

Stimulus Control Therapy

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PROTOCOL NAME

Stimulus Control Therapy (SCT).

GROSS INDICATION

Stimulus control therapy is indicated for the treatment of acute and/or chronic insomnia.

SPECIFIC INDICATION

SCT has been found to be effective for the treatment of all types of insomnia. There is no evidence to suggest that this form of therapy is differentially effective for one or another type of insomnia (psychophysiologic vs idiopathic vs paradoxical insomnia) or for any of the phenotypes/subtypes of insomnia (initial vs middle vs late insomnia). This said, the SCT instructions are formulated to be particularly effective for sleep onset problems, whether they occur at the beginning or middle of the night.

CONTRAINDICATIONS

While there is no evidence to show “where and when” this form of therapy is contraindicated, modifications of the instructions may be necessary in the following cases:

- patients who are disabled and cannot easily get out of bed unassisted;
- patients who cannot safely get out of bed owing to risk of slips and falls;
- patients who do not have the cognitive capacity due to dementia or mental retardation to follow the stimulus control instructions.

RATIONALE FOR INTERVENTION

SCT for the treatment of insomnia was proposed by Bootzin [1]. The instructions were expanded during the next few years [2,3] and have remained unchanged to the present. SCT for insomnia is based on a learning analysis of sleep in which falling asleep is conceptualized as an instrumental act emitted to produce reinforcement (i.e., sleep) [2,3]. Cues, both external and internal to the individual [4], that are associated with the onset of sleep become discriminative stimuli for the occurrence of reinforcement. Consequently, difficulty in falling asleep may be due to inadequate stimulus control. Strong discriminative stimuli for sleep may not have been established, or discriminative stimuli for activities that interfere with sleep may be present [2–4].

In addition to the importance of discriminative stimuli, Pavlovian conditioning in which cues are associated with emotional reactions is also important. The bed and bedroom can become cues for the distress and frustration of trying to fall asleep [3]. Internal cues, such as mind racing, anticipatory anxiety, and physiological arousal, thus become cues for further arousal and sleep disruptions [5]. The goal of SCT is to reduce cues associated with arousal as well as cues that are discriminative stimuli for activities that are incompatible with sleep [4–6].

Stimulus control therapy was designed to help individuals suffering from insomnia to strengthen the bed and bedroom as cues for sleep, to weaken the bed and bedroom as cues for arousal, and to develop a consistent sleep–wake schedule to help maintain improvement [2,3].

STEP BY STEP DESCRIPTION OF PROCEDURES

There are essentially three steps to the process:

1. Introduce the exercise
2. Detail the stimulus control instructions
3. Make a plan for what to do during the night.

Introduce the Exercise

The dialogue below is intended to be an example of how one might introduce the concept of stimulus control. It represents one of many approaches. The value of this particular example is that it emphasizes the learning aspect of stimulus control instructions. See Figure 2.1 for an example of the diagram referenced below.

Therapist: I'm going to suggest that you try stimulus control therapy which is based on the idea of strengthening the cues of bed and bedroom for sleep and weakening the cues for activities that interfere with falling asleep. But first, let me ask you a

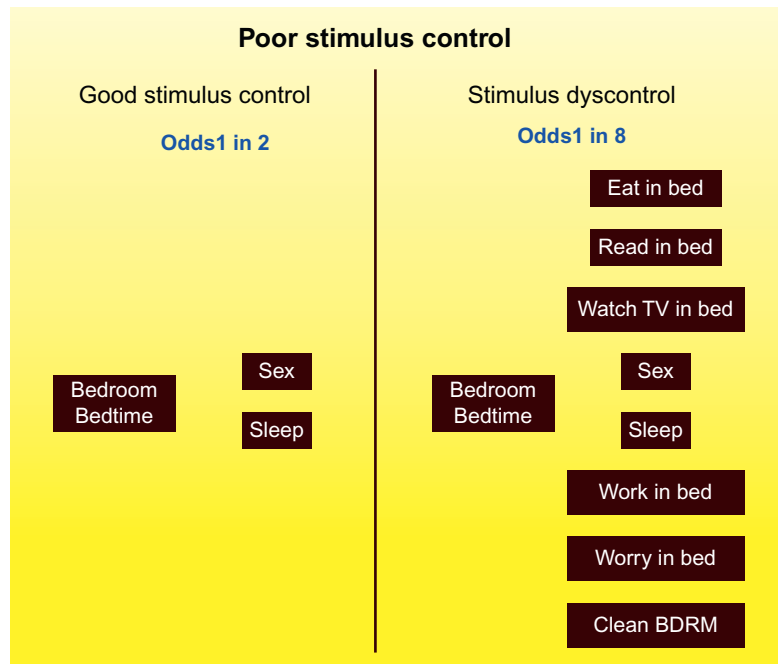


FIGURE 2.1 Poor stimulus control.

question that I often ask college students. If you were studying for an exam, what would happen if you studied in bed?

Patient: It's been a while since I've been a student, but I'd guess that I'd study for a while but would probably fall asleep.

Therapist: Yes. Exactly right. The cues for sleeping in bed are stronger than the cues for studying. So what would happen if you studied at the kitchen table?

Patient: I guess the same idea would apply. I'd study for a while, but I imagine that I'd think about having a snack and would stop to get one.

Therapist: Yes. The cues for activities that interfere with studying, like having a snack, are stronger at the kitchen table than the cues for studying. So let's switch to sleep. Tell me a bit about when you're awake at night. What you do?

Patient: I try to stay in bed, relax, and pray to God that I get enough sleep to be able to function tomorrow.

Therapist: I know what you mean. What else do you do?

Patient: Sometimes I do things to keep my mind off the fact that I am not sleeping, maybe read, maybe watch some TV, sometimes I work on my laptop or surf the Internet. Sometimes I'll lie bed and meditate – I have heard this helps.

Therapist: Anything else?

Patient: Sure. If my wife is awake we'll talk about the kids. Some times I get up and go into a different room and see if I feel sleepy there.

Therapist: OK. So let's draw this. For a good sleeper, someone who just lays down and is out in 60 seconds ... what behaviors do they engage in – in bed and in the bedroom?

Patient: Sleep.

Therapist: Anything else?

Patient: Maybe read ... but if they are out in 60 seconds they are probably not getting much reading done.

Therapist: I bet that's true. Anything else?

Patient: Well ... Sex ... I guess.

Therapist: As you'll see in the instructions, sex is the one activity other than sleeping that is allowed in bed. Usually I tell patients that the reason we allow sex in bed is that we're just not very creative about where we have sex. The dining room table just doesn't seem that appealing. So let's say that it's sleep or sex in bed.

Therapist: In your case ... you do more than sleep and sex in the bedroom in the effort to stay "ready for sleep". You read, work, surf the Internet, talk with your wife, meditate ... and frankly you probably spend a fair amount of time in bed worrying about not sleeping.

Patient: You betchya.

Therapist: OK. So if we count these up ... there's at least eight things you do in the bed and bedroom when you can't sleep. And although we can't calculate the exact odds of falling asleep, we know it has to be less if there are eight activities of which seven compete with sleep than if there are only two. So how can you make it more likely that you would fall asleep?

- Patient:** Don't do anything in the bed/bedroom besides sleep and sex.
- Therapist:** Exactly.
- Patient:** What am I supposed to do when I am awake?
- Therapist:** Anything you like (but that is not going to be too arousing) – and not in the bedroom. I recommend against doing work or being on the computer. There is more light from even a laptop because we sit closer to the computer than we would watching TV.
- Patient:** So when I am awake, I am supposed to get up and go into another room?
- Therapist:** Exactly.
- Patient:** How do I know when to get up and go into another room?
- Therapist:** The original formulation of this recommends that one stay in bed for no more than 15 minutes. Our sense of this is its better not to use a time-based rule but rather simply get out of bed when you realize that you are awake and/or that you are feeling frustrated about not being asleep.
- Patient:** How long do I have to stay out of bed?!
- Therapist:** The original formulation states that you should stay out of bed until you're sleepy. For some people, self monitoring for sleepiness puts on too much pressure. It's often easier to start by deciding ahead of time to stay awake for 30 or 60 minutes.
- Patient:** Why those time intervals?
- Therapist:** Good question. Because these time increments line up with the duration of what's usually on TV (which is what many people do when they are out of bed).
- Patient:** What if I get sleepy?
- Therapist:** Try and stay awake to the time you selected.
- Patient:** What if I get sleepy. Do I sleep on the couch?
- Therapist:** I am glad you asked that. If we're attempting to create a strong pairing between *sleep & sleepiness* and the *bed & bedroom...* would it be helpful in the long run to sleep on the couch?
- Patient:** I suppose not. What if I am awake a lot of times across the night?

Therapist: I am glad you asked that too. If we're attempting to weaken the association between *wakefulness* and the *bed & bedroom*, should you miss an opportunity to break that association by staying in bed some of the time?

Patient: I suppose not. But this means I may be up and down like a yoyo during the night.

Therapist: That may well happen. And on the nights that it happens it's bound to be unpleasant ... It's a trade off ... You'll be a yoyo for a few days, at worst a couple of weeks, and then you can expect to be better. It took a long time for your insomnia to develop, you have to give it a few weeks to get better.

Patient: Sounds reasonable.

Therapist: Let's review the rules and the reasons for each rule. We'll also discuss what you can do during the night that will make this, if not something to look forward to, than at least bearable for the next week or two.

An alternative or adjunctive approach to the above introduction might be to orient the patient to the Pavlovian conditioning aspect of stimulus control. This latter approach is particularly useful for patients who report "being terribly sleepy at the end of the day" and then find themselves "instantly awake as they cross the threshold into the bedroom".

The SCT instructions [2,3] are:

1. Lie down to go to sleep only when you are sleepy.
2. Do not use your bed for anything except sleep; that is, do not read, watch television, eat, or worry in bed. Sexual activity is the only exception to this rule. On such occasions, the instructions are to be followed afterward when you intend to go to sleep.
3. If you find yourself unable to fall asleep, get up and go into another room. Stay up as long as you wish and then return to the bedroom to sleep. Although we do not want you to watch the clock, we want you to get out of bed if you do not fall asleep immediately. Remember, the goal is to associate your bed with falling asleep *quickly*! If you are in bed more than about 10 minutes without falling asleep and have not gotten up, you are not following this instruction.
4. If you still cannot fall asleep, repeat step (3). Do this as often as is necessary throughout the night.
5. Set your alarm and get up at the same time every morning irrespective of how much sleep you got during the night. This will help your body acquire a consistent sleep rhythm.
6. Do not nap during the day.

Rationale for the Specific SCT Instructions

In our experience, it is not sufficient to just hand a patient with insomnia the list of SCT instructions. It is desirable to discuss the rationale for each instruction [5,6].

Instruction 1: The first instruction is intended to help individuals become more aware of their body's cues for sleepiness. Frequently, individuals with insomnia decide to go to bed at a specific time because of a calculation of how much sleep they feel they must get before awakening in the morning. This may produce increasing anxiety as sleeplessness persists, and can result in excessive time in bed for the amount of sleep that is obtained. Initially, individuals with insomnia rarely rely on internal cues of sleepiness as a signal to go to bed. Instruction 1 should be viewed as an aspirational goal to be achieved gradually over the first few weeks, rather than as an imperative to be started immediately [4]. Becoming sensitive to internal cues of sleepiness aids patients to determine an appropriate time to go to bed based on sleepiness, not on the clock.

Instruction 2: This instruction is the first of two core elements of SCT. It is intended to help strengthen the cues of the bed and bedroom with falling asleep, and weaken the cues of bed and bedroom with arousal and wakefulness. Often individuals with insomnia engage in activities in bed that interfere with falling asleep, such as reading, watching television, playing games on computers or the Internet, talking on the phone, text-messaging, checking email, or working. Engaging in these behaviors establishes the bed and bedroom as conditioned stimuli for wakefulness, not sleep. Patients are typically asked to engage in activities associated with arousal in a different room in the house *before* going into the bedroom. This helps individuals with insomnia create a new bedtime routine that is better suited to facilitate sleep onset [6].

Instructions 3 and 4: The third and fourth instructions reflect the second core element of SCT. Instructing patients to get out of bed if they are not sleeping limits them from being awake in bed, and further strengthens the association between the bed and bedroom and falling sleep. While SCT is focused primarily on sleep onset problems, Instruction 4 is incorporated for use with sleep maintenance issues. Getting out of bed to engage in other activities when unable to sleep strengthens a perception of control over insomnia. This makes the problem less distressing and more manageable for the patient [6].

Instruction 5: The goal of Instruction 5 is to establish a consistent sleep rhythm [5]. This is accomplished by setting a consistent wake-up time for all 7 days of the week, with less than 1 hour of discrepancy between days off and workdays [6]. Many people with insomnia stay in bed later in the morning in the hope of catching up on the sleep they missed the night before. However, irregular schedules weaken the association between the cues of the bed and bedroom and sleep. Maintaining consistent sleep schedules has been found to

reduce daytime fatigue and sleepiness [7]. Consequently, a consistent schedule helps both strengthen cues for sleep and reduce daytime problems associated with sleep disturbance.

Instruction 6: The rationale for the final instruction about not napping is to ensure that those with insomnia use the sleep deprivation from the prior night to facilitate falling asleep quickly on the next night [5]. This strengthens the cues of the bed and bedroom with falling asleep, and provides a success experience for the patient to help maintain compliance with the instructions. It should be emphasized that we are not opposed to all naps. Instruction 6 is intended to increase the likelihood that SCT will successfully change a dysfunctional sleep pattern. With some individuals, such as the elderly, however, it may be wise to have a brief nap (30 minutes or less) scheduled at the same time every day [5,6]. It is the irregularity of napping that produces and maintains irregular sleep schedules.

POSSIBLE MODIFICATIONS/VARIANTS

There are two variants that have been used in successfully implementing SCT [6]. First, how long should someone with insomnia be in bed before getting out of bed? The instructions place a premium on getting out of bed quickly – within 10 minutes. However, some individuals with insomnia become anxious with such a recommendation, and constantly check the clock to determine if it is time to get out of bed. To avoid clock-checking, patients are typically instructed to turn the face of the clock away from them. If time pressure produces increased anxiety, Instruction 3 is often modified to put emphasis on the internal cues of frustration and distress rather than on how much time has passed [6]. Thus, the patient is instructed to get out of bed at the first signs of frustration at not having fallen asleep. It is important to stress, however, that it is not permissible to stay in bed for long periods of time while waiting to fall asleep (such as 60 minutes or longer) even if not frustrated. The goal of the SCT instructions remains to associate the bed and bedroom with falling asleep *quickly*. Research has indicated that a quarter-hour rule (staying in bed for no more than 15 minutes before falling asleep) is manageable and effective in producing improved sleep in those with insomnia [8].

A second variant is that once patients have gotten out of bed, what activities are permissible, and how long should they stay awake before going back to bed? A good clinical rule of thumb for when to return to sleep is that patients should stay out of bed long enough to feel that they might successfully be able to fall asleep if they returned to bed [6]. This is an opportunity to practice paying attention to internal cues of sleepiness and using them as a guide. Generally, this means staying awake for at least 15 or more minutes before trying to go to sleep again.

Regarding what activities are permissible when out of bed in the middle of the night, patients should be encouraged to do something relaxing and

enjoyable. Because of the increasing evidence that even room light can alter sleep–wake circadian schedules [9], we have placed additional emphasis on keeping lights dim when out of bed during the night. Reading with a reading light and watching television from a distance is acceptable. We discourage patients from doing anything on the computer – even checking email – since the amount of light from the monitor when sitting close to it is brighter than most individuals realize, and activities done on the computer are usually arousing [6]. Finally, many adults with sleep maintenance problems elect to start the day at 4 am or 5 am rather than trying to return to the bed for additional sleep. This is not a wise strategy, since even 30 or 60 minutes of additional sleep increases alertness and reduces fatigue during the day. As long as the usual final wake-up time is maintained, returning to bed is recommended when there are 45 minutes or more until wake-up time [6].

PROOF OF CONCEPT/SUPPORTING DATA/EVIDENCE BASE

There have been numerous reviews and meta-analyses of the effectiveness of cognitive behavioral treatments for chronic insomnia. Practice guidelines have been used to identify which treatments have sufficient evidence of efficacy to be recommended for use. In 1999, a review [10] and practice guidelines [11] identified SCT as the only psychological and behavioral treatment to meet the highest standard for recommendation. In 2006, the American Academy of Sleep Medicine (AASM) published an update of both the review [12] and evidence-based practice parameters for psychological and behavioral treatment of insomnia [13]. Most of the newly added studies in the review investigated multi-component cognitive behavioral treatments in which SCT is a core component. Nevertheless, the AASM identified individual treatment components that met their standard for recommendation, and SCT continued to be identified as an “effective and recommended therapy in the treatment of chronic insomnia” [13, p. 1417].

A commonly employed multi-component package combines stimulus control instructions, sleep restriction, sleep education, and cognitive therapy. This combination of interventions lends itself well to clinical settings in which patients with diverse insomnia symptoms are seen. Case series studies have found this treatment combination to be as effective in clinical settings as in controlled outcome studies [14–17].

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