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Motivational Interviewing and Motivational Interactions for Health Behavior Change and Maintenance

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Abstract and Keywords

Motivational interviewing (MI) is a patient-centered and collaborative approach to clinical care (Miller & Rollnick, 2013). This narrative review describes MI and then concentrates on evidence for its use with patients to help enhance health behaviors in a variety of settings. Because of the proliferation of research in the area, this overview necessarily is selective. This review focuses on some of the most common chronic health behavior problems, such as those associated with obesity, oral hygiene behavior, and chronic disease management. Additionally, motivational interactions (MIACTs), which are spoken and nonverbal communications from health professionals with patients, are proposed as very brief communications that are based on MI spirit and other MI principles. These MIACTs may promote positive interactions between patients and providers, enhance patient satisfaction with healthcare, and help to establish rapport, even when the time available for healthcare interactions does not allow a true implementation of MI.

Keywords: Motivational Interviewing, health behavior, healthcare, primary care, oral health

Introduction

Motivational interviewing (MI) is an approach to interactions in healthcare that is patient-centered and collaborative, and has proven effective for eliciting and supporting a wide variety of behavior changes (Miller & Rollnick, 2013). Motivational interviewing has an important part to play in healthcare generally, and in the individual treatment of people with common, yet often chronic and even fatal, conditions (Rollnick, Miller, & Butler, 2008).

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Chronic health conditions have become more prevalent in the past century, particularly in industrialized countries (Gerstman, 2013). For example, in the USA in 1900, the leading causes of death were pneumonia, influenza, tuberculosis, and gastrointestinal infections (e.g., diarrhea; Gerstman, 2013). Comparatively, in 2010, the leading causes of death were heart disease, cancer, and chronic lower respiratory diseases (Gerstman, 2013; Murphy, Xu, & Kochanek, 2013). This shift in causes of mortality is referred to by public health professionals as the “epidemiological transition” (Omran, 1971, p. 509). Currently, approximately half of adult Americans live with at least one chronic disease or illness (Ward, Schiller, & Goodman, 2014), and costs associated with chronic disease account for over 75% of total healthcare expenditures in the USA (Centers for Disease Control and Prevention, 2014). Fortunately, unlike the infectious diseases common to the early 20th century, chronic diseases often are associated with modifiable risk factors such as tobacco cessation, maintaining a healthy weight, diet, and engaging in regular physical activity (Strong, Mathers, Leeder, & Beaglehole, 2005).

Overweight and obesity, often related to other chronic medical conditions, present a challenge for many children and adults, both in the USA and throughout much of the more economically developed world (Ahima & Lazar, 2013; Centers for Disease Control, 2012). Behavioral interventions are effective for weight reduction in both adults (Lang & Froelicher, 2006) and children and adolescents (Bean et al., 2015; Resnicow et al., 2015; Resnicow et al., 2012; Schwartz et al., 2007; Stice, Shaw, & Marti, 2006). Motivational interviewing is one approach that has demonstrated some success in promoting weight loss and management (DiLillo & West, 2011).

Primary care practices provide care to many patients with chronic disease; in 2010, the majority of adults over 50 seen in primary care had at least one chronic condition, and many had two or more comorbid conditions (Glynn et al., 2011). Given the complicated self-care regimens and individual burden associated with some chronic diseases (e.g., diabetes), behavioral interventions and treatment plans can be crucial to disease management (Bodenheimer, Lorig, Holman, & Grumbach, 2002). Due to the high financial and societal cost of obesity and chronic disease, and the important role of primary care providers in tackling these issues, this narrative, selective review focuses on MI as it relates to these health arenas and summarizes relevant literature on the use of MI to promote and maintain health behavior change.

What Is Motivational Interviewing?

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Motivational interviewing began in the addiction treatment field in the 1980s, in part in reaction to an approach at that time that involved an authoritarian, confrontational treatment in working with clients, to “break down the denial” in a sometimes inhumane approach with what was viewed as an intractable set of problems (i.e., alcoholism). The early successes with a substance abuse and dependence patient population that previously was regarded as resistant and difficult to treat were dramatic in the field and certainly helped MI to spawn and evolve into the broadly applied and nuanced approach that it is today. In 1991, Miller and Rollnick published the first edition of the classic text in the area, which now is in its third edition. Motivational interviewing has evolved somewhat over time, a strength attesting to its scientific integrity, flexibility, and responsiveness to evolving social and cultural changes and norms.

Motivational interviewing has been understood both as a stand-alone intervention, and as a component of, or precursor to, other treatments (e.g., Randall & McNeil, 2017). Additionally, the current definition specifies MI as a “conversation style” (Miller & Rollnick, 2013; p. 12). Brief forms of MI have been explored in relation to healthcare (Rollnick, Heather, & Bell, 1992). Miller and Rollnick (2013, p. 343) discuss the analogy of MI as being either a great concerto or a 5-minute piece on the piano. Indeed, even a single note, or perhaps a few notes of “motivational interactions,” can be engaging by garnering attention, promoting focus, and providing a precursor for future work together. Another way, then, that MI can be viewed is in providing a basis for “motivational interactions” (here referred to as “MIACTs”), which are in the spirit of MI and adhere to its principles, and which can be very brief, even one sentence. Even a single response from a practitioner can be immensely powerful (either positive or negative) with a patient, just as a single note from a piano can dramatically focus a room of people, or if discordant, may be annoying, or if in a minor key, may dampen the mood.

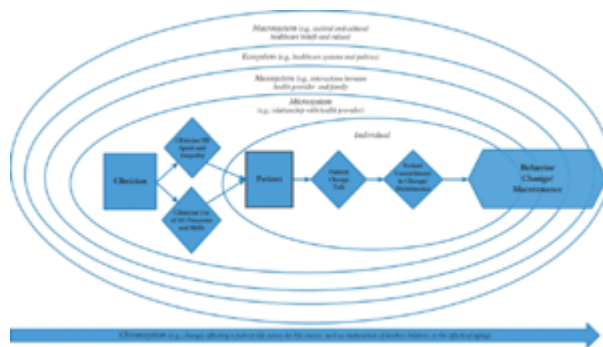
As a therapeutic module, MI as stand-alone intervention or even in its briefer forms (Rollnick, Heather, & Bell, 1992) sometimes is unnecessary in healthcare settings, because some patients are ready to follow instructions, take prescribed medications, and attend regularly for health-screening appointments. Nevertheless, motivational interactions or MIACTs are generally applicable and can be used even with patients who are highly motivated and ready to comply or change. In primary and other forms of healthcare, it is with chronic and intractable conditions, however, that MI itself is most applicable.

Motivational interviewing is unique in how patient ambivalence is understood and in the response to it. Rather than being regarded warily, or as an indication of likely nonadherence, ambivalence is elicited and even welcomed. Evoking, understanding, respecting, and accepting the ambivalence is a necessary step in MI. Ambivalence is altogether normal and natural, and is an integral part of the change process that cannot be defeated but can be harnessed to help a patient propel him or herself forward toward a healthier lifestyle.

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Consistent with the way in which ambivalence is regarded, MI employs a guiding communication style by practitioners. Instead of being highly directive as in prescriptive behavior change, or on the other hand, being wholly nondirective as in Rogerian counseling, the MI practitioner is a helpful guide who is compassionate, can provide information on request, but also respects the patient's autonomy and strengths. After all, it is the patient's life, and the patient him- or herself who lives it and is responsible for it. An analogy may help illustrate MI's guiding style: Imagine that every person travels down the river of life in a canoe. The canoe uniquely belongs to that one person. One paddles it through still waters and rapids, in glorious weather and in storms, just as in the travails and phases of life. The clinician sometimes is invited onto the canoe (or perhaps even jumps into the canoe, uninvited and unwelcomed!). The clinician has a paddle and "know-how," but must work with the patient in the canoe. If the practitioner paddles too robustly, overpowering the patient, the canoe will travel in circles. The guiding style involves working collaboratively. Ultimately, the clinician must depart the canoe, after perhaps only one of 168 hours in a week, leaving the patient to again travel the waters of life autonomously. In MI, clinicians guide, helping the patient to understand the workings of the canoe in various waters and weather conditions, and advise the patient with permission.

Motivational interviewing may best be understood using a conceptual model proposed by Miller and Rose (2009); an adaptation of that model appears in Figure 1, within the context of the Bronfenbrenner's ecological systems theory (Bronfenbrenner, 1979). In this portrayal, both provider-patient relationship and technical skills contribute downstream to decision-making and possible behavior change. The interaction between clinician and patient is portrayed in the context of larger ecological systems that influence patients, clinicians, and their relationship.



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Figure 1 A model depicting behavior change and maintenance from the perspective of a patient working with a clinician who is employing motivational interviewing as an approach. This model is based on a preliminary theoretical account of motivational interviewing (Miller & Rose, 2009), in the context of the bioecological model (Bronfenbrenner & Ceci, 1994). Rectangles portray two persons (i.e., patient or clinician), diamonds relate to behaviors (on the part of either the patient or the clinician), and the hexagon depicts behavior change and/or maintenance. This latter element transcends the individual level into the microsystem and mesosystem, reflecting that behavior change on the part of the individual affects clinicians, families, coworkers, and others, and the relationships among them. Individual elements in the figure are not to scale.

Spirit of Motivational Interviewing

Motivational interviewing is characterized by the practitioner's basic approach to patients, known as the "spirit of MI," including *partnership*, *acceptance*, *compassion*, and *evocation* (Miller & Rollnick, 2013), as shown in Table 1. In MI, behavior change is best achieved through a strengths-based and collaborative approach, wherein the patient and provider interact with one another as equal partners (Moyers, Miller, & Hendrickson, 2005).

Table 1 Four Components of MI "Spirit"

Component	Description
Partnership	Patient and provider work together to achieve patient's goal(s)
Acceptance	Provider accepts patient fully as a human being, and also accepts what the patient brings to the therapeutic relationship
Compassion	Desire to help relieve suffering
Evocation	Change comes from the patient, rather than the provider

The aspect of *partnership* is based on the idea that a clinician cannot achieve change on behalf of a passive recipient (Miller & Rollnick, 2013). One metaphor used to describe MI spirit is that MI is more like dancing than wrestling, such that the patient and provider work in harmony to achieve a common goal, rather than struggling to see whose methods come out on top (Miller & Rollnick, 2013).

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Genuine *acceptance* is a second major component of MI spirit; providers accept the patient and what the patient brings to the therapeutic relationship. This does not mean that the therapist necessarily agrees with or approves of the patient's behavior, but rather that the provider accepts patients as fellow human beings and where they are on their life journey. Acceptance includes valuing the worth and potential of every person, expression of accurate empathy (i.e., correct communication of genuine understanding of a patient's perspective and feelings), support for the individual's autonomy, and affirmation of the patient's strengths and efforts toward change (Miller & Rollnick, 2013; Rogers, 1980).

A third aspect of MI "spirit" is *compassion*. Motivational interviewing involves a primary devotion to the welfare of the patient, such that the focus of the session or interchange is on the patient and the patient's feelings, thoughts, beliefs, and cultural background. Priority is placed on the needs of the patient (e.g., to maintain autonomy), and not the needs of the provider (e.g., to "make" the patient change in some way) or the healthcare system in which the provider may be situated.

Fourth, *evocation* in MI "spirit" means that change (including change talk) is elicited from within the patient, rather than "given out" by the provider (Miller & Rollnick, 2013). The evocation component of the "spirit" of MI runs counter to the typical behavior of healthcare providers, in which the norm is to advise, teach, prescribe, and give information to patients. There is, however, a place for information-giving within MI, but key to this aspect of MI is that providers must first set the stage through relationship-building and then when the time is right, ask permission to offer information rather than just spewing it out (Miller & Rollnick, 2013).

Motivational interviewing "spirit" is essential to the proper use of the "techniques" that are associated with MI. Both spirit and the elemental processes now described are necessary, and by themselves are not sufficient for truly implementing MI, consistent with the adaptation of the Miller and Rose (2009) model presented earlier in Figure 1.

Processes in Motivational Interviewing

The most recent iteration of MI has elucidated four processes that occur during its course, including *engaging*, *focusing*, *evoking*, and *planning* (Miller & Rollnick, 2013), as described in Table 2. These processes often occur somewhat sequentially, but are overlapping across time. In healthcare, *engaging* involves building a professional relationship that provides a basis for future interactions that may promote change or maintain healthy lifestyle behaviors. More than immediate rapport, engaging is facilitated by the practitioner, and involves a rather deep level of interaction in which both patient and practitioner have a commitment to, and comfort with, working together collaboratively.

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Table 2 Processes of Motivational Interviewing

Process	Description
Engaging	Build provider-patient relationship that will help to promote healthy behavior change
Focusing	Collaboratively consider goals and direction of treatment
Evoking	Elicit patient's own motivation for change
Planning	Establish commitment to change, develop change plan

After (and realistically, alongside) the essential element of engagement, *focusing* leads to a collaborative consideration of direction and goals, and ultimately to an establishment of an agenda, including change goals. Focusing, as elsewhere in MI, involves a great deal of listening, guiding patients along the paths that they choose, among many possible routes. "Allowing" the patient to choose is essential in adhering to the respect for autonomy that is a key ingredient of MI. "Premature focus" (Miller & Rollnick, 2013, p. 42) is a common problem in healthcare, as clinicians act too quickly and directly, instead of in a guiding style, as they respond to pressure to efficiently care for increasing numbers of patients.

Evoking the patient's own motivation for change is the "heart of MI" (Miller & Rollnick, 2013, p. 28). Patiently and carefully listening for talk about change (i.e., "change talk") from the patient, the clinician selectively attends to and reinforces (Christopher & Dougher, 2009) statements about willingness to consider change, verbalizations about reasons for change, and why change might be preferable to the status quo. One of the more important principles of MI is that it is essential that the patient vocalize the reasons for change. Such evoking of the patient's own verbalizations, particularly including commitment language, is supported by psycholinguistic research (e.g., Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003), indicating that greater strength of patient change talk is associated with more likelihood of later behavior change. Evoking requires the practitioner to avoid the "righting reflex" (Miller & Rollnick, 2013; p. 5), which involves attempts to "fix" patients and/or their problems by direct advice-giving. Healthcare professionals typically are devoted to the health of their patients, and care strongly about their welfare. But, these well-intentioned attitudes about patients can backfire when they result in practitioners giving direction about behavior change that patients have heard all too often and about which they are disinclined to act. Instead, what is needed from the practitioner is listening to the patient and encouraging change talk.

Establishing a commitment to change and developing a change plan are the tasks of the *planning* process. Solutions still must emanate from the patient, although information and advice can be shared, with explicit permission or request from the patient. Solidifying the decision to change (and likely, reaffirming it over time) is a crucial step that cannot be

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missed in service of advancing toward action. Respecting that the patients are “experts” about their own lives, change plans are negotiated collaboratively, perhaps from a menu of brainstormed options, blending the expertise of both the patient and the clinician.

Core Skills of Motivational Interviewing

Within MI, and across the four processes, there are five elemental skills: asking open-ended questions, affirmations, reflections, summarizations, and informing/advising. The first four of these skills have been grouped together in an acronym, OARS, as described in Table 3.

Table 3 Five Core Skills of Motivational Interviewing

Core Skill	Description	Example
Open-ended questions	Ask questions that allow patient flexibility in responses	<i>What are the healthiest foods you eat?</i>
Affirmations	Positive comments on patient’s behaviors or motivations	<i>You’ve made a lot of effort to include more exercise in your weekly schedule!</i>
Reflections	Mirroring the patient’s “meaning” of statement	Patient: <i>I am sick of having to keep track of my blood sugar.</i> Clinician: <i>Diabetes is hard to manage and you’re getting frustrated.</i>
Summarizations	Provide overview of important components of what patient has communicated	<i>To summarize our conversation so far, you feel good about the progress you’ve made in improving your oral hygiene, but you’re experiencing a few barriers, such as fear of going to the dentist.</i>
Informing and advising	With permission, elicit from patient about what he/she wants to learn more about, then provide information, and elicit about how patient	<i>Would it be alright if I provide more information about sleep hygiene? What would you like to learn more about? Ok ... [provide</i>

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	understands, feels, or thinks about the information.	information]. <i>Tell me about what you are thinking.</i>
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In healthcare generally, questions, even if open-ended ones, are a primary way that clinicians communicate with patients. While an important means of information gathering, questions still are overused in healthcare. The occasional, skillful use of *open-ended questions*, which reflect a clinician's curiosity about and interest in a patient, however, can be helpful in evoking motivation and planning for change.

Affirmations of patients are based on general respect for the patient and that person's autonomy and worth as a human being. This overarching perspective is complemented by specific verbalizations (i.e., affirmations) by the clinician that positively note the patient's efforts to change, prosocial values, strengths, and skills. A powerful method, affirmations are underused in healthcare.

Reflections are perhaps the most common verbalization from the clinician in interacting with patients in an MI-consistent way. They focus on what the patient says, and provide a way for patients to again hear themselves, and allow the opportunity for increased awareness ("Is that really what I believe?") and clarity. Reflections also are important to MI in that they focus on what the patient says, not on what the clinician is thinking. There are many different formulations (e.g., simple and complex) and types (e.g., amplified/ understated, reflection of feeling, double-sided) of reflections. The reader is referred to Miller and Rollnick (2013) for more in-depth coverage of reflections.

As a way-point, *summarizations* are a way for clinicians to capture a crucial point or series of points in understanding the patient. They, too, are reflective, should be brief (providing more time for patients to talk), and allow the clinician and patient to check for the clinician's understanding of the patient and the patient's perspective.

Lest one believe that MI solely is supportive listening, *informing and advising* can be key aspects of the planning process. Patients often need information (and support) in making behavior changes, and in maintaining those changes, so providing ideas, possible courses of action, and expert knowledge comes into play here. Important to MI, however, is that this information be given with permission and at an appropriate time, particularly not prematurely (i.e., as in premature focus à la MI). The elicit-provide-elicited sequence (Miller & Rollnick, 2013) is ideal in these instances, in which information and knowledge first is elicited from the patient, then knowledge provided by the clinician, followed by a "talk back" step in which understanding and more information is elicited from the patient.

Uses of Motivational Interviewing

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Motivational interviewing has been implemented by an impressively diverse array of providers, in a multitude of healthcare settings, and with a wide variety of patients and clinical problems. As an ever-evolving approach, MI continues to be successfully implemented during in-person encounters, as well as via telehealth technologies.

Types of Providers using Motivational Interviewing

Although originally developed by psychologists, the variety of professionals who use MI mirror the wide variety of problem behaviors for which MI can be helpful. In healthcare settings, MI has been effectively delivered by general practice physicians (e.g., Stott, Rees, Rollnick, Pill, & Hackett, 1996), nurses (e.g., Stott et al., 1996), dental professionals (e.g., Williams, 2010), dietitians (e.g., Mhurchú, Margetts, & Speller, 1998), and midwives (e.g., Tappin et al., 2005), among others. Low, Giasson, Connors, Freeman, and Weiss (2013) trained undergraduates to deliver an MI treatment for weight loss, and suggested that MI can be an effective intervention even when delivered by nonhealthcare professionals.

In-Person Motivational Interviewing

The original and still most prevalent method of MI delivery is in-person (Morton et al., 2015), but the specific type of “in-person” settings vary from cardiac rehabilitation centers (Scales, 1998), to prenatal home visits (e.g., Tappin et al., 2005), to primary care offices (Anstiss, 2009), to name a few. Woollard and colleagues (1995) compared the effectiveness of face-to-face MI versus telephone-based MI for decreasing blood pressure and weight; participants in the in-person group experienced greater positive results than those in the telephone-based group, but both groups experienced more positive results than the no-treatment control group. Although it is possible that in-person treatment studies may yield greater behavior change, there are some populations for whom in-person treatment are less feasible, such as those who are rural dwelling or those with a rare disease who have difficulty accessing the specialty treatment facility.

Telehealth and Motivational Interviewing

Studies using only telephone-based MI have shown success in healthcare. Young and colleagues (2014) conducted a study to determine whether MI delivered via telephone was successful for enhancing diabetes medication adherence and management among patients living in rural areas, where resources for healthcare, and particularly behavioral healthcare, can be scarce. It was found that individuals assigned to the telehealth intervention developed significantly better self-efficacy for diabetes self-management than those in the treatment as usual group. In another telephone-based study, MI increased physical activity and fruit and vegetable intake in adults (Van Keulen et al., 2011). Similarly, MI delivered by telephone helped to improve self-care behavior and

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decrease disease severity after 3 months among patients with psoriasis as compared with a treatment-as-usual control group (Larsen, Krogstad, Aas, Moum, & Wahl, 2014). Studies such as these suggest that MI delivered via telephone or video conferencing may be an effective and efficient manner for delivering care to individuals with chronic disease, including those living in rural communities. Expanding beyond talking and telephone-based MI, there are exciting technological developments being developed, implemented, and tested that may expand the public health reach of MI (Shingleton & Palfai, 2016).

Training in Motivational Interviewing for Healthcare Professionals

In the early days of MI, practitioners were trained in how to use the approach in the context of helping patients with psychoactive substance use problems (Miller & Rollnick, 2013). As MI's applicability to other behavior problems has become apparent, so have the types of practitioners trained, as well as the demand for MI trainings for healthcare professionals (Martino, Ball, Nich, Frankforter, & Carroll, 2008; Söderlund, Madson, Rubak, & Nilsen, 2011). Today, MI is a popular approach among healthcare providers (Knight, McGowan, Dickens, & Bundy, 2006), likely because it is patient-centered, enhances the rapport between patient and provider, can be readily applied to health behavior change, increases the likelihood of change in behavior, and can be implemented in brief encounters.

Despite the fact that MI can be used as a brief and relatively straightforward intervention (Rubak, Sandboek, Lauritzen, & Christensen, 2005), it is not an easy approach in which to acquire competency (Miller & Rollnick, 2013). Rather, MI in its fullest form is a complex way of being with patients (Miller & Rollnick, 2013). True competency in MI requires the provider to understand the "spirit of MI" and to be able to bring it to life through interactions with patients, reflective listening, hope, confidence, and the ability to evoke and respond to change talk, among others (Miller & Moyers, 2006; Miller & Rollnick, 2013). Translating skills from training to clinical practice can be difficult for many clinicians, and can present a barrier for successful implementation (Forsberg, Berman, Kallmén, Hermansson, & Helgason, 2008). It is just so much easier and faster for the clinician in the short term—but typically less effective for the patient—to give stepwise direction to the patient, sometimes even without a rationale about *why* the patient should act according to the clinician's instructions. Trying to implement MI in real time, on the spot, is challenging, even for seasoned mental health clinicians. Thus, similar to most other evidence-based treatments, a healthcare provider cannot become sufficiently trained in MI by simply reading a treatment manual and then trying out the approach (Miller & Moyers, 2006).

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Training in MI for healthcare and in general is fostered worldwide by the Motivational Interviewing Network of Trainers (MINT). This international organization is composed of individuals who have been accepted and participated in the Training for New Trainers. The MINT is based on the values of quality, openness, generosity, and respect (http://www.motivationalinterviewing.org/about_mint). The MINT website provides a comprehensive list of MINT trainers and a variety of resources, as well as a calendar of training events worldwide (see <http://www.motivationalinterviewing.org/motivational-interviewing-training> for more details).

Motivational interviewing trainings range from being very broad in scope to quite specific. For example, some introductory trainings provide the basics of MI, and are geared toward general healthcare professionals (Söderlund et al., 2011). On the other hand, some trainings are tailored specifically to meet the needs of a certain type of provider treating a particular kind of patient problem. For example, several MI trainings have been developed for obstetric physicians and nurses to help target patient weight loss (Lindhardt et al., 2014) and smoking cessation (Velasquez et al., 2000). Typical MI trainings for healthcare professionals combine didactics and experiential activities such as role-plays, observing others conduct a faux MI session via film, or use of standardized patients (Madson, Loignon, & Lane, 2009). Trainings sometimes include video feedback from the trainer after the workshop (Söderlund et al., 2011).

There is great variability in the length, or “dose,” of MI training workshops, ranging from less than 1 hour (e.g., Handmaker, Miller & Manicke, 1999) to more than 24 total hours (e.g., Brug et al., 2007). Trainings also range greatly in the amount of follow-up work and consultation provided to the trainees, if any, and the amount of time between trainings (i.e., 2 consecutive days versus days separated by weeks or months; Söderlund et al., 2011).

There is preliminary evidence for consistent outcomes in 22-hour online versus in-person MI trainings (Mullin, Saver, Savageau, Forsberg, & Forsberg, 2016). Post-training consolidation of knowledge, attitudes, and practices are similar in online and in-person formats, but with greater engagement in the latter approach (Clancy & Taylor, 2016). A specific example of one online training comes from the Health Science Institute, an organization that provides training for individuals who want to become certified in health coaching and chronic care management. This training is geared toward healthcare professionals (see <http://healthsciences.org/Motivational-Interviewing-Health-Coach-Training>). The program consists of five interactive training modules, in which participants can chat with the instructor and other participants. Remote learning via the Internet offers a flexible option for providers who may not have the time or other resources to travel to an in-person training (Radecki et al., 2013).

Effectiveness of Motivational Interviewing Training for Healthcare Professionals

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Participants in MI training studies typically report increased confidence in using MI, intention to use MI, actual integration into clinical practice, and more interest in using MI (Madson et al., 2009). A single-day workshop has been found to be effective in training healthcare providers in MI, but the effects of the training tend to diminish over time (Miller & Mount, 2001). “Booster sessions” following a training workshop might help to combat decreases in MI skills; Fu and colleagues (2014) found that primary care providers who participated in a 4-hour training along with six booster sessions on MI training were able to maintain their MI skills over time better than those who participated only in the workshop.

Motivational interviewing training also has been integrated into medical residency training programs (Dunhill, Schmidt, & Klein, 2014). Motivational interviewing training for residents improves their knowledge of the approach, competency in using MI, and resident satisfaction with patient interactions (Dunhill et al., 2014). Unfortunately, studies on resident training in MI rarely have included patient outcomes, instead focusing on clinician behavior change (Dunhill et al., 2014).

Despite the success in increasing knowledge and use of MI through a workshop-style approach, few of these studies implement ongoing coaching over time (Madson et al., 2009; Söderlund et al., 2011). Another weakness in the existing MI training literature is the limited use of valid treatment integrity measures, such as the Motivational Interviewing Treatment Integrity Scale (Moyers, Martin, Manuel, Hendrickson, & Miller, 2005) or the Motivational Interviewing Skill Code (Miller, Moyers, Ernst, & Amrhein, 2008). Additionally, more research is needed to assess not only the skill of the provider after training and hopefully after follow-up consultation, but actual clinician behavior and patient clinical outcomes (Madson et al., 2009; Miller & Mount, 2001).

Motivational Interviewing and Primary Care

Primary care has an ever-increasing role in maintaining health and managing disease in the USA and elsewhere in the world. With expected substantial increases in annual primary care visits in the USA (Hofer, Abraham, & Moscovice, 2011), the need for excellence and efficiency in patient interactions in primary care is profound. Primary care practitioners provide a wide range of assessment and treatment, including diagnosis and management of acute and chronic conditions, education, health promotion, and prevention of disease (Steinberg & Miller, 2015). Due to the expansive scope of practice and strong focus on education and behavior change, MI not only might be a useful approach in primary care but also might be essential part of the primary care provider’s skill set. Many chronic health conditions are related to lifestyle issues involving nutrition, exercise, and psychoactive substance (particularly tobacco and alcohol) use; since effective intervention for these conditions requires behavior change on the part of the patient, MI is an obvious approach. Given the ineffectiveness of simple advice-giving for

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many (but not all) primary care patients (e.g., Hillsdon, Thorogood, White, & Foster, 2002), other approaches are needed, and MI presently is enjoying a zeitgeist in healthcare.

Motivational interviewing has been tested in numerous areas in which primary care is involved, such as increasing physical activity, modifying diet (including greater consumption of fresh fruits and vegetables), tobacco use cessation, control or elimination of alcohol use, medication adherence, condom use, and enhanced oral hygiene (Martins & McNeil, 2009), as well as chronic disease management (Tuccero, Railey, Briggs, & Hull, 2016). The clinical problems related to these behaviors include obesity, metabolic syndrome, cardiovascular disease, diabetes, risky sexual behaviors, and psychoactive substance abuse and dependence, among others.

Indeed, there is a large body of evidence supporting the use of MI to promote behavior change that can result in improvements in these clinical problems, with effect sizes ranging from small to large across studies. For example, a meta-analysis of 10 independent trials found a small but significant effect of MI on increasing physical activity in people with chronic health conditions (i.e., SMD = .19; O'Halloran et al., 2014), with another meta-analysis describing a moderate effect of MI on tobacco cessation observed across 31 independent studies (i.e., OR = 1.45; Heckman, Egleston, & Hofmann, 2010). A review of four meta-analyses suggests that MI is useful for the treatment of substance use and dependence, with MI having a small to moderate effect compared to no treatment (i.e., Cohen's d = .18 to .43 across the four reviewed meta-analyses; Lundahl & Burke, 2009), although effects may not persist over the long term (i.e., large and significant effect at post-treatment [SMD = .79] but small and nonsignificant at long-term follow-up [SMD = .06]), as suggested by a meta-analysis of 59 studies of MI for substance use (Smedslund et al., 2011). Moderate effect sizes also have been found for MI with modification of other health behaviors frequently targeted in primary care settings, such as treatment adherence and HIV-risk behavior (e.g., Cohen's d = .35-.56; Burke, Dunn, & Atkins, 2004) and management of chronic pain (e.g., Hedges' g = .441; Alperstein & Sharpe, 2016). In targeting improved medication adherence, small but significant effect sizes have been demonstrated for MI approaches (Palacio et al., 2016; Zomahoun et al., 2017). Similarly, systematic reviews have supported the efficacy of MI focusing on behaviors related to diabetes (Ekong & Kavookjian, 2016; Knight et al., 2006), and in the arena of cardiovascular diseases (Lee, Choi, Yum, Yu, & Chair, 2016).

An overall review (Morton et al., 2015) of MI in primary care concluded, "MI can be an effective intervention (or intervention component) for use within primary care settings" (p. 16). Similarly, MI has been used and has shown some efficacy in pediatric healthcare settings and can be applied to address such issues as immunizations, adherence in asthma, and health-risk behaviors among adolescents, among others (Erickson, Gerstle, & Feldstein, 2005). A broad systematic review and meta-analysis, not restricted to primary care, concluded, "Motivational Interviewing in a scientific setting outperforms traditional advice giving in the treatment of a broad range of behavioral problems and diseases" (Rubak et al., 2005, pp. 310-311). Moreover, it was noted, "No

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studies have reported Motivational Interviewing to be harmful or to have any kind of adverse effect” (Rubak et al., 2005, p. 309). This consideration for MI in healthcare is important in that it will be delivered by a diversity of practitioners (with a broad range of skill and experience levels) and across an array of patients, so the risk/benefit ratio supports its use in primary care and other medical and dental settings.

A major challenge in implementation of MI in primary care, however, is the amount of practitioner time available for patient contact (Morton et al., 2015). With ever-increasing demand for clinician productivity and efficiency (Williams et al., 2001), need to adopt new technologies in record-keeping (Lau et al., 2012), and high rates of burnout among primary care physicians (Shanafelt, Bradley, Wipf, & Back, 2002; Spickard, Gabbe, & Christensen, 2002), MI might be regarded as a panacea for some of these ills. To demand great efficiency from MI, however, is contrary to its spirit (Rollnick, Mason, & Butler, 1999). Brief MI interventions can be effective, but they do not always produce behavior change in each and every patient. Again, to expect otherwise would be in opposition to MI’s focus on the autonomous decision-making of patients. Nevertheless, MI does have promise in primary care for providing the best-quality interactions for those patients who are less than eager to change their lifestyles. Even the interactional style of MI, and the MIACTs mentioned earlier, can help produce an atmosphere in the clinical setting that is respectful of patients and “takes the heat off” the practitioner to produce behavior change.

A second but similarly crucial issue for MI in primary care is the proper training of practitioners (e.g., Miller, Yahne, Moyers, Martinez, & Pirritano, 2004). Regarded as “simple but not easy” (Miller & Rollnick, 2009, p. 135), the skills are accessible in a didactic sense, but to work with patients in an MI-consistent way requires not only training (e.g., 2-day workshop), but also rehearsal, consultation, and feedback, and may even require years of ongoing practice for true proficiency (Miller & Rollnick, 2013). The time demands on practitioners in the primary care setting do not easily allow the true implementation of MI (Rollnick et al., 2008). Ideally, in individual practices or clinics, an MI approach would be implemented with all members of a treatment team, including those who interact with patients in administrative ways (e.g., in scheduling and billing) along with clinicians at all levels and across disciplines (Grumbach & Bodenheimer, 2004).

A third issue with MI in primary care is that of fidelity of the intervention. Many clinician behaviors are purported to be “motivational interviewing” but to truly “do” MI requires adherence both to the spirit of MI and to specific parameters of clinician behavior (e.g., use of reflections, questions being mostly open-ended, affirming patients) in certain relative quantities. Thus, much of what is said to be “MI” in clinical (and even many research) settings may in fact be watered down or even inconsistent with MI. This issue of fidelity holds true for MI in all areas outside of primary care as well, and is a major issue for all psychosocial treatments (McHugh, Murray, & Barlow, 2009).

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Motivational interviewing holds great promise for use in primary care settings. Regarded as a “proven and practical front-line approach” (Anstiss, 2009, p. 87), it appears to be safe and is helpful for many patients, particularly those for whom considering behavior change will be challenging. Motivational interviewing is generally well received by patients, and its delivery involves a learnable set of skills for practitioners. Even if the MI itself is not of sufficient duration or quality to evoke behavior change among patients at a particular point of intervention, it still may be a helpful interactional style (e.g., MIACT).

Consistent with the spirit of MI, and respecting the autonomy of patients, however, practitioners must be content with patients who are only considering change and/or deciding not to change at a particular point in time. That is one of the benefits of the primary care situation: If patients have a certain practice or clinic as their “medical home” (Rosenthal, 2008), then interventions to evoke behavior change might not be as imperative to happen immediately, as the patient will be seen again and again over time. While immediate behavior change may be ideal, in reality, lifestyle adjustments take time, and maintenance of them occurs over years, and even a lifetime.

Motivational Interviewing and Oral Health Behavior, Dental Hygiene, and Dentistry

As with other health behaviors, oral health behavior is complex, with many interacting determinants. Current guidelines recommend that people engage in a variety of oral hygiene practices, many of them regularly and at a relatively high frequency. For example, the American Dental Association (2013, 2014) recommends that people brush their teeth at least twice daily, floss at least once daily, and visit a dentist at least once per year for preventive care (e.g., dental exam and prophylaxis or “cleaning” [scaling and polishing to remove plaque and calculus]). In some cases, there are hosts of other oral self-care behaviors that must be implemented. For instance, periodontal patients sometimes must complete a maintenance oral hygiene regimen following treatment to prevent future periodontal disease. Similarly, orthodontic patients often must regularly wear elastic bands or appliances as part of long-term treatment. Good oral health also involves healthy diet and avoidance of substances such as tobacco (Rooban et al., 2011), and limited use of sugar-sweetened beverages (Bernabé, Vehkalahti, Sheiham, Aromaa, & Suominen, 2014). Given the important role of patient behavior in the promotion and maintenance of oral health, dental professionals are quite interested in health behavior change and ways to encourage sustainable self-care practices. Recently, attention has been given to incorporating MI in oral health practice in order to improve patient adherence to dental treatment regimens and oral hygiene recommendations.

With regard to oral health, it has been recommended that interventions aimed at health promotion and modifying health-related behaviors draw on theoretical and empirical knowledge, particularly information from disciplines outside of dentistry (Newton, 2012).

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Interdisciplinary health promotion should involve theory-based interventions with an evidence base demonstrating effectiveness; MI, specifically, has been highlighted as one of these interventions (Newton, 2012). Historically, basic oral health education has been the intervention of choice for promoting oral health behavior change. While education alone undoubtedly reaches some portion of patients (and the public at large), data generally indicate that education alone largely is an ineffective intervention for those who have not readily adopted prescriptive oral health practices, and that more intensive strategies are needed for oral health behavior change in those individuals (see Newton, 2012).

Motivational interviewing has an important place in the dental clinic and in the promotion of oral hygiene behavior, and oral health clinicians are being encouraged to gain clinical competencies in MI as applied to dental practice (Curtin, Trace, Ziada, & Crowley, 2014). Dental hygiene, in particular, has found value in applying MI to practice. Notably, there appears to be opportunity for dental hygienists to employ MI when working with patients who are noncompliant with hygiene instructions, ambivalent about or unmotivated to engage in health behavior change, and/or untrusting of the provider (Williams & Bray, 2009, 2011). Indeed, a recent systematic review demonstrated that MI, when delivered during brief encounters in healthcare settings, affords advantage over comparison interventions; across health issues and patient characteristics, MI is useful in increasing likelihood of health behavior change, with especially high effect sizes and promise in dental outcomes (e.g., OR = 1.74–2.01; see Lundahl et al., 2013; Martins & McNeil, 2009). A systematic review focusing on the use of MI in dental settings, specifically, demonstrated that MI is better than conventional education in reducing prevalence of early childhood caries (i.e., cavities) and in improving periodontal health and adherence to dental appointments (Gao, Lo, Kot, & Chan, 2014). Importantly, it appears that MI can be learned by dental practitioners and trainees; research has shown that dental students are able to learn and use MI after training sessions (Hinz, 2010).

Though there exist many opportunities for the use of MI in dental practice, MI might be particularly useful in improving and maintaining oral self-care (i.e., hygiene maintenance, home care). Williams and Bray (2009, p. 36) note, “chronic dental diseases are largely preventable but require patient engagement and behavioral adherence to dental hygiene recommendations,” and, given the elements of MI, suggest that it might be especially effective for improving patient retention of health information and follow-through with oral hygiene instruction. Though somewhat limited and mixed, available evidence generally supports that MI applied in the dental clinic might be particularly suited for and effective in improving oral hygiene. In a randomized controlled trial, MI added to traditional consultation/education resulted in greater oral hygiene improvement at 1-month follow-up and greater patient satisfaction scores, compared to traditional consultation/education alone (Godard, Dufour, & Jeanne, 2011). In another randomized controlled trial, patients receiving an individually tailored oral health education program that incorporated cognitive-behavioral principles and MI demonstrated lower bleeding on probing (an index of periodontal health) and greater likelihood of treatment success at 12 months post-treatment than patients receiving standard education (Jonsson, Ohrn,

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Lindberg, & Oscarson, 2010). Similarly, MI has been shown to improve oral hygiene behavior and oral health in the short-term for dental patients with serious mental illness (Williams, 2009). Thus, long-term periodontal health can be improved with the incorporation of MI into providers' armamentarium.

"Dose" of MI might play a role in the efficacy of the intervention in the improvement of oral self-care and periodontal health, as two other randomized controlled trials—both of which used one-time, brief MI sessions—returned nonsignificant differences in periodontal health and infection control between MI and regular hygiene instruction treatment groups (Brand, Bray, MacNeill, Catley, & Williams, 2013; Stenman, Lundgren, Wennstrom, Ericsson, & Abrahamsson, 2012). A single MI session alone might be insufficient for promoting improved periodontal health. Even though mixed, evidence suggests that MI may be useful for improving oral hygiene behavior and oral health, likely because MI elicits change talk and commitment statements from patients, which are associated with actual behavior change (Bray, 2010).

Another relatively well studied application of MI to dental treatment has been in the domain of pediatric dentistry. In this arena, MI has been delivered to the caregivers of young children with the aim of preventing early childhood caries. The first study to assess how MI can be used in parent dental hygiene education to improve infant/child oral health demonstrated that children whose parents received a personalized MI session and follow-up telephone calls had significantly fewer caries at 1-year follow-up than those whose parents received only an educational pamphlet and video (Weinstein, Harrison, & Benton, 2004). Subsequent studies provided additional evidence that using MI with parents/caregivers when providing infant oral hygiene instruction impacts parent behavior and decreases the likelihood of early childhood caries experience, even at up to 2-year follow-up (Freudenthal & Bowen, 2010; Harrison, Benton, Everson-Stewart, & Weinstein, 2007). Again, "dose" of MI be important, as one study reported that a single MI session delivered to parents did not impact early childhood caries experience, although it was associated with change in some oral health behavior (Ismail et al., 2011). Given the evidence from many studies, it appears clear that it is feasible to implement such an intervention with a high degree of fidelity and effectiveness, even on a large scale and with the involvement of community health agency workers (e.g., Batliner et al., 2014; Cook, Richardson, & Wilson, 2013; Weinstein et al., 2004; Weinstein et al., 2014). Several resources exist for providers who wish to apply MI to oral healthcare with the goal of initiating changes in, or maintenance of, oral health behaviors (see Bray, 2010; Martins & McNeil, 2009; Ramseier & Suvan, 2010; Syrjala, 2014; Williams & Bray, 2009).

Motivational Interviewing for Weight Loss and Weight Management

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Obesity in adults is defined as having a body mass index (BMI) greater than or equal to 30, and overweight is defined as having a BMI between 25 and 30 (Centers for Disease Control, 2014). Obesity has been called the “public health challenge of our time” (Bassett & Perl, 2004, p. 1477). Reducing obesity among adults and children are “Healthy People 2020” objectives, indicating a national recognition of the seriousness of the problem (Office of Disease Prevention and Health Promotion, 2014). Indeed, addressing obesity continues to be a challenge by over one-third of American adults, 18% of children, and 21% of adolescents (Ogden, Carroll, Kit, & Flegal, 2014).

In a cost analysis for 2008 by Tsai, Williamson, and Glick (2011), obesity was found to be associated with an annual direct medical cost of \$1,723 per obese person in the USA. Obesity impacts the development and progression of other chronic diseases; for people with Type 2 diabetes, each point increase in body mass index (BMI) results in a significant increase in costs associated with treating the diabetes (Brandle et al., 2003).

While individual approaches are not enough to solve the obesity epidemic, MI has potential to be a successful alternative or adjunct to traditional patient education programs. It has long been recognized that weight loss treatment requires educational and behavioral components, but historical approaches have included using scare tactics, coercion, or complex didactics to promote weight loss (Van Dorsten, 2007). There is some evidence to suggest that these techniques actually may cause patients to be more resistant to change (Burke, Arkowitz, & Menchola, 2003).

In the majority of studies examining the effects of MI on weight loss, the primary outcome variables include amount of weight reduction or reduction in BMI (DiLillo & West, 2011). Given the importance of physical activity to most weight loss regimens, self-report of physical activity often is included as an ancillary variable (e.g., Gourlan, Sarrazin, & Trouilloud, 2013; Hardcastle, Taylor, Bailey, & Castle, 2008). A few studies include related biomarker data (e.g., cholesterol, blood pressure, HbA1c; see Mhurchu et al., 1998; Rubak et al., 2005).

Effectiveness of Motivational Interviewing for Weight Loss

Motivational interviewing is generally effective for promoting weight loss (VanBuskirk & Wetherell, 2014). In fact, in a meta-analysis of MI for a wide variety of problems in a primary care setting, effect sizes were largest for weight loss-related outcomes (VanBuskirk & Wetherell, 2014). In a meta-analysis of randomized controlled studies of MI for weight loss, MI typically produced greater reductions in BMI compared to treatment as usual or attention-control conditions (Armstrong et al., 2010). Patients in the MI groups lost more weight compared to typical general practitioner care (Armit et al., 2009; Pollak et al., 2010; Woollard et al., 1995), print materials on weight loss strategies (Greaves et al., 2008; Hardcastle et al., 2008), a self-help weight loss program (DiMarco,

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Klein, Clark, & Wilson, 2009), and usual treatment from dietitians not trained in MI (Brug et al., 2007).

Motivational interviewing has been used as a weight loss treatment in a variety of adult patient populations, including obese women with Type 2 diabetes (Smith, Heckemeyer, Kratt, & Mason, 1997; West, DiLillo, Bursac, & Gore, & Greene, 2007), firefighters (Elliot et al., 2007), adults with high cholesterol (Mhurchu et al., 1998) and high blood pressure (Woollard et al., 1995), overweight and obese women prior to fertility treatment (Karlsen, Humaidan, Sorensen, Alsbjerg, & Ravn, 2013), individuals at risk for colorectal cancer (Caswell, Craigie, Wardle, Stead, & Anderson, 2012), people with serious mental illness (Methapatara & Srisurapanont, 2011), and sedentary adults (Armit et al., 2009; Carels et al., 2007). In 2010, the American Heart Association recommended MI as an effective treatment to promote heart-healthy outcomes such as weight loss (Artinian et al., 2010). Indeed, evidence suggests that among individuals having been diagnosed with or at risk for cardiovascular disease, MI is more effective than standard information about diet and exercise in promoting weight loss (Hardcastle, Taylor, Bailey, Harley, & Hagger, 2013; Low et al., 2013). On the whole, meta-analyses suggest that effect sizes for MI for obesity (i.e., promoting change in exercise, diet modification, and weight loss) range from small to large (e.g., OR = 0.98-1.58; Lundahl et al., 2013), with MI generally having a moderate effect (e.g., SMD = -.51; Armstrong et al., 2010).

Motivational Interviewing and Pediatric Obesity

The prevalence of pediatric obesity is associated with greater rates of pediatric Type 2 diabetes, insulin resistance, hyperlipidemia, and other chronic disease (Washington, 2008). In addition, children who are overweight or obese experience a variety of negative social and emotional issues at higher rates than their healthy weight peers (Moyer, 2013). Despite the high prevalence of and negative consequences associated with childhood obesity, few primary care providers feel confident addressing obesity with their pediatric patients, and many feel frustrated about treating it (Jelalian, Boergers, Alday, & Frank, 2003). Given these reactions of uncertainty and negative evaluation associated with treating childhood obesity, studies in this arena have yielded mixed results (Tripp, Perry, Romney, & Blood-Siegfried, 2011).

Motivational interviewing was found to be effective at improving motivation for pediatric weight loss and healthy food choices in 5- to 18-year-olds in the short term, but the positive effects faded after 1-2 months (Tripp et al., 2011). The authors suggested that pediatric patients may require a higher “dose” of MI than their adult counterparts in order to maintain benefits over time, although the underlying issue may be that the intervention needs to span a greater portion of the evolving developmental period during childhood and adolescence. Taveras et al. (2011) found that, compared with treatment as usual, children ages 2-6 and their parents/caregivers assigned to an MI intervention reported greater decreases in television watching, fast food consumption, and sugar-sweetened beverage consumption. Interestingly, in this study, the intervention

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significantly decreased BMI among girls (but not among boys) and among children living in households with an annual income of \$50,000 or less (but not in higher-income households). A similar study (Resnicow et al., 2015) addressed the effects of type of provider and number of MI sessions on pediatric weight loss. Overweight children ages 2–8 and their parents/caregivers were assigned to either treatment as usual, four MI sessions with a primary care provider, or four MI sessions with a primary care provider plus six MI sessions with a registered dietitian. Results revealed that children whose parents/caregivers received treatment from both dietitians and primary care providers had the largest reduction in BMI. The authors concluded, however, that despite its effectiveness, dissemination and implementation research is needed in order to adequately and efficiently serve the needs of pediatric patients and families.

Gourlan and colleagues (2013) found that obese adolescents randomly assigned to a standard weight loss program enhanced with MI lost more weight and engaged in more physical activity than adolescents assigned to the standard weight loss program only. Furthermore, adolescents in the MI-enhanced group reported greater autonomy and less amotivation than the standard weight loss group. Another study, however, found that compared to social skills training, MI for weight loss did not result in added benefit (Walpole, Dettmer, Morrongiello, McCrindle, & Hamilton, 2013). Still, adolescents assigned to the MI group attended significantly more sessions than those in the social skills group, suggesting that the MI sessions were more palatable to the youth. MI-adherent communication skills are associated with adolescent patients' increased physical activity, reports of reduced weight, and reduced "screen" time including computer, television, and smartphone use (Pollak et al., 2009). Motivational interviewing may be a helpful approach for reducing childhood obesity, but more research is needed to determine the relative effect and appropriateness for children of various ages and their parents/caregivers. There is a need to determine the most effective "dose" of MI with pediatric patients and families, including the possibility of "booster sessions," necessary to sustain therapeutic change during developmental changes over time. One of the issues that is poorly defined in this area is whether MI is being used with the pediatric patient, parents/caregivers, or both. (For an exception, however, see Wong and Cheng, 2013.) Clearly, there is an inherent developmental issue in the application of MI with children and adolescents. Parents/caregivers will be the clinician's sole focus in work with infants or the very young child. On the other hand, consistent with developmental changes, there will be greater (or even exclusive) practitioner focus on the adolescent or emerging young adult. Depending on the age and developmental stage, clinician use of MI may be focused exclusively on parents/caregivers, children/adolescents, or both.

Motivational Interviewing and Management of Chronic Disease

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Acute health problems (e.g., infection, injury), sometimes have straightforward treatments (e.g., antibiotics, short-arm cast) and require only moderate levels of patient adherence. Chronic disease, on the other hand, typically requires daily management and often there are multiple treatment routes from which to choose (e.g., medication versus diet changes in hypertension; Bodenheimer, Lorig, Holman, & Grumbach, 2002). In the context of chronic disease management, patient involvement in treatment can greatly influence outcomes (Montori, Gafni, & Charles, 2006). Especially when multiple treatment choices exist, patients can and should play a role in their medical decisions. Many governing bodies and professional organizations have taken official stances on the importance of patient shared decision-making and patient-centered care (Patient Protection and Affordable Care Act, 2010). In the context of MI, the patient is the ultimate expert on his/her health, and is treated as such, making MI congruent with calls for more shared decision-making in healthcare.

Motivational interviewing has been applied to treatments for a range of chronic diseases and conditions. Evidence for the utility and efficacy of MI to improve clinical outcomes for chronically ill patients varies, as does the quality of extant studies. For example, effect sizes demonstrating an impact of MI on chronic illness management range from small and nonsignificant to large (e.g., OR = 0.97–7.57; Lundahl et al., 2013). In terms of medication adherence, which is relevant to virtually all chronic illnesses, a meta-analysis by Palacio et al. (2016) determined a relative risk of 1.17, suggesting use of MI improves patient outcomes with chronic diseases in terms of taking prescribed drugs. Factors associated with positive outcomes in the reviewed studies, which included approximately one-half racial/ethnic minority participants, were incorporating MI fidelity testing, providing MI by telephone or in groups, and MI provided by nurses or research assistants. A similar meta-analysis of medication adherence in chronic diseases revealed a small effect size favoring MI (Hedges' $g = .12$), with suggestions that coaching of interventionists during MI implementation and exclusively face-to-face interventions (versus exclusively telephonic ones) were associated with more positive outcomes (Zomahoun et al., 2017). Generally speaking, it is clear that, across various chronic diseases, it is feasible, acceptable, and worthwhile for healthcare providers to use MI to promote health behavior change as part of chronic disease treatment regimen.

As one example, chronic pain can lead patients to engage in less physical activity, which ultimately can exacerbate the pain experience due to muscle deconditioning (Verbunt, Seelen, & Vlaeyen, 2004). Thus, physical activity can be important in preventing the worsening of chronic pain problems. One study demonstrated that MI, when paired with a physical exercise program, was effective in reducing pain, increasing physical mobility, and improving psychological well-being and self-efficacy for community-dwelling older adults (i.e., age 65 years or older) with chronic pain (Tse, Vong, & Tang, 2013). Another study demonstrated that, for patients with fibromyalgia, a six-session MI intervention delivered via telephone promoted exercise (Ang et al., 2011). A large effect size was observed for the influence of MI on self-management of pain when delivered in a primary care setting (i.e., OR = 4.18; Habib, Morrissey, & Helmes, 2005). A systematic review highlighted the generally poor quality of studies on the efficacy of using MI in the

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treatment of chronic musculoskeletal pain, however, namely due to lack of consistent implementation of MI and dearth of randomized controlled trials (Chilton, Pires-Yfantouda, & Wylie, 2012). As noted earlier, a meta-analysis and review of chronic pain treatment studies that incorporated MI revealed a small to moderate effect size, supporting positive effects in short-term adherence (Alperstein & Sharpe, 2016). Both reviews suggested that there is promise for the addition of MI to treatment for chronic pain conditions such as fibromyalgia, osteoporosis, and arthritis, but that additional well-designed randomized controlled trials are warranted. Certainly, it appears that the application of MI to treatment regimens for chronic pain is feasible and that such interventions can be implemented by nurses and other healthcare providers (e.g., Ang et al., 2011; Mertens, Goossens, Verbundt, Koke, & Smeets, 2013). Moreover, training nurses to use MI can lead to changes in perceptions about patients' ability to change and manage their own behavior and perceptions about disease generally (Robinson et al., 2007).

Motivational interviewing also has been used to improve adherence to treatment for chronic kidney disease, with a defined protocol describing the use of MI as an adjunct to chronic kidney disease treatment to improve self-management (Martino, 2011; Sanders, Whited, & Martino, 2013). In one study, following an MI intervention delivered as monthly 90-minute sessions over 6 months, patients with chronic kidney disease demonstrated greater treatment adherence, lower levels of depression and anxiety, increased health-related quality of life, and better-controlled biochemical parameters, compared to their own preintervention baseline (Garcia-Llana, Remor, del Peso, Celadilla, & Selgas, 2014).

Similarly, MI has been applied to treatment of Type 2 diabetes, with the aim of improving patient health behaviors, adherence to medication adherence, and lifestyle changes. Early evidence showed a promising role for MI in the treatment of diabetes, with some studies indicating that MI intervention, compared to treatment as usual, led to outcomes such as better glycemic control (i.e., lower HbA1c levels), improved food diary completion rates, and/or increased frequency of blood glucose testing (e.g., Channon, Smith, & Gregory, 2003; Smith et al., 1997; Viner, Christie, Taylor, & Hey, 2003). Nevertheless, other early studies demonstrated less promising results, with only short-term effects of MI intervention observed. For example, Hokanson and colleagues (2006) found that MI for smoking cessation added to a self-care education intervention for patients with Type 2 diabetes resulted in increased tobacco abstinence at 3-month, but not 6-month follow-up, compared with control participants who did not receive MI. Similarly, West and colleagues (2007) found that female participants with Type 2 diabetes who received an MI intervention demonstrated better glycemic control at 6-month, but not 18-month, follow-up, compared with control participants who did not receive MI intervention; however, participants receiving MI intervention, compared with control participants, sustained significantly more weight loss at 6- and 18-month follow-up. More recent work in the area has been variable, sometimes with no effect of MI intervention on Type 2 diabetes risk score and lifestyle behaviors (Lakerveld et al., 2013), and no effect of MI intervention on metabolic status or medication adherence (Pladevall, Divine, Wells, Resnicow, & Williams, 2015; Rubak, Sandbaek, Lauritzen, Borch-Johnsen, & Christensen,

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2011) in Type 2 diabetes patients, but positive effects of motivational enhancement therapy combined with cognitive behavior therapy for Type 1 diabetes (Ismail et al., 2010).

A systematic review of the literature in MI for Type 2 diabetes nevertheless suggested promising outcomes, particularly in the area of dietary behaviors and weight management (Ekong & Kavookjian, 2016). The need to demonstrate training of interventionists and to assess MI fidelity also was highlighted in that review. In general, effect sizes for MI in the realm of diabetes are mixed across studies (e.g., OR = 1.11–6.16; Lundahl et al., 2013; see also Martins & McNeil, 2009). The preliminary nature of most of the reviewed literature (including small sample sizes) and questionable fidelity of MI intervention may contribute to the mixed findings. Williams, Manias, Walker, and Gorelik (2012) highlighted the feasibility of delivering MI interventions to patients with Type 2 diabetes. Brief MI focusing on diabetes can be trained and successfully employed by family medicine residents (Nightingale, Gopalan, Azzam, Douaihy, & Conti, 2016). Given those results, and the clear theoretical promise of applying MI to the treatment of diabetes, additional work is needed to reconcile mixed research findings and to determine the best way for MI to be used in the treatment of diabetes.

In the treatment of congestive heart failure, MI has successfully been used as an adjunct to patient health education with older patients. A randomized controlled trial (Brodie, Inoue, & Shaw, 2008), in which patients received either standard patient education or eight, 1-hour sessions of MI focused on changing health behavior (primarily physical activity), demonstrated that MI can effectively promote exercise in patients with congestive heart failure. In that study, patients in the group receiving MI showed significantly improved quality of life in general and disease-specific domains, compared with control patients. Relatedly, a systematic review of MI with patients with cardiovascular diseases, or at risk for such, found positive effects for smoking cessation and improving depression (Lee et al., 2016).

Similarly, the treatment of chronic obstructive pulmonary disease (COPD) can be enhanced with MI. Benzo and colleagues (2013) suggested that it is feasible to use MI to promote self-management and behavior change in patients with COPD because the intervention increases patient commitment. Indeed, in a randomized controlled trial, patients with COPD who received an MI intervention, compared with control patients who received brief education, smoked significantly fewer cigarettes and demonstrated decreased level of nicotine dependence and increased quality of life following intervention (Hamdi, Mostafa, & Wahed, 2013).

Motivational interviewing also has been used with a variety of other chronic disorders and conditions, including promoting changes in dietary behavior for patients with chronic colorectal cancer (Campbell et al., 2009) and in cardiac rehabilitation (Hancock, Davidson, Daly, Webber, & Chang, 2005). For example, MI may be helpful in enhancing medication adherence among older adults with various chronic diseases who are being treated with multiple medications simultaneously (Moral et al., 2015). Likewise, MI may

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lead to better adherence to hypertension medications among African Americans (Ogedegbe et al., 2008). Riekert, Borrelli, Bilderback, and Rand (2011) developed a five-session MI intervention to increase self-management among inner-city, African American adolescents with asthma. Although the intervention did not result in increased adherence for adolescents in the MI group, adolescents in the MI group did report increased readiness for change and increased motivation for change, suggesting some utility. As in other cases, it is possible that higher and lengthier “doses” of MI are needed in order to produce behavioral results.

Taken together, it appears that MI has considerable utility and potential for patients with chronic disease in order to promote health behavior change ranging from increased physical activity, reduced smoking, improved eating, or adherence to treatment regimens. For patients with chronic conditions and diseases, MI can be used in combination with medications, health education, and other approaches. Clearly, results of studies in the application of MI to the treatment of chronic disease are mixed. The long-term and persistent nature of chronic conditions and diseases likely are major challenges for any intervention, particularly in terms of lifelong maintenance of behavior. This area of research, however, is ripe with possibilities and need given the ever-increasing rates of many lifestyle-related chronic diseases.

Summary and Future Directions

Research on MI has grown tremendously in the past three decades, with a more recent upsurge of work on health behavior change and maintenance. There are many studies that examine the effectiveness of MI training, including more recent ones that examine the feasibility of training unique “providers,” such as undergraduate students (Low et al., 2013). Similarly, the diversity of health and lifestyle problems included in MI research are varied and expansive. Compared to when MI was in its nascence, randomized control trials now are more common in MI research (Lundahl et al., 2013). For many health behaviors, diseases, and conditions, and across a range of domains of healthcare, MI appears to be safe and beneficial, with effect sizes ranging from small to large. For detailed and nuanced inspection of the effect of the use of MI in various healthcare settings and health conditions, see the following meta-analyses and reviews: Alperstein and Sharpe (2016), Ekong & Kavookjian (2016), Lee et al. (2016), Lundahl et al. (2013), Martins and McNeil (2009), Morton et al. (2015), and Zomahoun et al. (2017).

Although the breadth of MI and the health behavior change literature is wide, there are needs in several important arenas. First, more research should focus on cultural issues and MI, particularly for those who are underserved (e.g., cultural minority groups) with poor access to in-person healthcare (e.g., those in rural areas).

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Also, future research should aim to determine the optimal “dose” of MI required to achieve desired effects on health behavior change, as there currently is a dearth of literature in that area and, given examples presented earlier, “dose” may drive results in some cases. Future studies should address how much MI is needed to promote target health behavior change, with attention given to whether necessary “dose” differs by type of health behavior, setting, type of practitioner, and/or other relevant conditions. Future research also should address topics such as cost-effectiveness of MI for health behavior change, whether MI delivered electronically performs the same as MI delivered in person, and whether effect sizes are equally good for self-report data and objective health outcome data, including biomarkers.

Additionally, the MI training literature would benefit from more methodologically sound studies, such as ones that consistently use control groups and standardize training *a priori* (to criteria). Fidelity of the provider behaviors regarded as “MI” continues to be of paramount importance. Given the increasing prevalence of electronic health care, future research should investigate the utility and effectiveness of virtual MI training as compared to in-person training. Provider preferences for mode of training also are important. Furthermore, training outcomes should focus not only on trainee skill-building but also on patient outcomes. Although this approach indeed would require longer follow-up and considerable resources, it is important to investigate the true results of training health professionals in MI (to established criteria), which are patient health behavior change and patient outcomes. The MI training literature also may benefit from research that addresses how best to train healthcare professionals to use MI, including at what points in their professional development (including postdegree continuing education) they should be trained in MI in order to be most likely to use it effectively.

As an important final recommendation, providers using MI should work to continue to encourage the inclusion of MI in various healthcare settings. So much of the spirit of MI is acting as an advocate for the patient. At the same time that clinicians using MI can be successful at advocating for individual patients, they also can advocate for MI as an approach by regularly presenting research and information about MI at conferences that healthcare providers attend, as well as providing information about MI trainings and how to implement MI and/or related practice principles (Rollnick et al., 1999) into an already busy practice setting. Motivational interviewing practitioners and scientists also can advocate for the inclusion of MI training in training programs in nursing, medicine, dentistry, psychology, and other healthcare professions by advocating with national organizations and state and federal government entities.

Motivational interviewing has an important role to play in healthcare. As the landscape of healthcare in the USA and elsewhere continues to change, brief behavioral treatments will become increasingly important, and it is predicted that delivery of high-quality MI will become more and more valuable. Motivational interactions, reflecting a style of working with patients, may help further usher in patient-centered healthcare (Institute of Medicine, 2001) and comfortable patient “medical homes” (Sia, Tonniges, Osterhus, & Taba, 2004); research is needed to understand the impact of MIACTs in fostering

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collaborative relationships between providers and patients. Many practices—primary care, psychological, and otherwise—may benefit from including MI as part of routine training or continuing education for providers and in everyday interactions with patients.

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