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The Power of Words, Biofeedback, and Somatic Feedback to Impact Illness Beliefs^{1, 2}

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Abstract:

The Health Belief Model proposes that medical treatment and patient self-care plans need to be congruent with the client's illness beliefs. When the client's illness attribution is compatible, the client is more likely to comply with both medical treatment and self-care. The authors emphasize the internal versus external locus of control dimension in illness attributions. Clients may believe that the illness is outside of personal control and that only external treatment such as surgery or medication will help. With such beliefs in place, the client is unlikely to be open to a regimen emphasizing self-regulation and personal behavioral changes. When medical professionals give information without taking into account the patient's perceptions, it can transform patients' illness beliefs and create a poorer prognosis. On the other hand, when physician's instructions suggest hope, healing is augmented by the placebo instructions. The authors propose that biofeedback and somatic feedback exercises provide effective tools for changing illness attributions and awaken the client to the impact of thoughts and emotions on physiology. A case study and a description of a somatic feedback exercise illustrate the approach.

According to the Health Belief Model, medical treatment and patient self-care need to be congruent with the client's illness beliefs (Rosenstock, 1966). When the client's beliefs or illness attributions are compatible with the therapeutic interventions and other recommendations offered, the client is more likely to adhere to the treatment and engage in self-care (King, 1983). Illness beliefs are predictors of clinical outcome such as depression, and changes in illness beliefs can produce changes in psychological distress in patients with cancer (Dempster et al., 2011; Glattacke, Heyduck, & Meffert, 2012).

One of the most critical dimensions in illness attribution involves internal versus external locus of control. Many clients perceive their illness as outside of their control, that is, as curable only by external treatment such as surgery or medication. Yet, it is well established that stress, life style, and personal health patterns significantly contribute to the onset, maintenance, and resolution of the illness (Cohen, Janicki-Deverts, & Miller, 2007). Humans have the capacity for developing significant control over

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factors that support recovery from illness and that achieve a higher-level wellness. For 70%–80% of all patient visits to primary physicians for physical symptoms, stress, anxiety, and depression are contributing factors (Kroenke & Mangelsdorff, 1989). Despite an increasingly well-established link between emotions/behavior and physical health, many clients are unaware of the significant mind-body connection in which thoughts and emotions affect their bodies. When the patient lacks this awareness, it is challenging to teach self-care practices that are based on changing the harmful cognitions and substituting more beneficial cognitions.

The goal of self-care training is to change the patient's focus from dysfunctional behaviors or stress-evoking thoughts to health-promoting behaviors or health-supportive thoughts. Enhancing the patients' perception of an internal locus of control may enhance their openness to self-care and disease self-management approaches.

By observing how their thoughts, emotions, and behaviors affect their body and their health/illness, clients can become more willing to learn strategies to change cognitions, emotional responses, and behaviors. The process of becoming aware of the mind-body relationship is illuminated through biofeedback and somatic feedback approaches. This article first describes the powerful impact of how a physician's words affected the illness beliefs and medical outcome in a cardiac patient. It then describes two clinically useful strategies—biofeedback and somatic feedback—which have been shown to facilitate increased awareness of the mind-body link.

WORDS AFFECT ILLNESS BELIEFS

Health care provider's words can unintentionally cause either positive and negative patient outcomes (Lowen, 1996). Patients listen to what the health provider describes and then create their own illness belief based on the words as heard and interpreted. Yet, how the patient interprets these words may not be medically correct and can significantly affect the clinical outcome as illustrated in the following case report.

Two years ago Roman, a 50-year-old male patient, was admitted to the hospital after three hours of chest pain, with electrocardiographical signs of anterior wall myocardial infarction. The patient had no previous history of cardiovascular disease and no family history of cardiovascular diseases, but was a smoker. He was an active businessman, fully active in life. The treatment consisted of percutaneous angioplasty with the insertion of a metal scaffold in an area of the artery where the atheromatous plaque had ruptured, in order to sustain blood flow in the coronary artery.

In addition to a loading dose of aspirin, clopidogrel, and unfractionated heparin, the patient received a IIa/IIIb platelet inhibitor. The further course of his hospitalization was uncomplicated and the patient was discharged on the fourth day. Before discharge, an echocardiogram was performed showing no impairment of regional wall motion. The patient received the following information: your ejection fraction is 60%. He received this information without any additional comment, without anyone asking if he understood the information. He received the following drugs: aspirin, clopidogrel, a statin, a beta-blocker, an ACE-inhibitor, and a proton-pump inhibitor.

The *ejection fraction* (EF) is the portion of blood that is pumped away at every single contraction of the heart, expressed in a percentage. 60% is normal and if a patient after myocardial infarction has 60% it is an excellent result. Even an EF of 35% would allow for normal activity with proper training and a rehabilitation program. Moreover, the EF may improve within weeks after myocardial infarction during cardiovascular rehabilitation programs.

Now, two years after his myocardial infarction this patient, Roman, was referred to me (RS), and the referring physician commented, “This guy is physically perfect with no signs of ischemia or congestive heart failure, but he is completely down.” When I met the patient for the first time I saw a round-shouldered man with sad eyes, looking towards me with no emotion. Two years before the myocardial infarction, he was an active businessman, a proud husband and father, and actively participating in life. Now, he had completely given up on all those areas and had been diagnosed with depression and sleep disturbances.

In the clinical interview, I quickly realized the source of the problem: the diagnosis of a 60% ejection fraction. We reviewed how his emotional breakdown began on his discharge day, when he was informed about his EF without any additional comments. As he was very literal and realized that 60% was only 60 parts of 100, he concluded that he would have to decrease by 40% anything he could previously do. If his heart function (according to his misunderstanding) was 60%, then he could not sustain the activities of his previous life.

This basic assumption concerning his illness was the foundation for his changed behaviors. He now believed that he no longer was able to do so many things he had done before. Every time he felt weaker he interpreted this as the result of his 60% EF. Every time he was tired or exhausted, he interpreted that to be an effect of the 60% EF. The 60% EF was now his rationale for restricting his activities in business, and his reduced efforts were producing serious financial consequences. Very quickly his prevailing cognitions came to focus on limitations; all of Roman’s interpretations of self and world became tied to the 60% EF concept.

The 60% EF explained so many things: Why he was tired -- because he only had 60%. Why he panted -- because he only had 60%. Why he could not be a good husband -- because he only had 60%. Why he could not be successful in business -- because he only had 60%. Why he could not sleep -- because he only had 60%. Etc.

Roman had internalized the 60% ejection fraction to mean that he could only live life up to 60%. Of course after discussing other aspects of his illness and his actual position on the health-disease continuum, I explained what the 60% EF fraction really meant -- it meant that his heart could totally recover. It was remarkable that after his illness beliefs were changed by our discussion, within weeks he became his hopeful self again and his posture changed. Roman has now recovered fully. All problems of a physical dimension are resolved, and he has no negative self-narration about his heart. Once again Roman is living 100%..

THE BIOFEEDBACK APPROACH

Biofeedback has been described as a “psychophysiological mirror,” allowing patients to monitor and learn from physiological signals produced by the body (Peper, Harvey, Takabayashi, & Hughes, 2009). Biofeedback procedures usually utilize electronic sensors that are noninvasive for monitoring physiological signals that often occur beneath conscious awareness. With the feedback, clients can learn to change their physiological patterns. This mastery often occurs as the person implements different awareness, breathing, cognitive, and emotional patterns. As a clinical teaching procedure, biofeedback training has been shown to be an efficacious treatment procedure for numerous illnesses such as tension headaches, incontinence, stroke, anxiety, recurrent abdominal pain, epilepsy, and attention deficit disorders (Yucha & Montgomery, 2008).

Most biofeedback procedures include training components that support developing self-awareness and control over a person’s own physiology. As self-awareness increases, the person may achieve insight and control over how he or she moves, thinks, emotes, and reacts (Peper et al., 2009). In many cases, one of

the most powerful clinical uses of feedback is to change the person's illness beliefs. Many clients are unaware how much their thoughts and emotions can influence their physiology, illness, and health. These beliefs change when the person actually sees on the computer screen how their physiology is changing as they change cognitions and emotions. The numbers and graphs on the computer screen show how the body is responding. Seeing the changes—which are based upon scientific physiological monitoring, computer analyses, and immediate feedback signals—is usually accepted by the patient as evidence or hard data, whereas the verbal comments made by a therapist might be denied as the therapist's subjective opinion. The feedback is experienced as objective data— numbers and graphs “do not lie”—which represents truth to the client. This process has been labeled by Wickramasekera (2003) as a “Trojan Horse” approach. Clients seek biofeedback therapy because they believe the cause of illness is in their body, and then the biofeedback serves to demonstrate that emotions and cognitions influence their somatic illness patterns.

Clinical Example of the Biofeedback Approach: David

“I had no idea I tightened my pelvis when I was talking.”

David, a 42-year-old male client, had severe urinary flow difficulties. Over the last year he experienced more and more difficulty urinating. It took much longer for the urination to begin, and the flow was minimal. He was fearful and anxious as he anticipated feeling the sensation of urinary urgency (or felt sense) followed by a failure to urinate. He was also terrified of having surgery to widen the urethra. After initial assessment, it seemed that a significant contributing factor to his urination difficulty was his high arousal/activation and body-fear pattern. During the past year, he had experienced major stresses, including being a falsely-accused defendant in a legal case, which could have led to a prison sentence. He also had a job in which he frequently had to confront people; each anticipated confrontation triggered a fear response in David. The holistic biofeedback procedure consisted of:

1. Reframing the difficulty of urination as a normal biological response to fear. Namely, urination and defecation are inhibited if we are vulnerable to attack; thus if we anticipate that the world is not safe, it naturally becomes more difficult to urinate.
2. Explaining how thinking about or talking about these unsafe situations tends to tighten the pelvic floor and inhibit urination.
3. Combining respiration and muscle biofeedback with breathing and muscle relaxation to teach in-depth relaxation.
4. Practicing a diaphragmatic breathing exercise which included relaxing the pelvic floor upon inhalation many times during the day.

During the second session, David was guided through the process of relaxation in the practitioner's office. The relaxation consisted of slower diaphragmatic breathing and dynamic relaxation while respiration was being monitored. He reported being relaxed and feeling safe. To his surprise, he found that when he went to urinate at the end of the session, it went easily and without effort. His homework consisted of practicing the same in-depth relaxation as well as mini-practices during the day.

This initial experience and his successful experience of urinating easily at home for two days was used to change his illness belief. He initially perceived the problem as a plumbing problem: “there is something wrong in the tubing.” The therapist pointed out that if the urination problem was a “plumbing problem,” then it would most likely not be reversible. A clogged sewer pipe does not unclog by itself; a clogged, old water pipe does not allow more water to flow. The mechanical plumbing solution would be to replace the pipes or use a tool to clean the obstructions. In his case, the problem seemed to reverse by itself; thus, it must have involved something that he was doing, which he could reverse himself.

David's challenge was and is how to learn to deeply relax (trust) and inhibit behaviors that triggered the fear response. He experienced a dramatic "aha" experience that transformed his illness beliefs when he observed his own muscle tension while sitting in a recliner chair. His mental map of his illness changed from picturing a structural problem to picturing a functional problem, or a problem in how he uses his body.

Procedure for Monitoring Muscle Tension

The muscle tensions of the pelvic floor, as well as the muscle activity of the legs and buttocks, were monitored with one channel leg-to-leg surface electromyography. The active electrodes were placed on the right and left leg tibialis muscles, and the reference electrode was placed on the left tibia. In this procedure, surface electromyography (SEMG) is low when all the muscles of the legs, buttocks, and the pelvic floor are relaxed. The measurement of SEMG is a general measure of these muscle groups, thus it is not possible to know which muscle caused the increase or decrease in SEMG activity.

Training Procedure

The training procedure consisted of tensing and relaxing the pelvic floor. He was asked to tighten his anus and pull it up as if stopping the urine flow, then hold the tension and relax and let go. He observed that often after he relaxed, SEMG activity did not return directly to the low level, but slowly decreased over a 30-second period. This data was used to point out first, that he needed time to relax, and second, that with training he could learn to relax more quickly. After the specific training, he discussed his work while his muscle activity was covertly recorded. The moment he began to discuss his work, the SEMG increased as shown in Figure 1. Further discussion revealed that discussing his job elicited feelings of aggression, anger, and fear.

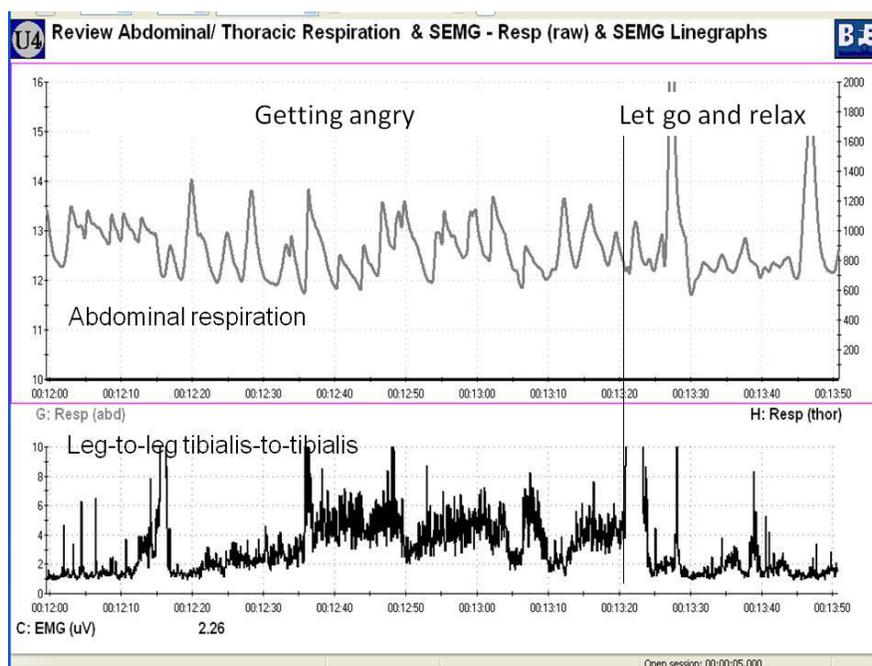


Figure 1. Leg-to-leg SEMG while talking. The client was unaware that as he became angry, muscle tension in his pelvic floor, legs, and buttocks increased. When he saw the recording, he finally realized that his thoughts and feelings directly affect his body.

David was unaware that he had tightened his pelvic floor and/or legs and buttocks while he was talking. Seeing the data was his "aha experience," which transformed his illness beliefs. He now knew that his

emotional and cognitive behaviors directly affected his pelvic floor/leg/buttock muscle tension and ability to urinate. Seeing is believing! This gave him the motivation to continue to observe his thoughts and feelings, practice the behavior intervention techniques to interrupt the thoughts and emotional patterns, and substitute more calming regenerative patterns, which facilitated relaxing the pelvic floor and allowed urination to go easier.

SOMATIC FEEDBACK APPROACH

“I couldn’t believe it. I could not resist the downward push on my arm.”

“I could tell [when] the person was thinking the hopeless, helpless, powerless thought; she lost all her strength.”

“I finally realized how my thoughts truly could influence my health.”

Feeling overwhelmed, hopeless, and powerless are common feelings especially when sick. We often forget that evoking or ruminating on negative thoughts decreases our energy level and strength. This change in strength can be used as a metaphor for immune competence (Peper, 2012). In many cases caretakers of a family member with Alzheimer disease or a child with disabilities have reduced immune competence. For many of these caretakers, life feels like being on a treadmill with no end in sight. Just recalling or ruminating on a hopeless, helpless memory, our energy drops. Experience the change in energy and physical strength when you shift your thoughts in the following practice adapted in part from the book by Peper and Gorter (2011), *Fighting Cancer: A Nontoxic Approach to Treatment*.

How our Thoughts Affect our Strength

This exercise needs to be done with a partner or a friend. Take turns, but begin by identifying who is the subject and who is the tester.

_ Begin by standing facing each other. First test the strength of the subject’s arms (see Figure 2a and b).



Figure 2. Testing how a subject can hold her arm up (a) and can resist the downward pressure (b). Reproduced with permission from Gorter and Peper (2011).

- _ The subject extends her left arm straight out to her side at shoulder level. The tester places his right hand on top of the subject’s left wrist and gently applies downward pressure while the subject resists. The tester slowly increases the pressure until he senses when the subject can no longer hold the arm in a horizontal position.
- _ Relax, and repeat the test with the subject’s right arm.
- _ Identify which arm appears stronger and more able to resist the downward pressure.

- _ Now let the subject relax. Then have the subject mentally evoke a past memory or experience in which she felt either:
 - (1) hopeless, helpless, and/or powerless
 - (2) empowered, positive, and/or successful.
- _ The subject should not reveal to the tester which memory is chosen.
- _ Encourage the subject to think about the memory and make it as real as possible—feel it, hear it, and so forth. The goal is to experience that memory as vividly as if it were happening in the present moment.
- _ At that point the subject extends his or her stronger arm straight out to the side. The tester once again tests the strength of the arm by pressing downward on the wrist.
- _ Do not share your experience at this point.
- _ Now relax and have the subject focus on the opposite memory, again making it as real as possible. Once the subject feels the experience, she should raise the same arm again out to her side at shoulder level, and the tester will test the strength of the arm by pressing down on the wrist.
- _ Now share and compare your experiences.
- _ Reverse roles. The tester becomes the subject and repeats the same exercise.

What did you notice? In 98% of all cases, when people think of hopeless, helpless, or powerless memories, they have significantly less strength than when they think of empowering, positive, and successful memories. With hopeless, helpless, and powerless memories, it's much easier to press down the subject's arm. The subject experiences a lack of energy and feels unable to resist the pressure, as if the energy has just drained from his or her body. While when the person thinks about the empowering, positive, and successful memory, the tester typically needs to apply more pressure to the subject's arm to lower it. The person experiences a sense of increased energy and greater ability to resist the pressure. In about 2% of people who do this exercise, the arm felt stronger or there was no difference when they thought about the hopeless memory (Peper, 2011). In most of those cases, the subjects were thinking of a memory that included anger and resentment, which often made them stronger. In a very few cases, the person was captured by either the empowering memory or the hopeless/helpless/powerless memory and found it challenging to shift, or they could not access the memories while doing the exercise.

For clinical and educational experiences, this single blind study is a powerful demonstration of how thoughts/memories affect the body; however, it is possible that the tester unconsciously knows which memory the person is evoking. In some cases the subject's posture changes depending on which memory evoked. To avoid this problem, we recommend that a pressure gauge should be used as an objective measurement for strength and resistance to movement.

The subjective experience of the change in strength and resistance is a metaphor for how memories/thoughts affect our immune system and health. Worrying, ruminating on negative memories, or anticipating a negative view of the future, negatively affects our physical and mental health (e.g., producing increased illness, depression, and earlier death). On the other hand, positive framing and an optimistic perspective enhances our immune system and physical and mental health. This practice demonstrates that we can have some control by changing our focus of attention. Thus, when captured by hopeless, helpless, and powerless memories or by worries and concerns, acknowledge the feeling, "I feel at this moment," and then shift the focus of attention to an empowering memory or present experience. Use some of the following approaches to facilitate this transition:

- _ Go to a different location (nature).
- _ Look at a picture or listen to music which you associate with positive experiences.
- _ Ask people for support and positive distraction.

When this practice is done in groups, it is a powerful demonstration and a motivator for wanting to learn how to control thoughts and emotions. The somatically-experienced changes serve as the person's own feedback and demonstrate the mind-body relationship, just as the biofeedback monitoring demonstrates

how the person covertly responds by making the invisible visible (Harvey & Peper, 2012). We commonly use this experiential approach to begin teaching clients how to change thoughts and emotions, as well as to provide them with a rationale for mindfulness training.³

CONCLUSION

One does not often in clinical practice encounter such a dramatic example as the cardiac patient Roman, whose story illustrates how a single strong illness belief can evoke such an overwhelming effect on patient's life. Nevertheless the more we work with patients, the more we recognize the power that illness beliefs have in the healing process. Each patient has his or her own illness beliefs, and the health provider's words, tests, and documentation co-structure these illness beliefs. If the words, pictures, and non-verbal cues suggest the absence of hope or imply that patients cannot do anything themselves, then the words will often become post-hypnotic suggestions. Illness beliefs can be highly influenced by providing patients with feedback.

Providing the patient with direct feedback about his or her own body can enhance bodily awareness and self-awareness, and restore positive health beliefs. Whether the feedback comes from a biofeedback device that records the covert physiological signal or is subjectively experienced through a somatic exercise, the self-experience is a powerful trigger for an "aha" experience—a realization that mind, body, and emotions are not separate (Wilson, Peper, & Gibney, 2004). Clinically, this approach can be used to facilitate changing illness beliefs and to motivate clients to begin changing their cognitive, emotional, and behavioral patterns. They begin to realize that they can be active participants in the healing process and that in many cases it is their mind-body life patterns that contribute to illness or health.

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³ For more pragmatic suggestions on how to deal with ruminations, transforming thoughts and emotions see the book by Gorter and Peper (2011).

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