

Strengthening and Generalizing Self-Efficacy in a Male With a Spinal Cord Injury

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This case report, representing a collaborative effort between a therapeutic recreation participant and a CTRS, describes a treatment designed to generalize self-efficacy from weight training exercises to activities of daily living (ADL). The effects of the treatment on the weight training efficacy and ADL efficacy in an adult male with a spinal cord injury are presented.

KEY WORDS: *Activities of Daily Living, Efficacy Scales, Generalization, Self-Efficacy, Spinal Cord Injury, Weight Training*

People with traumatic spinal cord injuries experience a sudden and drastic change in their physical abilities. Activities of daily living (ADL) that were once performed without a second thought, such as going up steep ramps and getting into cars, become physically challenging (Janssen, van Oers, van der Woude, &

Hollander, 1994). In addition to physical challenges, people with spinal cord injuries may experience psychological challenges such as a lack of confidence or self-efficacy in their abilities to perform ADL (Wise, in press). These psychological challenges can prevent people from realizing their full potentials. This

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case report will examine the effects of a treatment (Wise, 1997) designed to address the self-efficacy challenges faced by people with spinal cord injuries. The treatment, which addresses generalizing efficacy from the recreation activity of weight training to ADL, was administered to a participant with a spinal cord injury.

An interesting aspect of this case report is that the first author delivered the treatment to the second author. After the treatment was completed, the participant (Scott Hale, RN) and therapist (Jim Wise, CTRS/CSCS) decided to publicly share the results. Jim delivered this treatment as a research component of doctoral course work under the supervision of a Utah licensed therapeutic recreation specialist. It is hoped that this example of collaboration between participant and therapist will encourage other similar efforts.

Biographical and Demographic Information

The treatment was an 8-week (16 lessons) weight training program that was designed to increase weight training efficacy and ADL efficacy. The program was offered by the Salt Lake County Parks and Recreation Adapted/Therapeutic Recreation Program and took place in the weight room of a community recreation center in Midvale, Utah. The Adapted/Therapeutic Recreation Program provides a full range of recreation and therapeutic recreation services to people with disabilities, at-risk youth, and people who are in substance abuse programs. Services include camps, socialization activities, a substance abuse treatment program, and sport, art, after-school, and teen programs.

Flyers were used to inform potential participants about the weight training program. The flyers were distributed to the local spinal cord injury rehabilitation center, independent living center, community recreation centers, organizations that provide outdoor recreation activities to people with disabilities, and a mailing list of people who had expressed in-

terest in wheelchair sports. People who were interested in the program contacted the first author who conducted strength training for the Adapted/Therapeutic Recreation Program. He informed them that if they had high blood pressure and/or were at risk for heart disease, they would need their physicians' approval to join the program. None of the participants reported either condition.

Participant

Scott was a 34-year-old Caucasian male who had experienced an incomplete spinal cord injury in an automobile accident 9 months prior to his involvement with the weight training program. His spinal column from T-10 to L-1 was damaged and as a result, he used a wheelchair as his primary means of mobility. Scott also walked with the use of leg braces and crutches.

Immediately prior to his injury, Scott had been pursuing his career. He had just completed a 2-year registered nurse program at a local state college. While attending school, he had worked as a licensed practical nurse.

Scott had weight trained before his injury. He began weight training when he played high school football. After high school, he continued to lift 3 to 4 days a week to stay in shape. The injury devastated Scott's sense of confidence in his ability to weight train. He was unsure how to weight train with a spinal cord injury. Thus, when a social worker who worked at the local spinal cord injury rehabilitation center told Scott about the program, Scott became excited. He believed that the program would teach him how to weight train with a spinal cord injury and it would give him an opportunity to socialize with people his age who had spinal cord injuries.

Case Content

The treatment utilized in this case was based on self-efficacy theory (Bandura, 1977, 1986, 1997). A brief description of the theory follows. Readers who want to learn more about self-efficacy are encouraged to consult Bandura's major works (1977, 1986, 1997).

Self-efficacy is defined as the “beliefs in one’s capabilities to organize and execute courses of action to produce given attainments” (Bandura, 1997, p. 3). Self-efficacy can be thought of as situation-specific confidence. Because self-efficacy is situation-specific, perceptions of it can vary greatly, even within a task such as lifting weights. People may be sure they can lift 100 pounds but may be unsure that they can lift 150 pounds.

Self-efficacy influences people’s choice of activities, how much effort they expend, and how long they persevere when they experience failure (Bandura, 1997). Compared to people who are not efficacious, people who are efficacious will attempt new activities, expend greater effort on those activities, and persevere longer in spite of difficulties they encounter.

Self-efficacy is influenced by four sources of information including: (a) vicarious experiences, (b) performance accomplishments, (c) verbal persuasion, and (d) physiological arousal (Bandura, 1977, 1986, 1997). Examples of these sources are:

1. Watching others (e.g., models) perform a task is a vicarious experience. When people observe a competent model successfully perform a task, they can learn how to perform the task and increase their efficacy.

2. Performance accomplishments, the most influential source of information, occur when people actually perform a task. Successfully performing a task provides direct evidence of their abilities and increases their efficacy.

3. The verbal persuasive statements people receive from others, who are respected and regarded as knowledgeable about the task, can influence efficacy. When statements attribute successful performance to performers’ personal abilities and efforts, their efficacy increases.

4. Physiological arousal, the final source of information, involves the interpretation of somatic signals that people receive prior to, during, and after the performance of a task. For example, people can interpret increased

respiratory and heart rates as indicators that their bodies are preparing to successfully perform the task. This interpretation can result in an increase in efficacy.

Efficacy can generalize from one task to another task. Bandura (1997) described five processes by which efficacy generalizes: (a) generalization occurs when tasks share similar subskills, (b) generalized coping skills are learned or improved, (c) the similarities between two tasks are cognitively recognized, (d) two tasks are learned at the same time, and (e) a performance accomplishment is so profound that efficacy beliefs about many other tasks are affected. The treatment described in this report incorporated the first three processes as explained below.

First, efficacy generalizes when two tasks such as in-line skating and ice-skating share similar subskills: a need for dynamic balance, skating motions of the legs, and footwear with a narrow line of contact with the ground surface. For example, two people are learning to ice skate. The one who is a competent in-line skater and is efficacious toward in-line skating will be more efficacious toward ice skating than the one who has never tried in-line skating.

Second, efficacy generalizes through the acquisition of coping skills. For people with spinal cord injuries, ADL can be physically strenuous (i.e., transferring into a car; Janssen, van Oers, van der Woude, et al., 1994; Janssen, van Oers, Veeger, et al., 1994). Becoming stronger can help people with spinal cord injuries cope with strenuous ADL (Janssen, van Oers, Veeger, et al.; Noreau, Shephard, Simard, Pare, & Pomerleau, 1993).

Third, efficacy generalizes through cognitive recognition of the commonalities that activities share. In a study by Taylor, Bandura, Ewart, Miller, and DeBusk (1985), patients who were recovering from a heart attack performed a treadmill stress test. The test results were interpreted in terms of what everyday activities the patients could engage in without fear of exceeding their cardiac capabilities.

They became more efficacious when they learned that activities such as taking out the garbage or walking around the block were less stressful than the treadmill test.

The first author, Jim, came up with the idea to incorporate techniques to generalize efficacy with weight training exercises after reading research in social psychology (Holloway, Beuter, & Duda, 1988). This research described how young women became more confident in their abilities to handle confrontational situations (i.e., addressing someone who cut in front of them while standing in a line) after completing a 12-week weight training class. Efficacy generalized from the weight training exercises to situations where physical strength was considered to be an asset. This result occurred despite no active attempt by the researchers to get the young women to generalize efficacy. Jim wondered what would happen if an active attempt to generalize efficacy from weight training exercises to targeted

activities was made? Based upon his experience teaching weight training to people with disabilities as a certified strength and conditioning specialist (CSCS), he was able to envision and develop a treatment to generalize efficacy.

The CSCS credential indicates that the holder has the knowledge to design and implement safe and effective strength and conditioning programs. To obtain the CSCS credential, one must earn a bachelor's degree and pass a national exam. Completion of continuing education requirements are necessary to maintain the credential. Although the treatment was developed and implemented by a CTRS who was also a CSCS, the first author believes it could be implemented by CTRSs who can teach weight training.

Assessment

Immediately prior to the first lesson, Scott completed a medical history questionnaire and two self-efficacy scales: the Weight Training

Table 1.
Weight Training Efficacy Scale

0	10	20	30	40	50	60	70	80	90	100
Certainly Cannot		Probably Cannot			Maybe (50/50 Chance)		Probably Can			Certainly Can

Directions: Please indicate how confident you are that you can perform each action right now. Using the scale above as a reference, write the number that corresponds to your level of confidence on the line.

Example: I can lift a 20-pound weight.

Confidence: 100

Explanation: You are certain you can lift a 20-pound weight right now you put 100 on the line.

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|---|--------------|
| 1. I can fit weight training into my regular routine. | Confidence__ |
| 2. I can perform weight training exercises correctly. | Confidence__ |
| 3. I can adapt weight training exercises to accommodate my disability. | Confidence__ |
| 4. I can design a weight training program to achieve my strength goals. | Confidence__ |
| 5. I can monitor my progress toward my strength goals. | Confidence__ |
| 6. I can weight train at home safely. | Confidence__ |
| 7. I can find accessible places to weight train in the community. | Confidence__ |
| 8. I can weight train at a facility in the community. | Confidence__ |
| 9. I can weight train with other people. | Confidence__ |
| 10. I can ask for assistance when I need it. | Confidence__ |
| 11. I can weight train by myself. | Confidence__ |

Table 2.
Activities of Daily Living Efficacy Scale

0	10	20	30	40	50	60	70	80	90	100
Certainly Cannot		Probably Cannot			Maybe (50/50 Chance)		Probably Can			Certainly Can

Directions: Please indicate how confident you are that you can perform each action right now. Using the scale above as a reference, write the number that corresponds to your level of confidence on the line.

Example: I can lift a 20-pound weight. Confidence:100

Explanation: You are certain you can lift a 20-pound weight right now you put 100 on the line.

Please respond to all of the following activities assuming that you are alone.

- | | |
|---|--------------|
| 1. I can shovel snow. | Confidence__ |
| 2. I can rake leaves. | Confidence__ |
| 3. I can take a garbage can out to the curb. | Confidence__ |
| 4. I can work in a garden. | Confidence__ |
| 5. I can mow a lawn. | Confidence__ |
| 6. I can get up from the floor. | Confidence__ |
| 7. I can transfer/sit down on a toilet. | Confidence__ |
| 8. I can transfer/get into a car. | Confidence__ |
| 9. I can transfer/get into a tub. | Confidence__ |
| 10. I can transfer/get into a bed. | Confidence__ |
| 11. I can transfer/get up from a couch. | Confidence__ |
| 12. I can put a heavy item (e.g., waffle iron) on a high shelf. | Confidence__ |
| 13. I can carry a heavy container (e.g., casserole dish). | Confidence__ |
| 14. I can pull a heavy door to me. | Confidence__ |
| 15. I can push a heavy door away from me. | Confidence__ |
| 16. I can carry a laundry basket full of clothes. | Confidence__ |
| 17. I can carry a heavy bag of groceries. | Confidence__ |
| 18. I can move the heavy furniture in my house/apartment. | Confidence__ |
| 19. I can vacuum. | Confidence__ |
| 20. I can pick up a 3 year old child (approximately 40 pounds). | Confidence__ |
| 21. I can get over a short curb. | Confidence__ |
| 22. I can get over a tall curb. | Confidence__ |
| 23. I can go up a steep ramp into a building. | Confidence__ |
| 24. I can travel over uneven ground. | Confidence__ |
| 25. I can go down a flight of stairs. | Confidence__ |
| 26. I can go up a flight of stairs. | Confidence__ |

Efficacy Scale (WTES; see Table 1) and the Activities of Daily Living Efficacy Scale (ADLES; see Table 2). Both scales were developed by the first author and have been shown to be internally consistent, as well as exhibiting content and criterion-related evi-

dence of validity (Wise, 1999). In Wise's study, reported Cronbach's alpha values were .86 for the WTES and .96 for the ADLES. Content validity was addressed through a series of steps. First, content for the items was derived from previous research (Janssen, van

Oers, van der Woude, et al., 1994; Janssen, van Oers, Veeger, et al., 1994), and discussions with physical therapists, exercise physiologists, people with spinal cord injuries, and special physical educators. Second, items were reviewed by a social psychologist and a sport psychologist for consistency with self-efficacy theory. Finally, a professor with expertise in measurement reviewed the items. Criterion-related evidence of validity for both scales was found through significant correlations between participants' measures of efficacy and their self reported level of injury and level of physical activity. Participants who had a lower level of injury and those who were physically active were more confident in their abilities to weight train and perform ADL.

Efficacy strength was measured by asking respondents to indicate their level of confidence in performing the task indicated in each item. Efficacy strength values ranged from 0 (*certainly cannot*) to 100 (*certainly can*). The mean value of the items on each scale was considered to be the efficacy strength for that scale.

Weight training efficacy is the confidence people with spinal cord injuries have to continue to train with weights after they complete an instructional weight training program. People who have a strong sense of weight training efficacy are predicted to continue weight training after completion of an instructional program. Scott's WTES pre-treatment score of 71.82 indicated that he was fairly certain he could perform the tasks associated with weight training (see Table 3).

ADL efficacy is the confidence people with spinal cord injuries have to perform various activities of daily living alone. People with a strong sense of ADL efficacy are predicted to perform ADL. Scott's ADLES pre-treatment score of 38.08 indicated that he was not confident in his abilities to perform various ADL (see Table 3).

Treatment

The treatment consisted of 16 lessons. The lessons were scheduled for 1 hour, twice a

Table 3.
Efficacy Strength Values

	Weight Training Efficacy	ADL Efficacy
Pre Treatment	71.82	38.08
After Six Lessons	95.45	60.00
Eight Months Post Treatment	97.27	78.10

week. Each lesson included a weight training workout, techniques to increase weight training efficacy, and techniques to generalize efficacy from weight training exercises to ADL.

Typically, Jim supervised 3 to 4 participants who weight trained at the same time. Although each participant received individualized instruction, the group-like format naturally led to interactions between participants. They often discussed personal issues and modeled exercises for one another.

Weight training workouts. The weight training workouts were based upon the concept of periodization. Periodization refers to altering variables (i.e., weights, sets, repetitions) during the course of a weight training program (Fleck, 1999; Stone, O'Bryant, & Garhammer, 1981). Generally, as a program progresses, the amount of weight increases and the number of sets and repetitions decrease. The goals of periodization are to increase muscular strength, improve performance, and decrease the likelihood of injury.

Scott performed the bench press, bent over row, shoulder press, medial deltoid raise, rear deltoid flye, dip, pull up, and biceps curl exercises using dumbbells and weight machines. The exercises were taught using accepted techniques (Baechle, 1994).

Weight training efficacy. The four sources of efficacy information were addressed in each lesson to increase weight training efficacy (Bandura, 1977, 1986, 1997). The following description illustrates how the sources were

addressed in the first lesson. First, Jim performed an exercise with correct technique as Scott watched (vicarious experience). Then Scott performed the same exercise (performance accomplishment). If necessary, Jim physically assisted Scott through the exercise. After Scott performed one set of 10 repetitions, the therapist said, "Scott, you used excellent technique on that set of bench presses" (verbal persuasion). Finally, if Scott had appeared to be or said he was anxious, the therapist would have described how the physiological signals (e.g., increased heart and respiratory rates) indicated that Scott's body was preparing to perform the exercise (physiological arousal). This format was repeated for each exercise.

Generalization of efficacy. The treatment used multiple techniques to generalize efficacy. First, Scott performed exercises that had subskills similar to ADL. For example, shoulder presses are similar to placing heavy items on a high shelf and dips are similar to transfers. Second, Scott used dumbbells rather than weight machines whenever possible because lifting dumbbells is more similar to ADL. Lifting dumbbells and performing ADL involve maintaining correct body posture in space. A third technique was the use of informal processing sessions. These processing sessions occurred while Scott was weight training. During the sessions, Scott and Jim discussed how the increase in strength Scott experienced from weight training helped him cope with strenuous ADL. Also, we spent time discussing the similarities between weight training and ADL. Both tasks required Scott to overcome resistance (i.e., weight, gravity). Therefore, if Scott was lifting more than a cumulative total of 10,000 pounds during some workouts, then what would prevent him from pushing his wheelchair up a ramp?

Evaluation

Scott attended 13 of the 16 lessons. He missed one lesson due to a hand injury that was unrelated to the program. He missed 2 other lessons due to familial and social com-

mitments. After 6 lessons, the two self-efficacy scales were administered a second time. Originally, the scales were to be administered a third time, at the completion of the treatment. However, because Scott was searching for employment, he was unable to complete the two scales at that time. In order to assess the consequence of time on self-efficacy strength, the scales were administered a third time, 8 months post treatment.

An examination of the efficacy strength values indicated that Scott's efficacy in both areas increased during the treatment and that these increases were maintained for 8 months (see Table 3). Immediately following six lessons of the treatment, Scott's WTES score of 95.45 indicated he felt certain that he could perform the tasks associated with weight training: "This program helped me realize how to lift safely, do it effectively, and get the results I wanted." During the first 3 months after the treatment, Scott did not weight train because of financial constraints. However, as soon as he secured employment he joined a gym and began lifting 2 to 3 times a week. Even with a 3 month lay off, Scott's strong sense of confidence was still present 8 months after the treatment was completed as reflected in a WTES score of 97.27.

After six lessons, Scott's ADL efficacy increased to 60.00, approximately 60% over the pre-treatment value (see Table 3). "I was able to get off of the floor with crutches and braces on and I was never able to do this before the class. Being stronger helps me manipulate my environment better like when I lift my full clothes basket." Eight months later, his ADL efficacy value had become even stronger, rising to 78.10 (see Table 3).

Authors' Comments

Both authors reflected on the experience of giving and receiving treatment with outcomes of strengthening and generalizing self-efficacy, and the unexpected outcome of socializing. They viewed their interaction as successful and personally meaningful.

Scott

I thought it [the program] was awesome. I had always weight lifted and just because I had experienced a spinal cord injury, it should not stop me from what I enjoy. I didn't view the program as rehabilitation. I joined because I wanted to learn how to weight train with my injury and to meet other people with spinal cord injuries. I also liked the idea that I would receive personalized instruction from a qualified, knowledgeable professional.

I met a lot of people while I was involved in the program. This had a significant impact on me because one of my biggest fears [after my spinal cord injury] was that I wasn't going to be happy and that I wasn't going to have a life. Hanging out with the other people helped me see things differently. It helped me realize that there is life after spinal cord injury, that I could be happy even with a spinal cord injury.

Right after the program ended, I got a job and started working 40 hours a week and going back to school. I wasn't able to lift regularly but I made a goal to start again. Once work and school slowed down, I decided to begin weight training again and joined a gym. I am now weight training on a regular basis again.

Jim

I learned a couple of things from the implementation of the treatment and subsequent collaboration with Scott on this manuscript. First, the treatment appeared to be effective in strengthening Scott's sense of efficacy toward performing a lifelong recreation activity (i.e., weight training) and generalizing self-efficacy from that activity to other aspects of his life, particularly successful ADL. These were anticipated outcomes of the treatment.

Second, the treatment resulted in meeting Scott's need for socialization. This was an outcome that was not originally anticipated. After his accident, Scott had many concerns about how he was going to live the rest of his life as a person with a spinal cord injury. Weight training helped him make the transition into his post

injury life. Because of his prior experience with weight training, the treatment provided a context where he felt comfortable and could socialize. Socializing with other people who had spinal cord injuries enabled Scott to deal with many of his concerns.

Finally, collaborating with Scott reinforced my belief in the importance of therapists listening to participants. I was looking for certain outcomes and when those outcomes occurred I was happy. So happy, in fact, that I would have failed to fully realize what Scott had gained from his involvement in the treatment. Thankfully, by listening, I was able to learn what benefits he received.

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