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Integrating Motivational Interviewing in Pain Neuroscience Education for People With Chronic Pain: A Practical Guide for Clinicians

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Pain neuroscience education (PNE) and motivational interviewing (MI) have been widely implemented and tested in the field of chronic pain management, and both strategies have been shown to be effective in the short term (small effect sizes) for the management of chronic pain. PNE uses contemporary pain science to educate patients about the biopsychosocial nature of the chronicity of their pain experience. The goal of PNE is to optimize patients' pain beliefs/perceptions to facilitate the acquisition of adaptive pain-coping strategies. MI, on the other hand, is a patient-centered communication style for eliciting and enhancing motivation for behavior change by shifting the patient away from a state of indecision or uncertainty. Conceptually, PNE and MI appear to be complementary interventions, with complementary rather than overlapping effects; MI primarily improves cognitive and behavioral awareness and, potentially, adherence to treatment principles, whereas PNE potentially increases pain knowledge/beliefs, awareness, and willingness to explore psychological factors that are potentially associated with pain. Therefore, combining PNE with MI might lead to improved outcomes with larger and longer-lasting effect sizes. The combined use of PNE and MI in patients having chronic pain is introduced here, along with a description of how clinicians might be able to integrate PNE and MI in the treatment of patients experiencing chronic pain. Clinical trials are needed to examine whether combining PNE with MI is superior to PNE or MI alone for improving pain and quality of life in patients having chronic pain.



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Chronic pain (pain that persists beyond normal expected healing times or for >3 months) affects around 20% of the population.¹ The prevalence of chronic pain is higher than any other chronic disease,^{2,3} including cancer, heart disease, and diabetes. Chronic pain has a tremendous personal and socioeconomic impact; it causes the highest number of years lived with disability⁴ and is the most expensive cause of work-related disability.^{5,6} Chronic pain also decreases life expectancy, independent of sociodemographic factors.^{7,8}

Over the past decades, the scientific understanding of chronic pain has revealed that biopsychosocial factors contribute to the intensity and persistence of pain.^{9–13} Factors such as comorbidities, physical fitness, behavior, psychosocial characteristics, and environmental aspects can all influence the pain a person experiences.^{9–13} This improved understanding of chronic pain has shifted management strategies away from purely biomedical treatments, such as lumbar fusion surgery,¹⁴ injections, or pharmacotherapy, to multimodal approaches acknowledging the complex biopsychosocial nature of chronic pain. Such multimodal approaches often include patient self-management.

The successful incorporation of self-management strategies typically requires a behavioral change from the patient. To facilitate a behavioral change, patient education and communication strategies such as pain neuroscience education (PNE) and motivational interviewing (MI) have been developed and tested for the management of chronic disabling pain.^{15,16} PNE entails the explanation of the neurophysiological-endocrine-immune changes in the central nervous system in patients with chronic pain. This approach incorporates contemporary pain (neuro)science to educate a patient about the nature of her or his pain experience and associated contributing factors in order for the patient to reconceptualize the meaning of the pain experience.¹⁷ PNE facilitates the patient to gain a broader biopsychosocial understanding of her or his pain experience, including the role of neurophysiological (eg, central and peripheral nervous system sensitization), psychological, social, and environmental factors in addition to biomedical factors.^{17,18} The typical aim of PNE is to decrease the threat value of pain, diminish catastrophic thinking, and facilitate a more active coping strategy (Figure).¹⁹ MI, on the other hand, is a directive, collaborative, patient-centered communication approach for eliciting and enhancing motivation for behavior change by helping clients to resolve ambivalence and uncertainty.^{20,21} MI is a communication process in which the health care professional is supportive, empathetic, positive, and hopeful. MI relies strongly on the therapeutic alliance to assist in changing certain health behaviors based on the patients' internal thoughts, decisions, and motivation. MI also aims to strengthen personal commitment by respecting the individual's autonomy and assists them to reach a specific goal by exploring personal intentions or reasons for change.^{20,21} MI includes 2 essential components: the therapeutic relationship, or MI spirit, which is based on empathy, open-ended questions, eliciting the patient's thoughts, respecting the patient's autonomy, and appreciating the patient's reflections; and increasing cognitive dissonance for the current state and "change talk," which implies the use of each of the abovementioned aspects as well as reflective listening to delineate the patient's ambivalence or underlying reasons for behavior change and therefore instigating internal motivated change.^{20–22}

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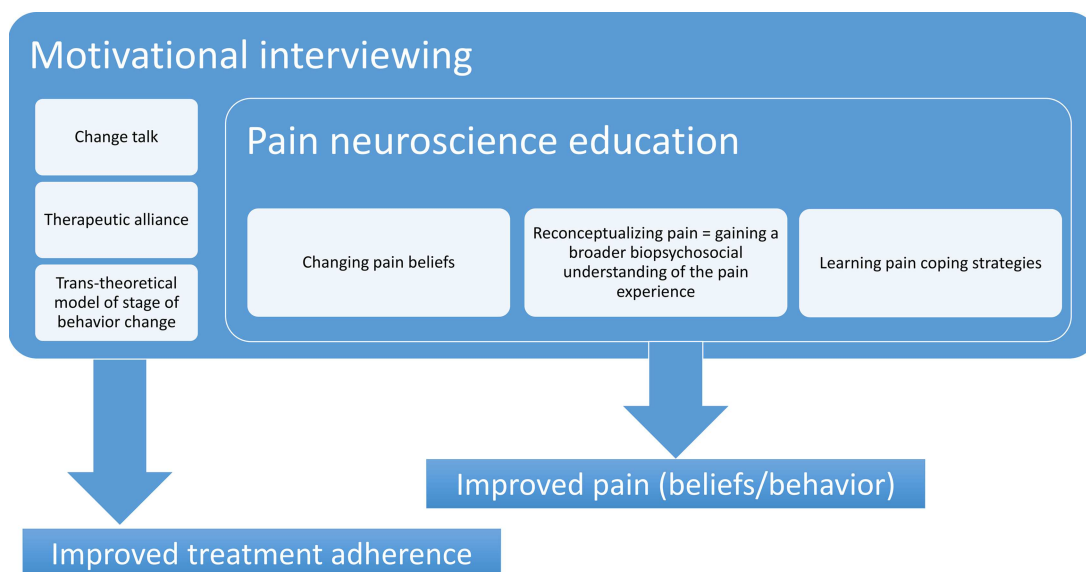


Figure. Pain neuroscience education and motivational interviewing are conceptually complementary interventions.

Both PNE¹⁹ and MI¹⁵ have been widely tested and implemented for the management of chronic pain, and both strategies appear to be useful components for the treatment of patients with chronic pain.^{15,19} Both strategies appear to elicit short-term effects in individuals experiencing chronic pain.^{15,19} PNE and MI also appear to have complementary results (Figure); MI appears to primarily improve treatment adherence,¹⁵ whereas PNE results in clinically meaningful improvements in kinesiophobia and pain catastrophizing in the short and medium terms, respectively.¹⁶ However, data from 12 randomized controlled trials (755 participants) demonstrated that improvements in pain and disability following PNE are not clinically important.¹⁶ Combining PNE and MI might lead to improved outcomes, as PNE and MI appear to be conceptually complementary interventions in terms of outcomes as concerning clinical application possibilities. Although the concepts of PNE and MI clinically are frequently used together, to the best of our knowledge, no attempts have been made to describe the combined use of PNE and MI in patients experiencing chronic pain. This article describes how clinicians symbiotically integrate PNE and MI into the management of chronic pain.

Evidence Supporting the Use of PNE in People With Chronic Pain

In populations with noncancer pain, including patients with chronic low back pain, chronic neck pain, fibromyalgia, chronic fatigue syndrome, osteoarthritis, and postsurgical pain, PNE appears to result in favorable outcomes^{18,23} and has proven to be effective in changing pain beliefs as well as leading to pain-coping strategies

and improving health status (level A evidence).^{18,23–30} Still, only the improvements in kinesiophobia and pain catastrophizing are considered clinically meaningful,¹⁶ and adding 2 hours of PNE to recommended first-line care for patients with acute low back pain did not improve pain outcomes.³¹ The learning objectives of PNE include decreasing the threat value of pain, increasing the patients' knowledge about pain, and reconceptualizing of pain into a broader biopsychosocial perspective. To achieve this, the patient needs to understand that all pain is produced, constructed, and modulated by the brain (eg, pain triggered or worsened by pain anticipation) and that their pain symptoms often relate to hypersensitivity of the nervous system rather than (ongoing) tissue damage. Current evidence¹⁹ suggests patients learn PNE best via metaphors, examples, and images.

Although effective in the short term,¹⁹ the effect sizes of PNE are typically small.³² However, PNE appears to pave the way for more active interventions, such as cognition-targeted exercise therapy, and combining the 2 treatment strategies generates a synergistic effect, with medium to large effect sizes that have been shown to be sustained at a 1-year follow-up in patients having chronic spinal pain.³³ Studies exploring the long-term effects of PNE as an isolated intervention are scarce and limited to a single study comparing presurgical PNE with no intervention for individuals undergoing surgery for lumbar radiculopathy.³⁴ No effects on pain-related outcomes were observed, but large (approximately 40%) reductions in health care utilization and related costs were found and maintained at 3-year follow-up.^{34,35} Given the potential for success, PNE programs for other populations within the chronic pain population have been developed

yet still require experimental testing in randomized controlled trials. This includes PNE for pediatric chronic pain,³⁶ pain in athletes,³⁷ and postcancer pain.³⁷

In health care, contextual factors, previously known as nonspecific factors, have a larger influence on the treatment outcome in patients experiencing chronic pain^{38,39} than initially thought. The interpersonal and communication skills of the health care professional significantly influence the therapeutic relationship.⁴⁰⁻⁴² Whether it is labeled patient-centered care, the therapeutic alliance, or shared decision-making, all theoretical concepts surrounding the patient-therapist interaction include active listening to be sure the patient feels heard and validated as well as shared decision-making to ensure the patient feels in control of the ultimate treatment decisions. The therapist should be empathic, friendly, and understanding, have excellent communication skills, and establish a bond with the patient that leads to agreement on the goals and plan of care, implying that the treatment should be individualized. These characteristics are also important features of MI but are less explored in current PNE programs.

Evidence Supporting the Use of MI in People With Chronic Pain

MI is a strategy that originates from the field of alcohol and other substance abuse²⁰ to facilitate behavioral change toward a more healthy lifestyle.^{22,43,44} Since its development, MI has been tested and applied to a variety of patient populations, including obesity,⁴³ arthritis,⁴⁵ and cancer.⁴⁴ MI has become a popular approach for increasing treatment adherence.¹⁵ A systematic review identified 7 randomized clinical trials with 962 participants with chronic pain and concluded that there was a small to moderate overall effect of MI on increased adherence to treatment in the short term but not in the long term.¹⁵ There were insufficient study data available to make robust conclusions regarding the effects of MI on pain severity or physical functioning, but the available data suggest improvements in pain intensity but no effects on physical functioning in patients experiencing chronic pain.¹⁵

In addition, there is strong evidence supporting the efficacy of MI to address lifestyle behaviors as well as the psychosocial needs of cancer patients and survivors, but more effort is needed to examine whether MI is also useful for self-management of cancer-related symptoms such as pain.⁴⁴ The positive effects of MI on lifestyle behaviors and psychosocial needs in the cancer (survivor) population are highly relevant in the context of chronic pain management. Indeed, chronic (post)cancer pain is increasingly recognized as an underestimated yet debilitating symptom in cancer (survivorship)⁴⁶ and one that requires addressing lifestyle factors as well as psychosocial factors.⁴⁷

Even though the use of MI in patients with chronic pain is promising, there are several points to address. First, in the fibromyalgia population, both the use of opioids⁴⁸ and obesity⁴⁹ are associated with diminished effects of MI, indicating that these impeding factors need to be considered. Second, a recent review on MI focusing on which individuals will benefit from MI reported that more high-quality research is needed to be confident about the effectiveness of MI.⁵⁰ It is clear, however, that the consistency of the provided MI intervention across sessions and clinicians is critical.⁵¹ A study where nurses were trained to deliver an MI-based pretreatment in pain rehabilitation for patients with fibromyalgia or chronic musculoskeletal pain revealed the need for the rigorous selection of MI counselors before training and the important role of continuous supervision and feedback for MI practitioners to reach proper MI fidelity.⁵² It is important to emphasize that MI is not a separate treatment component or treatment module; on the contrary, MI is a communication style that should be integrated throughout the treatment, including the (preparatory) educational phase. Within a multidisciplinary setting, all therapists should master MI skills to optimize its effects.

MI can be based on the transtheoretical model of the stage of behavior change (this script is an adaptation of the MI script developed by the UCLA Center for Human Nutrition for weight reduction in people with obesity, available at http://www.cellinteractive.com/ucla/physician_ed/scripts_for_change.html). Hence, it is essential to know where the patient is regarding readiness to change her or his beliefs about and/or way of dealing with pain. Further, it is essential to stipulate on what aspect of the pain experience the patient is ready (or not) for change. A person can be ready to change their beliefs about pain but not to change pain-related behavior.

Why Combining PNE and MI Is Indicated

How could MI help the delivery of PNE? Providing valuable information in the form of PNE is an important role of the health care professional. A common behavior and strategy that many health care providers use is often rooted from a paternalistic approach, thus using presumptuous patient education rather than tailoring the education to the needs to change behavior, thoughts, and linguistic/intelligence level.⁵³ This approach compromises the therapeutic alliance and patient-centered care and creates the risk of evoking resistance in the patient. “Ruptures” in the therapeutic alliance are hard to overcome and can negatively influence the outcomes of the treatment.⁵⁴ Using MI strategies such as elicit-provide-elicite can help increase patient receptiveness, acceptance, and engagement. For example, the therapist could ask the patient to share what they know about back pain (elicit). The therapist could then ask permission to comment on the patient’s thoughts and beliefs based on current best evidence (provide). Following the provision

of new information, the therapist could then ask the patient how the new information reconciles with their thoughts about back pain (elicit). This approach is in line with the finding that allowing patients to tell their own story is a key component for enhancing the patient experience of PNE.¹⁶ Exchanging information in MI builds on patients' personal knowledge and experience, assesses their understanding of the new information, and allows for feedback in a nonconfrontational manner.

Individuals who can successfully combine PNE and MI include psychotherapists, physical therapists, nurses, doctors, or any other health care professional, as long as they comply with certain prerequisites. First, the provider must possess an in-depth understanding of pain mechanisms⁵⁵ and the dysfunctional central nociceptive processing associated with chronic pain.^{56,57} This includes a thorough understanding of biopsychosocial factors in the development and sustainment of chronic pain.⁵⁸ Second, health care providers need adequate skills to provide evidence-based explanations to their patients regarding pain mechanisms, central sensitization, and neuropathic pain in the presence of chronic pain. Third, specific communication skills are required. For instance, a Socratic-style dialogue of education⁵⁹ is preferred over "lecturing" to the patient. This is where MI can be beneficial and why we advocate integrating PNE and MI. Indeed, neither PNE and MI are standard interventions or stand-alone treatments but rather treatment concepts that should be individually tailored to the specific features, needs, and perceptions of patients having pain. Indeed, PNE typically establishes the path for more active approaches to current evidence-based biopsychosocially driven pain management strategies, including graded activity,⁶⁰ exposure in vivo,⁶¹ stress management, and acceptance-based interventions (eg, acceptance and commitment therapy).^{62,63} Fourth, theoretical knowledge on behavioral learning and change is necessary to put PNE and MI in the context of goal-directed behavioral change.

Also, the aims of PNE and MI appear to be complementary for optimizing a comprehensive pain management program. The learning objectives of PNE focus on decreasing the threat value of the pain experience, and increasing the patients' knowledge of pain, whereas MI is more focused on inviting a person to engage in a behavioral change. Such a behavioral change in patients with chronic pain can potentially be facilitated and accelerated through PNE supplemented with MI. Maladaptive pain knowledge/beliefs can delay or prevent targeted behavioral change and therefore should be addressed through PNE. MI may be effective in eliciting the desired change. Finally, as explained in the introduction, the different scope of MI and PNE manifests itself in different yet complementary results.

How to Integrate PNE and MI in Clinical Practice

Using MI to Prepare People for PNE

A thorough biopsychosocial intake should always precede PNE. A clinical guide for such a biopsychosocial intake before PNE is presented elsewhere.¹³ Next, it is important to acknowledge the pain, not by telling patients, "We take your pain seriously," but by telling them that we understand how it works.

Many providers use PNE without obtaining explicit consent from the patient. This can lead to a rupture in the therapeutic alliance when the patient accuses the provider of thinking that the patient's pain is "all in their head." MI principles suggest that the provider should ask the patient for permission to talk about pain neuroscience. Having the patient express consent to receive PNE maintains the therapeutic alliance and may result in the patient being more receptive to the message. PNE can be proposed to patients together with other options (eg, initiating exercise therapy straight away without prior explanation about their pain) in a shared decision-making format. MI is a communication style to facilitate the shared decision-making process, especially in patients having treatment expectations that are not in line with evidence-based treatment guidelines. A similar approach (elicit-provide-elicit) can be used to ask for patients' permission to integrate stress management (and/or the management of fear, anxiety, and behavioral factors) into the treatment program: first ask patients about their thoughts on the role of stress in their daily pain experience (elicit); ask permission to explain why stress influences pain (using examples given in [Appendix 1](#)) and how coping skills may be used to address those stressors (provide); and ask patients about their thoughts on this new information (elicit). Integrating education about stress physiology into PNE allows patients to understand that stress is not purely a psychological factor but instead represents a complex biopsychosocial issue with an important and measurable biological component (ie, cortisol, adrenaline, and heart rate). This approach may allow the provider to move to the next phase of behavioral change, including asking permission to discuss patient-specific stressors and how to cope with them.

Using MI During PNE

Change talk is an essential component of MI^{20,21} and can be an important addition to PNE, which traditionally has been a more passive, paternalistic communication strategy. The provider typically lectures about pain mechanisms and explains the importance of changing the way in which the patient interprets and manages the pain experience. Using MI principles, change talk elicits important reasons for change from the patient by having them give voice to the need for change that is personally important. Examples of such change talk that can be used when providing PNE to patients with chronic pain are presented in [Appendix 1](#).

Also, integrating MI during PNE can be based on the transtheoretical model of the stage of behavior change, implying the need to assess where the patient is about readiness and willingness to change their beliefs about and/or way of dealing with pain. Trying to elicit “change” in a patient who is not ready will not be successful and may be disruptive to the therapeutic relationship.

Appendix 2 provides a series of examples of how MI can be used when providing PNE to patients who are in the precontemplation stage of behavior change (ie, when the patient is not considering change regarding any aspect of pain-related behavior), the contemplation stage (ie, when the patient is ambivalent about change), and the preparation stage (ie, when the patient is preparing to change and begins making small changes to prepare for a larger life change). In addition to the examples, Appendix 2 also provides suggested goals and strategies to use in each stage of behavior change. Hence, the appendix can be used as a practical guide for clinicians willing to integrate MI during PNE and vice versa.

Combining MI and PNE may motivate patients to invest time and energy into changing their thoughts/beliefs by reading PNE materials at home (this can be either a PNE information leaflet^{55,64} or online PNE material⁶⁵;

Appendix 2, part II, contemplation stage, item 5). The patient may also be motivated to share this information with a significant other, which may facilitate social support (Appendix 2, part III, preparation stage, item 5). The combined approach (MI plus PNE) also may allow clinicians to set the stage for a multimodal approach, that is, preparing patients for a comprehensive treatment plan to include a behavioral change to address various lifestyle factors, including stress, sleep, and physical activity (Appendix 2, part III, preparation stage, item 5).

Research Agenda

Although the aims of PNE and MI appear to be complementary for optimizing a comprehensive pain management program, it is unclear whether combining the 2 approaches is superior to PNE or MI alone. Therefore, clinical trials are needed to examine whether combining PNE with MI is superior to PNE or MI alone for improving pain and quality of life in patients with chronic pain. We want to reiterate that combining PNE and MI does not constitute a comprehensive pain management program. Chronic pain management requires a multimodal and individually tailored best practice approach, including patient education, exercise therapy, activity modification (including graded activity), stress management, acceptance and commitment therapy, cognitive therapy, sleep hygiene, and dietary interventions. We believe that a combined approach using PNE and MI has the potential to optimize patient outcomes from a multimodal plan of care for patients having chronic pain. Future research should explore the possible additive value of combining PNE with MI within a multimodal plan of care for patients with chronic pain.

Conclusion

Both PNE¹⁹ and MI¹⁵ have been widely investigated and implemented in chronic pain management, and both have been shown to be effective to some extent in the short term for the management of chronic pain.^{15,19} PNE uses contemporary pain science to educate patients about the biopsychosocial nature of their pain experience. PNE aims to optimize a patient’s pain beliefs/perceptions with the goal of improving adaptive pain-coping strategies (in line with the common-sense model).⁶⁶ MI, on the other hand, is a patient-centered communication style for eliciting and strengthening motivation for behavior change by facilitating patients to resolve ambivalence/uncertainty.^{20,21} MI and PNE appear to be complementary interventions. In addition, they may yield complementary rather than overlapping effects; MI primarily improves treatment adherence,¹⁵ whereas PNE has been shown to improve pain knowledge/beliefs and psychological factors, such as kinesiophobia and pain catastrophizing associated with pain.^{16,19} Combining MI and PNE may lead to improved outcomes. Clinical trials are needed to examine whether combining PNE with MI is superior to PNE or MI alone for improving pain and quality of life in patients experiencing chronic pain.

A patient-centered communication style such as MI may interact with PNE to increase the effect of the treatment. However, as many patients with chronic pain present with specific functional impairments linked to fear avoidance beliefs, the addition of MI to a PNE treatment may not be enough to change patients’ behaviors regarding functional tasks limited by the pain or fear. Therefore, it is recommended adding not only MI but also cognition-targeted exercises for treating musculoskeletal chronic pain.^{33,67} Information and motivational strategies do not necessarily lead to behavioral change. Combining MI plus PNE should establish the path for more active approaches to current evidence-based biopsychosocially driven pain management strategies, including graded activity,⁶⁰ exposure in vivo,⁶¹ stress management, and acceptance-based interventions.^{62,63} When providing such a comprehensive multimodal pain management approach, the desired behavioral change can be expected.

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References

- 1 Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. *Euro J Pain*. 2006;10:287–333.
- 2 Report EC. The pain proposal consensus report: improving the current and future management of chronic pain. <http://www.mijnpijn.nl/pdf/PainProposal/EuropeanReport.pdf>. Accessed September 2, 2010.
- 3 Belgisch Consensus Rapport. De huidige en toekomstige behandeling van chronische pijn. http://www.mijnpijn.be/_pdf/report-belgium-nl.pdf. Accessed September 2, 2010. 7.
- 4 Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*. 2015;386:743–800.
- 5 Andersson GB. Epidemiological features of chronic low-back pain. *Lancet*. 1999;354:581–585.
- 6 Waddell G, Burton AK. Occupational health guidelines for the management of low back pain at work: evidence review. *Occup Med*. 2001;51:124–135.
- 7 Torrance N, Elliott AM, Lee AJ, Smith BH. Severe chronic pain is associated with increased 10 year mortality. A cohort record linkage study. *Eur J Pain*. 2010;14:380–386.
- 8 McBeth J, Symmons DP, Silman AJ, et al. Musculoskeletal pain is associated with a long-term increased risk of cancer and cardiovascular-related mortality. *Rheumatol*. 2009;48:74–77.
- 9 Fillingim RB. Individual differences in pain responses. *Curr Rheumatol Rep*. 2005;7:342–347.
- 10 Lumley MA, Cohen JL, Borszcz GS, et al. Pain and emotion: a biopsychosocial review of recent research. *J Clin Psychol*. 2011;67:942–968.
- 11 Meeus M, Nijs J. Central sensitization: a biopsychosocial explanation for chronic widespread pain in patients with fibromyalgia and chronic fatigue syndrome. *Clin Rheumatol*. 2007;26:465–473.
- 12 McLean SA, Clauw DJ, Abelson JL, Liberzon I. The development of persistent pain and psychological morbidity after motor vehicle collision: integrating the potential role of stress response systems into a biopsychosocial model. *Psychosom Med*. 2005;67:783–790.
- 13 Wijma AJ, van Wilgen CP, Meeus M, Nijs J. Clinical biopsychosocial physiotherapy assessment of patients with chronic pain: the first step in pain neuroscience education. *Physiother Theory Pract*. 2016;32:368–384.
- 14 Wang JC, Dailey AT, Mummaneni PV, et al. Guideline update for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 8: Lumbar fusion for disc herniation and radiculopathy. *J Neurosurg Spine*. 2014;21:48–53.
- 15 Alperstein D, Sharpe L. The efficacy of motivational interviewing in adults with chronic pain: a meta-analysis and systematic review. *J Pain*. 2016;17:393–403.
- 16 Watson JA, Ryan CG, Cooper L, et al. Pain neuroscience education for adults with chronic musculoskeletal pain: a mixed-methods systematic review and meta-analysis. *J Pain*. 2019.
- 17 Moseley GL, Butler DS. Fifteen years of explaining pain: the past, present, and future. *J Pain*. 2015;16:807–813.
- 18 Nijs J, Paul van Wilgen C, Van Oosterwijck J, van Ittersum M, Meeus M. How to explain central sensitization to patients with 'unexplained' chronic musculoskeletal pain: practice guidelines. *Man Ther*. 2011;16:413–418.
- 19 Louw A, Zimney K, Puentedura EJ, Diener I. The efficacy of pain neuroscience education on musculoskeletal pain: a systematic review of the literature. *Physiother Theory Pract*. 2016;32:332–355.
- 20 Miller WR. Motivational interviewing: research, practice, and puzzles. *Addict Behav*. 1996;21:835–842.
- 21 Miller WR, Rollnick S. Ten things that motivational interviewing is not. *Behav Cog Psychother*. 2009;37:129–140.
- 22 Amiri P, Kazemian E, Mansouri-Tehrani MM, Khalili A, Amouzegar A. Does motivational interviewing improve the weight management process in adolescents? Protocol for a systematic review and meta-analysis. *Syst Rev*. 2018;7:178.
- 23 Louw A, Diener I, Butler DS, Puentedura EJ. The effect of neuroscience education on pain, disability, anxiety, and stress in chronic musculoskeletal pain. *Arch Phys Med Rehabil*. 2011;92:2041–2056.
- 24 Van Oosterwijck J, Meeus M, Paul L, et al. Pain physiology education improves health status and endogenous pain inhibition in fibromyalgia: a double-blind randomized controlled trial. *Clin J Pain*. 2013;29:873–882.
- 25 Van Oosterwijck J, Nijs J, Meeus M, et al. Pain neurophysiology education improves cognitions, pain thresholds, and movement performance in people with chronic whiplash: a pilot study. *J Rehabil Res Dev*. 2011;48:43–58.
- 26 Moseley GL. Evidence for a direct relationship between cognitive and physical change during an education intervention in people with chronic low back pain. *Eur J Pain*. 2004;8:39–45.
- 27 Moseley GL. Widespread brain activity during an abdominal task markedly reduced after pain physiology education: fMRI evaluation of a single patient with chronic low back pain. *Aust J Physiother*. 2005;51:49–52.
- 28 Moseley GL. Joining forces – Combining cognition-targeted motor control training with group or individual pain physiology education: a successful treatment for chronic low back pain. *J Manual Manipulative Ther*. 2003;11:88–94.
- 29 Moseley GL, Nicholas MK, Hodges PW. A randomized controlled trial of intensive neurophysiology education in chronic low back pain. *Clin J Pain*. 2004;20:324–330.
- 30 Moseley GL. Combined physiotherapy and education is efficacious for chronic low back pain. *Aust J Physiother*. 2002;48:297–302.
- 31 Traeger AC, Lee H, Hubscher M, et al. Effect of intensive patient education vs placebo patient education on outcomes in patients with acute low back pain: a randomized clinical trial. *JAMA Neurol*. 2019;76:161–169.
- 32 Malfliet A, Kregel J, Meeus M, et al. Blended-learning pain neuroscience education for people with chronic spinal pain: Randomized controlled multicenter trial. *Phys Ther*. 2018;98:357–368.

- 33 Malfliet A, Kregel J, Coppieters I, et al. Effect of pain neuroscience education combined with cognition-targeted motor control training on chronic spinal pain: a randomized clinical trial. *JAMA Neurol*. 2018;75:808–817.
- 34 Louw A, Diener I, Landers MR, Puentedura EJ. Preoperative pain neuroscience education for lumbar radiculopathy: a multicenter randomized controlled trial with 1-year follow-up. *Spine*. 2014;39:1449–1457.
- 35 Louw A, Diener I, Landers MR, Zimney K, Puentedura EJ. Three-year follow-up of a randomized controlled trial comparing preoperative neuroscience education for patients undergoing surgery for lumbar radiculopathy. *J Spine Surg*. 2016;2:289–298.
- 36 Pas R, Meeus M, Malfliet A, et al. Development and feasibility testing of a pain neuroscience education program for children with chronic pain: treatment protocol. *Braz J Phys Ther*. 2018;22:248–253.
- 37 Malfliet A, Leysen L, Pas R, et al. Modern pain neuroscience in clinical practice: applied to post-cancer, paediatric and sports-related pain. *Braz J Phys Ther*. 2017;21:225–232.
- 38 Ferreira PH, Ferreira ML, Maher CG, Refshauge KM, Latimer J, Adams RD. The therapeutic alliance between clinicians and patients predicts outcome in chronic low back pain. *Phys Ther*. 2013;93:470–478.
- 39 Wijma AJ, Speksnijder CM, Crom-Ottens AF, et al. What is important in transdisciplinary pain neuroscience education? A qualitative study. *Disabil Rehabil*. 2017;1–11.
- 40 Wijma AJ, Bletterman AN, Clark JR, et al. Patient-centeredness in physiotherapy: what does it entail? A systematic review of qualitative studies. *Physiother Theory Pract*. 2017;33:825–840.
- 41 Hiller A, Guillemin M, Delany C. Exploring healthcare communication models in private physiotherapy practice. *Patient Educ Couns*. 2015;98:1222–1228.
- 42 Newell S, Jordan Z. The patient experience of patient-centered communication with nurses in the hospital setting: a qualitative systematic review protocol. *JBI Database System Rev Implementation Rep*. 2015;13:76–87.
- 43 Burgess E, Hassmen P, Welvaert M, Pumpa KL. Behavioural treatment strategies improve adherence to lifestyle intervention programmes in adults with obesity: a systematic review and meta-analysis. *Clin Obes*. 2017;7:105–114.
- 44 Spencer JC, Wheeler SB. A systematic review of motivational interviewing interventions in cancer patients and survivors. *Patient Educ Couns*. 2016;99:1099–1105.
- 45 Gilbert AL, Lee J, Ehrlich-Jones L, et al. A randomized trial of a motivational interviewing intervention to increase lifestyle physical activity and improve self-reported function in adults with arthritis. *Semin Arthritis Rheum*. 2018;47:732–740.
- 46 Leysen L, Beckwee D, Nijs J, et al. Risk factors of pain in breast cancer survivors: a systematic review and meta-analysis. *Support Care Cancer*. 2017;25:3607–3643.
- 47 Nijs J, Leysen L, Pas R, et al. Treatment of pain following cancer: applying neuro-immunology in rehabilitation practice. *Disabil Rehabil*. 2018;40:714–721.
- 48 Kim S, Slaven JE, Ang DC. Sustained benefits of exercise-based motivational interviewing, but only among nonusers of opioids in patients with fibromyalgia. *J Rheumatol*. 2017;44:505–511.
- 49 Kalth AS, Slaven JE, Ang DC. Obesity moderates the effects of motivational interviewing treatment outcomes in fibromyalgia. *Clin J Pain*. 2018;34:76–81.
- 50 Frost H, Campbell P, Maxwell M, et al. Effectiveness of motivational interviewing on adult behaviour change in health and social care settings: a systematic review of reviews. *PLoS*. 2018;13:e0204890.
- 51 Morton K, Beauchamp M, Prothero A, et al. The effectiveness of motivational interviewing for health behaviour change in primary care settings: a systematic review. *Health Psychol Rev*. 2015;9:205–223.
- 52 Mertens VC, Forsberg L, Verbunt JA, Smeets RE, Goossens ME. Treatment fidelity of a nurse-led motivational interviewing-based pre-treatment in pain rehabilitation. *J Behav Health Serv Res*. 2016;43:459–473.
- 53 Wittink H, Oosterhaven J. Patient education and health literacy. *Musculoskelet Sci Pract*. 2018;38:120–127.
- 54 Safran JD, Muran JC, Eubanks-Carter C. Repairing alliance ruptures. *Psychotherapy*. 2011;48:80–87.
- 55 Butler D, Moseley GL. *Explain Pain*. Adelaide, Australia: NOI Group Publishing; 2003.
- 56 Woolf CJ. Central sensitization: implications for the diagnosis and treatment of pain. *Pain*. 2011;152:S2–S15.
- 57 Woolf CJ, Salter MW. Neuronal plasticity: increasing the gain in pain. *Science*. 2000;288:1765–1769.
- 58 Vlaeyen JW, Crombez G. Fear of movement/(re)injury, avoidance and pain disability in chronic low back pain patients. *Man Ther*. 1999;4:187–195.
- 59 Siemonsma PC, Schroder CD, Dekker JH, Lettinga AT. The benefits of theory for clinical practice: cognitive treatment for chronic low back pain patients as an illustrative example. *Disabil Rehabil*. 2008;30:1309–1317.
- 60 Macedo LG, Smeets RJ, Maher CG, Latimer J, McAuley JH. Graded activity and graded exposure for persistent nonspecific low back pain: a systematic review. *Phys Ther*. 2010;90:860–879.
- 61 de Jong JR, Vlaeyen JW, Onghena P, Cuypers C, den Hollander M, Ruijgrok J. Reduction of pain-related fear in complex regional pain syndrome type I: the application of graded exposure in vivo. *Pain*. 2005;116:264–275.
- 62 Wicksell RK, Ahlqvist J, Bring A, Melin L, Olsson GL. Can exposure and acceptance strategies improve functioning and life satisfaction in people with chronic pain and whiplash-associated disorders (WAD)? A randomized controlled trial. *Cogn Behav Ther*. 2008;37:169–182.
- 63 Wicksell RK, Olsson GL, Hayes SC. Psychological flexibility as a mediator of improvement in Acceptance and Commitment Therapy for patients with chronic pain following whiplash. *Euro J Pain*. 2010;14:1059 e1– e11.
- 64 Louw A. *Why you hurt*. Story City, IA: International Spine & Pain Institute, Therapeutic neuroscience education system; 2014.
- 65 Retrain Pain Foundation. <https://www.retrainpain.org/> Accessed November 11, 2018.
- 66 Meyer D, Leventhal H, Gutmann M. Common-sense models of illness: the example of hypertension. *Health Psychol*. 1985;4:115–135.
- 67 Nijs J, Meeus M, Cagnie B, et al. A modern neuroscience approach to chronic spinal pain: combining pain neuroscience education with cognition-targeted motor control training. *Phys Ther*. 2014;94:730–738.
- 68 Ditte JW, Heckman BW, Zale EL, Kosiba JD, Maisto SA. Acute analgesic effects of nicotine and tobacco in humans: a meta-analysis. *Pain*. 2016;157:1373–1381.
- 69 Sa S. Motivational Interviewing Strategies and Techniques: Rationales and Examples. 2008. https://www.esrdnetwork.org/sites/default/files/MI_rationale_techniques.pdf. Accessed March 6, 2020.
- 70 Brinjikji W, Luetmer PH, Comstock B, et al. Systematic literature review of imaging features of spinal degeneration in asymptomatic populations. *AJNR Am J Neuroradiol*. 2015;36:811–816.

Appendix 1.

Motivational Interviewing Strategies and Techniques Integrated in Pain Neuroscience Education: Rationales and Examples for Asking Permission and Eliciting Change Talk^a

Asking Permission

Rationale. Communicates respect for patients. Also, patients are more willing to discuss changing behaviors, thoughts, or habits when asked than when being lectured or being told to change.

Integrating pain neuroscience education implies that the therapist asks the patient permission to talk about an understanding of pain neuroscience. For example, before patients are being asked permission to discuss coping skills, they first ask permission to discuss why stresses influence pain. As soon as patients understand that stress is not a pure psychological factor but rather represents a complex biopsychosocial factor with an important and measurable biological component (ie, cortisol, adrenaline, and heart rate variability), the therapist can move to the next stage, often including asking permission to discuss identifying stresses and how to cope with them.

Examples of Asking Permission

- “Do you allow me to explain your pain experience the way I look at it?”
- “Several physicians/health care practitioners have said that they could not find a specific tissue damage causing your pain. Are you willing to look at it from a different perspective?”
- “You previously informed me that stress impacts your pain and how you feel. Do you mind if we take a few minutes and talk about how stress can increase a pain experience?”
- “Before we start some of the physical treatments, do you mind if we take a few minutes and talk about (insert pain issues, eg, spreading pain and sensitivity?)” This sentence often reassures the patient that there will be physical treatment and not (only) psychological treatment.
- “Do you mind if we talk about [insert what is appropriate] (eg, changing the way you deal with your pain, the nature of your pain, what is causing your pain, why you are still feeling pain even though several physicians have told you that they cannot find anything wrong in your spine or affected body region)?”
- “Can we talk about your [insert behavior or what you think is appropriate] (eg, way of dealing with pain, life, and how it is currently controlled by your pain)?”
- “You realize that pain is controlling your life and that it has been like this for quite some time. Do you mind if we talk about how you are currently dealing with pain and what we can do to regain control over your life?”
- “You told me that you aim at returning to your favorite sport, but currently even a gentle walk is triggering

pain. Do you mind if we talk about why such low-intensity activity is currently triggering more pain and search for a solution together?”

- “You previously informed me that stress impacts upon your pain and how you feel. Do you mind if we talk about what stresses you and how you try to cope with it?”
- “Last time we discussed how your sleep problem impacts upon your [insert body region] pain and how you feel. Do you mind if we talk about how sleep interacts with your [insert body region] pain and how you try to cope with it?”

Eliciting/Evoking Change Talk

Rationale. Change talk tends to be associated with successful outcomes. This strategy elicits reasons for changing from patients by having them give voice to the need or reasons for changing. Rather than the therapist lecturing or telling patients the importance of and reasons why they should change, change talk consists of responses evoked from patients. Patients’ responses usually contain reasons for change that are personally important for them. Change talk, like several MI strategies, can be used to address discrepancies between patients’ words and actions (eg, saying that they want to exercise but continuing to be sedentary) in a manner that is nonconfrontational.

Questions to Elicit/Evoke Change Talk

- “What would you like to see different about your current situation?”
- “What makes you think you need to change?”
- “What will happen if you don’t change?”
- “What will be different if you complete this therapy program?”
- “What would be the good things about changing your way of dealing with pain?”
- “What would your life be like 3 years from now if you changed your way of dealing with pain?”
- “Why do you think others are concerned about your pain experience?”

Elicit/Evoke change talk for patients having difficulty changing. Focus for the practitioner is on being supportive as the patient wants to change but is struggling.

- “How can I help you get past some of the difficulties you are experiencing with dealing with your pain?”
- “If you were to decide to change the way you are dealing with your pain, what would you have to do to make this happen?”

Elicit/Evoke change talk by provoking extremes. For use by the practitioner when there is little expressed desire for change by the patient. Typically, this requires

having the patient describe a possible extreme consequence.

- “Suppose you don’t change your way of dealing with your pain; what is the WORST thing that might happen?”
- “What is the BEST thing you could imagine that could result from changing your way of dealing with pain?”
- “We’ve explained that the variety of short-term pain killers, including massage, acupuncture, and drugs, have similar pain-relieving effects as alcohol or smoking.⁶⁸ We’ve also emphasized the short-term nature of their effects. Suppose you continue relying on such short-term pain killers; what is the WORST thing that might happen to you in the long term?”
- “What is the BEST thing you could imagine that could result from changing from short-term pain killers to long-term solutions for your [insert body region] pain experience?”
- “If you look back on the treatments you received in the past, what is the WORST thing that might happen to you in the long term?”

Elicit/Evoke change talk by looking forward. These questions can be asked to patients to deploy discrepancies by comparing the current situation with what it would be like to not have the problem in the future.

- “If you make changes to your way of dealing with pain, how would your life be different from what it is today?”
- “If you change from short-term pain killers to long-term solutions for your [insert body region] pain experience, how will your life be different from what it is today?”
- “How would you like things to turn out for you in 2 years?”

“Inspired by the guide *Motivational Interviewing Strategies and Techniques: Rationales and Examples*, by Sobell and Sobell (2018).⁶⁹”

Appendix 2.

Integrating Motivational Interviewing in Pain Neuroscience Education: Rationales and Examples Based on the Transtheoretical Model of Behavior Change

Examples of MI techniques when providing pain neuroscience education based on the transtheoretical model of the stage of behavior change.⁶ Hence, it is important to know where the patient is with regard to readiness to change her or his beliefs about and/or way of dealing with pain.

I: When the Patient Is in a Precontemplation Stage

Eg, when the patient is not considering change—“I’m not willing to simply accept the pain and learn how to live with it; you need to fix the problem that is causing the pain.”

Goals for This Stage

1. Help the patient with self-developing a reason for changing.
2. Validate the patient’s experience.
3. Encourage the patient for further self-exploration.
4. Leave the door open for future conversations.

Validate the Patient’s Experience

- “I can understand why you feel that way.”
- “I can understand that you have little hope left for any new treatment.”
- “I can understand that you expect me to have a quick solution for your pain experience.”
- “It makes sense to target the cause of your pain, here we strive the same purpose. What do you think is causing the pain?”
- “I understand that you believe that the wear in your [insert body region] is causing the pain, especially when you have seen the images of your [insert body region].”

Acknowledge the Patient’s Control of the Decision

- “It’s up to you to decide if and when you are ready to initiate the treatment, or if you prefer to end it.”
- “It’s up to you to decide if and when you are ready to change your understanding of your pain experience, but please know that we are here to help you.”
- “It’s up to you to decide if and when you are ready to change how you are dealing with the pain, but please know that we are available to help you.”
- “We’re here to aid you with providing treatment options. Please remember it’s always your call which treatment option to choose.”
- “We’re here to help you with your [insert body region] pain. Please remember you are in control and it’s always you are making the decisions. You need to feel comfortable with every part of the treatment. Please indicate whenever you are not comfortable with anything that happens here.”

Explore Potential Concerns

- “If I understand your situation correctly, your pain is currently controlling your life. Is that correct or am I wrong?”
- “You let the pain decide whether or not you can initiate and continue activities you love to do. Does this prevent the pain getting worse? Is that strategy beneficial in the short term, in the long term, or both? What does this strategy do to you in the long term?” . . . [leave time for the patient to respond] . . . “Is this similar to the short- vs long-term effects of alcohol?”
- “Looking at the way your pain and your quality of life has evolved over the time period you had pain, can you imagine how your pain might cause problems in the future?”
- “You were told that your wear in the lower back [or other body area] is causing your back pain. Here is a table^b with the percentage of people—depending on age—who have worn in their spine despite not having any back or leg pain. Please pick your own age category and read what proportion of people with your age without back or leg pain have wear just like you do in their lower spine.” . . . [patient responds] . . . “What does that tell you?” . . . [patient responds] . . . “Perhaps there is more to it than just the wear? Are you interested to learn about a more comprehensive explanation for your back pain?”
- “You previously tried [insert previous treatments that specifically addressed anatomical or physiological dysfunctions]. If muscle tension and related joint dysfunctions (depending on the patient’s beliefs possibly including impairments in motor control) are causing your pain, why weren’t previous treatments that specifically treated that muscle tension and joint dysfunctions beneficial to you?” “Perhaps the muscle tension and joint dysfunctions are only part of the story?”
- “Using this worksheet, can you list all benefits of continuing the way you are dealing with your pain right now in this left column, and all drawbacks in the right column? Are you willing to do that at home and bring it back to me the next time? It will be very useful so we can develop a tailored plan for you together.”

Repeat a Simple, Direct Statement About Your Stand on the Medical Benefits of Changing the Way of Dealing With the Pain for This Patient

- “Your pain is currently controlling your life—your pain is telling you what to do and what not to do. This way you are rewarding your brain for producing pain. In the long term, this is making your situation worse—every time your brain gets better at producing pain. How do you feel about regaining self-control over your life?”^c
- “Your pain is currently controlling your life—the pain is telling you what to do and what not to do and you rely on short-term pain killers with similar effects as

alcohol or smoking. How do you feel about switching the focus toward long-term solutions?”^d

- “Your pain is currently controlling your life—the pain is telling you what to do and what not to do. You’re rewarding your brain for producing pain by giving it short-term pain killers. How do you feel about switching the focus toward long-term solutions?”

Acknowledge Possible Feelings of Being Pressured or Frustration

- “It can be hard to initiate changes in your life when you feel pressured by others. I want to thank you for talking with me about this today/being so open-minded about this today.”
- “It must be difficult for you to understand why previous practitioners didn’t inform you about the sensitive alarm system. Please don’t blame them, they have a different specialization within the health care system. We cannot fathom what you must be undergoing. Everyone’s pain is different. Focus on the good news: we have learned so much about pain in the last 10 years and can explain many of the issues you told us about. You are free to decide on how to proceed from here.”

Validate That the Patient Is Not Ready

- “Please correct me if I’m wrong, but I hear you saying that you are not ready to change your understanding of your pain right now.”
- “Please correct me if I’m wrong, but I hear you saying that you are not ready to change the way you are dealing with your pain right now.”
- “Please correct me if I’m wrong, but I hear you saying that you are not ready yet to change from relying on short-term pain relief to more sustainable ways of dealing with your [insert anatomical region if appropriate] pain.”

Restate Your Position That It Is Up to the Patient

- “It’s totally up to you to decide if this is right for you right now.”
- “It’s totally up to you to decide if and when you are willing to change your understanding of pain.”
- “It’s totally up to you to decide if and when you are willing to change from relying on short-term pain relief to more sustainable ways of dealing with your [insert anatomical region of appropriate] pain.”

Encourage Reframing of the Current State of Change—the Potential Beginning of a Change Rather Than a Decision Never to Change

- “Everyone who’s ever changed the way they dealt with pain starts right where you are now; they start by seeing the reasons where they might want to regain control over their own life. And that’s what I’ve been talking to you about.”

- “Everyone who’s ever changed from short-term pain relief to long-term solutions starts right where you are now; they start by seeing the reasons where they might want to change toward more sustainable ways of dealing with your [insert anatomical region if appropriate] pain. And that’s what we’ve discussed today.”

II: When the Patient Is in a Contemplation Stage

Eg, when the patient is ambivalent about change—“Yes the way I deal with my pain and especially the fact that the pain is in control of my life is a concern for me, but I’m not willing or able to change my way of dealing with the pain yet.” At this stage, other factors, such as (a lack of) confidence and fear (of pain or movement and reinjury) can also play an important role and should be taken into account.

Goals for This Stage

1. Validate the patient’s experience.
2. Acknowledge the patient’s control of the decision.
3. Clarify the patient’s perceptions of the pros and cons of attempted change in the way they understand their pain (to adopt a broader model of pain).
4. Clarify the patient’s perceptions of the pros and cons of attempted change in the way they deal with the pain experience.
5. Encourage the patient for further self-exploration.
6. Restate your position that it is up to the patient.
7. Leave the door open for moving to preparation.

Validate the Patient’s Experience

- “I’m hearing that you are thinking about refining and extending your understanding of your pain but you’re not ready to take action right now.”
- “I’m hearing that you are thinking about changing the way you deal with your pain but it feels like you are not ready to take action right now.”
- “I’m hearing that you are thinking about changing from relying on pain killers to more sustainable solutions, but you’re definitely not ready to take action right now.”
- “It’s very important that you now have a more comprehensive understanding of your pain experience (after a first session of pain neuroscience education). Understanding is one thing, acting is another big step. You’re not up to acting yet, but are you willing to explore options for taking action in the next couple of treatment sessions? For now, you can continue your way of dealing with your pain.”
- “It’s very important that you understand that your spam filter^e is malfunctioning and that with our help you will be able to (re)adjust your spam filter yourself. Understanding is one thing, acting is another big step. You’re not up to taking action yet, but are you willing to explore options for taking action to fix your spam filter in the next couple of treatment sessions?”

Acknowledge the Patient’s Control of the Decision

- “It’s up to you to decide if and when you are ready to explore options for taking action to readjust your spam filter. Exploring options creates opportunities and will never oblige you to act. Having more options is always a good thing.”
- “It’s up to you to decide if and when you are ready to make lifestyle changes, but remember we are available to support you.”
- “Also, in the upcoming sessions, when we will explore options for changing the way how to deal with your pain, it will always be up to you to decide how to move forward. Exploring options creates opportunities and will never oblige you to take action. Having more options is always a good thing.”

Clarify Patients’ Perceptions of the Pros and Cons of Attempted Change in the Way in Which They Understand Their Pain (to Adopt a Broader Model of Pain)

- “What is 1 benefit of changing the way you understand your pain experience? What is 1 drawback of broadening the understanding of your pain experience?”
- “How would improving your understanding of your pain experience impact upon your life in the short and long terms?”

Clarify Patients’ Perceptions of the Pros and Cons of Attempted Change in the Way in Which They Deal with the Pain Experience

- “Using this worksheet, what is 1 benefit of trying to readjust the spam filter? What is 1 drawback of trying to readjust the spam filter?”
- “Using this worksheet, what is 1 benefit of changing the way to deal with pain? What is 1 drawback of changing the way to treat with pain?”
- “Using this worksheet, can you list all benefits of changing the way you are dealing with your pain right now in this left column, and all drawbacks in the right column?”
- “How would changing the way you deal with your pain impact upon your life in the short and long terms?”

Encourage Further Self-Exploration

- “Reading this information leaflet^f/watching this online educational movie^g is important to beginning a successful pain management program. Would you be willing to either read this information leaflet or watch it online at home and talk to me about it at our next visit? Which option do you prefer: the online or printed version, or both?”
- “After having explored the information yourself, would you be willing to share it with your husband/wife/child/parent/friend (whatever is appropriate for the patient)? If your husband/wife/child/parent/friend is willing to explore

the information, it will be important for you to discuss the content with her or him afterward. This will stimulate her or his understanding of what you are dealing with, and hopefully this will give you additional support in your pain management program.”

- “We have now addressed several factors that contribute to your pain experience. Can you think of benefits and drawbacks of these contributing factors?”

Restate Your Position That It Is Up to Them

- “It’s totally up to you to decide if this is right for you right now. Whatever you choose, I’m here to support you.”
- “It’s your pain; you own it and you make the decisions—not the doctor, therapist, etc.”

Leave the Door Open for Moving to Preparation

- “After talking about this, if you feel you would like to make some changes, the next step won’t be jumping into action—we can begin with some preparation work.”

III: When the Patient is in a Preparation Stage

Eg, when the patient is preparing to change and begins making small changes to prepare for a larger life change—“The way pain is currently controlling my life is a concern for me; I’m clear that the benefits of attempting changing the way I deal with pain outweigh the drawbacks, and I’m planning to start within the next month.”

Goals for This Stage

1. Reinforce the patient’s decision to change behavior.
2. Prioritize behavior change opportunities.
3. Identify and assist in problem solving regarding obstacles.
4. Encourage small initial steps.
5. Encourage identification of social supports.

Reinforce the Decision to Change Behavior

- “It’s great that you feel good about your decision to change your understanding of pain; you are taking important steps to regain control over your life.”
- “It’s great that you feel good about your decision to change the way you deal with pain; you are taking important steps to regain control over your life.”
- “It’s great that you feel good about your decision to change from short-term pain relief to more sustainable solutions; you are taking important steps to regain control over your life.”

Prioritize Behavior Change Opportunities

- “Looking at your current situation, I think one of the biggest benefits would come from getting better at dealing with everyday stress(ors) [replace by “improving your sleep,” “becoming more physically active,” or any other part of the pain management program, depending on the patient]. What do you think?”

Identify and Assist in Problem Solving Obstacles

- “Have you ever attempted relaxation (or stress management) [replace by “improving your sleep,” “becoming more physically active,” or any other part of the pain management program, depending on the patient] before? What was helpful? What kinds of problems would you expect in practicing stress management [replace by “sleep management,” “exercise therapy,” “physical activity management,” or any other part of the pain management program, depending on the patient] now? How do you think you could deal with them?”

Encourage Small, Initial Steps

- “So, the initial goal is to try stop worrying about what causes your pain, as you now have a comprehensive understanding of the complexity of your pain.”
- “So, the initial goal is to try stop relying on short-term relief, as you now understand that short-term pain relief reward your brain in producing pain/sensitive alarm system.”

Assist the Patient in Identifying Social Support

- “Which family members or friends could support you in regaining self-control over your life? Are they willing to read the pain information leaflet (or watch the online educational movie) themselves and discuss it together with you to get a better understanding of your situation? Is there anything else I can do to help?”

“Adapted from the MI script developed by the UCLA Center for Human Nutrition for weight reduction in people with obesity, available at http://www.cellinteractive.com/ucla/physician_ed/scripts_for_change.html.

⁷⁰The table is based on the meta-analysis reported.⁷⁰

“Depending on how you provide pain neuroscience education,” brain talk” can be scary for patients and drive the dualism model. If you notice that patients are uncomfortable with relating their pain to changes in the brain, keep away from brain talk until they have (further) improved their understanding about pain. For patients with little knowledge about pain and pain science, any reference to the brain may fuel the idea that the pain is “fake” or “in my head.”

⁷¹The term “short-term pain killers” may be inappropriate for patients struggling with long-term drug use. In such patients, alternative wording, such as “short-term pain relief” or “short-term analgesia” is more suitable.

“Factors aggravating pain can be explained as those pushing on a car’s accelerator, whereas factors relieving

pain are those that activate brain-orchestrated descending nociceptive inhibition, which can be explained easily to patients using a car's brake or spam filter metaphor. For explaining the spam filter metaphor, the following conversation can be included:

Therapist: "Do you use email?"

Patient: "Yes, I do."

Therapist: "Do all emails sent from anywhere in the world to your email account end up in your inbox?"

Patient: "I hope not; the spam filter should keep out inappropriate messages, including publicity."

^fThis information can be found in the publications *Explain Pain*⁵⁵ and *Why You Hurt*⁶⁴ and at <http://www.paininmotion.be/education/tools-for-clinical-practice>, <https://www.optp.com/Everyone-Has-Back-Pain>, and <http://www.paininmotion.be/education/tools-for-clinical-practice>.

^gPain neuroscience education tools can be accessed at <https://www.retrainpain.org/>, <https://www.youtube.com/channel/UCAfjSufXOnORMLMfSid6CQQ> ("Brainman" videos), or <http://www.paininmotion.be/patients/information> (Dutch language video).