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American Physical Therapy AssociationSM

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Vanderbilt Institute for Clinical and
Translational Research (VICTR)



Learning Objectives

- Understand the influence and interaction of negative and positive psychological factors on chronic musculoskeletal pain
- Differentiate psychological approaches used for promoting positive psychology
- Evaluate and be able to apply practical and evidence-based strategies for targeting positive psychology within orthopaedic physical therapy practice

Positive Psychological Factors in Musculoskeletal Pain

Rogelio A. Coronado, PT, PhD

Research Assistant Professor

Vanderbilt University Medical Center

Chronic Pain

- Chronic daily pain in U.S. affects > 40 million people
- ~26% (10.6 million people) report high-impact chronic pain
 - Headache/migraine, legs, low back, joints

Pitcher et al. 2018

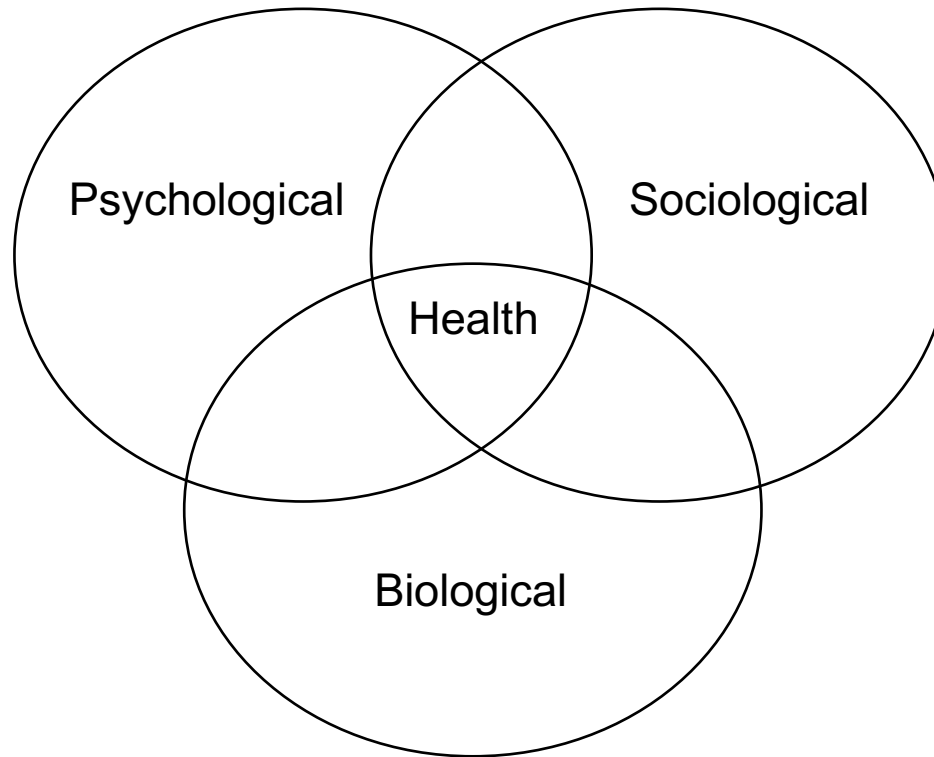
Opioids

- Patients with chronic pain at-risk for prolonged opioid use
- Questionable utility for chronic pain when considering benefit-risk

CDC Guideline for Prescribing Opioids for Chronic Pain — United States, 2016

Guideline 1: Nonpharmacologic therapy and nonopioid pharmacologic therapy are preferred for chronic pain.

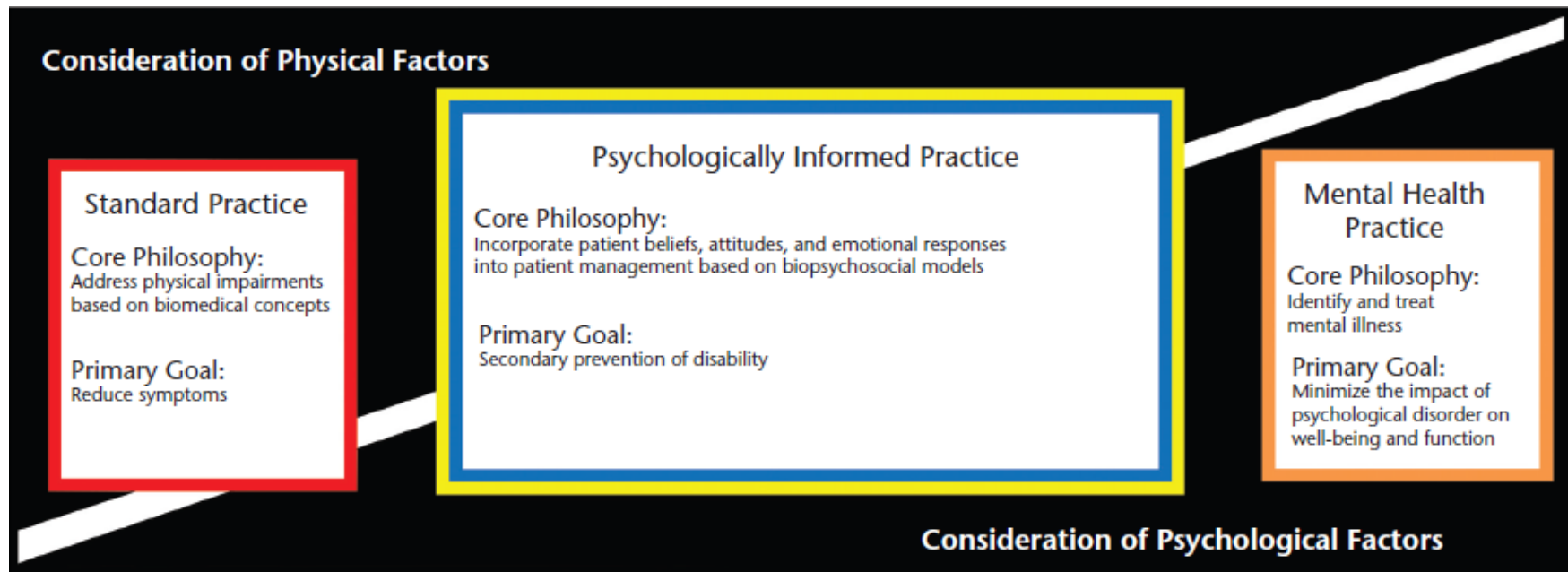
Biopsychosocial Model



Psychologically Informed Practice

Physical Therapy
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Main and George. 2011.

“Fix What’s Wrong”

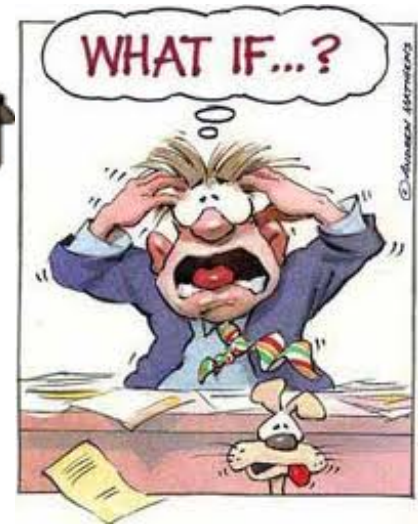
- Much like medicine and psychology, the historical focus of musculoskeletal PT has been on addressing the negative:
 - Symptoms
 - Dysfunction
 - Disease/disorder
 - Trauma
 - Distress
 - Pathoanatomy

Good Reasons for Negative Focus

- Most urgent or salient
- Directly relates to suffering/relief
- Has lead to advancement in disease management

Negative Psychological Factors

- Depression
- Anxiety
- Anger
- Negative affect
- Pain catastrophizing
- Fear of movement
- Activity avoidance



Symptoms of Depression and Risk of New Episodes of Low Back Pain: A Systematic Review and Meta-Analysis

MARIN
GUSTA

Influence of Catastrophizing on Treatment Outcome in Patients With Nonspecific Low Back Pain

NA,³
IRA¹

A Systematic

Maria M. Wertli
Johann Steurer



The Spine Journal 14 (2014) 2658–2678



Clinical Study

Fear-avoidance beliefs—a moderator of treatment efficacy in patients with low back pain: a systematic review

Maria M. Wertli, MD^{a,b,*}, Eva Rasmussen-Barr, RPT, PhD^{a,c}, Ulrike Held, PhD^b, Sherri Weiser, PhD^a, Lucas M. Bachmann, MD, PhD^b, Florian Brunner, MD, PhD^d

Psychological Screening

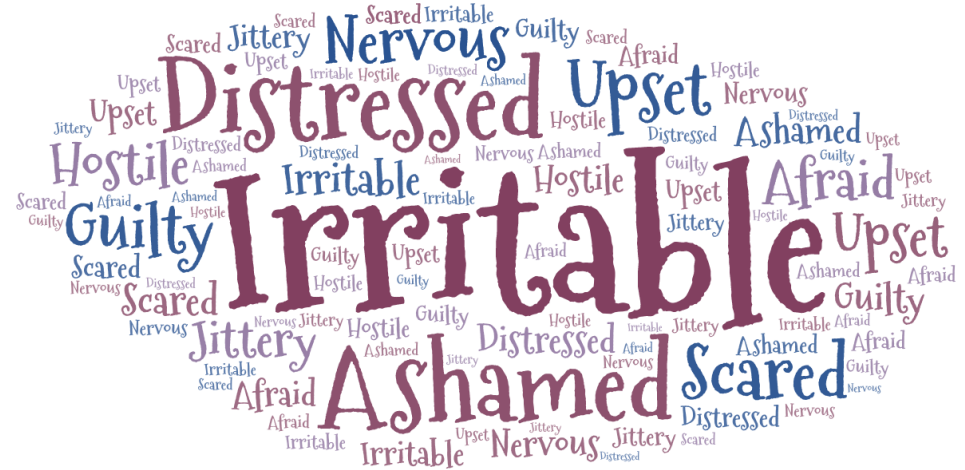
- Measures highlighted in Low Back Pain Clinical Practice Guidelines, include:
 - PHQ-2 (depression)
 - FABQ (fear-avoidance beliefs)
 - PCS (pain catastrophizing)
 - Orebro (psychological distress)
 - STarT Back (psychological distress)

Targeted Management Strategies

- Graded Exposure – *fear of movement*
- Pain Neuroscience Education – *fear-avoidance, pain catastrophizing, negative affect*
- Traditional Cognitive-Behavioral Strategies – *maladaptive thoughts and beliefs*

Why consider positive psychological factors?

Negative Affect



Point # 1



Positive Affect

The scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you *generally feel this way, that is, how you feel on average*. Use the following scale to record your answers.

Negative Affect

1
Very slightly
or not at all

2
A little

3
Moderately

4
Quite a bit

5
Extremely

_____ Interested

_____ Distressed

_____ Excited

_____ Upset

_____ Strong

_____ Guilty

_____ Scared

_____ Hostile

_____ Enthusiastic

_____ Proud

_____ Irritable

_____ Alert

_____ Ashamed

_____ Inspired

_____ Nervous

_____ Determined

_____ Attentive

_____ Jittery

_____ Active

_____ Afraid

Point # 1



Positive Affect

Negative Affect

Goodness of fit statistics for CFA models of the original PANAS

Model	S-B χ^2	χ^2	df	CFI	RMSEA	SRMR	Reference Model #	Δ S-B χ^2	Δ df	Δ p
1a. One factor	896.4	1243.8	170	.51	.13	.18				
1b. One factor, correlated uniquenesses	588.5	823.6	157	.71	.13	.17				
1c. One factor, significantly correlated uniquenesses only	639.5	904.8	165	.86	.11	.17				
2a. Two uncorrelated factors	344.1	503.4	170	.88	.07	.10				
2b. Two uncorrelated factors, significantly correlated uniquenesses only	280.2	411.8	165	.92	.05	.10				
3a. Two correlated factors	335.9	490.7	169	.89	.06	.07				
3b. Two correlated factors, significantly correlated uniquenesses only	271.1	397.2	164	.93	.05	.07	2b	6.6	1	.01
4a. Three correlated factors	289.1	423.0	167	.92	.06	.07				
4b. Three correlated factors, significantly correlated uniquenesses only	248.9	367.7	162	.94	.05	.06	3b	61.4	2	<.001

Point # 1



Positive Affect

Negative Affect

43.5% - Asymptomatic
10.1% to 12.0% - Fibromyalgia

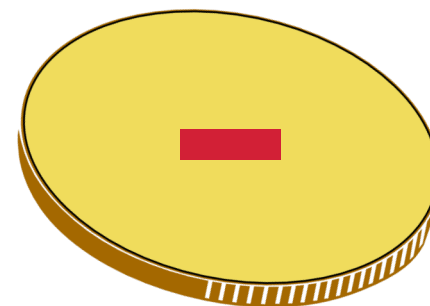
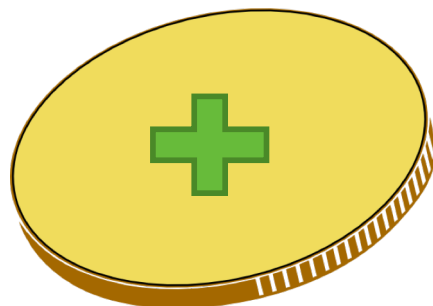
Healthy High Positive Low Negative	Reactive High Positive High Negative
Low Low Positive Low Negative	Depressive Low Positive High Negative

16.4% - Asymptomatic
4.4% to 17.7% - Fibromyalgia

24.7% - Asymptomatic
17.7% to 32.5% - Fibromyalgia

15.3% - Asymptomatic
51.8% to 54.8% - Fibromyalgia

Point # 2



		Correlation of well-being with biomarkers		
		Positive associations	No associations	Negative associations
Correlation of ill-being with biomarkers	Positive associations	<i>Anger</i> ⇔ Epinephrine ⇒ Positive relations	<i>Depressive symptoms*</i> ⇔ DHEA-S	<i>Negative affect</i> ⇐ Glycosylated hemoglobin ⇒ Positive relations <i>Anxiety</i> ⇐ Weight ⇒ Positive relations <i>Anger</i> ⇐ Weight ⇒ Positive relations <i>Depressive symptoms</i> ⇐ Weight ⇒ Positive relations
	No associations	Cortisol ⇒ Purpose in life Personal growth Norepinephrine ⇒ Autonomy HDL cholesterol ⇒ Purpose in life Personal growth Positive affect		Waste-hip ratio ⇒ Positive relations ⇒ Purpose in life Total HDL cholesterol ⇒ Personal growth
	Negative associations		<i>Negative affect</i> ⇔ Systolic blood pressure <i>Anxiety*</i> <i>Anger</i>	

■ Distinct associational patterns; □ mirrored associational patterns.

Ryff et al. 2006

Final Point

- Psychological-based approaches largely focused on addressing negative factors have modest effect sizes and are not beneficial for everyone

A New Science of Human Strengths

- 1998 APA President's Address by Martin Seligman, PhD



<https://positivepsychologyprogram.com/perma-model/>

Seligman. *American Psychologist*. 1999

“Build What’s Strong”

- Positive psychology is devoted to the study of positive individual attributes and strengths, well-being, and optimal functioning
- Shift from disease prevention → health promotion
- Shift from pathology/dysfunction → optimal functioning

Upward Spiral Theory

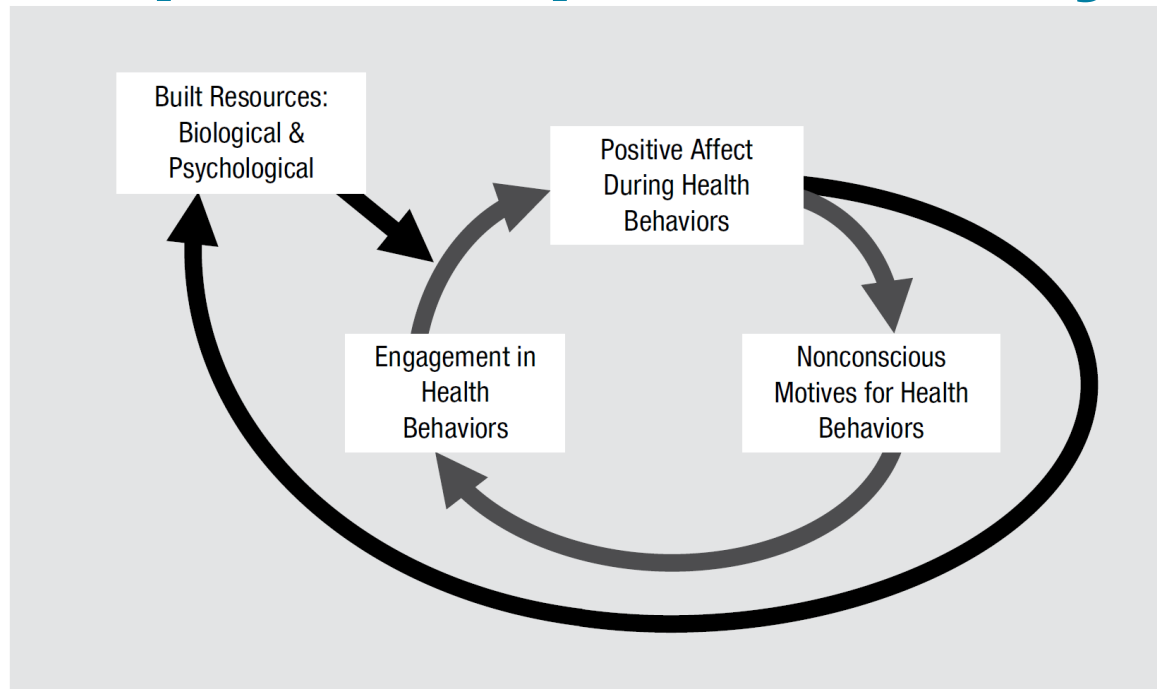
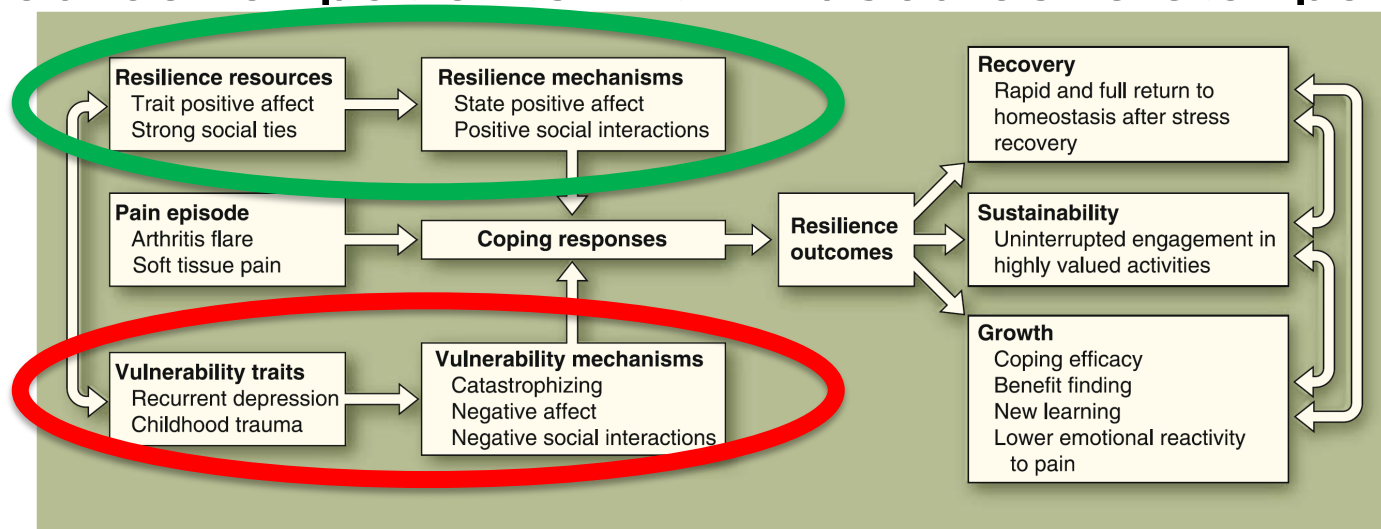


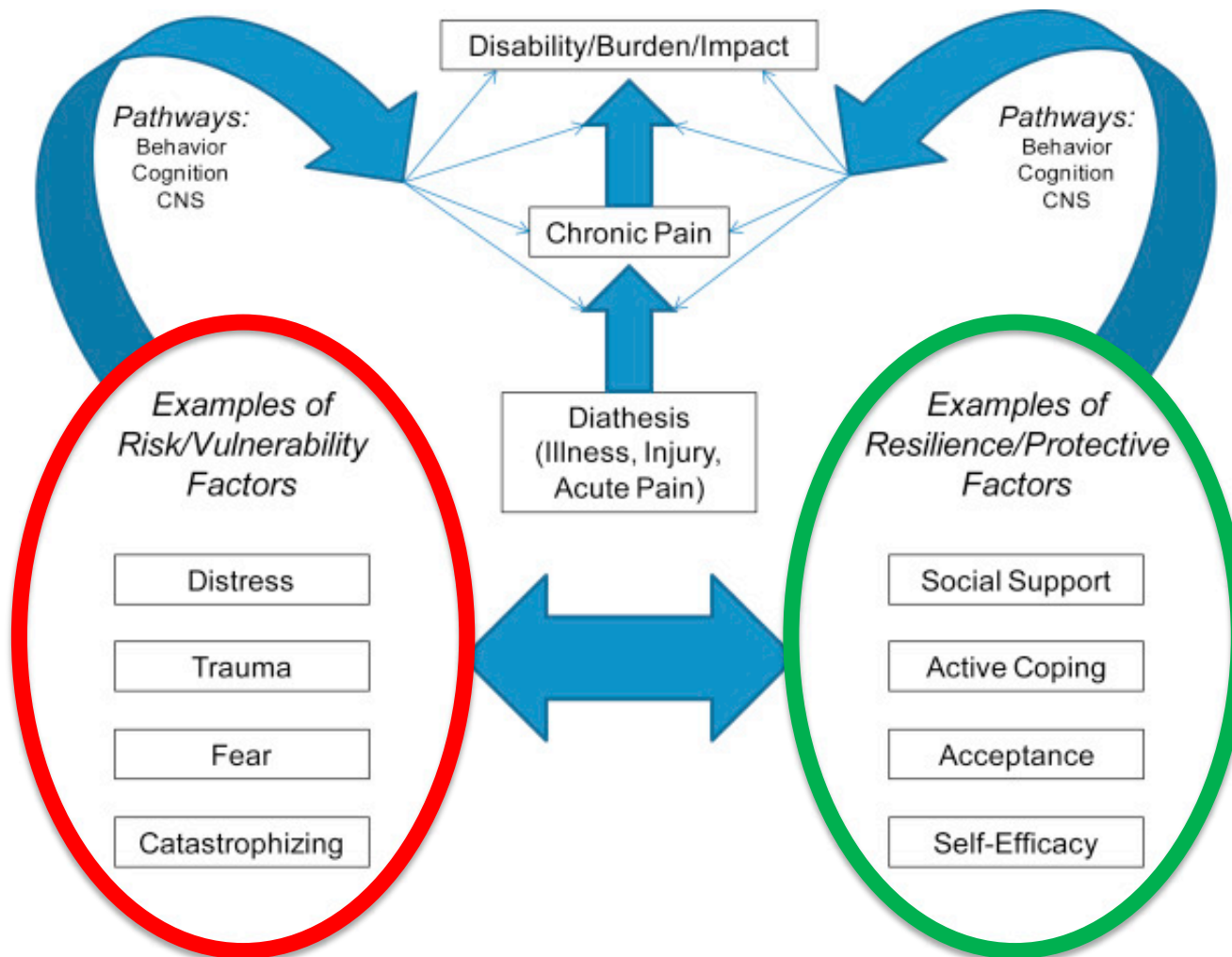
Fig. 1. Model articulated by the upward spiral theory of lifestyle change (Fredrickson, 2013; Van Cappellen et al., 2017).

Fredrickson and Joiner 2018

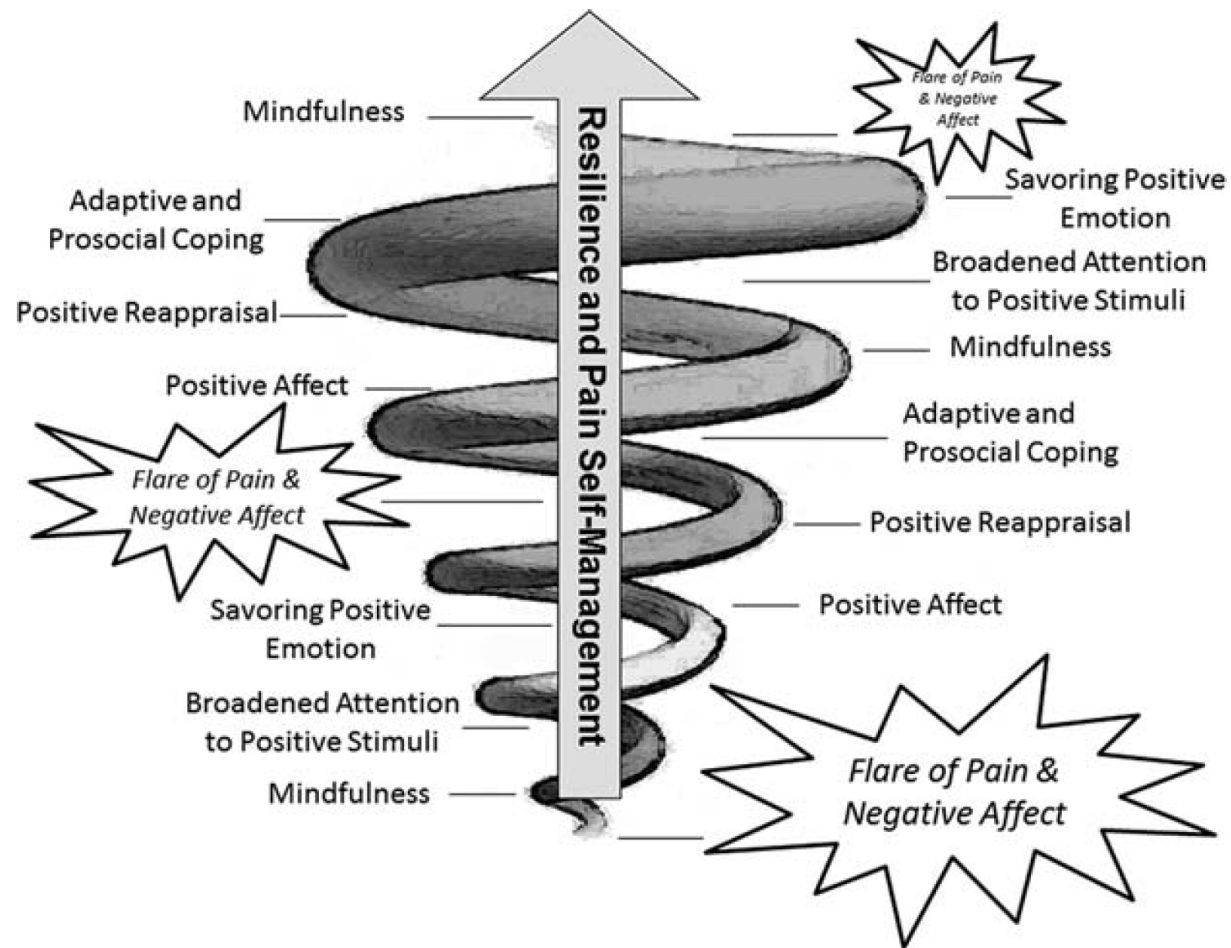
Positive Psychology and Pain

- Positive psychological factors can be a *protective* resource for patients with musculoskeletal pain



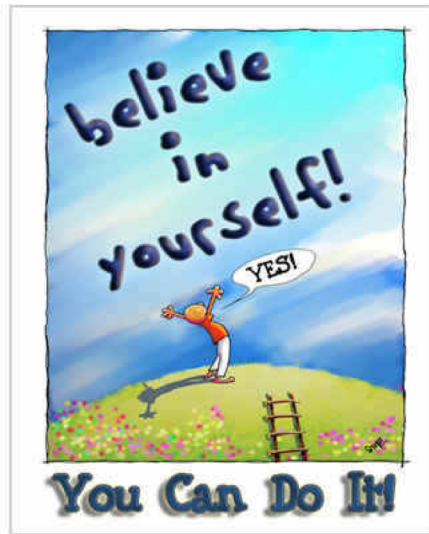


Edwards et al. 2016



Finan and Garland 2015

Positive Psychological Factors



- Self-efficacy
- Positive affect
- Optimism
- Resilience

Self-Efficacy

- Expectations that one can execute a behavior required to produce an outcome
- Confidence and belief in one's capabilities

Pain Self-Efficacy Questionnaire

Please rate how **confident** you are that you can do the following things at present, **despite the pain**. To indicate your answer circle **one** of the numbers on the scale under each item, where 0 = not at all confident and 6 = completely confident.

For example:

0 1 2 3 4 5 6
Not at all Completely
Confident confident

Remember, this questionnaire is **not** asking whether or not you have been doing these things, but rather **how confident you are that you can do them at present, despite the pain.**

- PSEQ is a 10-item measure
- Sum of 10 items
- Higher scores reflect greater self-efficacy

1. I can enjoy things, despite the pain.

0 1 2 3 4 5 6
Not at all Completely
Confident confident

2. I can do most of the household chores (e.g. tidying-up, washing dishes, etc.), despite the pain.

0 1 2 3 4 5 6
Not at all Completely
Confident confident

3. I can socialise with my friends or family members as often as I used to do, despite the pain.

0 1 2 3 4 5 6
Not at all Completely
Confident confident

Self-Efficacy and Musculoskeletal Pain

TABLE 7. Results From Multivariable Logistic Regression Analyses for Pain Intensity, Pain Interference, and Satisfaction With Pain Treatment (N = 233)

Risk Factor	Pain Intensity, OR (95% CI)	Pain Interference, OR (95% CI)	Satisfaction, OR (95% CI)
Age in yr	—	0.93 (0.86–1.02)	—
Male vs. female	—	0.16 (0.02–1.8)	—
>High school education vs. <high school	0.05 (0.003–0.73)	—	—
Pain intensity at hospital discharge	—	—	0.08 (0.007–0.83)*
Self-efficacy for pain management	0.87 (0.78–0.98)*	0.91 (0.82–1.01) [†]	1.04 (0.99–1.09) [†]
Depression	1.5 (1.01–2.1)*	1.9 (1.01–3.5)*	0.89 (0.75–1.1)
Posttraumatic stress disorder	0.99 (0.89–1.1)	0.96 (0.87–1.1)	1.0 (0.94–1.1)

* $p < 0.05$.

[†] $p < 0.10$.

Multivariable regression models included a random effect to account for clustering of visits by patient (i.e., repeat hospitalizations).

Self-Efficacy and Musculoskeletal Pain

Identifying the independent baseline psychological constructs* related to RMDQ^a score at 6 months: multivariate linear regression models.

	Regression coefficient (95% CI)	Standardised β coefficient (95% CI)
Initial multivariate model – all 11 univariately significant constructs (n = 724)		
Initial multivariate model	$R^2 = 55.8$ Adj $\%R^2 = 54.5$	
IPQ-R		
Consequences	0.06 (–0.03, 0.16)	0.06
Emotional representations	–0.004 (–0.09, 0.09)	–0.003
Personal control	–0.17 (–0.27, –0.08)	–0.11
Treatment control	0.05 (–0.07, 0.18)	0.03
Timeline – acute/chronic	0.21 (0.14, 0.28)	0.20
Identity	0.17 (0.002, 0.34)	0.06
Immunity attribution	0.10 (–0.07, 0.27)	0.03
HADS: depression	0.01 (–0.12, 0.09)	0.01
PSEQ: pain self-efficacy	–0.04 (–0.08, –0.01)	–0.09
TSK: fear avoidance	0.05 (–0.11, 0.02)	0.05
CSQ24: catastrophising	0.04 (–0.02, 0.10)	0.03
Reduced multivariate model – all 4 constructs still significant in multivariate model (n = 761)		
Reduced multivariate model	$R^2 = 56.6$ Adj $\%R^2 = 55.9$	
IPQ-R		
Personal control	–0.16 (–0.24, –0.07)	–0.10
Timeline – acute/chronic	0.21 (0.15, 0.27)	0.20
Identity	0.18 (0.04, 0.35)	0.07
PSEQ: pain self-efficacy	–0.05 (–0.08, –0.02)	–0.11

Psychological constructs with regression coefficients significant at $p < 0.01$ are in bold.

* Scores for each of the psychological constructs are subject to missing data and hence the models are fitted in different numbers of responders.

^a Roland and Morris Disability Questionnaire.

Self-Efficacy and Chronic Pain Outcomes: A Meta-Analytic Review

Todd Jackson,^{*,†} Yalei Wang,[†] Yang Wang,[†] and Huiyong Fan[‡]

Abstract: A meta-analysis was performed to evaluate overall strengths of relation between self-efficacy (SE) and functioning (pain severity, functional impairment, affective distress) in chronic pain samples, as well as potential moderating effects of sociodemographic characteristics and methodologic factors on these associations. In sum, 86 samples (N = 15,616) fulfilled selection criteria for analysis. SE had negative overall correlations with impairment, affective distress, and pain severity although considerable heterogeneity was observed for all effect sizes. Age, pain duration, SE scale content (SE for functioning despite pain vs SE for pain control vs SE for managing other symptoms such as emotional distress) and type of impairment measure (self-report vs task performance) had significant moderating effects on SE–impairment associations. SE–affective distress relations were moderated by employment status and SE scale content. Finally, moderator analyses of studies having longitudinal designs indicated associations between baseline SE, and each outcome at follow-up remained significant in prospective studies that had statistically controlled for effects of baseline responses on that outcome. Hence, SE is a robust correlate of key outcomes related to chronic pain and a potentially important risk/protective factor that has implications for subsequent functioning in affected groups. **Perspective:** Meta-analysis indicated that SE has significant overall associations with impairment, affective distress, and pain severity within chronic pain samples and identified several factors that contribute to variability in effect sizes. Findings highlighted SE as a robust correlate and potentially important risk/protective factor for subsequent adjustment in affected groups.

Positive Affect

- Positive feelings or attitude
- Can be a state and trait characteristic
- Linked to positive social interactions and behaviors

Positive and Negative Affect Schedule

- PANAS is a 20-item measure
- Positive affect = sum of 10 positive items
- Higher scores reflect greater positive affect

The scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you *generally feel this way, that is, how you feel on average*. Use the following scale to record your answers.

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

_____ Interested	_____ Irritable
_____ Distressed	_____ Alert
_____ Excited	_____ Ashamed
_____ Upset	_____ Inspired
_____ Strong	_____ Nervous
_____ Guilty	_____ Determined
_____ Scared	_____ Attentive
_____ Hostile	_____ Jittery
_____ Enthusiastic	_____ Active
_____ Proud	_____ Afraid

When It Hurts, a Positive Attitude May Help: Association of Positive Affect With Daily Walking in Knee Osteoarthritis. Results From a Multicenter Longitudinal Cohort Study

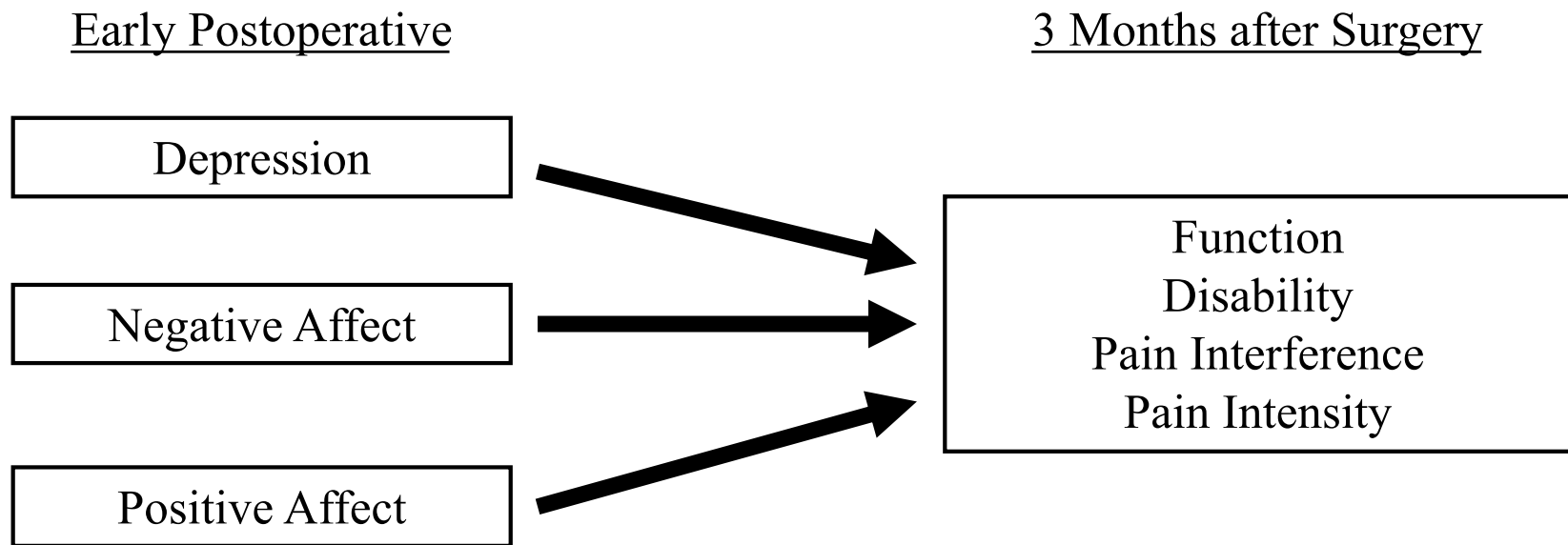
DANIEL K. WHITE,¹ JULIE J. KEYSOR,¹ TUHINA NEOGI,¹ DAVID T. FELSON,¹ MICHAEL LAVALLEY,¹
K. DOUG GROSS,² JINGBO NIU,¹ MICHAEL NEVITT,³ CORA E. LEWIS,⁴ JIM TORNER,⁵ AND
LISA FREDMAN¹

Results. Compared to respondents with low positive affect (27% of all respondents), those with high positive affect (63%) walked a similar number of steps per day, while those with depressive symptoms (10%) walked less (adjusted β -32.6 [95% confidence interval (95% CI) $-458.9, 393.8$] and -579.1 [95% CI $-1,274.9, 116.7$], respectively). There was a statistically significant interaction of positive affect by knee pain ($P = 0.0045$). Among the respondents with knee pain (39%), those with high positive affect walked significantly more steps per day (adjusted β 711.0 [95% CI $55.1, 1,366.9$]) than those with low positive affect.

Conclusion. High positive affect was associated with more daily walking among adults with painful knee OA. Positive affect may be an important psychological factor to consider for promoting physical activity among people with painful knee OA.

Seebach et al. 2012

Positive Affect and Musculoskeletal Pain



Positive Affect and Musculoskeletal Pain

Multivariable mixed-model linear regression analyses for 6-week postoperative depression and 3-month postoperative outcomes (N = 128).

	Pain intensity β (95% CI)	Pain interference β (95% CI)	Disability β (95% CI)	Functional status β (95% CI)
Depression	0.14 (0.07 to 0.21)*	0.21 (0.11 to 0.31)*	1.8 (1.2 to 2.3)*	0.09 (-0.35 to 0.53)

Multivariable mixed-model linear regression analyses for 6-week postoperative positive and negative affect and 3-month postoperative outcomes (N = 128).

	Pain intensity β (95% CI)	Pain interference β (95% CI)	Disability β (95% CI)	Functional status β (95% CI)
Positive affect	-0.02 (-0.04 to 0.09)	-0.01 (-0.04 to 0.06)	-0.08 (-0.91 to 0.24)	0.52 (0.07 to 0.97)*
Negative affect	0.04 (-0.03 to 0.12)	0.10 (0.04 to 0.16)*	0.71 (0.26 to 1.2)*	-0.28 (-0.13 to 0.68)

Results suggest that positive affect and depression are important variables to target when seeking to improve postoperative outcomes in a spine surgery population. Recommendations include screening for positive affect and depression, and treating depression as well as focusing on rehabilitation strategies to bolster positive affect....”

Seebach et al. 2012

Optimism

- Generalized expectation of a good outcome
- Optimists are likely to engage in approach (vs. avoidance) oriented coping

Life Orientation Test - Revised

- LOT-R is a 10-item measure
- Sum of items 1, 3*, 4, 7*, 9*, 10
*reverse code 3, 7, and 9
- Higher scores reflect higher optimism

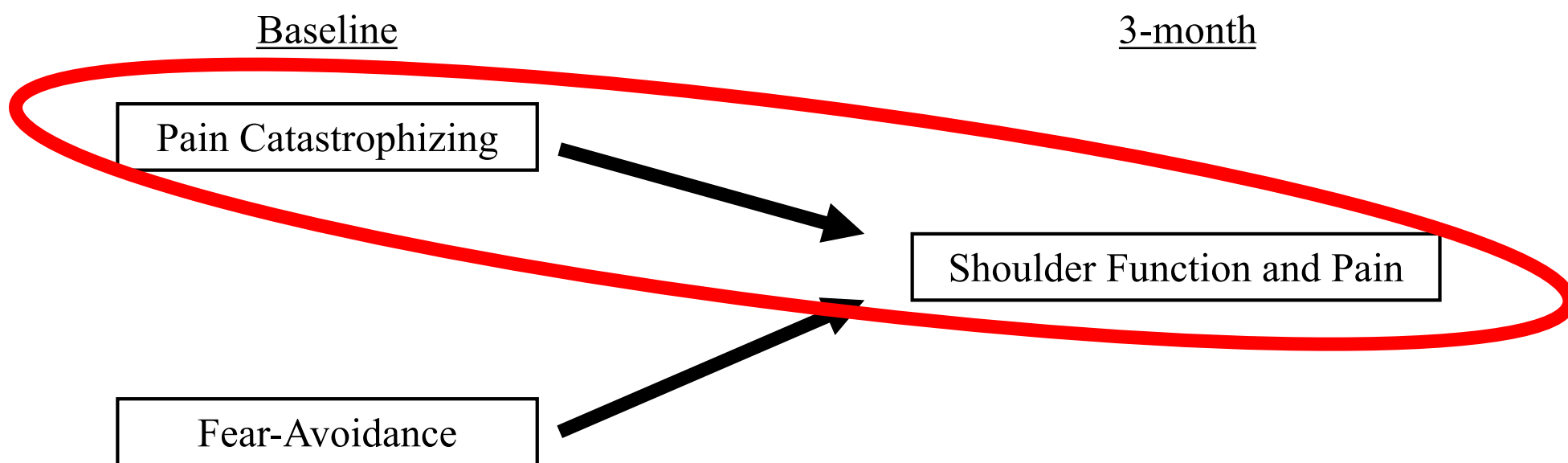
Please answer the following questions about yourself by indicating the extent of your agreement using the following scale:

[0] = strongly disagree
[1] = disagree
[2] = neutral
[3] = agree
[4] = strongly agree

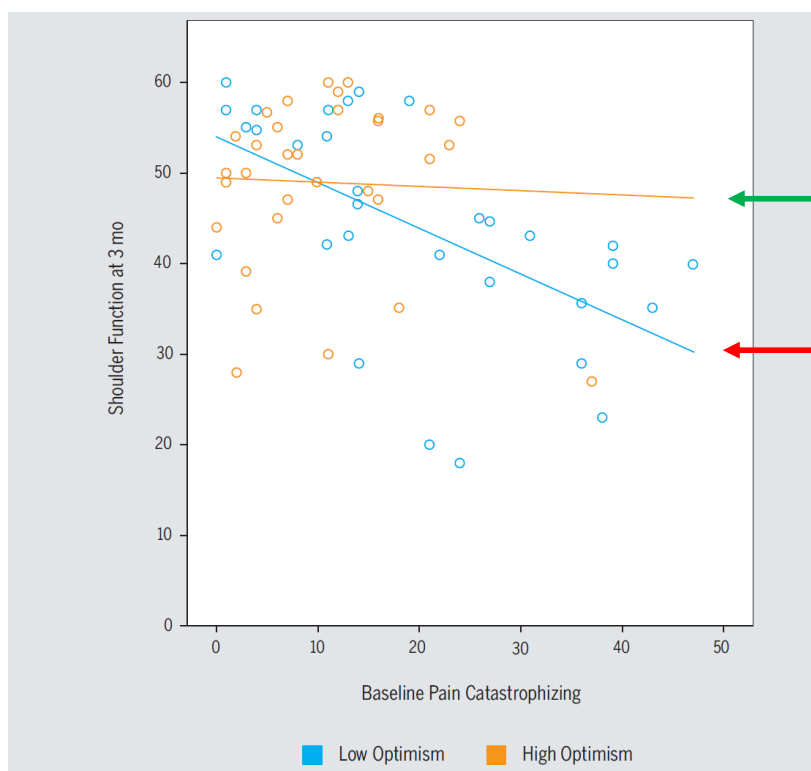
Be as honest as you can throughout, and try not to let your responses to one question influence your response to other questions. There are no right or wrong answers.

- _____ 1. In uncertain times, I usually expect the best.
- _____ 2. It's easy for me to relax.
- _____ 3. If something can go wrong with me, it will.
- _____ 4. I'm always optimistic about my future.
- _____ 5. I enjoy my friends a lot.
- _____ 6. It's important for me to keep busy.
- _____ 7. I hardly ever expect things to go my way.
- _____ 8. I don't get upset too easily.
- _____ 9. I rarely count on good things happening to me.
- _____ 10. Overall, I expect more good things to happen to me than bad.

Optimism and Musculoskeletal Pain



Optimism and Musculoskeletal Pain



Participants with high optimism: no relationship between baseline pain catastrophizing and 3-month shoulder function

Participants with low optimism: baseline pain catastrophizing influences 3-month shoulder function

Optimism and Musculoskeletal Pain

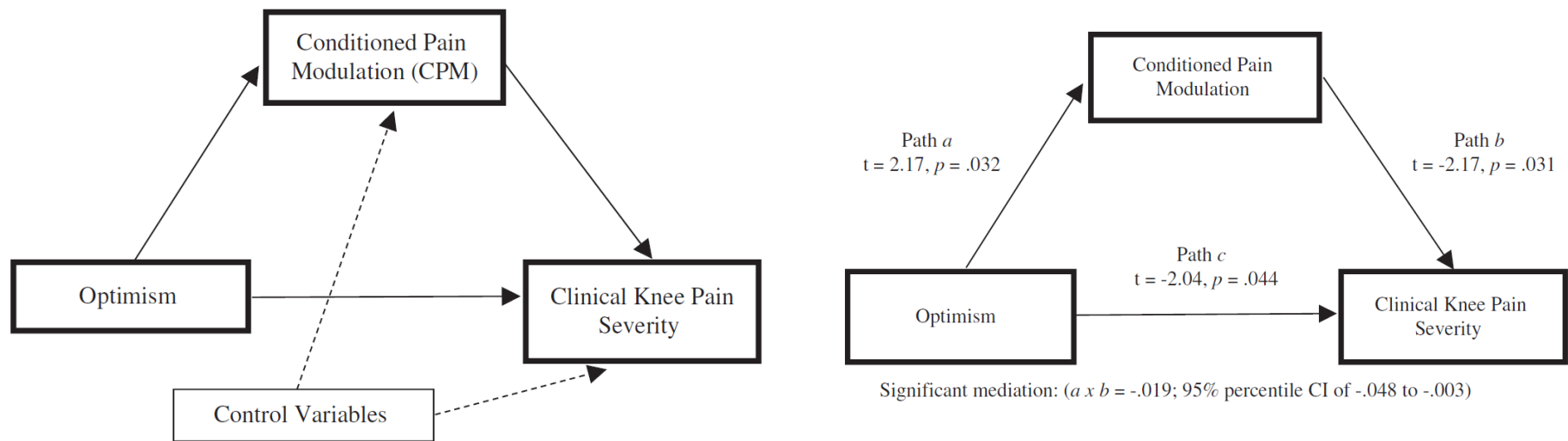


FIGURE 1. Mediation model representing the indirect association of optimism with clinical knee pain severity through conditioned pain modulation.

Thompson et al. 2018

Resilience

- Ability to bounce back from negative event
- “Flourishing in the face of adversity”
- Resilient individuals handle adversity through up-regulation of positive emotions

Resilience Measures

- Connor-Davidson Resilience Scale
- Resilience Scale for Adults
- Brief Resilience Scale
- Pain Resilience Scale

Brief Resilience Scale

- BRS is a 6-item measure

Please indicate the extent to which you agree with each of the following statements by using the following scale:

[1] = strongly disagree
[2] = disagree
[3] = neutral
[4] = agree
[5] = strongly agree

- Average of 6 items

*reverse code 2, 4, and 6

- Higher scores reflect greater resilience

- _____ 1. I tend to bounce back quickly after hard times.
- _____ 2. I have a hard time making it through stressful events.
- _____ 3. It does not take me long to recover from a stressful event.
- _____ 4. It is hard for me to snap back when something bad happens.
- _____ 5. I usually come through difficult times with little trouble.
- _____ 6. I tend to take a long time to get over set-backs in my life.

Resilience and Musculoskeletal Pain



Aim: Examine psychological correlates of widespread pain sensitivity

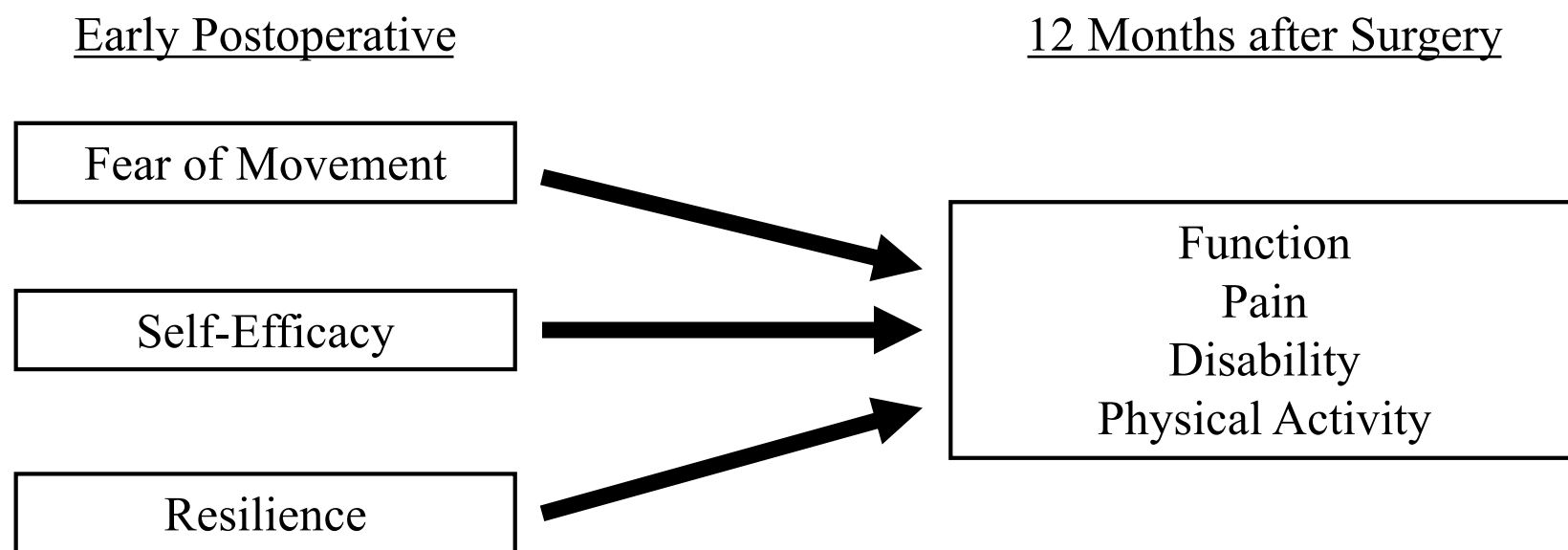
Unadjusted and adjusted odds ratios (OR) for self-report measures and the association with widespread pain sensitivity.

Measure	Unadjusted OR (95% CI)	Adjusted OR ^a (95% CI)
Pain Sensitization – Self-Report		
Central sensitization (CSI)	1.01 (0.97; 1.05)	1.00 (0.97; 1.05)
Pain sensitivity (PSQ, total)	1.21 (0.92; 1.59)	1.17 (0.87; 1.57)
Pain sensitivity (PSQ, minor)	1.15 (0.89; 1.50)	1.09 (0.82; 1.46)
Psychological – Positive		
Resilience (BRS)	0.34 (0.16; 0.75)	0.41 (0.18; 0.94)
Positive affect (PANAS)	0.93 (0.87; 1.00)	0.92 (0.86; 1.00)
Psychological – Negative		
Depression (DASS-21)	1.03 (0.96; 1.09)	1.02 (0.95; 1.10)
Anxiety (DASS-21)	1.01 (0.92; 1.10)	1.00 (0.91; 1.11)
Stress (DASS-21)	1.02 (0.96; 1.08)	1.01 (0.95; 1.08)
Negative affect (PANAS)	1.03 (0.97; 1.10)	1.01 (0.94; 1.08)

Abbreviations: BRS = Brief Resilience Scale; CSI = Central Sensitization Inventory; DASS-21 = Depression Anxiety Stress Scale; PANAS = Positive and Negative Affect Schedule; PSQ = Pain Sensitivity Questionnaire.

^a Adjusted for age, sex, and education.

Resilience and Musculoskeletal Pain



Resilience and Musculoskeletal Pain

Early postoperative
resilience and *self-efficacy*
were consistent predictors of
12-month physical function,
disability, and pain

Only *resilience* was
associated with 12-month
physical activity

	beta [95% CI]	Semi-partial r	p-value
Physical Function: PROMIS			
Resilience: BRS	2.42 [0.98; 3.86]	0.19	0.001
Self-efficacy: PSEQ	0.12 [0.04; 0.19]	0.17	0.002
Fear of movement: TSK	-0.14 [-0.30; 0.02]	-0.10	0.08
Pain Interference: PROMIS			
Resilience: BRS	-2.22 [-3.79; -0.64]	-0.16	0.006
Self-efficacy: PSEQ	-0.11 [-0.20; -0.02]	-0.14	0.01
Fear of movement: TSK	0.08 [-0.11; 0.27]	0.05	0.41
Disability: ODI			
Resilience: BRS	-3.89 [-6.80; -0.99]	-0.14	0.009
Self-efficacy: PSEQ	-0.25 [-0.41; -0.08]	-0.15	0.003
Fear of movement: TSK	0.17 [-0.15; 0.49]	0.06	0.30
Back Pain Intensity: NRS			
Resilience: BRS	-0.53 [-0.96; -0.10]	-0.14	0.02
Self-efficacy: PSEQ	-0.02 [-0.05; 0.00]	-0.12	0.03
Fear of movement: TSK	0.05 [0.00; 0.10]	0.12	0.03
Physical Activity: Activity Counts			
Resilience: BRS	36.70 [8.53; 64.87]	0.12	0.01
Self-efficacy: PSEQ	0.19 [-1.19; 1.57]	0.01	0.79
Fear of movement: TSK	0.38 [-2.59; 3.36]	0.01	0.80

Coronado et al. *Manuscript in progress*

Take Home Message #1

- Positive psychological factors like self-efficacy, positive affect, optimism, and resilience are important determinants of musculoskeletal pain outcomes

Next Steps

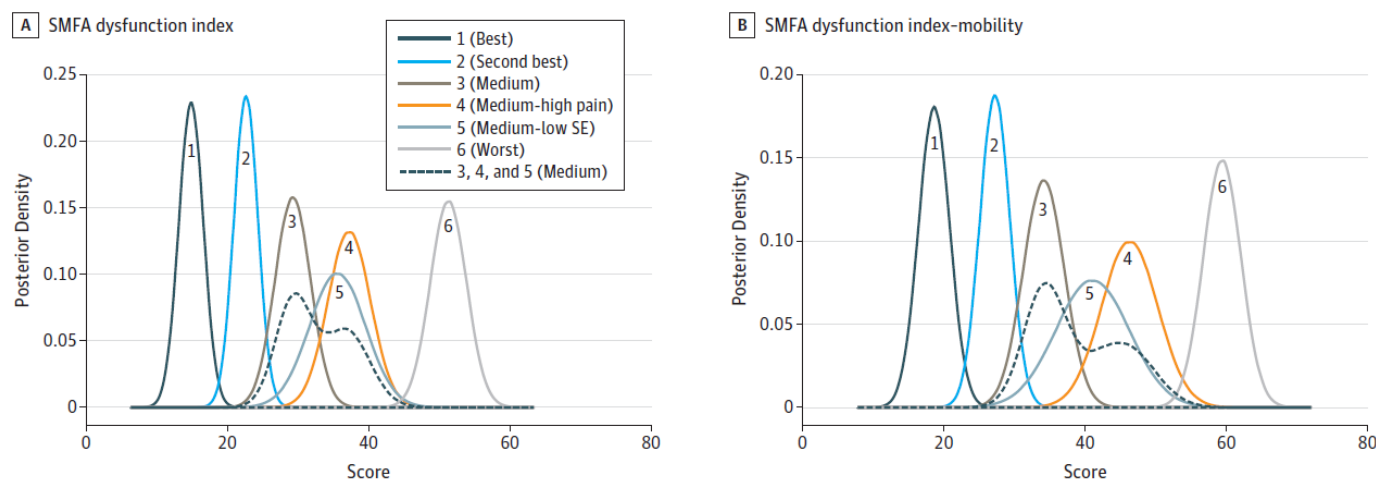
- Multidimensional screening tools that examine both positive and negative psychological factors for estimating prognosis or guiding treatment

Association Between 6-Week Postdischarge Risk Classification and 12-Month Outcomes After Orthopedic Trauma

Renan C. Castillo, PhD, MS; Yanjie Huang, ScM; Daniel Scharfstein, ScD; Katherine Frey, PhD, MS, MPH; Michael J. Bosse, MD; Andrew N. Pollak, MD; Heather A. Vallier, MD; Kristin R. Archer, PhD, DPT; Robert A. Hymes, MD; Anna B. Newcomb, PhD, MSW; Ellen J. MacKenzie, PhD; Stephen Wegener, PhD; and the Major Extremity Trauma Research Consortium (METRC)

MAIN OUTCOMES AND MEASURES At 6 weeks after discharge, patients completed standardized measures for 5 risk factors (pain intensity, depression, posttraumatic stress disorder, alcohol abuse, and tobacco use) and 4 protective factors (resilience, social support, self-efficacy for return to usual activity, and self-efficacy for managing the financial demands of recovery). Latent class analysis was used to classify participants into clusters, which were evaluated against measures of function, depression, posttraumatic stress disorder, and self-rated health collected at 12 months.

Figure. Posterior Distribution of 12-Month Short Musculoskeletal Function Assessment (SMFA) and Self-rated Health Outcomes Based on 6-Cluster Solution



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CONCLUSIONS AND RELEVANCE This study demonstrates that during early recovery, patients with orthopedic trauma can be classified into risk and protective clusters that account for a substantial amount of the variance in 12-month functional and health outcomes. Early screening and classification may allow a personalized approach to postsurgical care that conserves resources and targets appropriate levels of care to more patients.

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Take Home Message #2

- Interventions aimed at boosting positive psychological attributes may be beneficial within a comprehensive and/or personalized pain management approach