

SOCIAL AND BEHAVIORAL SCIENCES EXERCISE 2:
The Transtheoretical
Model of Change: An Application to Medication Adherence
STUDENT VERSION 1.0

**SBS Exercise 2: The Transtheoretical Model of Change:
An Application to Medication Adherence**

Estimated time to complete this exercise: 60 minutes

LEARNING OBJECTIVES

At the completion of this exercise, participants should be able to:

- Identify the central constructs of the transtheoretical model of change
- Distinguish among the six stages of change
- Apply constructs from the transtheoretical model of change to individual cases of medication adherence

ASPH SOCIAL AND BEHAVIORAL SCIENCES COMPETENCIES ADDRESSED

- E.1. Identify basic theories, concepts, and models from a range of social and behavioral disciplines that are used in public health research and practice
E.7. Describe the merits of social and behavioral science interventions

ASPH INTERDISCIPLINARY/CROSS-CUTTING COMPETENCIES ADDRESSED

- F.1. [Communication and Informatics] Apply theory and strategy-based communications principles across different settings and audiences
J.10. [Professionalism] Appreciate the importance of working collaboratively with diverse communities and constituencies (e.g., researchers, practitioners, agencies, and organizations)

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Students should read the required reading and the Introduction before class, and have them available to refer to while completing the exercise.

Required Reading: Prochaska JA, Redding CA, Evers KE. “The transtheoretical model and stages of change.” In: Glanz K, Rimer BK, Viswanath k, eds. Health Behavior and Health Education. Theory, Research, and Practice. 4th ed. San Francisco, CA: John Wiley and Sons, Inc.; 2008: 97-121.

Introduction

The Transtheoretical Model of Behavior Change

The transtheoretical model (TTM) attempts to synthesize valuable elements of the most important theories of behavior change, to better understand the range of factors that influence behavior change and to guide effective interventions to promote behavior change. The TTM stands out among models of individual health behavior in its emphasis on the temporal dimension of behavior change.

Building from research into how people successfully stopped smoking over long periods of time, the TTM posits that movement toward mastery of any new health behavior proceeds through a sequence of discrete stages, the order of which does not vary. This sequence of stages is the first core construct of the TTM, the **stages of change**. A central assumption of the construct is the invariability of the stage sequence; however the model also acknowledges that individual movement through the stages may include periods of backward movement, or relapse along the sequence. A potential strength of the TTM is that it sees relapse as a natural part of the evolution of behavior change, rather than as evidence of a failure of behavior change efforts.

The TTM uses a second core construct, **processes of change**, to classify a wide variety of cognitive, perceptual, and behavioral factors found in health-related interventions and therapies. Processes of change operate to promote individual progress toward the desired change. According to the TTM, each process of change has a primary affiliation with certain stages, so that some processes are more effective in promoting change in early stages, while others are more effective in later stages.

Table 1 summarizes the first core construct of the TTM, the **stages of change**.

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Table 1. TTM Stages of Change Constructs¹

| | |
|-----------------------------------|---|
| Precontemplation | Individual is unaware, under-informed, or unconvinced of the need for change, or the possibility of change, and has no plans to undertake change in the foreseeable future (operationalized as 6 months). |
| Contemplation | Individual expresses desire or intent to change without any concrete action toward change and may also express ambivalence or worry over costs of making the change. |
| Preparation | Individual has concrete plans to initiate behavior change in the near future (1 month) and has taken some steps toward the behavior or has practiced it for a brief time. |
| Action | Individual is practicing the behavior successfully. The new behavior is not yet habitual (practiced for less than 6 months) and adjustments are made to integrate the behavior into daily life. |
| Maintenance | Individual practices the behavior habitually (for at least 6 months) and has integrated it into daily life. |
| Termination (where applicable) | For life-long behavior changes, the individual has practiced the behavior for 5 years or more. Relapse is nearly impossible because the behavior is so deeply integrated into daily routines and significant social activities. |

The termination stage is conceptualized as the only stage in which an adopted behavior is so fully habitual and deeply integrated into an individual's life that the possibility of relapsing and discontinuing the behavior is negligible. This stage is thought to emerge only after several years of consistent behavior; thus it is relevant for life-long behaviors, such as abstinence from drug use or control of food intake. The termination stage does not apply to behaviors with discrete goals such as weight loss or completing a course of medication.

Table 2 summarizes the 10 TTM processes of change.

Table 2. TTM Processes of Change Construct²

| Process | Definition |
|----------------------------|--|
| Consciousness raising | Increase information about targeted behavior change and how it relates to one's self. |
| Dramatic relief | Experience and express feelings about targeted behavior and related issues such as diagnosis, disability, and loss. |
| Environmental reevaluation | Assess old behavior's impact on one's environment and loved ones; assess how targeted behavior may change this impact. |
| Self-reevaluation | Assess how current behavior and targeted change affirms or challenges one's identity or self-image. |
| Self-liberation | Affirm one's personal ability to change and make a commitment to change. |
| Helping relationships | Seek out social and emotional support, including self-help groups. |

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| | |
|--------------------------|---|
| Counter-conditioning | Learn new coping mechanisms to avoid old behaviors and support new, targeted behavior. |
| Stimulus control | Avoid or mitigate against stimuli that block new behavior or trigger old behavior. |
| Reinforcement management | Reinforce successful execution of target behavior Reinforcement may be self-generated or come from others. |
| Social liberation | Identify and support social forces that encourage target behavior change. |

Figure 1 presents the flow of process through the stages of change. Because the termination stage involves no actual change or steps to address the risk of relapse, there are no processes unique to that stage.

Figure 1. Processes of Change by Stage³

| Precontemplation | Contemplation | Preparation | Action | Maintenance/Termination |
|--|-------------------|-------------|-----------------|--|
| Consciousness raising Dramatic relief Environmental reevaluation | Self-reevaluation | | Self-liberation | Counter-conditioning Helping relationships Stimulus control Reinforcement management Social liberation |

The model also incorporates 2 constructs that are hypothesized to play a mediating role in behavior change because they are affected by the processes of change and are associated with movement between stages. The first of these, decisional balance, refers to how the individual perceives the relative cost and benefits of adopting behavior change. The second construct, self-efficacy, is the person's level of confidence that he or she can successfully execute a behavior, even in challenging situations. These constructs, with many of the processes of change, are crucial elements of other models and theories of individual health behavior.

Medication Adherence

Adequate adherence to prescribed medication regimens is necessary for good patient outcomes. However, poor adherence is common across a variety of diseases, treatments, and patient populations. Adherence is often described as the extent to which patient behavior coincides with medical advice. Thus, adherence includes keeping appointments, having recommended tests, and following dietary advice and special instructions for medications, in addition to taking medications on a prescribed schedule. Many factors can affect patient adherence, including: chronicity and severity of disease; whether a medication

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reduces symptoms or produces side effects; aspects of the patient-provider relationship and of the clinical encounter. Several patient-related factors also affect adherence, especially: confidence or belief in the diagnosis; perceived severity of the condition; perceived efficacy and benefits of treatment; co-occurring conditions and prescribed regimens; and life-style considerations such as substance use and unstable housing.

In some cases, poor adherence can not only jeopardize patient outcomes but can also contribute to public health challenges, such as on-going transmission of infectious disease and the emergence of drug-resistant disease strains because of widespread poor adherence to antimicrobial medications. The re-emergence of tuberculosis (TB) as a worldwide killer and the emergence of drug-resistant strains of the disease in the past several decades provide an example of dual personal and public health threats resulting in part from poor adherence to treatment.

TB and Latent TB Infection (LTBI)

TB is among the oldest recorded diseases in human history. When TB bacteria are expelled with moisture from the respiratory system of a person with the disease while coughing, sneezing, speaking, or singing, they can be inhaled into another person's lungs and cause TB infection.

Transmission of TB through close human contact is common; about one-third of the world is infected with TB. A proportion of those who become infected will develop active TB disease, which is deadly if untreated or improperly treated. Generally, people are most likely to progress from infection to active TB disease just after they are infected; the risk of developing the disease within 2 years of infection is from 5% to 10%. Thereafter, there is about a 10% lifetime risk of progression to disease if LTBI is not treated. Progression is significantly accelerated among certain groups, including young children and the immuno-compromised, especially individuals infected with HIV.

One vaccine to prevent TB is currently available: the bacille Calmette-Guérin vaccine, or BCG. BCG is effective in preventing childhood TB and is given to very young children in many countries where TB is prevalent. It is not routinely given in the United States, because its effectiveness in adults is highly variable and because the vaccine may interfere with the reactivity of the most widely used test for TB infection, the tuberculin skin test (TST). Given the difficulty in preventing transmission of TB, it is critically important that people who are infected with TB be identified early and when appropriate, be treated before the disease progresses to its symptomatic and usually infectious phase. TB-infected individuals for whom treatment is appropriate for treatment: children under 5 years of age; those who are at high risk for progression from infection to TB disease because of immunosuppression due to disease, therapeutic drug regimen, or lifestyle considerations such as injection drug use and severe alcoholism; those in congregate settings, including prisons and jails, homeless shelters, and long-term care facilities; close contacts of infectious TB cases; and recent immigrants from countries where TB prevalence is high. Effective treatment of LTBI can halt the development of TB disease in patients and may reduce the infections that would result

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from contact with an active disease case, infections that could become additional cases of TB disease.

The preferred treatment for LTBI consists of 9 months of isoniazid (ī-sə-nī-ə-zəd; also referred to as INH) taken daily. INH is inexpensive and easily administered; however, it can produce toxic side effects, the most common of which is hepatitis. Alcohol use may increase the risk of hepatotoxic side effects from INH. INH can cause tingling in the hands and feet of some people. Therefore, vitamin B6 is frequently prescribed with INH.

Recognizing the importance of LTBI treatment to TB control efforts in the United States, the US Department of Health and Human Services has established a target of an 85% completion rate among high-risk individuals prescribed LTBI treatment.⁴ However, most reported completion rates fall well below that target.⁵ The difficulties of identifying people with LTBI before they become symptomatic and infectious and seeing them successfully complete treatment have challenged health care providers and policy makers since effective treatment was made available.

-----End of Introduction-----

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Exercise: TTM for LTBI Adherence

Background

Given the importance of treating LTBI and persistently low rates of treatment completion, the health department of a large, east coast city has decided to initiate an intervention to improve adherence to LTBI treatment, tailored to each LTBI patient prescribed treatment. All LTBI patients at the health department TB clinic are prescribed 9 months of INH and supplemental vitamin B6. Several patients are part way through treatment when the intervention begins; others have just received their prescription and are expected to start treatment. The intervention is based on the TTM; thus the first step in tailoring the intervention is to assess the stage of each patient.

Instructions

Following are descriptions of the interactions of 5 patients with staff from the health department's LTBI adherence support intervention. Based on the description, match each case to the appropriate TTM stage of change, and briefly explain the rationale for placing each case where you did in the space provide following the case. Note that because LTBI treatment is completed in 9 months, the **termination stage**, which describes behavior consistently practiced over several years, will not be an appropriate choice for any case.

Next, discuss how the TTM **processes of change** relative to adherence operated in each case and how they could be used to support adherence for the case. Write examples of processes of change in the space provided.

CASE #1

Yolanda is a home health aide who received a positive TST result in the course of being screened to begin working in a new agency. She was evaluated at the TB clinic, and the doctor recommended that she undergo treatment because of her close contact with patients. She began taking daily INH 3 weeks ago. One morning she woke up with a tingling feeling in the soles of her feet, and over the course of the day had the same sensation in her hands. The next day she felt that it was worsening, and looking at the information sheet the adherence program nurse gave her, she saw that tingling in the hands and feet might be a side effect of INH. She skipped her INH pill and, as instructed on the information sheet, made an appointment to see the nurse the next day.

In response to the nurse's questioning, Yolanda reported that she had been taking the INH tablet daily until the tingling developed. The nurse asked her if she were also taking the vitamin B6 supplement that was prescribed to her. "Oh," Yolanda replied, "No, I didn't get that prescription filled because I already take a vitamin pill everyday. I have to take a lot of pills, so I thought I could just cut that one out." The nurse reviewed with her the importance of getting extra vitamin B6 while taking INH. The nurse commented, "It's great that you are already used to taking a vitamin pill every day. A lot of us are not that committed to investing in our health! If you ever feel frustrated that you have to take both the INH and the vitamin B6 pill every day, remember that they are another way of investing in your health." Although Yolanda felt disappointed about adding another pill to her daily dose, she was pleased that

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the nurse recognized the care that she took with her health. She agreed to get the prescription filled right away and start taking the vitamin B6 supplement along with the daily INH, as prescribed.

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| Case #1: Yolanda |
| Stage |
| Rationale |
| Processes of Change |

CASE #2

Ricardo immigrated to the city from Ecuador several years ago, and many members of his extended family eventually did too, living with him for periods of time until they found jobs and moved into their own homes. While his elderly aunt was staying with him, she developed a fever and then a persistent cough. His aunt grew worse and Ricardo took her to the emergency department of a nearby hospital. She was admitted to the hospital and was eventually diagnosed with infectious TB. When the city health department worker in charge of her treatment told Ricardo that he should be evaluated for TB too, he complied. He was tested and evaluated at the health department TB clinic, where he learned that he did not have TB disease, but that he did have LTBI. Because he was so recently exposed to TB through his aunt, the doctor recommended that he undergo treatment for LTBI and referred him to the new LTBI adherence program.

Ricardo met with a counselor in the program, who explained LTBI treatment to him. Ricardo responded that he did not think the treatment would do him any good. Everyone in his country had been given the BCG vaccine when they were young and it protected them against TB. In fact, Ricardo said, he had heard that the BCG vaccine could cause a positive reaction to the TST. The counselor replied that the BCG effect does not last into adulthood, and urged him to consider treatment. "Let me give you some material to read over," the counselor concluded. "Take it with you, and if it's all right, I'll call tomorrow to see if you have any questions about it." He handed Ricardo several pamphlets in Spanish with information about TB disease, the BCG vaccine, and treatment for LTBI.

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At home, Ricardo looked at the pamphlets for a minute before tossing them aside and stretching out on the couch. Although he did not want to admit it to anyone at the hospital or clinic, he was scared by how ill his aunt had become and worried that she would not recover. He felt sure that she also had received the BCG vaccine at some point in her life, and he wondered if the counselor was right that the vaccine lost effectiveness over the course of many years. If he got as sick as his aunt, he would not be able to keep his job. That job helped support several family members in addition to him – they would all suffer if he got sick. But could he really make it through 9 months of taking pills, 9 months of going to the clinic every month for a check up? As it was he did not know how he would manage to keep up with his aunt’s care and still get to work every day. He wondered what to say to the counselor when they spoke the next day. He picked up the pamphlets again.

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| Case #2: Ricardo |
| Stage |
| Rationale |
| Processes of Change |

CASE #3

Harold is a 78-year old retiree recovering from surgery to remove a cancerous growth. He will undergo 6 weeks of weekly chemotherapy infusions at the city hospital adjacent to the TB clinic. In preparation for chemotherapy, the oncology nurse reviewed his entire medical history with him. The nurse saw documentation of a positive TST several decades ago and asked him if he had ever undergone treatment for LTBI. “What are you talking about?” asked Harold. The nurse explained the meaning of the TST and added that many people undergo treatment to prevent the infection from progressing into TB disease. “Oh that!” said Harold. “That test has been positive ever since I came back from serving in the Korean Conflict. It’s nothing. I’ve had that for years.” The nurse replied that even though the infection had been latent for a long time, the chemotherapy he was preparing for would weaken his immune system and might make him more vulnerable to developing TB disease. When Harold waved away her concerns, she called next door to the TB clinic and asked a counselor there to talk to Harold about LTBI and chemotherapy.

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The TB clinic counselor began by asking Harold what he knew about his positive TST. Harold responded that everybody came back from Korea with that positive result, but as far as he knew, TB was very rare in the United States. “Nobody I know has ever gotten TB. It certainly doesn’t run in *my* family. As a matter of fact, I was never sick a day in my life until I came down with this cancer problem. Now all of you want this test and that test, this surgery and that procedure. I keep trying to tell you people, I don’t need all of these medicines and what-have-you. Sometimes I think that I’ll explode if I have to take just one more pill!” He stopped, looking a little embarrassed. “I didn’t mean to tear into you like that. I know you are just trying to help me, but that test from way back when I was a kid is the least of my problems right now!”

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| Case #3: Harold |
| Stage |
| Rationale |
| Processes of Change |

CASE #4

John was staying in a city shelter for homeless men. The shelter administration required that all men registering at the shelter get a TST, and John’s TST was positive. He was sent to the TB clinic and after the staff there determined that he did not have TB disease, he was prescribed LTBI treatment. John was initially reluctant to begin treatment and although he filled the prescriptions for INH and vitamin B6, he privately doubted that he needed medication. He did not want to take the pills around other people in the shelter or around his friends because he did not want them to think he was sick. Besides, the staff at the TB center had told him to avoid alcohol while taking INH. He and just about everyone he hung out with drank beer every day, and he could not imagine socializing without it.

However, the manager of the shelter, Clyde, reminded him that it was a requirement of the shelter program to complete treatment for LTBI. He asked John every morning if he had taken his INH, and, after a week, John got tired of lying to him about it. He told Clyde why he was not taking the pills. Somewhat to his surprise, Clyde did not become angry but instead offered to go to the TB clinic with him and talk to the adherence program counselor there about John’s misgivings.

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The counselor listened and said that he understood that John didn't want to give up alcohol use altogether. He told them about a harm reduction program at the hospital next door for people who were cutting back on alcohol use and said that John might want to check out some of the activities and groups held there. He also suggested that John transfer his prescription medications to a nonprescription bottle to avoid drawing attention when he took his pills. After leaving the TB clinic, Clyde suggested they go together to look at the harm reduction program. Mostly to avoid disappointing Clyde, John agreed to go.

When they got to the program, he recognized people he knew from the shelter and from just hanging out in the neighborhood. After a while John felt very comfortable at the harm reduction program and looked forward to support groups, afternoon movies, and outings with other participants. He felt more comfortable taking his medications there and always carried his pills with him when he went to the program. For 7 months John kept all his appointments at the TB clinic since it was right next door to his program.

John told the LTBI counselor and Clyde, "I'm not going to lie to you and tell you I'll never touch a beer. But in the program, we stay so busy that sometimes I don't even think about it. And you know, a lot of people there are taking medication, for one thing or another, not because they are sick but to stay well. It helps. When I see other people pulling out their pills, it reminds me to take mine too."

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| Case #4: John |
| Stage |
| Rationale |
| Processes of Change |

CASE #5

Rita was a mother of 4 and a teacher at one of the city's larger high schools. When a student was diagnosed with pulmonary TB, she got a TST along with other teachers and students. She had had a negative test 2 years earlier, but this time the result was positive. After evaluating her, the doctor at the TB clinic said that she was not ill with TB disease, but, since she was recently exposed, she should consider taking treatment for LTBI. Rita quickly

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agreed and started her medication the same day. At first, it was easy to remember to take the INH and vitamin B6 supplement. She and her colleagues discussed the ill student's progress every day and that served as a reminder to take her own medication. She had a little more trouble making time for her follow-up appointments at the TB clinic since she had to leave school early for them, but she managed it for the first 4 months.

Then disaster struck. Rita's husband was in a car accident and underwent surgery to repair his broken collarbone. Between running to the hospital and keeping up with her children, the days after the accident were hectic and filled with anxiety.

Rita missed several days of school and did not even think about taking her LTBI medications until she went back to work. She was not sure if she should try to make up the missed doses or just start taking the daily pills again, so she decided to call the TB clinic when she had time. Days passed and the call to the clinic stayed at the back of her mind. The day for her next clinic appointment came and went, but with so many things to do Rita did not even try to get there.

A week later, a card from the clinic's LTBI program came in the mail. In addition to the printed text asking her to call to reschedule her appointment, there was a hand-written note that the nurse had added, saying, "We miss you." That made Rita smile. The nurse had always seemed pleased to see her and asked about how things were going at work and with her family. She decided to call right then, before it slipped her mind again.

When Rita made it back to the adherence program, she described why she had started to miss her doses of INH. After offering her sympathy for what Rita was going through, the nurse explained that her treatment would be prolonged by a month to make up for the doses she had not taken. The nurse also offered her a pillbox with an alarm that could be set to sound at the same time every day, reminding her to take her medications. Rita used the alarm for 4 weeks, and she was happy to tell the nurse at her next appointment that she had not missed a day of medication.

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|----------------------------|
| Case #5: Rita |
| Stage |
| Rationale |
| Processes of Change |

¹ Adapted from Prochaska JA, Redding CA, Evers KE. “The transtheoretical model and stages of change.” In: Glanz K, Rimer BK, Viswanath K, eds. Health Behavior and Health Education. Theory, Research, and Practice. 4th ed. San Francisco, CA: John Wiley and Sons, Inc.; 2008, 99. Permission to adapt pending.

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⁴ US Department of Health and Human Services. Healthy People 2010. 2nd ed. Washington DC, 2000.

⁵ Hirsch-Moverman Y, Daftary A, Franks J, Colson PW. Adherence to treatment for latent tuberculosis infection: systematic review of studies in the US and Canada. Intl J Tuberc Lung Dis. 2008;12: 1235-1254.