Therapeutic Enhancements and the View of Rehabilitation Educators

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ABSTRACT: So far, the meaning of health and therefore treatment and rehabilitation is benchmarked to the normal or species typical body. Therapeutic interventions increasingly have the potential to generate beyond the 'normal' bodily abilities (therapeutic enhancements) The field of rehabilitation, the desire for certain especially beyond species-typical body abilities and the direction and governance of science and technology are becoming increasingly interrelated. How we judge and deal with bodily abilities, or the lack of them, among others influences the direction and governance of science and technology processes, products and research and development and influence the meaning and scope of health and rehabilitation, the identity and job description of health and rehabilitation professionals, the desires of health and rehabilitation clients. This paper presents the results of an exploratory, non-probability survey of National Council of Rehabilitation Educators (USA) members seeking their views on issues of bodily enhancement and their impact on health and rehabilitation professions. The majority surveyed perceived human enhancements beyond the 'normal' and the attached changes as unavoidable. The results indicate that it is high time that the enhancement discourse moves outside the ethics realm and that impact analysis of beyond the normal enhancement is performed that includes so far mostly invisible health and rehabilitation professionals, their clients and disability policy scholars.

KEYWORDS:Therapeutic enhancements; people with disabilities; rehabilitation; counseling; future; meaning of health and rehabilitation; disability policy

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Introduction

"Science and technology activities are often articulated in terms of better and/or more sustainable health care, better health, less disease, more wellness, more efficient health systems, and better health-care delivery and better rehabilitation" (Wolbring, 2005). Both, the health and rehabilitation fields, depend on species-typical normative body functioning as their framework of reference (Boorse, 1977; Boorse, 1975; Wade & de Jong, 2000; Griffiths, 1940; Medical Dictionary, 2009; Stucki, Cieza, & Melvin, 2007). We expect certain abilities in members of a certain species; we expect humans to walk but not to fly but a bird we expect to fly. If the bird cannot fly, we perceive it as impaired and if humans cannot walk, we perceive them as impaired. Health and rehabilitation interventions are meant to restore as much as possible the species-typical functioning. However, therapeutic in-

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terventions developed to regain expected body functioning, through iterative advancements as a side effect, increasingly are envisioned to allow the health and rehabilitation client to outperform the species-typical body in various functions. The 'cheetah' prosthetic legs worn by active or former Paralympic Amputees such as Oscar Pistorius (Zettler, 2009; Wolbring, 2008b; International Paralympic Committee, 2008; The Courts of Arbitration for Sport (the "CAS"), 2008; Swartz & Watermeyer, 2008) Aimee Mullins (Romon, 2010; TED Talks, 2010) or Sarah Reinertsen (Ironman Triathlon, 2010) are just one example therapeutic devices that are envisioned to outperform the species-typical body soon.

Some of the main future health, health-care and rehabilitation policy challenges are linked to the ever-increasing ability of science and technology products and processes to modify the appearance and functioning of the human body beyond existing norms and species-typical boundaries. Brain–machine interfaces, bionic ear, bionic eyes, retinal prostheses; wheelchair control; bionic legs and arm; bionic knee; neural prostheses; speech; artificial joints, artificial muscles, bioartificial kidney, artificial liver, artificial cartilage artificial lungs, artificial discs, artificial pancreas bionic dental pulp and other areas all advance (Wolbring, 2005; Coenen et al., 2009). Many projects under way at the Defense Advanced Research Projects Agency (DARPA) USA (Coenen et al., 2009) such as the virtual soldier program, prosthetics and the exoskeletons for Human Performance Augmentation Program will lead to the enhancements beyond the species-typical of injured veterans. The increasing ability, demand for, and acceptance of changing, improving, modifying, enhancing the human body in terms of its structure, function or capabilities beyond its Homo sapiens-typical boundaries leads to a changed understanding of oneself, one's body, and one's relationship with others of the species, other species and the environment (Wolbring, 2009; Wolbring, 2008a; Coenen et al., 2009; M.Roco, 2003; Word Transhumanist Association., 2005; Wolbring, 2005; Nature, 2008; Williams, 2006; Nature, 2008). In a 2006 Summary Report of an Invitational Workshop Convened by the Scientific Freedom, Responsibility and Law Program American Association for the Advancement of Science (Williams, 2006) one reads that polls indicate that personal interest in or aversion to using Human enhancement technologies depends on one's perceived social status, and how Human enhancement would affect his/her competitive advantage. Some drivers for human enhancement mentioned are; "1) global competitiveness; 2) brain drain/depopulation economics; 3) national security concerns; and 4) quality of life/consumer life-style demands" (Williams, 2006). The move beyond the species-typical enables the transformation of the meaning of health, medicine and rehabilitation (Wolbring, 2010; Wol-

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bring, 2005) toward a enhancement version that incorporates, condones, and even expects human performance enhancement beyond species-typical boundaries as one prerequisite of being "healthy". Enhancement beyond species-typical body structures and functioning is perceived in such an understanding as a therapeutic interventions. The enhancement model of health medicine and rehabilitation is linked to an emerging form of ableism that perceives abilities beyond the species-typical as essential (Wolbring, 2008d; Wolbring, 2008c). It enables a change of the rehabilitation definition: 'rehabilitation is a treatment or treatments designed to facilitate the process of recovery from injury, illness, or disease to **as normal** a condition as possible'(TheFreeDictionary, 2009) towards a definition where normal is replaced by optimum, whereby optimum is not linked to species-typical but to the best condition possible even going beyond species-typical performance (Wolbring, 2010). Enhancement Medicine and Rehabilitation will provide for the remedy of a non enhanced body and the maintenance of an enhanced human body. The increasing feasibility of Enhancement Rehabilitation will influence rehabilitation education, the self-understanding of rehabilitation practitioners, the expectations of rehabilitation clients and the focus, priority setting and self-understanding of the meaning of rehabilitation as a field. People with disabilities many of whom are rehabilitation clients are seen as trailblazers for increasing the acceptance of enhancement technologies (Hughes, 2004; Dvorsky, 2003). At the same time many people with disabilities might become part of the new social group of techno poor impaired and disabled, which are people who are seen as deficient because they are not able or do not want to enhance their body beyond the 'normal' (Wolbring, 2006). The dynamic around access to therapeutic enhancement will be one area rehabilitation counselors might have to consider. However, although the use of human enhancement is debated for some time (Lewens, 2010; Coenen et al., 2009; Gunson, 2009; Buchanan, ; Pound, ; Riis, Simmons, & Goodwin, 2008; Beck, 2007; Irish Council for Bioethics, 2007; Tomasini, 2007; Williams, 2006; Robert, 2005; Rothman S, 2005; Baylis & Robert, 2004; Caplan A, 2004; Farah MJ et al., 2004; Khushf, 2004; Eugene Russo, 2002; Brodey & Lindgren, 1968; President's Council on Bioethics, 2003) this discourse so far does not take place within the broader health care, health policy and rehabilitation community and without analyzing the impact on the health care and policy and rehabilitation fields.

As for the USA the National Council on Rehabilitation Education (NCRE) represent over 90 institutions of higher education and 600 individual members (National Council of Rehabilitation Education, 2011) and is one group that trains rehabilitation counselors of which there are ap-

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proximately 131,000 rehabilitation counselors working in the United States today (Pagerankstudio.com, 2010). The objective of rehabilitation counselors is to "provide counseling and guidance services to people with disabilities, to help them resolve life problems and to train for and locate work that is suitable to their physical and mental abilities, interests, and aptitudes" (Pagerankstudio.com, 2010). They are as such intricately involved in advising their clients on the availability of solutions to their problems. In the future, the solution suggested might include enhancement technologies. However, rehabilitation counselors are not visible in the policy discourses around enhancements. Therefore views of NCRE members were solicited through an online, exploratory and non-probability survey. The purpose of this survey was to gain a better understanding of the views of NCRE members regarding various aspects of enhancement technologies and their use and impact. The results are presented in this paper.

Method

Survey Instrument.

In order to generate empirical data on the perspectives of members of the National Council of Rehabilitation Education (NCRE) on therapeutic enhancements an online non probability and exploratory survey was generated through the survey monkey platform.

Survey Implementation.

The link to the survey was transmitted via expert snowball sampling by the chair of the NCRE research committee to the membership of NCRE after the survey received ethics approval by the University of Calgary Health Research Ethics board and the research committee of the NCRE.

Survey Content:

The online delivered exploratory, non-probability survey used a combination of 37 simple yes or no, Likert scale, as well as opinion rating scale questions. Th questions aimed to better understand a)which nanoscale science and technology products and processes one should focussed on in general b) which nanoscale science and technology products and processes one should focussed on in regards to disabled people, c) the increasing ability of nanoscale science and technology processes and products to enhance the human body beyond the 'normal' and d) the impact if any of the increasing ability of nanoscale science and technology processes and products to enhance the human body beyond the 'normal'. This paper cover the answers linked to enhancement technologies.

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Data Compilation and Analysis.

The membership of the NCRE that potentially could have been reached consist of students and researcher/teachers, of over 90 institutions of higher education and 600 individual members (National Council of Rehabilitation Education, 2011). If one takes the individual membership rate as a measure around 8% answered part of the survey. The full scope of reach of the NCRE network can not be measured as the 90 member institutions of higher eductions as well as the 600 individuals could have distributed the link further. As the survey was anonomous the author had no way to identify people who answered the survey. The survey link was open between October 2009 and March 2010. Fifty five participants answered the survey partly and N=24 (43.6%) answered every question. A database was automatically generated by Survey Monkey. Data was exported as csv and pdf files for subsequent analysis. Frequency distribution analysis of answers were performed as well as cross tabulation analysis of the results related to the demographics of student, researcher/teacher, female and male respondents. As this is a non-probability sample no tests of significance were performed (The Advisory Panel on Online Public Opinion Survey Quality, 2011). Results were presented at the NCRE March 2010 conference.

Results

Demographics

The respondents consisted of 23 females and 21 males, 5 male students and 18 male university researchers/teachers, 10 female students and 14 female university researchers/teachers.

Main Results:

The tables of the paper highlight five main findings.

1) the majority of male researcher/teacher and female student and research/teacher believe that people with disabilities should be given therapeutic interventions (drugs to alleviate post traumatic stress disorder, brain machine interfaces, artificial hippocampus, artificial eyes, artificial nose, artificial legs, artificial arms, artificial skin, artificial retina. cochlear implants, hearing aids, cognoceuticals (enhancing cognition) and subvocal speech devices) even if they lead to abilities not 'normal' for humans (table 1).

2) with the exception of female students who indicate mostly a "don't know" the majority of male researcher/teacher and student and fe-

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male research/teacher believe that the 'non-disabled' should also have access to these advances (table 2).

3) the majority of female and male researcher/teacher and student believes that it cannot be prevented that therapeutics developed for disabled people are used for different purposes by non-disabled people (table 3).

4) the majority of female students and teachers/researchers respondents believed that enhancement medicine and a transhumanized form of ableism, health and medical model of disability as well as the appearance of a new social group of the techno poor impaired and disabled is unavoidable. Male students were more skeptical but mostly felt they can't say. The majority of male researcher/teacher felt transhumanized enhancement medicine and a transhumanized form of health is likely or very likely to appear whereby the appearance of a new social group of the techno poor impaired and disabled and a transhumanized form of ableism is seen as less likely (table 4).

5) the respondent saw rarely a pure negative impact whereby often highlighting a pure positive impact. Especially female student respondents saw a pure positive impact for many of the options (Well-Being of disabled people in high income countries; Well being of disabled people in low income countries; The self identity of disabled people in general; The medical model identity of disabled people; The social model understanding of disabled people; Living situation of Disabled People; Disability Studies; Medical Research; Access to Education for disabled people from the elementary level onwards; Disabled people organization; Disabled people related service Organization; Rehabilitation covering organization; Rehabilitation Counselors; Rehabilitation Professionals; Disability Studies Scholars; Rehabilitation Medicine; Community Rehabilitation and Access to health care for disabled) (table 5).

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Table 1 All of the below examples can be defined as therapeutic for disabled people and very likely give them abilities beyond the 'normal' in the future. Question Should disabled people be given these therapeutic interventions even if they lead to abilities not 'normal' for humans?

	Male Researcher Yes N=12	Male Student Yes N=4	Female Researcher Yes N=12	Female Student Yes N=8
Drugs to alleviate Post Traumatic Stress Disorder	66.7	25.0	66.7	87.5
Brain Machine Interfaces (enables someone to control with ones mind devices with embedded computer chips)	66.7	25.0	41.7	50.0
Artificial Hippocampus (a chip that can act as a memory repository)	58.3	25.0	58.3	100.0
Artificial Organs	75.0	25.0	58.3	100.0
Artificial Eyes	75.0	25.0	66.7	100.0
Artificial Nose	75.0	25.0	58.3	87.5
Artificial Legs	75.0	25.0	75.0	100.0
Artificial Arms	75.0	25.0	75.0	100.0
Artificial Skin	75.0	25.0	75.0	87.5
Artificial Retina	75.0	25.0	75.0	100.0
Artificial Ears (cochlear implants or hearing aids)	75.0	25.0	75.0	87.5
Neuropharmaceuticals: Cognoceuticals (enhancing cognition)	66.7	25.0	58.3	75.0
Subvocal Speech: Using signal processing, unpronounced speech representing the thought of the mind can be translated from intercepted neurological signals	66.7	25.0	75.0	87.5

Table 2: Many nanoscale enabled products that are given as 'therapeutics' to disabled people might give disabled people abilities not existent in 'normal' humans. Many of these advances will also be available to nondisabled people. Should the 'non-disabled' have access to these advances?

	Male Researcher N=12	Male Student N=4	Female Researcher N=12	Female Student N=8
Yes	75.0	50.0	66.7	25.0
No	8.3	0.0	0.0	12.5
Don't Know	16.7	50.0	33.3	62.5

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Table 3: Do you think it can be prevented that therapeutics developed for disabled people are used for different purposes by non-disabled people?

	Male Researcher N=12	Male Student N=4	Female Researcher N=12	Female Student N=8
Yes	8.3	0.0	0.0	25.0
No	83.3	100.0	75.0	50.0
Don't Know	8.3	0.0	25.0	25.0

Table 4: Do you think the below listed will come to pass with the reality that increasingly products appear that allow for the enhancement of the human body?

	Male Researcher Very likely+ Likely/Not likely+ very unlikely N=9	Male Student Not likely/ Don't Know N=3	Female Researcher Very likely+ Likely/Not likely+ very unlikely N=8	Female Student Very likely+ Likely/Not likely+ very unlikely N=4
Enhancement form of ableism	33.3/44.4	33.3/66.6	75.0/12.5	75.0/0.0
Enhancement Model of Health	55.5/22.2	33.3/66.6	87.5/12.5	75.0/0.0
New social group of the techno poor impaired and disabled	37.5/50.0	33.3/66.6	75.0/12.5	50.0/0.0
Enhancement Medicine	66.6/11.1	33.3/66.6	100/0/0.0	75.0/0.0

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Table 5: What do you think will be the impact of the increasing ability of products and processes to enhance the human body beyond the 'normal' for ...?

	Male Researcher Positive Effect/ Positive and Negative Effect N=12	Male Student Positive Effect/ Positive and Negative Effect N=3	Female Researcher Positive Effect/ Positive and Negative Effect N=10	Female Student Positive Effect/ Positive and Negative Effect N=8
Well-Being of disabled people in high income countries	50.0/25.0	0.0/33.3	50.0/40.0	50.0/25.0
Well being of disabled people in low income countries	16.7/8.3/no effect 41.7	0.0/33.3	0.0/40.0 /don't know 50.0	25.0/25.0 don't know 37.5 no impact 12.5
The self identity of disabled people in general	8.3/50.0	0.0/33.3	30.0/60.0	62.5/25.0
The medical model identity of disabled people	16.7/33.3	0.0/33.3	30.0/30.0 neg 40.0	37.5/25.0
The social model understanding of disabled people	16.7/41.7	0.0/33.3	50.0/40.0	37.5/25.0
Living situation of Disabled People	50.0/25.0	33.3/33.3	50.0/50.0	87.5/12.5
Disability Studies	50.0/33.3	33.3/33.3	80.0/20.0	75.0/12.5
Medical Research	41.7/41.7	33.3/33.3	80.0/20.0	62.5/25.0
Access to Education for disabled people from the elementary level onwards	66.7/16.7	33.3/33.3	70.0/20.0	87.5/12.5
Disabled people organization	41.7/41.7	33.3/33.3	60.0/30.0	62.5/25.0
Disabled people related service Organization	41.7/50.0	33.3/33.3	60.0/30.0	50.0/12.5
Rehabilitation covering organization	41.7/33.3	0.0/33.3	60.0/30.0	62.5/29.0
Rehabilitation Counselors	41.7/33.3	0.0/33.3	60.0/30.0	75.0/25.0
Rehabilitation Professionals	41.7/50.0	0.0/33.3	60.0/30.0	62.5/25.0
Disability Studies Scholars	41.7/33.3	33.3/33.3	70.0/10.0	75.0/0.0
Rehabilitation Medicine	58.3/33.3	0.0/33.3	60.0/30.0	62.5/25.0
Community Rehabilitation	41.7/33.3	33.3/33.3	70.0/20.0	75.0/12.5
Access to health care for disabled People	58.3/16.7	33.3/33.3	60.0/10.0	62.5/12.5

Discussion

One of the question raised in the human enhancement discourse is whether one should and can draw a line between therapy and enhancement in general and between therapeutic and non-therapeutic enhancements in particular (Wol-

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bring, 2005; Irish Council for Bioethics, 2007). A key message from the survey is that a majority of respondents felt that limiting the access to enhancement technologies for people with and without disabilities very likely does not work and should not even be performed. The view of respondents to not limit the access of disabled people to enhancement technology, the rejection of limiting therapeutic interventions to restoring species-typical abilities makes sense given the Code of Ethics NCRE members are to follow (Commission on Rehabilitation Counselor Certification, 2010). According to the code, "the primary obligation of rehabilitation counselors is to clients, defined as individuals with or directly affected by a disability, functional limitation(s), or medical condition and who receive services from rehabilitation counselors" (Commission on Rehabilitation Counselor Certification, 2010). Given the job description and code of ethics of rehabilitation counselors, given the negative societal reality disabled people are experiencing (Kessler Foundation & National Organization on Disability, 2010; Adams-Shollenberger & Mitchell, 1996), given the negative social perception many people with disabilities experience (Meyerson, 1948; National Council on Disability, 2009) given legal decisions that indicate that people with disabilities have the obligation to fix themselves before they can use something like the American with Disabilities Act for a remedy and given the perception that society will never support and accept people with disabilities with their variation of being (Wolbring, 2004), it seems that rehabilitation counselors might have to advice people with disabilities to obtain therapeutic devices. At the same time given the assumption that a therapeutic device that leads to therapeutic enhancements is of better quality than a therapeutic device of the same make up that only obtains species-typical abilities the author submits that the enhancement enabling device might be more useful in rectifying the negative situation of a given disabled person in society than the therapeutic device that only leads to species-typical functioning and therefore the rehabilitation counselors might have to advise towards the beyond the species-typical ability enabling version of a therapeutic intervention if available. The answer of NCRE members is in sync with the discourse around therapeutic enhancement which is really not contesting therapeutic enhancements per se (Wolbring, 2005).

Many therapeutic enhancements will also be usable by so-called non-disabled people. Given this reality many believe one should draw a line between therapeutic and non-therapeutic interventions or therapeutic and non-therapeutic enhancements (Wolbring, 2005) boundaries which are seen as untenable by many (Wolbring, 2005). The majority of the respondents seem to agree with the non-tenability of a boundary between therapeutic and non-therapeutic interventions or therapeutic and non-therapeutic enhancements. The majority of respondents felt that the availability of enhancements should also not be limited for so-called non-disabled people. This sentiment by respondents fits with the sentiment that the majority of respondents felt that enhancement medicine

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and enhancement forms of ableism and health are unavoidable. These sentiments are of great impact for the enhancement discourse in general and how health and healthcare, disability and rehabilitation policies are shaped in regards to therapeutic enhancements. For one if they believe that there will be a transhumanized model of health there will also be a transhumanized model of rehabilitation. This means that a so called species-typical person seen so far as healthy might become a health care and rehabilitation client to be advised by rehabilitation counselors. It might lead to the situation where rehabilitation professionals from various rehab fields will accept the species-typical as rehabilitation clients training them in the enhancement enabling devices (at least for the ones which one can be trained on as a disabled and non-disabled perceived person without major medical interventions such as surgeries). Respondents also felt the appearance of a new social group of the techno poor impaired and disabled to be a reality. Given the code of ethics of rehabilitation counselors which among others states that "the primary obligation of rehabilitation counselors is to clients" (Commission on Rehabilitation Counselor Certification, 2010) might put the onus on rehabilitation counselors to get involved in the availability of such devices to make sure that their clients do not suffer due to non-availability. It is further of interest to the enhancement discourse that the answers to the impact question reveal in general a positive view on enhancements with little concerns. This seems to fit with another survey performed with members of the World Federation of the Deaf which for the most part did not had too many concerns (Wolbring, 2011). Code of ethics that are linked to people serving people with hearing loss also do not give so far any specific guidance as to therapeutic enhancements (Wolbring, 2011) but allow for the uptake of therapeutic enhancements even for people with species-typical hearing (Wolbring, 2011). Given, the results presented in this paper (although generated from a small sample) the author submits it being advisable that health and rehabilitation professionals and clients in general, NCRE members and their clients, people involved in various disability policy areas and disabled people in general become more visible in the enhancement product and development and governance discourses. The author also submits that follow up research being undertaken which generates a bigger sample of NCRE members and also surveys other professional fields as well as clients to get a better sense of what the perception related to therapeutic enhancements are.

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