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SPECIAL COMMUNICATION

Toward a Theory-Driven Classification of Rehabilitation Treatments

Tessa Hart, PhD,[a] Theodore Tsaousides, PhD,[b] Jeanne M. Zanca, PhD, MPT,[b] John Whyte, MD, PhD,[a] Andrew Packel, MSPT,[a] Mary Ferraro, PhD, OTR/L,[a] Marcel P. Dijkers, PhD, FACRM[b]

From the [a]Moss Rehabilitation Research Institute, Elkins Park, PA; and [b]Department of Rehabilitation Medicine, Icahn School of Medicine at Mount Sinai, New York, NY.

Abstract

Rehabilitation is in need of an organized system or taxonomy for classifying treatments to aid in research, practice, training, and interdisciplinary communication. In this article, we describe a work-in-progress effort to create a rehabilitation treatment taxonomy (RTT) for classifying rehabilitation interventions by the underlying treatment theories that explain their effects. In the RTT, treatments are grouped together according to their targets, or measurable aspects of functioning they are intended to change; ingredients, or measurable clinician decisions and behaviors responsible for effecting changes; and the hypothesized mechanisms of action by which ingredients are transformed into changes in the target. Four treatment groupings are proposed: structural tissue properties, organ functions, skilled performances, and cognitive/affective representations, which are similar in the types of targets addressed, ingredients used, and mechanisms of action that account for change. The typical ingredients and examples of clinical treatments associated with each of these groupings are explored, and the challenges of further subdivision are discussed. Although a Linnaean hierarchical tree structure was envisioned at the outset of work on the RTT, further development may necessitate a model with less rigid boundaries between classification groups, and/or a matrix-like structure for organizing active ingredients along selected continua, to allow for both qualitative and quantitative variations of importance to treatment effects.

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"Taxonomies are a losing battle, sandcastles shored up against the rising tide of change—but we fight nevertheless, because they give temporary respite from advancing chaos."[1(pxvi)]

For some time, rehabilitation researchers and practitioners have called for a classification system by which to organize the controlled chaos of rehabilitation interventions. A sound method for classifying rehabilitation treatments would be useful for consistent identification and labeling of treatments. Consistent labeling of treatments is an essential precursor to quantifying them (eg, measuring the dose or intensity of particular interventions).[2] A classification scheme would also facilitate training and program evaluation, communication and coordination across the disciplines involved in rehabilitation, and both planning and documentation of treatment. Several classification systems have been developed for portions of rehabilitation practice, based on bottom-up or primarily inductive processes.[3] That is, treatments have been listed using names or brief descriptions of activities within professional disciplines (eg, occupational therapy, physical therapy).[4,5] Although such schemes may be convenient and align well with clinicians' thinking, they risk separating treatments that are actually similar. For example, treatments aimed at dressing and walking with a cane may share attributes in common to training in sequential activities. Conversely, there is a risk of combining dissimilar activities under the same name, such as the diverse practices that are all called memory (re)training. As well, bottom-up schemes often label treatments by naming the problem that is treated (dressing skills, memory) without specifying how it

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is treated—a tautology that helps to keep the mechanisms of effective intervention buried in the black box of rehabilitation.[2]

In this article, we describe the interim findings of an ongoing effort to develop the structure of a **rehabilitation treatment taxonomy* (RTT) based not on names or surface characteristics of interventions but on the theories underlying them. (Words and phrases that are specifically defined in supplemental appendix S1 [available on page A9 of this supplement and online at http://www.archives-pmr.org/] are marked with an asterisk and italicized when initially used.) In addition to serving the purposes previously described, a classification system based on the theories that explain treatment effects would do much to advance rehabilitation research. Such a system would facilitate the specification, testing, and dissemination of effective treatments; enhance measurement of treatment fidelity; and simplify the process of organizing the knowledge gained (eg, for systematic reviews).[6]

We have used a number of methods to arrive at this point in the development of the RTT. These include a structured literature search for articles on treatments from all of the main rehabilitation disciplines. We have also sought periodic input from a multidisciplinary advisory committee. However, most of the concepts subsequently described have evolved from discussion among the authors, as we worked through a number of ways to conceptualize treatment theories and possible treatment classification schemes, and tested their resilience to numerous examples of real and hypothetical interventions. Although this work is far from its final form, we present it in the hope that input from the field will provoke more discussion to shape the future of this effort, the challenges of which are subsequently outlined in this article and highlighted in another article in this supplement.[7]

Theory-driven Taxonomy of Treatments

The term **taxonomy* can be applied to almost any means of categorizing items in such a way as to show their relations to one another. As an everyday example, a shopping list is a simple taxonomy, classifying items as "things I need," which could be subdivided by where to find them (grocery store, drug store, etc). A thesaurus is another type of basic taxonomy showing the relations among words and their meanings. A more complex type of taxonomy, a hierarchical tree structure, is illustrated by the familiar Linnaean scheme showing relations among living things, originally based on anatomy and later on genealogy.[1] Considering a rehabilitation taxonomy based on theories requires a brief review of what kinds of theories apply to rehabilitation, and how they might be used to sort and interrelate treatments.

Rehabilitation is often said to be lacking in theories. Historically, the field has focused on pragmatic rather than theoretical concerns.[8] Moreover, the assumption that many rehabilitation **patients* would improve regardless of the specifics of the intervention means there has not been pressure to develop, define, and refine treatments—activities that typically force theory development—compared with the situation in fields such as oncology. Nonetheless, rehabilitation does benefit from several types of theory. There is theory focused on explaining how disabling conditions come about, their causes, and risk factors, all of which are important for both treatment and prevention efforts. **Enablement/disablement theory*[9] helps to establish links among impairments and activity/participation restrictions. Understanding these links is important for selecting treatments that will have the maximal impact at the desired level(s) of function, and for refining predictions about the distal or cumulative effects of intervention on a range of outcomes. Enablement theory allows us to hypothesize effects beyond the direct focus of treatment, on **aims* that may be down the line from the treatment setting. For example, we may hypothesize that improvement in walking will follow quadriceps strengthening, or improved relationships will follow social skills training.

For the RTT, however, we are concerned with **treatment theory*, which explains "the actual nature of the process that transforms received therapy into improved health."[10(p34)] Treatment theory specifies how and why a treatment works. This type of theory is essential for research that aims to create sound treatments or to make existing treatments stronger, more effective, more efficient, or better suited to the characteristics of specific patients. Treatment theory is essential for isolating and testing the **active ingredients* of interventions: these are the attributes of treatment that effect the desired change, and that serve to define and organize treatments and to distinguish them from one another.

List of abbreviations:

ICF	***International Classification of Functioning, Disability and Health***
RTT	**rehabilitation treatment taxonomy**

Structure of Treatment Theory

A brief review of a central concept will place the succeeding material in context. The conceptual framework of the RTT assumes a tripartite structure for every treatment theory.[11] Figure 1 illustrates the 3 parts and shows their causal direction (top arrow) in effecting change in the **recipient* of treatment, who is commonly a patient but may also be a caregiver or other person. A given treatment may be hypothesized to exert its effects on the **target* (a specific aspect of the recipient's functioning that is selected for change) via some **mechanism of action* that is put into play by active ingredients administered by the therapist. The term "ingredients" is borrowed in its medical connotation from pharmacology, although most ingredients in rehabilitation are behavioral. For instance, when a therapist explains a task, praises the patient's effort, or engages the patient in goal setting, the therapist is administering ingredients just as a physician administers medication or an orthotist provides a brace.

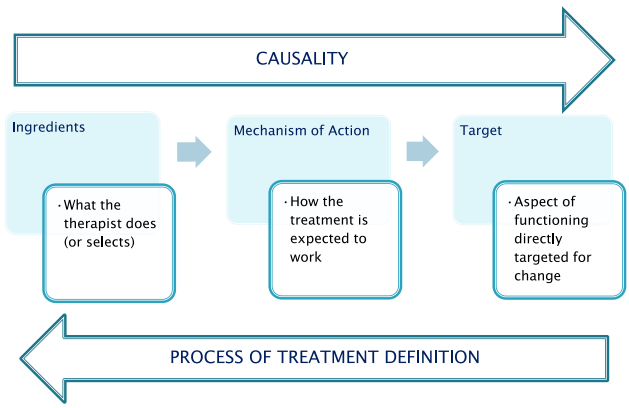

Fig 1 Casual and temporal aspects of the tripartite structure of treatment theory.