

Research article

Preliminary investigation into subjective well-being, mental health, resilience, and spinal cord injury

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Objectives: To undertake a pilot investigation into whether individuals whose subjective well-being had returned to the normal homeostatic range after a spinal cord injury (SCI) may be more resilient and therefore, at less risk of emotional distress over time. To consider the relative stability of subjective well-being in individuals with chronic SCI whose subjective well-being had previously returned to the normative homeostatic range.

Study design: Longitudinal study: Time 1 (T1) 2004 and Time 2 (T2) 2009.

Setting: Victoria, Australia.

Participants: Participants were adults living in the community with chronic SCI, who had no mental ill-health symptoms at T1.

Outcome measures: Scales include: Comprehensive Quality of Life Scale – Adult v5 (COMQoL-A5) at T1, Personal Well-being Index (PWI – the successor to the COMQoL-A5) at T2, and Depression, Anxiety & Stress Scale – short form (DASS-21) at T1 and T2.

Results: Twenty-one adults participated at T1 and T2. Subjective well-being was stable for 57% of the cohort. However, 19% presented with symptoms of emotional distress by T2. There was no significant difference in age ($P = 0.94$) or time since injury ($P = 0.51$) between those reporting significant emotional symptoms and those without; nor was there any systematic change in health status.

Conclusion: This study yielded two important findings. First, individuals with chronic SCI may be vulnerable to mental health issues even after they have previously exhibited good resilience. Second, subjective well-being after SCI may not be as stable as suggested by the general quality of life literature that have examined genetic and personality connections to subjective well-being.

Keywords: Psychological adaption, Mental health, Quality of life, Psychological resilience, Satisfaction with life, Disability, Spinal cord injuries

Introduction

“It has become generally accepted that, beyond the maintenance of human life through increasingly sophisticated interventions, maintained lives must be worth living” (ref. 1, p. 410). How someone feels about their life is, arguably, the most salient indicator of a life worth living.¹ Subjective quality of life (QoL) or subjective well-being includes the individual’s sense of happiness and their perception of *living a good life*.²

There has been a large amount of research into QoL in general populations³ and people living with a spinal

cord injury (SCI).⁴ A consistent finding in the general literature is that subjective well-being is a relatively stable phenomenon that is normally sited within the positive end of subjective QoL scales equating to an average of 75% of scale maximum (SM) (standard deviation (SD) 2.5%SM) in the western world.¹ This phenomenon was found constant across 16 studies that investigated subjective well-being using 14 different comprehensive satisfaction with life scales and questions, in large samples drawn from the general population.⁵ This stability in subjective well-being has also been linked to personality traits such as extraversion and neuroticism^{2,6,7} and strong genetic determination.⁸

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Various theories have been used to describe this phenomenon such as dynamic equilibrium,⁹ hedonic treadmill,¹⁰ subjective well-being homeostasis,³ and set-point of happiness.¹⁰ In essence, these theories describe how people adapt to significant life events such as winning the lottery or crashing their car, returning to their previous level of life satisfaction in the longer term.

Cummins *et al.*¹ describes this process as subjective well-being homeostasis, incorporating dispositional mechanisms such as adaptation, selective attention, social comparison, and external resources such as money and relationships, “to defend the self against adverse circumstances” (ref. 1, p. 411). Similar mechanisms have been linked to resilience and positive growth after physical disability¹⁰ and likewise, many individuals living with a SCI report a good subjective well-being regardless of their level of injury¹¹ and could, perhaps, be considered resilient under difficult circumstances.

On the other hand, there is evidence in the general literature suggesting that some of the life’s challenges can be so onerous that the reduction in subjective well-being can become permanent.¹² Long-term permanent defeat of normative subjective well-being has been found in people living with a range of disabilities.¹³ Poor subjective well-being for many individuals with chronic SCI has also been well documented.¹¹ Chronic defeat of the homeostatic set-point system has been linked with clinical depression.¹⁴ Substantial levels of depression have also been reported in individuals living with chronic SCI.¹⁵ Arguably, a longer-term aim of psychological therapies is to increase patient’s resilience so as to reduce their vulnerability to relapse of further episodes of mental illness.

While multiple definitions exist, in this study resilience refers to the dispositional attribute of hardiness, family cohesion and warmth, and the availability of external resources and supports.^{16,17} Resilience is not a matter of being heroic or superhuman. What is important to note is that there are skills that can be learnt and resources that can be modified to improve resilience.¹⁸ Until recently, there has been very little research examining the resilience of individuals who have experienced a traumatic injury.¹⁹

The objective of this pilot study was to test the hypothesis that individuals whose subjective well-being had returned to normative levels after a SCI could be more resilient and consequently be at less risk of mental illness such as depression. A secondary objective was to consider how stable the subjective well-being was in individuals with chronic SCI, whose subjective well-being had returned to normative levels post-injury.

Method

Settings

A database was made available of adults aged 18 years and over, with either traumatic or non-traumatic SCI living in the community in Melbourne, Australia who had participated in a previous project conducted in 2004^{11,15} – Time 1 (T1) – and who had agreed to participate in further research. Given the focus of this study was exploration of subjective well-being and resilience, only individuals who did not report symptoms of emotional distress, based on the Depression, Anxiety and Stress Scale – short form (DASS-21) scores²⁰ in the initial T1 project were approached to participate at Time 2 (T2).

Measures

Subjective well-being measures were included in the first (T1) and second time points (T2) and are detailed below. The DASS-21 was used to indicate mental distress and was used at both time points.

The DASS-21 is a reliable and well-validated measure with excellent psychometric properties used to discriminate between symptoms of depression, anxiety, and clinically significant stress in both clinical and non-clinical settings.^{20,21} Each subscale (depression, anxiety, and stress) consists of seven questions, has a clinical cut-off score, and four levels of symptom severity (mild, moderate, severe, and extremely severe). Participants are asked to indicate on a 0–3 scale how much each statement has applied to them over the previous week. According to Henry and Crawford²², the DASS-21 has good internal consistency, with a Cronbach alpha coefficient reported of 0.88 for the overall scale. In the current study, the Cronbach alpha coefficients were 0.93 at T1 and 0.94 at T2.

At T1, the Comprehensive Quality of Life scale for adult’s fifth edition (COMQoL-A5) was used as a measure of subjective well-being.²³ At T2, the Personal Well-being Index fourth edition (PWI) was used. The PWI is the successor of the COMQoL and was developed by the International Wellbeing Group within which the COMQoL authors are key members.²⁴

The COMQoL-A5 consists of objective (not part of the current study) and subjective components that are measured separately because they are usually poorly related. Both components appraise seven domains: material, health, productivity, intimacy, safety, place in the community, and emotional well-being. The scale is designed to be used with any section of the adult population. The scale is psychometrically sound and is reliable, stable, valid, and sensitive.²³ According to Cummins,²³ the COMQoL-A5 has good internal consistency, with a Cronbach alpha coefficient reported of

Table 1 Sample demographic and injury characteristics at T2

Variable	Sample characteristics	
Gender	Male <i>n</i> = 14	Female <i>n</i> = 7
Etiology	Non-traumatic SCI <i>n</i> = 5	Traumatic SCI <i>n</i> = 16
SCI Level	IT <i>n</i> = 4	IP <i>n</i> = 1
	CT <i>n</i> = 4	CP <i>n</i> = 12
T2 marital status	Single <i>n</i> = 9	Married/ <i>de facto</i> <i>n</i> = 12
T2 age	Mean age = 62 years (SD = 13.52 years)	Range = 30–79 years
T2 time since injury	Mean = 26 years (SD = 14.56 years)	Range = 7–51 years

SCI, spinal cord injury; IT, incomplete tetraplegia; CT, complete tetraplegia; IP, incomplete paraplegia; CP, complete paraplegia; SD, standard deviation.

0.81 for the satisfaction subscale. In the current study, the Cronbach alpha coefficient was 0.84. Subjective well-being was calculated as the mean of the seven subjective QoL domains and then converted into a percentage of scale maximum score (%SM) using the following formula:

$$\text{Satisfaction \% SM} = (\text{score } y - 1) \times 100 / (7 - 1)$$

where *y* is the sum of the satisfaction scores divided by 7.²³

This standardization enables direct comparison with similar measures^{5,23} including the PWI and is the same method Cummins used when examining the population-based studies referred to previously.^{1,5}

The PWI comprise semi-abstract items exploring satisfaction across eight broad domains of standard of living, health, achieving in life, personal relationships, safety, place in the community, future security, and spirituality or religion, using a 0–10 scale where 0 is completely dissatisfied and 10 represents completely satisfied, e.g. “how satisfied are you with your health”.²⁴ The data are averaged across the domains and transformed onto a 0–100 scale by simply shifting the decimal point to the right, e.g. a mean score of 7 becomes 70%SM.²⁴ A full discussion presenting the theoretical reasoning behind the COMQoL-A5 and PWI scale development as the successor of the COMQoL-A5, and normative Australian data for the past 10 years is readily available in the manual²⁴ and via the Australian Centre on Quality of Life website www.deakin.edu.au/research/acqol/introduction/ (accessed 2012 Nov 26). According to the International Wellbeing Group,²⁴ the PWI has good internal consistency, with Cronbach alpha coefficients reported as lying between 0.70 and 0.85 in Australia and overseas. In the current study, the Cronbach alpha coefficient was 0.80.

Satisfaction %SM from both the COMQoL-A5 and the PWI were then dichotomized into 0 = satisfaction

< 70%SM and 1 = ≥70%SM and the variable was renamed normative subjective well-being. The mean score for subjective well-being in the western world is 75%SM (SD = 2.5%SM)⁵; therefore the 0 score of the normative subjective well-being variable represents two SDs below the normative mean and therefore below the normative threshold and represents less than 5% of the distribution of the Australian population.

Statistical analyses used the paired *t*-test for continuous data and phi and Cramer’s V χ^2 test for discrete data. *P* values of less than 0.05 were deemed statistically significant. Ethics approval for the project was received from the relevant University and Health Network Ethics Committees.

Results

Twenty-one community-dwelling adults living with chronic SCI participated at T1 and T2. Most were married, male, and had complete paraplegia. A majority had been living with their SCI for over two decades and were middle aged or older (see Table 1). Subjective well-being lay well within the normative homeostatic range for around half of the participants at both time points: T1 mean = 78.0%SM (SD = 9.4%SM); T2 mean = 75.2%SM (SD = 20.1%SM). Similarly, the DASS-21 results fell within the non-clinical range for most participants (see Table 2).

No participants reported clinically significant mental health symptoms at T1 as per the participation qualifying criteria at T2, but some participants (*n* = 4, 19%) reported clinically significant mental health symptoms at T2. Just under half of participants (*n* = 8, 38%)

Table 2 Average depression, anxiety, and stress scores at Time 1 and Time 2

	Time 1 mean (standard deviation)	Time 2 mean (standard deviation)
Depression	2.2 (2.3)	3.6 (6.4)
Anxiety	1.2 (1.8)	0.3 (1.0)
Stress	4.5 (5.2)	4.1 (7.4)

Table 3 Changes in satisfaction with life, above and below the homeostatic threshold

Direction of change in satisfaction with life between T1 and T2	N	%
Satisfaction with life above the homeostatic threshold at T1 and T 2	12	57
Satisfaction with life above the homeostatic threshold at T1 but below at T2	4	19
Satisfaction with life below the homeostatic threshold at T1 but rose above at T2	4	19
Satisfaction with life below the homeostatic threshold at T1 and T2	1	05

experienced a meaningful change in their satisfaction with life over time (see Table 3).

Characteristics of participants reporting symptoms indicating the presence of a mental health disorder at T2 were as follows:

- Participant # A was female, age 30 years, complete paraplegia, non-traumatic SCI, time since injury = 18 years – severely stressed and severely depressed.
- Participant # B was male, age 64 years, complete paraplegia, traumatic SCI, time since injury = 7 years – severely depressed.
- Participant # C was male, age 74 years, complete paraplegia, traumatic SCI, time since injury = 51 years – mildly stressed.
- Participant # D was male, age 78 years, complete paraplegia, traumatic SCI, time since injury = 46 years – mildly stressed.

Post-hoc examination revealed no significant differences in age ($t = 0.1$ (df, 19) $P = 0.9$) and time since injury ($t = 0.7$ (df, 19) $P = 0.5$) between those reporting symptoms suggesting the presence of a mental health disorder and those without. A review of the type, range, and number of medications that participants took regularly at T1 and T2 – used as a proxy for possible change in health status – did not reveal any systematic influence on the probability of mental ill-health or level of subjective well-being at T2.

Discussion

This study has made two important findings that require further investigation: First, those individuals with chronic SCI may be vulnerable to mental health issues even after they have previously exhibited good resilience. Second, subjective well-being after SCI may not be as stable as the general QoL literature that has examined genetic and personality connections to subjective well-being would suggest.

Many participants demonstrated good resilience with their mental health and satisfaction with life lying within normal parameters at both time points. This is in keeping with the theory of subjective well-being homeostasis which declares subjective well-being to be a relatively stable phenomenon lying somewhere on the positive side of good to excellent.³ This is also in keeping with previous longitudinal

research on aging after SCI, where earlier perceived QoL predicted later stress, depression, and psychological well-being.²⁵

Nevertheless, there were some individuals whose mental health did deteriorate over time. This deterioration was not connected with their time since injury, age, or change in health status. Previous studies provide mixed findings on this issue.^{26–30} Some studies have found symptoms of depression decrease over time,^{27,30} other studies reported levels to be similar at various time points post-injury.^{26,28–30} The findings presented here are important because they suggest that vulnerability can manifest at any time post-injury, at any age post-injury, even after good subjective well-being has been established. There is no time after a SCI when health professionals can assume that the risk of new mental health issues is negligible.

In this cohort, the SCI characteristics associated with each person whose mental health had deteriorated was the same – complete paraplegia. This is contrary to Saunders *et al.*³⁰ who found reduced odds of probable major depression in those with non-ambulatory injuries in their large-scale study. This discordance may be due to a random irregularity in our data, in part due to the small sample size, rather than anything clinically meaningful, but no firm conclusion can be drawn at this point in time.

There was change in the subjective well-being between T1 and T2 for nearly half of the cohort as subjective well-being returned to normative levels in the same number of people as those whose subjective well-being deteriorated. In a much larger study ($n = 1035$), Hoffman *et al.*²⁸ found a similar pattern with the same number of their participants improving as those who experienced a worsening of depressive symptoms over time. Even considering the disparate nature of the sample size and characteristics and the differences between the outcome measure used, manifestation of the same pattern hints at the strong influence of extrinsic/external environmental factors on mental health and subjective well-being following SCI.

The debate around the relative impact of personal or intrinsic factors on independence and choice versus

external or environmental factors that limit or affect those choices may continue. However, the reality that community attitudes, social and economic factors, and physical access within home and community environments have an impact on choice, behavior, and subjective well-being is generally well accepted, as reflected in the biopsychosocial model, e.g. see WHO's *Towards a Common Language for Functioning, Disability and Health: ICF*.³¹ Assuming that the population groups in both Hoffman and colleague's study and the present study are relatively heterogeneous in composition aside from the presence of chronic SCI, future research must examine how to maximize opportunities for choice, participation, and home and community integration following SCI, as key determinants of improved mental health and subjective well-being.

There are a number of limitations to our study. Post and van Leeuwen³² in their recent review of psychosocial issues after SCI lament the lack of longitudinal studies into life satisfaction, especially in the longer term. Although the longitudinal design is an advantage of our study, the small sample size available is a significant limitation of the study and constrains the ability to draw absolute conclusions from the research findings. In addition, the purposeful sampling method of this study (i.e. only sampling from those individuals who did not have evidence of mental distress at T1) may have influenced the study findings. However, the focus of this study was always on positive subjective QoL and resilience rather than the negativity of mental illness. Considering these limitations, this exploratory study would benefit from repetition using a larger population and expansion of independent variables to address the issues raised above.

In conclusion, this pilot study highlights two important implications that require further investigation. First, vulnerability to deterioration in the mental health of persons with SCI may manifest at any time post-injury, at any age, and in individuals who have previously displayed good resiliency. The results underscore the importance of continuing to evaluate mental as well as physical health during health reviews in patients with chronic SCI. Second, subjective well-being after SCI may not be as stable as the general QoL literature that have examined genetic and personality connections to subjective well-being would suggest. In addition, this study is a reminder that, while it is important to examine characteristics of the individual, vulnerability is also attributable to factors external to the individual: not addressing those factors means there will always be individuals who will not be able to *live a good life*.

References

- Cummins RA, Mellor D, Stokes M, Lau ALD. Measures of subjective well-being. In: Mpofu E, Oakland T, (eds.) Rehabilitation and health assessment: applying ICF guidelines. New York: Springer Publishing Co; 2010. p. 409–26.
- Cummins RA. A model of subjective wellbeing homeostasis: the role of personality. In: Gullone E, Cummins RA, (eds.) The universality of subjective wellbeing indicators. Dordrecht: Kluwer; 2002.
- Cummins RA. Normative life satisfaction: measurement issues and a homeostatic model. *Soc Indic Res* 2003;64(2):225–56.
- Post M, Noreau L. Quality of life after spinal cord injury. *J Neuro Phys Ther* 2005;29(3):139–46.
- Cummins RA. On the trail of the gold standard for subjective well-being. *Soc Indic Res* 1995;35(2):179–200.
- Diener E, Lucas RE. Personality and subjective well-being. In: Kahneman D, Diener E, Schwartz N, (eds.) Well-being: the foundations of hedonic psychology. New York: Russell Sage Foundation; 1999.
- Headey B. The set-point theory of well-being: negative results and consequent revisions. *Soc Indic Res* 2008;85(3):389–403.
- Lykken D, Tellegen A. Happiness is a stochastic phenomenon. *Psychol Sci* 1996;7(3):186–9.
- Headey B, Wearing A. Personality, life events, and subjective well-being: toward a dynamic equilibrium model. *J Pers Soc Psychol* 1989;57:731–9.
- Dunn DS, Uswatte G, Elliott TR. Happiness, resilience, and positive growth following physical disability: issues for understanding, research and therapeutic intervention. In: Snyder CR, Lopez SJ, (eds.) Oxford handbook of positive psychology. 2 ed. New York: Oxford University Press; 2009. p. 651–64.
- Migliorini C, New PW, Tonge B. Quality of life in adults with spinal cord injury living in the community. *Spinal Cord* 2011; 49(3):365–70.
- Headey B. The set-point theory of well-being needs replacing: on the brink of a scientific revolution? *Deutsches Institut für Wirtschaftsforschung*; (October 2007). SOEP Paper No. 55. DOI: 10.2139/ssrn.1096451.
- Lucas RE. Long-term disability is associated with lasting changes in subjective well-being: evidence from two nationally representative longitudinal studies. *J Pers Soc Psychol* 2007;92(4):717.
- Cummins R. Subjective wellbeing, homeostatically protected mood and depression: a synthesis. *J Happiness Study* 2010;11(1):1–17.
- Migliorini C, Tonge B, Taleporos G. Spinal cord injury and mental health. *Aust N Z J Psychiatry* 2008;42(4):309–14.
- Herrman H, Stewart DEMD, Diaz-Granados N, Berger ELD, Jackson B, Yuen T. What is resilience? *Can J Psychiatry* 2011; 56(5):258–65.
- Wallace KA, Bergeman CS. Hardiness as a dispositional resource: methods of conceptualizing the construct. In: Ong AD, van Dulmen MHM, (eds.) Oxford handbook of methods in positive psychology. New York: Oxford University Press; 2007. p. 323–38.
- White B, Driver S, Warren A-M. Considering resilience in the rehabilitation of people with traumatic disabilities. *Rehabil Psychol* 2008;53(1):9–17.
- Quale AJ, Schanke AK. Resilience in the face of coping with a severe physical injury: a study of trajectories of adjustment in a rehabilitation setting. *Rehabil Psychol* 2010;55(1):12–22.
- Lovibond SH, Lovibond PF. Manual for the Depression Anxiety Stress Scales. 2 ed. Sydney, Australia: The Psychology Foundation of Australia Inc; 1995.
- Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson RP. Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychol Assess* 1998;10(2):176.
- Henry J, Crawford J. The 21-item version of the Depression Anxiety Stress Scales (DASS-21): normative data and psychometric evaluation in a large non-clinical sample. *Br J Clin Psychol* 2005;44:227–39.
- Cummins RA. Comprehensive quality of life scale – adult (ComQoL-A5). 5 ed. Melbourne: Deakin University; 1997.
- International Wellbeing Group. Personal wellbeing index. Melbourne: Australian Quality of Life, Deakin University. (http://www.deakin.edu.au/research/acqol/instruments/wellbeing_index.htm); 2006.

- 25 Charlifue S, Gerhart K. Changing psychosocial morbidity in people aging with spinal cord injury. *NeuroRehabilitation* 2004; 19(1):15–23.
- 26 Craig AR, Hancock KM, Dickson HG. A longitudinal investigation into anxiety and depression in the first 2 years following a spinal cord injury. *Paraplegia* 1994;32(10):675–9.
- 27 Dorsett P, Geraghty T. Depression and adjustment after spinal cord injury: a three-year longitudinal study. *Top Spinal Cord Inj Rehabil* 2004;9(4):43–56.
- 28 Hoffman JM, Bombardier CH, Graves DE, Kalpakjian CZ, Krause JS. A longitudinal study of depression from 1 to 5 years after spinal cord injury. *Arch Phys Med Rehabil* 2011;92(3):411–8.
- 29 Pollard C, Kennedy P. A longitudinal analysis of emotional impact, coping strategies and post-traumatic psychological growth following spinal cord injury: a 10-year review. *Br J Health Psychol* 2007;12(3):347–62.
- 30 Saunders LL, Krause JS, Focht KL. A longitudinal study of depression in survivors of spinal cord injury. *Spinal Cord* 2012; 50(1):72–7.
- 31 World Health Organization. Towards a common language for functioning, disability and health. Geneva, ICF: World Health Organisation; 2002.
- 32 Post MWM, van Leeuwen CMC. Psychosocial issues in spinal cord injury: a review. *Spinal Cord* 2012;50(5):382–9.