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Assessing Readiness for Adherence to Treatment

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To date, existing interventions designed to improve adherence have had limited success. According to a recent review of randomized clinical trials of adherence interventions (McDonald, Garg, & Haynes, 2002), theoretical, multifaceted interventions in clinic settings are common. Based on a review of 33 trials, including 39 interventions, less than half (19) were associated with statistically significant improvements in adherence.

The most effective interventions were multifaceted, combining several of the following common strategies: increased patient education and counseling, convenience of care, and patient involvement in care; use of reminders; and rewards or reinforcements for adherence (McDonald et al., 2002). Although these complex interventions

may produce greater success in many cases, there are several limitations. Such interventions are not typically based on an empirically supported theoretical model, and thus combine various strategies in a “hit or miss” fashion. This makes it difficult to determine which strategies were most effective with which patients. Moreover, interventions that adopt a one-size-fits-all approach are not tailored to an individual’s unique needs (Miller, 1997) and assume readiness to be adherent. Finally, using a wide variety of strategies with all patients is expensive and impractical to deliver.

The transtheoretical model (TTM) has been suggested as an approach to overcome these limitations by delivering individualized, theoretically delivered interventions for entire populations of

individuals (Willey, 1999; Willey et al., 2000), including those individuals who may not be ready to be adherent. The TTM systematically integrates four theoretical constructs central to change:

1. *Stages of change*: Readiness for treatment adherence
2. *Decisional balance*: Pros and cons associated with treatment adherence
3. *Self-efficacy*: Confidence to practice and sustain treatment adherence
4. *Processes of change*: Ten cognitive, affective, and behavioral activities that facilitate progress through the stages of treatment adherence

The TTM construes change as progress over time, through a series of stages: precontemplation, contemplation, preparation, action, and maintenance. Over 25 years of research on a variety of health behaviors have identified processes of change that work best in each stage to facilitate progress.

The Stages of Change

Stage of change is the TTM's central organizing construct. Longitudinal studies of change have found that people move through a series of five stages when modifying behavior on their own or with the help of formal interventions (DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983). In the first stage, *precontemplation*, individuals may deny they have a problem and thus are resistant to change their behavior, are unaware of the negative consequences of their behavior, believe the consequences are insignificant, or have given up the thought of changing because they are demoralized. They are not intending to take action in the next 6 months. Individuals in the *contemplation* stage are more likely to recognize the benefits of changing their behavior. However, they continue to overestimate the costs of changing and,

therefore, are ambivalent and not ready to change. Those in the *preparation* stage are seriously intending to make a change within the next 30 days and have already begun to take small steps toward the goal. Individuals in the action stage are overtly engaged in modifying their problem behaviors or acquiring new, healthy behaviors. Individuals in the *maintenance* stage have been able to sustain action for at least 6 months and are actively striving to prevent relapse. The stages form a simplex pattern in which adjacent stages are more highly correlated with each other than with more distant stages (Prochaska, DiClemente, Velicer, Ginpil, & Norcross, 1985). For most people, the change process is not linear, but spiral, with several relapses to earlier stages before they attain permanent behavior change (Prochaska & DiClemente, 1983, 1986).

Research comparing stage distributions across behaviors and populations finds that only a minority are in preparation with a majority in precontemplation and contemplation (Laforge, Velicer, Richmond, & Owen, 1999; Velicer et al., 1995). These data suggest that if we offered all individuals action-oriented interventions that assume readiness to participate in treatment adherence, we would be mis-serving the majority who are not prepared to take action.

Stage-matched interventions can have a greater impact than action-oriented, one-size-fits-all programs by increasing participation and increasing the likelihood that individuals will take action. Stage-matched interventions for smokers more than doubled the smoking cessation rates of the best action-oriented interventions available (Prochaska, DiClemente, Velicer, & Rossi, 1993). Stage-matched interventions have also outperformed one-size-fits-all interventions for exercise acquisition (Marcus et al., 1998), dietary behavior (Campbell et al., 1994), and mammography screening (Rakowski et al., 1998).

Assessing Stages

Stage of change is generally assessed using a staging algorithm, a set of decision rules that places

an individuals in one of the five mutually exclusive stage categories based on their responses to a few questions about their intentions, past behavior, and present behavior. This approach to staging is robust across behaviors and populations (e.g., DiClemente et al., 1991; Prochaska et al., 1994). In the staging measure used in a recent study of a TTM-based intervention to improve adherence to antihypertensive medication funded through the Small Business Intervention Research Grant mechanism from the National Institutes of Health (NIH), participants were given a definition of "taking high blood pressure pills as directed," which included taking the entire dose prescribed by a physician on time every day. A staging item asked, "Do you consistently take all your high blood pressure pills as directed by your doctor?" (Johnson, Driskell, Johnson, Prochaska, Zwick, & Prochaska, in press).

Participants who responded "No" to the staging item were asked if they intended to do so in the next 6 months or 30 days and were staged in precontemplation, contemplation, or preparation based on their responses. Participants who responded "Yes" to the staging items were asked how long they had been taking their pills as directed and were initially in action (6 months or less) or maintenance (more than 6 months). Participants who self-staged in action or maintenance were also asked additional items to verify stage—if they take their medication at the same time every day, in the same place every day, and if they use a pill organizer or case. Participants responding "No" to any of these questions were asked if they intended to change the way they took their medications so they could do all these things. Participants' responses to these questions were only used when participants exceeded thresholds on a series of questions regarding missed, forgotten, or intentionally skipped pills in the previous week, month, and 3 months. For example, if participants self-staged in maintenance but reported that they intentionally skipped pills, the answers to the stage questions were examined to reclassify them into the appropriate stage.

Decisional Balance

Change requires the consideration of the potential gains (pros) and losses (cons) associated with a behavior's consequences. The Decisional Balance Inventory (Velicer, DiClemente, Prochaska, & Brandenburg, 1985) consists of two scales, the pros of change and the cons of change. Longitudinal studies have found those measures to be among the best available predictors of future change (e.g., Velicer et al., 1985). In an integrative report of 12 studies, Prochaska et al. (1994) found that the balance of pros and cons was systematically related to stage of change in all 12 behaviors examined. The cons of changing to a health-promoting behavior outweighed the pros in the precontemplation stage, the pros surpassed the cons in the middle stages, and the pros outweighed the cons in the action stage. From these 12 studies, Prochaska et al. (1994) discovered the degree of change in pros and cons needed to progress across the stages of change: Progression from precontemplation to action involved approximately a 1 standard deviation increase in the pros of making the healthy behavior change, and progression from contemplation to action involved a one-half standard deviation decrease in the cons. The pros of adherence could include the following: makes me feel more in control of my health, can help me live longer, makes me feel more responsible, will help me participate in my health care, and could make my loved ones worry less about my health. Among individuals not adhering to a treatment regimen, increasing the salience and enhancing the decisional weight of the pros of treatment adherence, and decreasing the cons, can help increase readiness to adhere.

Self-Efficacy

Self-efficacy, or the degree to which an individual believes he or she has the capacity to attain a desired goal, can influence motivation and persistence (Bandura, 1977). Self-efficacy in the TTM

has two components that are distinct but related: (1) confidence to make and sustain changes and (2) temptation to relapse. Like decisional balance, levels of self-efficacy differ systematically across the stages of change, with subjects further along in the stages of change generally experiencing greater confidence and less temptation. Self-efficacy for treatment adherence means having the confidence to practice adherence in a variety of difficult situations (e.g., when one is stressed, has financial difficulties, or has side effects).

Processes of Change

In a comparative analysis of 24 major systems of psychotherapy, Prochaska (1979) distilled a set of 10 fundamental processes by which people change. The set was refined following further theoretical analyses (Prochaska & DiClemente, 1984) and empirical studies (Prochaska & DiClemente, 1985, 1986). These 10 processes describe the basic strategies that can be used to change problem behaviors, affects, cognitions, or interpersonal relationships. The 10 processes most often applied to treatment adherence are defined below with examples of interventions:

Consciousness-raising: Increasing awareness and information about treatment adherence (bibliotherapy, Internet resources, diary of behavior)

Dramatic relief: Experiencing strong negative emotions that go along with not practicing treatment adherence (grieving losses, personal testimonials)

Environmental reevaluation: Realizing the impact that one's effective treatment adherence has on other people (empathy training, asking others about their feelings about the patient's behavior)

Self-reevaluation: Emotional and cognitive reappraisal of values and self-image related to

treatment adherence (value clarification, self-narratives)

Self-liberation: Making and demonstrating a firm commitment to adhere to a treatment regimen (New Year's resolutions, contracts)

Reinforcement management: Increasing intrinsic and extrinsic rewards for treatment adherence (self-rewards, overt and covert reinforcement)

Helping relationships: Seeking and using social support to encourage or help with treatment adherence (help lines, self-help groups, buddy systems)

Counterconditioning: Substituting new behaviors and cognitions for old responses to treatment adherence (positive statements, relaxation, exercise)

Stimulus control: Adding cues or reminders to adhere to the treatment regimen (avoiding high-risk cues, posting notes)

Social liberation: Realizing that society is changing to support treatment adherence (noticing policy, others becoming empowered)

An 11th process, health care provider helping relationships, can also be important in the adherence area. This process involves relying on medical professionals for assistance with adherence.

The data from our research show that self-changers in different stages rely on different processes of change, naturally integrating change strategies and processes often considered incompatible. Individuals in the early stages rely more on cognitive, affective, and evaluative processes of change; individuals in the later stages rely more on social support, commitments, and behavior management techniques. Table 3.1 summarizes the current understanding of self-changers' patterns of emphasizing particular processes as they progress through the stages (see Prochaska, DiClemente, & Norcross, 1992).

Table 3.1 Integration of the Stages, Processes, and Principles of Change

<i>Precontemplation</i>	<i>Contemplation</i>	<i>Preparation</i>	<i>Action</i>	<i>Maintenance</i>
Consciousness raising				
Dramatic relief				
Environmental reevaluation				
	Self-reevaluation			
		Self-liberation		
Reinforcement management				
Helping relationships				
Counterconditioning				
Stimulus control				
	Pros of changing increasing			
		Cons of changing decreasing		
			Self-efficacy increasing	

NOTE: Social Liberation has been found to not have differentiated emphasis across all five stages.

Continuum of Adherence

We have found that it is important to create interventions that are appropriate for the specific adherence behavior that a patient confronts. The intervention for a patient who has not even been screened for a possible risk factor like hypertension would be quite different from a patient with hypertension who has discontinued using antihypertensives. Table 3.2 outlines a continuum of adherence that we use in developing such interventions.

Screening

Screening is the first phase of intervention that is needed to determine if patients have risk

factors that need to be treated. If patients have not been screened for risk factors like hypertension, hyperlipidemia, depression, stress, or a high-fat diet, then that is the first challenge. A big question is who is not being adherent, the patient or the professional? If clinical guidelines call for population-based screening, and particular practices are not following the guidelines, then these practices would be having problems with adherence. Medical practices tend to be much more proactive in following such screening guidelines when the risk factors are seen as more biological in nature, such as hypertension and hyperlipidemia. Practices tend to have more problems in being proactive in screening behaviors like alcohol abuse, depression, diet,

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Table 3.2 Continuum of Adherence

<i>Behavior</i>	<i>Appropriate Intervention</i>
Screening	Promote screening so individuals with risk can be identified and treated appropriately
Acquisition	Prepare those in early stages, provide action plans for those in preparation, and provide relapse prevention for those in action
Adherence (continuation/ persistence)	Provide action-oriented advice and relapse prevention
Nonadherence	Prepare those in early stages to become more adherent (raise pros, reduce cons, etc.)
Discontinuation	Increase readiness for reacquisition

smoking, or stress. The difference is due in large part to physicians having more confidence in prescribing medications, like antihypertensives or statins, than in providing counseling for more behavioral risk factors.

In general, patients tend to be passive when it comes to screening. They tend to take their lead from their physician. If the practitioner does not take the time and make the effort to screen for particular risks, then patients are likely to conclude that such screening is not particularly important.

Acquisition

Once screened, the second phase is the patient's acquisition of the prescribed intervention. Here problems can arise if clinicians have not assessed the patient's readiness to acquire a prescribed intervention. Patients diagnosed with hyperlipidemia, for example, are very likely to be prescribed a medication like a statin. Clinicians take care to match the appropriate biological treatment to the patient's biological condition that has been assessed. But clinicians are not likely to recognize that they are prescribing behavior as well as biology. Are patients ready to start on the prescribed medication? Just because the clinicians are ready to prescribe doesn't mean that all patients are ready to follow the biological

prescription of taking the medication. Patients may have entered the office with no intention of starting to take a medication each day for the rest of their lives. Patients in precontemplation are likely to weigh the cons of taking the medication (e.g., costs, side effects, hassles) as clearly outweighing the pros. Their decisional balance is likely to lead them to not even fill their prescription. The clinician has prescribed the correct biological medicine but not the appropriate behavioral medicine.

Continuation

In this phase patients have started the acquisition process, but the question is will they continue with the prescription. Patients in the contemplation stage may be very ambivalent about taking a particular pill every day for the rest of their lives. Their clinicians may convince them that the prescription is correct for them. Wanting to be cooperative patients, they may go along with their physician's recommendation initially. So they fill the prescription, take it daily as prescribed but begin to experience some cons, such as costs, side effects, or doubts about their real risk. An ambivalent decisional balance can now shift in a negative direction with the cons outweighing the pros. These patients are at increased risk of discontinuation. Here again,

the clinicians may have provided the appropriate biological medicine but an inappropriately matched behavioral medicine. An excellent adherence opportunity can be lost.

Nonadherence

In this phase, the patients are continuing with the prescription but are not taking it as prescribed. They may be cutting their pills in half, taking drug holidays, or missing pills on a repeated basis. Here, the assessment needs to be whether the problem is more of a memory problem, confidence problem, or a decision problem. If lapses are due mainly to memory, then a particular process like stimulus control technique can be used to help cure the patient. Pill containers can be of help as can computerized calls to high-cost patients who need more intensive help. If the problem is due to lowered self-efficacy under tempting situations, like times of stress or depression, then help may be needed on coping with such conditions. A stress management or mood management program may be prescribed.

If the problem is more decisional in origin such as cutting the pills in half as a way to cope with the price, then different help may be needed. Patients may need to be informed of lower cost options, like generic medications, if comparable ones exist.

Discontinuation

Once patients discontinue the prescribed biological and/or behavioral medications, then the major challenge is to help them recycle back through the stages to take more effective action. With behavioral discontinuation, such as relapse from a smoking cessation or exercise prescription, clinicians can be more optimistic or ambitious. The vast majority (about 85%) will regress only back to the contemplation or preparation stage. There, patients are ready to start contemplating or preparing for another serious action attempt. These patients can be helped to process

what they did right and what they need to do next time to be better prepared to sustain the action.

Patients in precontemplation need to be helped to not give up on their abilities to change or to not give up on their prescribed medicine. With behavioral medicine like smoking cessation or exercise, this challenge holds only for about 15% of patients. With medication, on the other hand, we have found that a much larger percentage of patients may regress all the way back to precontemplation. If these initial results continue to hold, then the implication would be that patients may give a particular prescription only one chance in the foreseeable future. If this chance fails, then an important opportunity may be lost. These results would suggest that taking the time and making the effort to prepare patients for the behavioral requirements of their biological medication may be particularly important. Recycling patients who discontinue medications may be much more challenging than recycling patients who discontinue behavioral treatments.

Stage-Matched Interventions Based on the TTM

In addition to providing an assessment framework, the TTM provides a scheme for tailoring programs by matching them to the needs of patients at each stage of change for treatment adherence. The degree of tailoring possible depends directly on the extent of the assessment. The following are descriptions of how one could use TTM for increasing treatment adherence through manuals, provider interventions, or Internet-based programs.

Stage-Based Manuals

When only the staging algorithm is administered, tailoring can occur at the stage level. Stage-based

manuals describe how self-changers progress through each stage of change, and how they recycle if they relapse. The manuals teach users about general principles of behavior change, about their particular stage of change, and the processes they can use to progress to the next stage. Appropriate sections of the manuals are matched to each stage of change, and they provide details on change processes and stage-matched exercises. There are several ways to use the manuals. First, they could be read through to get the big picture of how people change. Second, readers could turn to the section for the stage they are in and study that stage for a while. This is a good way to be sure they are heading in the right direction. Finally, users could look ahead to the next stage to learn more about how to move forward.

For example, if a patient in the precontemplation stage for adherence to statins is underestimating the pros of adhering to their medication regimen, that patient could use the section of the manual that describes dozens of documented pros of adhering to one's lipid-lowering medication regimen. The patient would be also encouraged to seek more information about the importance of adherence from the media, their health care provider, and their pharmacist.

Because each manual contains sections relevant to each stage of change, readers can refer to the appropriate chapters as they advance or regress through the stages. In addition, the manual underscores that the principles the patient is using to change his or her behavior relating to statin adherence can also be applied to other behavior changes. Individuals are taught that they can systematically use the 15 principles and processes of change to make progress on multiple behaviors simultaneously rather than focusing on only one. Given the generalizability of TTM's principles and the importance of diet and exercise to the treatment of hyperlipidemia, for example, stage-matched guidance of these behaviors is included in the manual to assist patients in making dietary modification and exercise essential parts of their treatment regimen (Johnson et al., in press).

Stage-Based Provider Guidance

Health care providers could also tailor interventions to the patient's stage of change for adherence by administering the staging algorithm (e.g., in the waiting room). Providers could then base brief interventions on processes that are most helpful to a particular stage. For example, precontemplators come in denying or minimizing their problems. They may be unaware of the negative consequences of their unhealthy behavior or they may be demoralized because of repeated failures in changing their behavior.

The goal for the provider is to engage precontemplators in the change process. Lecture and confrontation won't work. Providers can help precontemplators raise consciousness by teaching them about the stages of change, asking them to name as many benefits of treatment adherence as they can (precontemplators can typically name three to five), and providing more information about the treatment regimen to dispel any misconceptions the patient may have.

During the first appointment with precontemplators, providers can ask if they are willing to do any of the following before the next time they meet:

- Read about treatment adherence (e.g., the importance of depression management)
- Double or triple their list of the pros of treatment adherence
- Talk with someone who is currently adhering to a similar treatment

Providers should reinforce the notion that their patients have the capacity to be adherent. They should remind their patients that any forward movement (e.g., becoming more open to considering alternatives, becoming more aware) is progress; change does not equal action—change means progressing to the contemplation stage.

Contemplators are thinking about changing but are not yet committed to do so. They are more likely to acknowledge that their behavior

needs to be changed, but they substitute thinking about it for acting on it. They recognize the benefits of changing but overestimate the cons. Contemplators are ambivalent about changing and are often waiting for the magic moment. Providers can assist by acknowledging the ambivalence and work to resolve it by encouraging contemplators to weigh the pros of treatment adherence against the cons. Patients are asked to shrink cons by comparing them to the growing list of pros, by asking how important they are relative to the pros, and by challenging themselves to counter the cons. Interventions in these appointments can be more intensive including taking small steps toward treatment adherence. Providers can help by using motivational interviewing strategies like reflective listening to assist contemplators to resolve their ambivalence by working with them to identify the negative consequences on others of continuing not to be adherent, and by providing case examples of people who have been able to change to adhere to the treatment regimen. Helping patients create a new self-image is important in contemplation. Providers can encourage patients to ask themselves about their self-image. For example, "How do you think and feel about yourself as someone who doesn't adhere to your treatment regimen? What might it be like if you changed that behavior?"

Patients in preparation assess the pros as more important than the cons, are more confident and less tempted, are developing a plan, and are ideal patients most likely to participate in programs. With those in preparation, providers need to be experienced coaches to provide encouragement. They need to coach, not lecture, and give praise, support, and recognition for taking small steps; keep interventions short, focused, and action oriented; be available for phone support; focus on developing a plan for treatment adherence; and problem solve.

Providers can enhance progress by ensuring that patients choose steps that are realistic, concrete, and measurable. Those in preparation

should be asked to put treatment adherence plans in writing and to role-play how they will tell others about their commitment to adhere. It is important to help patients identify sources of support for their new behaviors—family members, coworkers, or friends. Providers should encourage the patients in preparation to be as specific as possible about the type and amount of support they need as well as role-play with their requests for support and identify additional sources of support. Providers can also help the patients to think about how they will feel about themselves after they have started making changes.

Patients in action have recently begun adhering to the treatment regimen. They are using behavioral processes of change. Their confidence is building but temptation and risk of relapse is a concern. Providers with patients in action need to be facilitators for the behavior change. The focus is on the behavioral processes of change—counterconditioning, stimulus control, and reinforcement management. It is important to also offer guidance for patients to plan ahead to prevent lapses and relapses.

Providers can help by getting patients to identify problematic beliefs and behaviors that inhibit treatment adherence and then by problem solving on positive alternatives that they believe will work for them. People, places, and things that increase the likelihood of not adhering need to be avoided (tempting cues). Reminders in both familiar and unexpected places that support treatment adherence need to be left around, like a gym bag filled and ready to use, a picture on the desk of relaxing with friends, or pill taking scheduled on the calendar. Those in action also need to notice the intrinsic rewards of their treatment adherence—better health, more energy, more control of life. Patients need to reward themselves with positive statements; providers can praise achievements and help patients recognize the benefits of their efforts.

Patients in maintenance have high confidence, and temptations are low. They are at risk primarily in times of distress or atypical temptations.

With those in maintenance, the provider needs to be a consultant to provide advice regarding relapse prevention. Providers can do this by helping patients to cope with distress (the major cause of relapse), continuing to refine a relapse prevention plan, being available to provide support, and establishing a support system in the community. For many people, maintenance can be a lifelong struggle—it is a dynamic, not a static stage. This may be particularly true in the area of adherence, where the regimen requires daily action and may be associated with ongoing cons. There needs to be work to consolidate gains and increase self-efficacy through increasing coping skills. Remember, a majority of individuals relapse to earlier stages before reaching permanent maintenance.

Intranet and Internet Expert System Program

Lengthier assessments that include each of the constructs of the TTM permit significantly more tailoring but may be impractical in a clinic setting where competing demands limit time. We have developed computerized tailored treatment adherence programs that are designed to be easy and engaging for patients to use and can be delivered over Intranet or Internet platforms which offer a cost-effective, easily disseminated alternative. The technical basis for these systems relies on the integration of statistical, word processing, multimedia, and database software. A system resides either on the Internet or on a web server and can be accessed by anyone who has the appropriate address and password. Once a patient logs onto the program, he or she is asked to complete a TTM treatment adherence assessment that evaluates stage, decisional balance, self-efficacy, and the processes of change.

In developing our treatment adherence programs, a series of multivariate statistical analyses are used to verify empirically the hypothesized relations between the constructs of the TTM (stage, decisional balance, self-efficacy, processes of change) and to determine the programs'

empirical decision rules. For each stage, the goal of the analysis is to empirically determine levels of construct use to optimize movement to the next stage. To generate individualized expert system feedback, an individual is assessed on all relevant TTM constructs. The assessment provides the input for the expert system (i.e., the basis for the tailoring and individualization of the intervention materials each participant receives). After a patient completes the assessment for each construct, his or her responses are analyzed by the expert system. The expert system then produces individualized feedback reports that are provided to the patient through text and graphical feedback on his or her computer screen.

People could use processes too little or too much, depending on their stage of change. If they are not using a process enough they would receive negative feedback. An example of the environmental reevaluation process is, "You're not paying enough attention to how your decision not to adhere to your medication regimen affects other people. Remind yourself that you could set a good example for others if you were to take your medication as directed." The decision rules depend on stage of change. The same process may be involved in more than one stage. For example, increasing an individual's knowledge may be important for those in both precontemplation and contemplation. How much of an increase is necessary for progress may, however, differ at different stages. In a similar manner, the decisional balance and self-efficacy scales represent sensitive change principles for facilitating progress. An example of positive feedback for someone in precontemplation is as follows:

Great! You seem to be well aware of the pros (benefits) of taking your high blood pressure medication each day. This is a good sign that you're ready to think more seriously about taking them as prescribed. If you want to make more progress, continue to think about the many pros.

The feedback also includes exercises for the participant to complete (e.g., set a start date, list

who can support your efforts and how they can help) and recommended strategies (e.g., how to deal with unexpected temptations, how to make a commitment to change behavior, strategies for building confidence) to help participants move forward. The feedback report (typically two to three printed pages) can be printed out at the end of the session.

During a patient's first use of the program, feedback is based on a comparison of the responses of the individual to a larger comparative sample of successful and unsuccessful individuals making the behavior change to treatment adherence. This feedback relies only on normative comparisons that differ by stages. The initial norms were derived from a naturalistic sample of individuals at risk for treatment adherence. Evaluation of the expert system provides updated norms at periodic intervals. The second and subsequent interactions compare the individual with both the normative group and his or her own previous responses and provide both ipsative (i.e., self-comparisons) and normative comparisons. The ipsative comparisons require access to the database for the results of the previous contact. The program makes individualized recommendations of change and guides the participants through the behavior change process that meets their individual needs.

The computer-generated feedback also links or refers participants to sections of a stage-matched self-help interactive resource workbook. Like the stage-matched manual described above, the online integrated workbook teaches users about general principles of behavior change as well as their particular stage of change and the processes they can use to progress to the next stage. The individualized feedback reports refer participants (via links) to appropriate sections of the workbook to provide more details on change processes and stage-matched exercises. For example, a participant can link to the online workbook where there are testimonials about the effects of stress from people who are now effectively managing their stress, an exercise to learn about what controls one's behavior, a bulletin board listing rewards people give

themselves for effectively managing stress, and substitutes for unhealthy stress management that don't involve food, smoking, or alcohol. For a demo of this program designed for stress management, please go to www.prochange.com/stressdemo

Conclusion

From a transtheoretical perspective, assessing and increasing treatment adherence is a complex challenge involving multiple variables for multiple behaviors. Fortunately, the same variables are assessed and applied to each behavior on the continuum of adherence. These variables are the stages of change, pros and cons of changing, self-efficacy about changing, and the processes of change. Depending on the depth of the assessment, varying degrees of tailoring are available to intervene on adherence. Once all variables are assessed for a specific adherence behavior (e.g., screening, acquisition, or discontinuation), the assessments can then drive an intervention designed to increase the specific adherence behavior. The intervention can vary from expert provider interventions to expert computers or some combination of each.

The literature to date indicates that the most promising approaches to increasing adherence will be multifaceted interventions on multiple variables for multiple behaviors. The TTM measures and intervention modalities can provide a framework that can systematically, empirically, and practically tailor these complex approaches to enhance adherence for populations at each point of the adherence continuum.

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