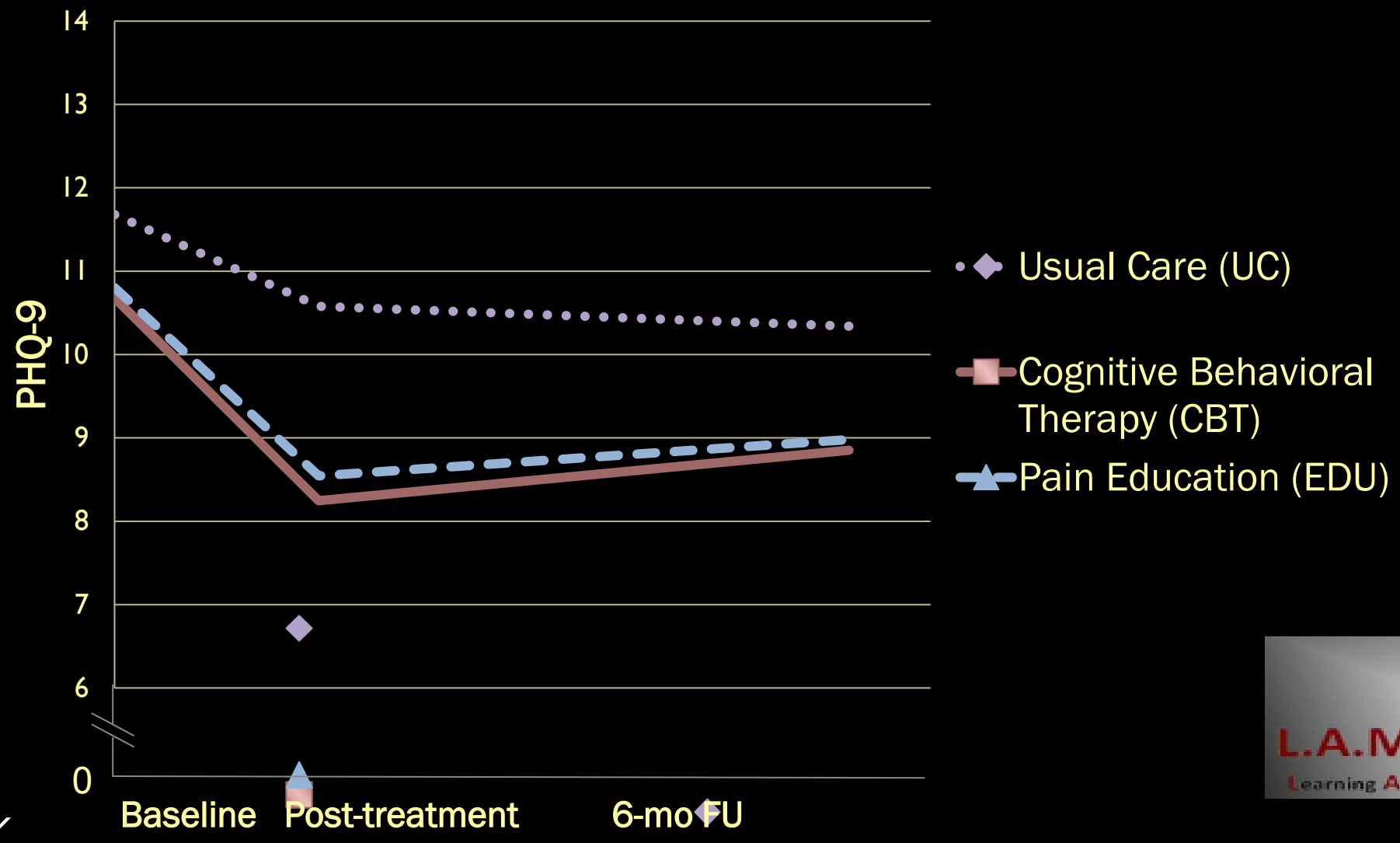
# Estimated Mean Depression Scores (PHQ-9) by Condition by Time Point from Mixed Linear Models




L.A.M.P.
Learning About My Pain

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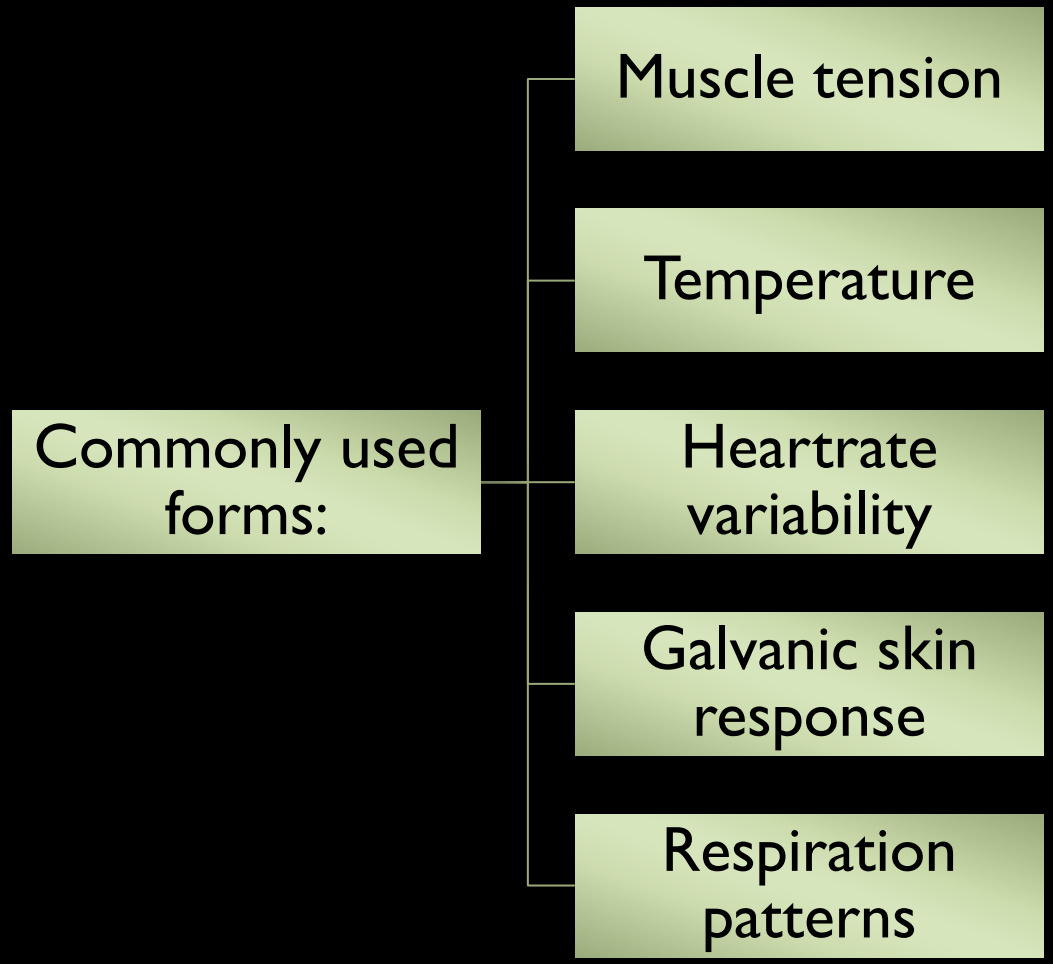
# Biofeedback

- Definition
- Course of treatment
- Non-invasive
- Active versus passive treatment modality

# Biofeedback Training



# Biofeedback Training: Outcomes

- Tension-type headache (literature review)
  - Medium to large mean effect sizes
  - Improvement in
    - Perceived self-efficacy
  - Reductions in
    - HA frequency
    - Depression/anxiety
    - Medication usage
  - Outcomes stable over greater than one year period



Nestoriuc Y, Martin A, Rief W, Andrasik F. Biofeedback treatment for headache disorders: a comprehensive efficacy review. Appl Psychophysiol Biofeedback. 2008 Sep;33(3):125-40.

# Biofeedback Training: Outcomes

- Back pain (meta-analysis)
  - Small to medium effect sizes
  - Improvement in
    - Cognitive coping
  - Reductions in
    - Pain intensity
    - Depression
    - Muscle tension
  - Reductions in pain intensity stable over 8-month period of time



Sielski R, Rief W, Glombiewski JA. Efficacy of Biofeedback in Chronic back Pain: a Meta-Analysis. Int J Behav Med. 2017 Feb;24(1):25-41.

# Mindfulness-Based Interventions

*The awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment to moment.*

-Jon Kabat-Zinn

# Mindfulness-Based Interventions

- Does not seek to modify responses to pain as in CBT
- Goal: be in the presence of pain without attaching to associated cognitions or emotions
- Traditional MBSR programs 8-weeks in duration
  - Combination of experiential and didactic sessions
  - Strong emphasis on practice

# Mindfulness-Based Interventions: Outcomes

- Comprehensive review & meta-analysis of MBSR
- Evaluated across multiple chronic health conditions, including pain
- Useful treatment pathway across disorders with strong effect sizes

Grossman P, Niemann L, Schmidt S, Walach H. 2004. Mindfulness-based stress reduction and health benefits: a meta-analysis. J. Psychosom. Res. 57: 35–43

# Mindfulness-Based Interventions: Outcomes

- Systematic review of MBSR for pain
- Small decrease in pain compared to controls (low quality evidence)
- Statistically significant effects for depression and QOL
- More rigorous studies needed

Hilton L, Hempel S, Ewing BA, Apaydin E, Xenakis L, Newberry S, Colaiaco B, Maher AR, Shanman RM, Sorbero ME, Maglione MA. Mindfulness Meditation for Chronic Pain: Systematic Review and Meta-analysis. Ann Behav Med. 2017 Apr;51(2):199-213.

# Acceptance and Commitment Therapy (ACT)

- Similar to MBSR, does not involve modification of thoughts or emotions
- Focuses on accepting thoughts/emotions and engaging in behaviors that are consistent with personal goals & values
- Key component: development of psychological flexibility, which promotes value-driven behavior

# Acceptance and Commitment Therapy (ACT)

- Pain acceptance alone is associated with reductions in:
  - Pain intensity
  - Pain-related anxiety
  - Pain-related avoidance
  - Depression
  - Disability

McCracken LM. 1998. Learning to live with the pain: acceptance of pain predicts adjustment in persons with chronic pain. Pain 74: 21–27

# ACT: Outcomes

- Systematic review and meta-analyses of ACT for chronic pain found
  - Small to medium effect sizes for
    - Functioning
    - Anxiety
    - Depression
  - Medium to large effect sizes for
    - Pain acceptance
    - Psychological flexibility

Hughes LS, Clark J, Colclough JA, Dale E, McMillan D. Acceptance and Commitment Therapy (ACT) for Chronic Pain: A Systematic Review and Meta-Analyses. Clin J Pain. 2017 Jun;33(6):552-568.

# ACT: Outcomes

- RCT examining ACT vs CBT for chronic pain
  - 114 Participants randomly assigned to 8 weeks of ACT or CBT
  - Data collected at 4 time points, including 6-months post treatment
  - Improvements in both groups on
    - Pain interference
    - Pain-related anxiety
    - Pain-related depression
  - Results maintained at 6 months
  - No between group differences on pain variables
  - ACT participants more satisfied with treatment



Wetherell JL, Afari N, Rutledge T, Sorrell JT, Stoddard JA, Petkus AJ, Solomon BC, Lehman DH, Liu L, Lang AJ, Atkinson HJ. A randomized, controlled trial of acceptance and commitment therapy and cognitive-behavioral therapy for chronic pain. Pain. 2011 Sep;152(9):2098-2107..

# Emotional Awareness and Expression Therapy

- Core principles:
  - The brain is responsible for the production and exacerbation of pain
  - Stressful experiences and avoidance of their impacts can influence pain



Lumley MA & Schubiner, H. Emotional Awareness and Expression Therapy for Chronic Pain: Rationale, Principles and Techniques, Evidence, and Critical Review. Current Rheumatology Reports (2019) 21:30.

# Emotional Awareness and Expression Therapy

- Best matched for centralized pain conditions
- Helps patients become aware of the above relationships and learn how to appropriately express their associated emotions
- Facilitates re-scripting of traumas and learning to express the “right emotion at the right target”
- Communication skills and boundary setting are also taught as a part of treatment



Lumley MA & Schubiner, H. Emotional Awareness and Expression Therapy for Chronic Pain: Rationale, Principles and Techniques, Evidence, and Critical Review. Current Rheumatology Reports (2019) 21:30.

# EAET: Outcomes

- Cluster-randomized control trial examining EAET, CBT, and education for fibromyalgia (FMS)
  - Significantly better outcomes overall compared to education
  - Similar outcomes to CBT
  - Significantly lower scores on widespread pain and FMS symptoms



Lumley MA, Schubiner H, Lockhart NA, et al. Emotional awareness and expression therapy, cognitive behavioral therapy, and education for fibromyalgia: a cluster-randomized controlled trial. *Pain*. 2017;158(12):2354-2363.

# Conclusions

- Chronic pain is a multifactorial experience; thus, an interdisciplinary approach is necessary to maximize treatment outcomes
- Treatment for chronic pain conditions focus on maximizing functioning and improving quality of life
- There are a wide range of evidence-based psychological treatments for pain

# Conclusions

- Which treatment is best matched for the patient is determined after a comprehensive psychological evaluation that obtains information on a wide range of psychosocial factors known to impact the experience of pain

- It is important for other members of the interdisciplinary team to reinforce the approaches being used by their colleagues to promote patient engagement

# Additional Questions?

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