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Abstract

In this study, the effect of locus of control on a visualization of a spinal-cord injury was investigated. Research has shown that *locus of control* plays an important role in determining the control one perceives to have over oneself and events. Life satisfaction is usually lowered because of negative behavior changes one goes through when experiencing a traumatic event, such as a spinal cord injury (Livneh, 2001). The research examined the hypothesis that those with an internal locus of control will be less upset following an intense visualization of a spinal-cord injury (SCI) compared to those with an external locus of control. The study used a total of 32 college students from Nova Southeastern University. The results indicated that those who had an internal locus of control were not any less upset than those with an external locus of control.

Influences of Locus of Control on Thinking About a Spinal Cord Injury

About 250,000 to 400,000 individuals in the United States have spinal cord injuries (SCI). Every year, 11,000 people sustain new spinal cord injuries (NINDS, 2006). Many of those who have a SCI have other medical complications including problems with mobility, arm and hand strength, blood clots, bowel and bladder control, reproductive and sexual function, infections, pressure sores, and pain (NINDS, 2006). When a significant life change happens, we have to wonder why one would cope more effectively than another. *Locus of control* plays an important role in determining the control one perceives to have over oneself and events. Locus of Control was first concepualized by John Rotter (1966). Those who believe they can make choices to affect their life circumstances are considered to have an *internal locus of control*, while those who believe their circumstances are controlled by external forces have *external locus of control* (Chen & Wang, 2007). Many who have an external locus of control are more prone to be stressed and suffer from depression and are also more alert of life difficulties (McCreary & Turner, 1984). It seems that people who have internal locus of control are more resistant to others' influences (McCreary & Turner, 1984). Several studies have examined locus of control in chronic pain populations and have considered how this type of control may influence a patient's response to pain, psychological treatment, and behaviors (McCreary & Turner, 1984). Life satisfaction is usually lowered by spinal cord injury, which leads to negative behavior changes that affect the person's lifestyle (Chase, Cornille, & English, 2000). Among locus of control, self-efficacy, ego-strength and self-esteem are also said to play a role in the adaptation to a chronic injury (Livneh, 2001). One study showed that participants who had more of an internal *locus of control* had a

better chance of making an easier commitment to change, whereas the participants who had more of an external *locus of control* were found to have more difficulty committing to change (Chen & Wang, 2007).

On the other end of the spectrum, however, there are studies that have shown that those who experience trauma have positive attributes such as an increased sense of self-confidence, an increased connection to others, and an enhanced sense of the meaning of life. Those who can make sense of their loss thus adjust more easily to their new injury (McCreary & Turner, 1984).

A traumatic injury (such as a spinal cord injury) can impact an individual on physical, social, and psychological levels. Vulnerability to depression, anxiety, and stress levels can all be a problem because of reduced energy, negative expectations and social withdrawal (McCreary & Turner, 1984).

The current study proposes that a SCI victim may change his or her outlook due to one of the key personality factors: locus of control. The study examined the hypothesis that those with higher levels of locus of control will be less upset when imagining themselves having a spinal cord injury than those participants with a lower level of locus of control.

Method

Participants

32 undergraduate students of Farquhar College of Arts and Sciences at Nova Southeastern University participated in the study. The age of the participants varied from the ages of 18 to 33 years of age with the m= 26. Participants were selected at the convenience of the researcher. There was no special selection of who were or were not

recruited. Some of the participants were specifically from psychology classes (n=10); others were random undergraduate students. No special populations were examined. Some participants from certain psychology classes received extra credit for their participation in this study. Any participants who changed their mind after initially agreeing were allowed to leave the study without penalty.

Materials and Methods

Each participant was given a Multidimensional Health Locus of Control Survey (Wallston, 2006). There are two forms of the scale, "A" and "B." Forms A & B are the "general" health locus of control scales that have been in use since the mid-late 1970s (Wallston, 2006). Each of these two "equivalent" forms contains three 6 item subscales: internality; powerful others externality; and chance externality. Using both forms A and B allows researchers to measure people's locus of control regarding beliefs (Wallston, 2006). Each form consists of 18 questions (see Appendix A). Using two scales, will give more sufficient evidence of participants' locus of control. Both scales "A" and "B" are allowed to be used for public and for research purposes (Wallston, 2006).

The diagram of the halo traction (see Appendix B) showed the metal tongs and pins that would have to be hypothetically placed around the participant's head for 3 months. Halo traction is used to prevent movement of the head and neck (Sanan, 2006). Showing such a diagram increases the realism of the situation – i.e., to get participants to think in depth about what it would be like to have a spinal cord injury.

A questionnaire consisting of 9 items on a 6 point Likert type scale was employed. The purpose was to see how upset the participants would be if they had a SCI. For example, "if I had a spinal cord injury, I would feel like I had no chance of being

truly happy."

Procedure

Participants were told that the purpose of this voluntary and confidential research study was to examine the effects of a visualization exercise on spinal cord injuries. Once agreed, all participants were asked to read and sign two Informed Consent Forms. One form was given to the participant, and one form was kept by the principal investigator. Participants were told that the study would last approximately 20 minutes. If any of the questions or visualization made them feel uncomfortable, they were allowed to leave at any time during the study. The students first received the Multidimensional Health Locus of Control Survey, consisting of 18 questions each on two forms (see Appendix A). Once each participant completed the survey and all materials were collected, they were asked to close their eyes and listen to an intense visualization of what it would be like to have a spinal cord injury. After the visualization, which took approximately 5 minutes, they were asked to open their eyes and were shown the diagram of a halo traction (see appendix B). This would hypothetically be the type of traction that they would have been wearing for 3 months after the accident. They were then asked to fill out the last questionnaire, consisting of 9 questions on how upset they would be if they had a SCI (see Appendix C).

Results

A within-participants design was used to examine the effects. 32 participants' scores were evaluated after having to drop one random participant in order to do a proper median split. The L.O.C. score (quasi- independent variable) and the "upset" score (dependent variable) were calculated. Everyone who was above the median score (n=17)

was considered to have a high L.O.C. and those below the median (n=15) were considered to have a low L.O.C. Then the comparison from the "1" group vs. the "2" group was done. The *M* for the L.O.C. group was 32.41 and the *SD* was 6.829. The internal L.O.C. group *M* was a 31.47 and the *SD* was 8.709. The results showed, t (30) = .34, p= .73. There was no significant effect of the quasi-independent variable on the dependent variable.

Discussion

Any traumatic injury can cause severe changes in a person. Spinal cord injury affects thousands of new people every year (NINDS, 2006). The current study examined the hypothesis that those with a higher locus of control would be less upset when imagining themselves having a spinal cord injury than those participants with a lower locus of control. Overall life satisfaction has been shown to be lowered following spinal cord injury that causes negative behaviors (Chase, Cornille, & English, 2000), this particular study showed no changes when examining the focus of this study, locus of control. Perhaps to get a significant result, more participants would have to be used.

The participants in this study were asked to complete the Locus of Control Scale, listen to an intense visualization of having spinal-cord injury, and then fill out a brief survey of how upset they would be if they had a SCI. The results were completed by using a median split to compare the external locus of control group from the internal locus of control group. The results were then analyzed using a t-test. There was no significance effect of the quasi-independent variable on the dependent variable.

If locus of control were a factor, this would have helped researchers continue on in the investigation of this influence. Possibly, victims of a disability would be able to

heighten their external locus of control and therefore have an easier commitment to change. Medical professionals, specifically mental health professionals, could have employed primary prevention techniques by helping those who have suffered a traumatic physical limitation (such as a spinal cord injury) try to comprise a higher locus of control.

Some limitations of the study included the research participants who were undergraduates from Nova Southeastern University, the rainy weather, age, and the higher amount of female participants than males. Nova Southeastern University is a South Florida University and this could have impacted the results due to ethnicity and culture. Age could have been an influence since everyone has had different experiences due to their age. The gloomy weather could have lowered some of the participants' mood, which could inaccurately tweak the L.O.C. scales. The larger amounts of females than males possibly limited the results due to biological reasons.

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Appendix A

Form A

Instructions: Each item below is a belief statement about your medical condition with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you agree or disagree with that statement. The more you agree with a statement, the higher will be the number you circle. The more you disagree with a statement, the lower will be the number you circle. Please make sure that you answer **EVERY ITEM** and that you circle **ONLY ONE** number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1=STRONGLY DISAGREE **(SD)** 2=MODERATELY DISAGREE **(MD)** 3=SLIGHTLY DISAGREE **(D)**	4=SLIGHTLY AGREE **(A)** 5=MODERATELY AGREE **(MA)** 6=STRONGLY AGREE **(SA)**

		SD	**MD**	**D**	**A**	**MA**	**SA**
1	If I get sick, it is my own behavior which determines how soon I get well again.	1	2	3	4	5	6
2	No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
3	Having regular contact with my physician is the best way for me to avoid illness.	1	2	3	4	5	6
4	Most things that affect my health happen to me by accident.	1	2	3	4	5	6
5	Whenever I don't feel well, I should consult a medically trained professional.	1	2	3	4	5	6
6	I am in control of my health.	1	2	3	4	5	6
7	My family has a lot to do with my becoming sick or staying healthy.	1	2	3	4	5	6
8	When I get sick, I am to blame.	1	2	3	4	5	6
9	Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6
10	Health professionals control my health.	1	2	3	4	5	6
11	My good health is largely a matter of good fortune.	1	2	3	4	5	6
12	The main thing which affects my health is what I myself do.	1	2	3	4	5	6
13	If I take care of myself, I can avoid illness.	1	2	3	4	5	6
14	Whenever I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.	1	2	3	4	5	6
15	No matter what I do, I 'm likely to get sick.	1	2	3	4	5	6
16	If it's meant to be, I will stay healthy.	1	2	3	4	5	6
17	If I take the right actions, I can stay healthy.	1	2	3	4	5	6

18	Regarding my health, I can only do what my doctor tells me	1	2	3	4	5	6

Form B

Instructions: Each item below is a belief statement about your medical condition with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you agree or disagree with that statement. The more you agree with a statement, the higher will be the number you circle. The more you disagree with a statement, the lower will be the number you circle. Please make sure that you answer **EVERY ITEM** and that you circle **ONLY ONE** number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1=STRONGLY DISAGREE **(SD)** 2=MODERATELY DISAGREE **(MD)** 3=SLIGHTLY DISAGREE **(D)**	4=SLIGHTLY AGREE **(A)** 5=MODERATELY AGREE **(MA)** 6=STRONGLY AGREE **(SA)**

		SD	**MD**	**D**	**A**	**MA**	**SA**
1	If I become sick, I have the power to make myself well again.	1	2	3	4	5	6
2	Often I feel that no matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
3	If I see an excellent doctor regularly, I am less likely to have health problems.	1	2	3	4	5	6
4	It seems that my health is greatly influenced by accidental happenings.	1	2	3	4	5	6
5	I can only maintain my health by consulting health professionals.	1	2	3	4	5	6
6	I am directly responsible for my health.	1	2	3	4	5	6
7	Other people play a big part in whether I stay healthy or become sick.	1	2	3	4	5	6
8	Whatever goes wrong with my health is my own fault.	1	2	3	4	5	6
9	When I am sick, I just have to let nature run its course.	1	2	3	4	5	6
10	Health professionals keep me healthy.	1	2	3	4	5	6
11	When I stay healthy, I'm just plain lucky.	1	2	3	4	5	6
12	My physical well-being depends on how well I take care of myself.	1	2	3	4	5	6
13	When I feel ill, I know it is because I have not been taking care of myself properly.	1	2	3	4	5	6
14	The type of care I receive from other people is what is responsible for how well I recover from an illness.	1	2	3	4	5	6
15	Even when I take care of myself, it's easy to get sick.	1	2	3	4	5	6

16	When I become ill, it's a matter of fate.	1	2	3	4	5	6
17	I can pretty much stay healthy by taking good care of myself.	1	2	3	4	5	6
18	Following doctor's orders to the letter is the best way for me to stay healthy.	1	2	3	4	5	6

Appendix B

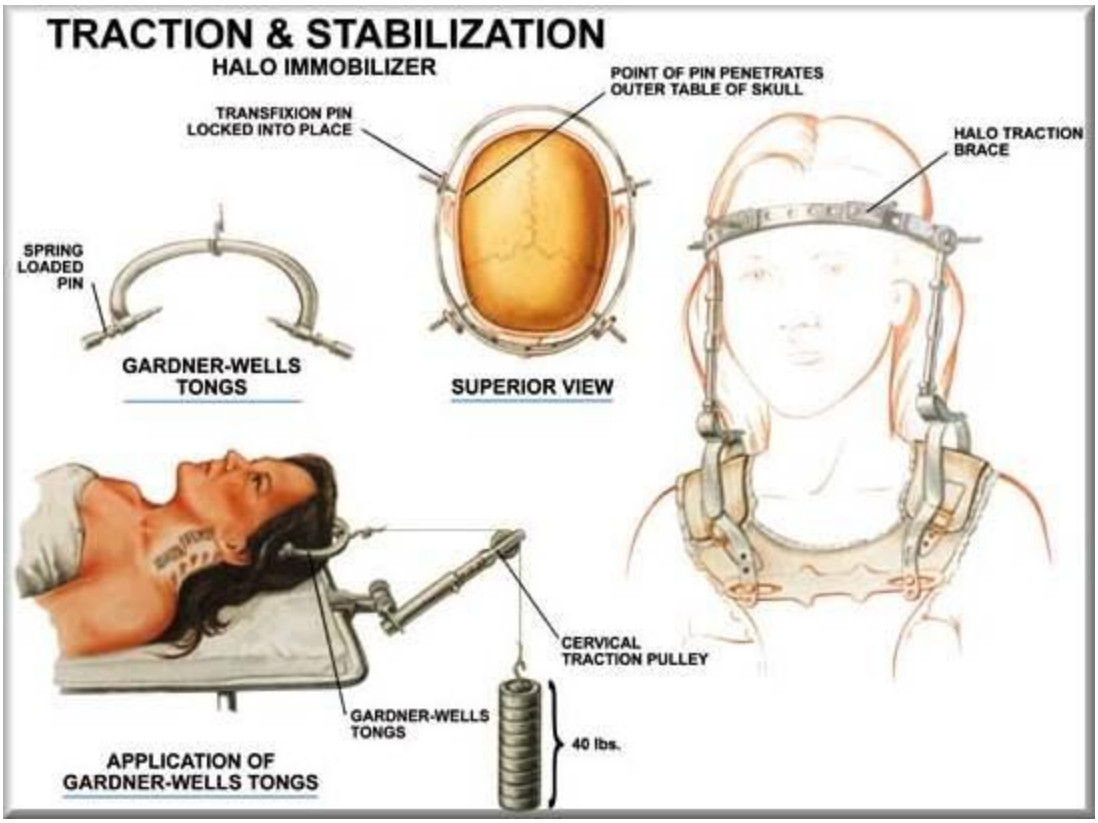
Visualization

Imagine that you have everything to live for: good friends, family, and an exciting future. Then one beautiful Monday afternoon after a long class, you decided to go for a car ride to the beach to relieve some stress. You remember thinking just how much you were looking forward to next week, when you were leaving with your friends on a cruise for spring break. Trying to cut across the median on a three lane highway, you are struck by a minivan on your side going over 65 MPH. Within a spilt second, you are struck again from the front. Your head immediately snapped back by the passenger side airbag so severely that your neck moved more than an inch off your spinal cord. The next thing you remember is waking up in the helicopter on your way to the Trauma Center. You were able to see that your arms and legs were attached to your body, but you were unable to feel or move them. Then suddenly it hit you: you were unable to feel anything below the neck. Surprisingly, you felt very little pain but knew straight away that something was definitely wrong. The Paramedics were trying to ask you some questions but when you tried to answer, for some reason you were unable to respond. The words just would not come out of your mouth, because you were having a very difficult time just breathing. When you woke up again in the hospital, you were told that the scans and x-rays revealed that you had shattered three bones in your neck. Your neck had to be stabilized using halo traction; this involved drilling 4 titanium screws through the skin and into the skull. Having to endure multiple operations, you were informed by the doctors that you would never be able to walk again and that you would have to spend the rest of your life in a wheel chair.

Having to miss two semesters of college, you decide to give it a go again. Your college degree has always meant so much to you. On the first day back you are already struggling to come into class, as your shoulders are in excruciating pain. They feel sore, heavy, and tired from wheeling yourself. The pain medication you took earlier has been weaning off. You see a space in the back of the classroom where there might possibly be room for a wheelchair. Placing yourself there, you can see everyone coming into the room after you unintentionally staring with a look of pity. You sit quietly, trying to endure the pain, as your professor tries to cover a long powerpoint presentation. Trying to concentrate the best that you can, you feel both a stabbing pain and a tingling sensation all along your body. Your legs, thighs, and toes all feel like they are being electrocuted. You are dreadfully uncomfortable; the catheter has also given you a kidney infection, which has been the least of your problems. Whispers are coming from two classmates and instantly you suspect that they are gossiping about you. Knowing you won't ever be able to enjoy going out as you use to, you begin to see your future. Everything now has to be planned out: wheelchair access, bathroom breaks, and medication. The aching from stress and anxiety in your stomach is eating at you. You begin to question starting school again. You cannot imagine dealing with this everyday.

Diagram of Halo Traction

Halo Traction



Appendix C

Spinal Cord Injury Questionnaire

Instructions: Below, you are asked to rate how you would feel if you had a spinal cord injury. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you agree or disagree with that statement. Please make sure that you answer **EVERY ITEM** and that you circle **ONLY ONE** number per item. This is a measure of your personal feelings; there are no right or wrong answers.

1=STRONGLY DISAGREE (SD) **2=MODERATELY DISAGREE** (MD) **3=SLIGHTLY DISAGREE** (D)	**4=SLIGHTLY AGREE** (A) **5=MODERATELY AGREE** (MA) **6=STRONGLY AGREE** (SA)

		SD	MD	D	A	MA	SA
1	If I ever had a spinal cord injury I would be completely devastated.	1	2	3	4	5	6
2	If I had a spinal cord injury, I would feel like I had no chance of being truly happy.	1	2	3	4	5	6
3	I would not want to be around my friends anymore if I had to live in a wheelchair.	1	2	3	4	5	6
4	A spinal cord injury would ruin my chances of having a career.	1	2	3	4	5	6
5	I would feel self-conscious as a spinal cord injury victim.	1	2	3	4	5	6
6	If I had a spinal cord injury, I would feel embarrassed about being intimate with someone else.	1	2	3	4	5	6
7	My family would not take care of my needs as a spinal cord injury victim.	1	2	3	4	5	6
8	I feel that having a spinal cord injury would ruin my mental well-being.	1	2	3	4	5	6