

## **Enhancing the conceptual clarity of the activity and participation components of the International Classification of Functioning, Disability, and Health**

Elizabeth M Badley

Department of Public Health Sciences, Faculty of Medicine, University of Toronto, Toronto, Canada

### **Abstract**

A key area left open in the International Classification of Functioning, Disability, and Health (ICF) is the distinction between activity and participation. This paper suggests characteristics to distinguish between the components in the ICF model which explicitly include the relationship of contextual factors to the different components. Ten distinguishing characteristics are presented which fall into three major groups: the construct of the component, individual effects, and contextual influences. Application of these suggests that there are four distinguishable components of functioning, disability, and health, which are labeled body functions and structures, acts, tasks, and societal involvement. The body functions and structures component is the same as the ICF component. Acts, tasks, and societal involvement are sub-components of the combined ICF components of activity and participation. Contextual influences operate both as facilitators or barriers (as suggested in the ICF) and as scene-setters. An enhanced model of the relationship between the components is presented, suggesting that there are reciprocal relationships between contextual factors acting as scene-setters, contextual factors acting as facilitators or barriers, societal involvement, tasks, and acts. Further research is needed to determine to what extent these characteristics can be operationalized to distinguish between items in the ICF combined activity and participation classification.

## Introduction

Since its publication in 2001 the International Classification of Functioning, Disability, and Health (ICF) (World Health Organization, 2001) has rapidly become a guiding model for disability research and a key tool for both population-based and clinical understanding of disability (Bickenbach, 1993; Bruyère, Van Looy & Peterson, 2005b). The ICF comprises a biopsychosocial model in which a person's functioning and disability is conceived as a dynamic interaction between health conditions and both environmental and personal contextual factors (World Health Organization, 2001). The ICF provides a conceptual framework linking these components, together with classification schemes for environmental factors and for the two components of functioning and disability: (a) body functions and structures, and (b) activities and participation.

A major aim of the ICF is 'to provide a scientific basis for understanding and studying health and the health-related states, outcomes and determinants' (World Health Organization, 2001). Other aims speak to the role of the ICF in providing a common language for communication between different users, facilitating comparison of data across settings, and providing a systematic coding scheme. The ICF has had considerable success since its publication in 2001. A scan of the literature suggests that the conclusions of the review by Bruyère et al published in 2005 remain true, that the success is particularly with the regard to the stated aims of providing a common language for communication and for coding schemes. The ICF has had less impact on specific applications of the model and on use of the classification in scientific studies, particularly those which concern the interrelationships of the dimensions and how these might be affected by contextual factors. This could well relate to some of the areas of uncertainty in the ICF (Bruyère, Van Looy & Peterson, 2005a; Jette, 2006a).

There are several areas where the mode of application of the ICF has been left open pending further experience. These include the distinction between activity and participation, whether environmental factors are coded generally or in relation to a particular construct of the classification, and the further specification of the conceptual model linking the components (World Health Organization, 2001). While the ICF manual gives some guidance on application of the classifications, including general descriptions of the scope of its components -- body functions and structures, and activity and participation -- the activities and participation component is a single combined classification. The manual to the ICF therefore leaves users to partition in the combined classification according to their own specific purposes, and makes the following four suggestions (World Health Organization, 2001): These suggestions are (1) making an arbitrary break in the classification with no overlap allowed, (2) making an arbitrary break with some overlap, (3) using detailed categories as activities and broad categories as participation with or without overlap, and (4) using all the domains as both activity and participation.

The need for a clear distinction between the components of the ICF, and in particular between activity and participation, is generally recognized as a prerequisite for the use of the ICF for research and for application of the conceptual model in practice (Chapireau & Colvez, 1998; Chapireau, 2005; Jette, 2006b; Reed, Lux, Bufka, Peterson, Threats, Trask et al. 2005; Schuntermann, 2005a; Whiteneck, 2005; World Health Organization, 2001). In a review of measures of participation, Perenboom et al. point out that users have often had difficulty distinguishing between these dimensions in surveys and field trials, and this ambiguity is reflected in the varying content of measures labeled 'participation' (Perenboom & Chorus,

2003c). The underlying construct between these two components has not been clearly articulated (Reed et al., 2005; Schuntermann, 2005b).

This paper suggests a range of characteristics which can be used to distinguish between the dimensions of the ICF, with particular focus on the distinction between activity and participation. In doing so, it also touches on two other areas of the ICF left open pending further experience: the use of environmental factor codes, and the application of the conceptual model. The final section of this paper reviews the implication of the distinctions proposed for enhancing the ICF model for research.

## **The development of distinguishing characteristics**

The ICF classification and model was not developed in isolation. It is officially a revision of the earlier WHO classification of Impairments, Disabilities, and Handicaps (ICIDH) which was published in 1980 (World Health Organization, 1980; Badley, 1993). The ICIDH stems from a biomedical tradition (Bickenbach, Chatterji, Badley & Ustun, 1999a) and is concerned with the consequences of health conditions and trauma. The revision process also drew on experience with other disability models, most notably the Nagi model (Nagi, 1965; Nagi, 1991) and its derivatives (Pope & Tarlov, 1991; Verbrugge & Jette, 1994a), and the Disability Creation Process (DCP), a model and classification scheme which was developed in Quebec, Canada (Fougeyrollas & St Michel, 1991; Fougeyrollas, 1995; Fougeyrollas, Noreau, Bergeron, Cloutier, Dion & St Michel, 1998). The Nagi and DCP models are both social models which view disability as arising from the relationship between the person and his/her environment, and have their origins in sociological and anthropological traditions respectively (Levasseur, Desrosiers & St-Cyr, 2007). Nevertheless, despite their somewhat different conceptual underpinnings all the models have in common that they are concerned with describing the impact of health conditions on an individual's body, the things that a person does, and the person's functioning in society. In other words, they all deal with the same universe of potential items. As indicated above, the ICF, ICIDH and DCP have explicit classifications for items in these broad domains. As might be expected based on their different origins, the scope and terminology of the different components in the models show considerable diversity (illustrated in Figure 1), particularly in the components which span the activity limitation—participation restriction domains of the ICF.

The starting point for the present attempt to distinguish between the components of functioning was a detailed examination of the content of the three classification schemes (the ICF, the ICIDH and the DCP) and the examples in the commentaries relating to all four disability models, with particular emphasis on the way the components were partitioned. An iterative inductive approach was used to attempt to make explicit the implicit partitioning decisions used and to draft characteristics to distinguish between the components.

This resulted in the identification of ten suggested distinguishing characteristics falling into three major groups: the construct of the component, individual effects, and contextual influences. The *construct of the component* deals with similar issues to the discussion of what characterizes the components of functioning and disability in the manual of the ICF (World Health Organization, 2001). The second grouping of distinguishing characteristics involves *individual effects* that refer to the role of cognition and volition. The third grouping relates to *contextual influences*. The ICF discusses contextual factors only in terms of the 'facilitating or hindering impact of the features of the physical, social, and attitudinal world' (Bickenbach, Chatterji, Badley & Ustun, 1999b; World Health Organization, 2001). However, they can also be viewed as having a scene-setting role. For all of us, the environment in which we live determines to a large extent the nature and range of activities and roles open to us irrespective of whether we have a health

condition or not. This scene-setting aspect of the environment determines what certain aspects of functioning mean, what is relevant to us in a particular context, how we do things, and what behavioral options we have at our disposal. If the health condition were suddenly gone, these would be the aspects that would still influence the nature of our activity and participation. This point has been made in connection to personal factors (Threats, 2007). Other aspects of contextual influences relate to cultural variation in what is understood by a particular area of functioning, and whether other persons need to be involved apart from the individual.

### **Distinguishing characteristics for the components of functioning and disability**

Taken together, the application of the ten distinguishing characteristics (Table 1) suggests that there are four distinguishable components of functioning, disability, and health, labeled body functions and structures, acts, tasks, and societal involvement. Table 1 outlines how the ten distinguishing characteristics relate to the four different proposed components. The first component, body functions and structures, is essentially the same as that proposed in the ICF. The remaining three are subdivisions of the ICF activity-participation component. Choosing labels for the three subdivisions is not easy as most candidate terms already have meaning either in the ICF or in other fields, for example the social sciences. In choosing labels I have tried to stay close to ICF terminology without duplicating the terms.

The ICF defines ‘activity’ as the execution of a task or action by an individual, and ‘participation’ as involvement in life situations. I have borrowed from these definitions to suggest the terms ‘acts’, ‘tasks’, and ‘societal involvement’ to cover the three components, and purposely avoided using the terms activity and participation. In what follows, ‘impairment’ will be used for significant deviations or loss in structure or function and, for simplicity, negative aspects of the three remaining components will be referred to as ‘problems’.

### **Construct of the components**

*Body Functions and Structures:* This component is similar to that in the ICF (World Health Organization, 2001). It includes functions such as those related to consciousness, visual acuity, taste, sensation of pain, breathing, power of muscles and so on. Structures include the anatomical parts of the body such as the organs and limbs and their components such as muscles and nerves. As noted in the ICF, the major distinguishing characteristic of body functions and structures is that the scope relates to physiological function of body systems (including systems of mental function) and the anatomical structure of parts of the body such as organs and limbs (World Health Organization, 2001). A closer examination of items in the classification suggests that this component can be exhibited by involvement of one or more systems of organ function or body structure, and it is clear that some complex functions are dependent on other functions and need integrity of structure. For example heart rhythm is dependent on the muscles, blood supply, innervation, and component structures of the heart such as the valves. Some impairments such as fatigue or lack of endurance may involve the whole body if related to a health condition. Generally in the case of such complex functions, an impairment in any one of the component functions or structures is likely to mean an impairment of the complex function.

*Acts,* in contrast, concern the description of the general things that a person can do independent of context or purpose. This component is similar to the ‘functional limitation’ category of Nagi, and ‘disability’ in the Disability Creation Process classification. It has also been referred to as ‘basic activity’ in connection with the WHO classifications (Heerkens, Van Ravensberg & Brandsma, 1995) and with the Nagi classification (Verbrugge & Jette, 1994b). Examples of acts include walking, standing, thinking, talking, and gripping. In contrast to body functions and

structures, acts relate to the functioning of the person as a whole. Acts serve as a link between body function/structure and tasks as they concern the impact of impairments on the functioning of the body, which in turn affects how activities might be carried out. In this context they are important in research related to the disablement process, particularly research related to rehabilitation since improvements in the way that acts are carried out are major targets for rehabilitation interventions. This is reflected in the content of many rehabilitation outcome measures such as timed walk tests, and tests of hand function such as grip strength. Acts always involve the use of more than one body system, including systems of mental function. They often involve synchrony of more than one structure or function of the body. An impairment in one of the contributing body systems may result in the person experiencing difficulty in performing the act or failing to do so. However, this is not necessarily the case, as there is often some leeway in how a particular action may be carried out, including with the use of assistive devices.

*Tasks* relate to the purposeful things that people do in daily life in a specific context. Tasks include most of what is covered by the terms 'activities of daily living' and 'instrumental activities of daily living'. They also include specific activities that are carried out as part of work, leisure or social activities. Tasks usually comprise coordinated, sequenced and often synchronized acts (or other tasks). So for example the task of dressing may require a range of acts such as reaching, holding, grasping and so on. A variety of sub-tasks may also be involved such as putting on appropriate clothing on the upper and lower body. The order in which the acts (or sub-tasks) are carried out is often crucial to the satisfactory performance of the task. Using the example of dressing again, there is a usual order of putting on different items of clothing. There may also be variation in the way a task is carried out. For example, when putting on a sweater or T-shirt some people put their arms in first and some their heads. Given this flexibility in performance, difficulty with one or more of the component acts or tasks does not necessarily mean there will be difficulty with the whole.

*Societal involvement* concerns the individual as a player in socially or culturally recognized areas of human endeavor. The main distinguishing feature of societal involvement is that it is defined by the social role (Biddle, 1986). Examples of societal involvement include roles such as work and employment, leisure, parenting, and community, social and civic life (Gignac, Backman, Davis, Lacaille, Mattison, Montie et al. 2007; Herzog & Markus, 1999; Reber, 1985). Societal involvement is not concerned as such with the performance of a particular task or combination of tasks or acts. So for example the emphasis is on employment as a role, and neither on the nature of the job, such as working in construction or education, nor on the associated tasks such as using a hammer or a pen. Societal involvement relates to patterns of behaviour and is likely to involve a range of acts and tasks which are woven together, take place in an appropriate setting (or settings), and which may extend over a period of time, and may indeed evolve or change over time. In the context of health there may also be a trade-off between opportunities and personal preference in the choice of area to maximize performance and to minimize difficulty.

### **Individual effects**

*Body functions and structures* are generally not under immediate voluntary control, nor is there usually a cognitive component (except for functions explicitly related to cognition), although there may be some limited voluntary control for some functions such as breathing. Over a longer time span there may be possibilities for modification; for example muscle strength may be affected by exercise.

*Acts:* In contrast to body function, there is always a cognitive or other mental contribution to the carrying out of acts, although this may be largely automated with a lack of conscious awareness. For example, most of the time when standing we do not think about how to balance and stand. Further, most acts are voluntary: a person has to choose to carry something or to sit.

*Tasks:* Control and volition are also important features of tasks. Tasks are purposive: a task usually has a specific objective, e.g. dressing, cooking a meal, or communicating a message, and a person must want or need to carry out the task. A corollary of this is that tasks have a large cognitive component, although the habitual nature of tasks means that there may often be automatic processing.

*Societal involvement:* Overall control of whether or how a role is carried out may be negotiable and depend on personal preference and on the demands of the role or external factors. For example, marital roles depend on the presence of a willing partner, and participation in paid employment may be constrained by the availability of a job and the willingness of an employer. Maintenance of societal involvement requires ongoing cognitive appraisal of the wider environment, and being responsive to environmental situations. So, for instance, continuation of employment depends *inter alia* on meeting expectations for performance in that role.

### **Contextual influences**

*Body functions and structures:* Contextual influences are sometimes, but not always, relevant. Generally, contextual factors as scene-setters only have influence on impairment when they are integral to the body function. For instance, the composition of the air may affect the function of breathing. Some functions may be exhibited only in response to environmental stimuli, e.g. functions relating to reaction to stress or fear, or contraction of the pupil in response to light. Other than genetic differences, functions and structures do not vary by culture. Because they are universally understood, assessment across different settings and cultures is not generally an issue.

In some circumstances a substance or device can act as a facilitator to change the nature or extent of the impairment. In this case these environmental additions are incorporated in the functioning or structure of the body. For example, sometimes medication can be used to regulate body functions (e.g. blood pressure or heart rate). Prostheses can replace or augment body structures or functions (e.g. a joint replacement, artificial heart valve, or pace-maker). Conversely, lack of necessary substances or devices can be viewed as barriers.

*Acts:* The scene-setting context for acts is implied, although this is generally unspecified or ill-defined. For example, 'carrying in the hands' implies that an object (unspecified) is being carried. A corollary of this is that acts do not vary by culture and are universally understood. Other people are not generally involved when someone is learning how to carry out specific acts. This learning is usually acquired as the natural part of development, as with sitting, standing, and making meaningful sounds, i.e. acquisition is "hard-wired" in that humans have a built-in capacity to learn in these areas. However, instruction may be involved in some specific tasks such as calculation and reading. Contextual factors can also be facilitators or barriers and can modify accomplishment somewhat. If assistive devices are used, they are generally incorporated as an integral part of the action. For example, a splint can be used to help gripping. However, although some assistive devices may be thought of as helping a particular act, they actually contribute to the performance of a task. So increasing the diameter of a small object (such as a pen or a spoon) to make it easier to grip (as with built-up handles) is only relevant in connection with the specific use for that object.

*Tasks:* The importance of the context in scene-setting is a major feature distinguishing acts and tasks. Tasks require a meaningful context which affects both the type of task and the way in which it is carried out. Exactly how the 'typical' activities of daily living (toileting, bathing, dressing, eating and so on) are carried out will depend on the local environment and culture. The scene-setting environmental factors that are relevant include the nature of the things that a person has to use (such as clothing, furniture and appliances) and the characteristics of the indoor and outdoor environment. For example, dressing within a given culture is associated with norms about where and how it is carried out, and the type of clothing affects the way a person puts on clothes. It is understood that there will be gender, regional, seasonal and cultural differences. Cooking a meal implies both the type of food and cooking arrangements, and similarly there are likely to be large regional and cultural variations. The involvement of others can be important in acquiring the ability to perform tasks, as this usually happens through formal or informal learning. For example, parents teach their children how to dress, and practice, experience and reinforcement are important. However, other people are not generally germane to the performance of a task. In tasks relating to communication the presence of other individuals is part of the presumed and understood context.

As indicated in the ICF, environmental factors can act as facilitators and barriers and modify the manner and extent of accomplishment of tasks. The environment can often be controlled to some degree by the individual, for example by choice of clothing that is easier to put on or by use of an assistive device. Environmental factors relevant to tasks also include any adapted or specially designed equipment, as well as the availability of personal help if required. Given the large learned component in tasks, the receipt of appropriate teaching also becomes a major contextual facilitator.

*Societal involvement:* The wider environmental, social and cultural context is crucial for setting the scene for societal involvement, as are the personal characteristics of the individual. These set the opportunities for, and the nature of, role performance. This is true for all of us. So parenting implies a relationship with a child, and anyone who has looked for paid employment realizes that there have to be available job opportunities. Other more subtle factors that are important include cultural and social expectations. For example, expectations differ between cultures as to what are appropriate roles for women. The contextual scene-setters also determine the nature and manner of accomplishment of the tasks that are associated with different areas of societal involvement. For instance, the tasks that make up paid employment will vary by type of job, and the nature of recreational activities may be dictated by climate, custom and culture. The involvement of others is important for entry to areas of societal involvement as individuals are expected, taught, and encouraged to perform relevant patterns of behaviour within a broader social-cultural environment where much of the "learning" is through observation of others. Involvement is reinforced by inter-personal and situational experience. Unlike tasks, interaction with other people is usually integral to societal involvement. Both the social and cultural context and personal factors make large contributions to societal involvement. So although roles such as paid employment or parenting may be recognized, a general understanding of exactly which tasks are implied by particular areas of societal involvement is unlikely. This is discussed further in the next section.

Environmental factors can also be facilitators or barriers to performance. For example, social norms or legislation can act as facilitators or barriers to societal involvement. An example of legislated facilitation is the *Americans with Disabilities Act*. Given the interactional nature of societal involvement, the attitudes of others, and relationships with family, friends,

acquaintances, and colleagues are likely to be crucial for an individual. Contextual facilitators and barriers can also work through the component acts and tasks of societal involvement.

### **Implications for research.**

Using the ICF as a scientific basis for research to understand health and health-related states, outcomes, and determinants implies looking at postulated interrelationships between well-characterized components in a conceptual model.

The distinctions between acts and tasks, and tasks and societal involvement, in particular, raise new issues of relationships within the model: some of these are illustrated in Figure 2. For clarity the health condition (disorder or disease) has been omitted but it can be viewed as having a scene-setting role by determining the nature of impairments in body functions and structures and associated problems with acts or tasks. By definition the nature and range of possible societal involvement roles is set by the physical, social and cultural context, both environmental and personal. As indicated above using the examples of parenting and paid employment, environmental and personal factors shape possible areas of role participation for all of us (Figure 2, path a), as well as the way in which specific tasks are carried out (Figure 2, path b). Although major areas of societal involvement may have associated patterns of activities or behaviours in a generic sense, there is likely to be no fixed relationship between societal involvement and component tasks (Figure 2, path c). So, for example the activities that make up a parenting role may be very different depending on the age of the child. Problems with parenting may vary over time: as children age they make different demands on parents. Some of the essential components of parenting are difficult to describe in terms of specific tasks and have overtones of nurturing, comforting and providing for. Further, and particularly depending on the cultural setting, it may be the responsibility of parents only to see that these are provided (for example by a nanny) rather than themselves providing direct child-care. Similarly, the range of tasks that make up paid employment may vary dramatically from one person to another. Arguably the only task that is common to all is the receipt of pay. Also, how and whether an individual carries out a task will depend on the performance of acts, associated impairments of body functions and structures, and the nature of the health condition (Figure 2, path d). The relationship between tasks and societal involvement will also be influenced by contextual facilitators and barriers (Figure 2, path e). As well, there may be reciprocal effects as shown by the dotted arrows, as the carrying out of tasks and areas of societal involvement may in turn affect both contextual scene-setters and facilitators and barriers.

Thus there is an inherently reciprocal relationship between societal involvement and tasks: each has an effect on the other, moderated and mediated by contextual factors (Wang, Badley & Gignac, 2006). Environmental and personal factors as scene-setters influence the tasks that get carried out within a particular area societal involvement, and contextual facilitators and barriers may affect the way in which acts get translated into tasks. The lack of a consistent relationship between tasks and societal involvement also means that the assessment of the latter has to be directly in terms of the overall societal role not via component tasks. So, for example, involvement in leisure activities or employment needs to be ascertained in a global way rather than via a listing of possible leisure or work-related activities (Gignac et al., 2007).

### **Discussion and Conclusion**

The application of models for understanding and studying health and health-related states, outcomes and determinants, requires clear definition of concepts and their inter-relationships.

As noted in the introduction to this paper, the ICF left open several areas pending further experience. The analysis presented here potentially makes a contribution to resolving a key outstanding issue, the distinction between activity and participation. It also suggests that there needs to be provision for the noting of contextual factors as scene-setters, and for these to be incorporated and taken into account in the conceptual models linking the components.

A range of characteristics is proposed by means of which the components of functioning and health can be distinguished. These characteristics are more encompassing than the overview of what comprises the components presented in the manual of the ICF (World Health Organization, 2001). The next stage will need to be research to determine whether these characteristics can indeed discriminate between the components, and to ascertain how and to what extent they can be operationalized in order to allocate systematically the individual items in the ICF combined activity and participation classification to categories relating to acts, tasks, and societal involvement. It will also be necessary to investigate the extent to which they can be generalized to disability relating to the full range of health conditions: many of the examples in this paper relate to physical disability.

The way the characteristics proposed in this paper distinguish between the components that fall within the activity-participation domain does not correspond to any of the four options for identifying activity or participation items suggested in the ICF manual (World Health Organization, 2001). However, application of the characteristics to distinguish acts, tasks and societal involvement suggest a solution most similar to the option of making arbitrary breaks in the combined classification with no overlap.

The three components – acts, tasks, and societal involvement – permit the activity and participation domains to be defined in two different ways. Making the break between acts and tasks, and keeping tasks together with societal involvement, would be compatible with a number of participation measures that include questions related to specific activities and well as to social roles, or where information about social roles is elicited by questions relating to relevant tasks (Brown, McGahan, Alkhaledi, Seah, Howe & Worrall, 2006; Gandek, Sinclair, Jette & Ware, 2007; Gray, Hollingsworth, Stark & Morgan, 2006; Ostir, Granger, Black, Roberts, Burgos, Martinkewiz et al. 2006; Perenboom & Chorus, 2003b). On the other hand the split could be made between tasks and societal involvement, equating participation with societal involvement. If that were the case then a more appropriate label for the latter component might be indeed be societal participation. A key assumption would then be that participation is equivalent to engagement in social roles. This concurs with much previous work on disability models where arguments are made for the importance of role performance, which takes into account the circumstances of the individual, including their own values and aspirations (Dijkers, Whiteneck & El Jaroudi, 2000; Jette & Badley, 2000; Perenboom & Chorus, 2003a; Wiersma, 1996; Williams, 1987). However, this partitioning of activity and participation is cleanly made in few, if any, of the current measures of participation. The existence of three components is also supported by the findings from data analytic studies of the Late Life Function and Disability Instrument (Jette, Haley & Kooyoomjian, 2003).

The proposed characteristics that distinguish between the components raise the little discussed aspects of volition. This has not been hitherto mentioned very much in relation to disability models: Nordenfeld's critique is an exception (Nordenfeld, 2003). The involvement of others for acquisition and reinforcement especially when this occurs in relation to the life-course is of particular importance when using the classification for children. The recognition that the component of societal involvement is acquired via processes of socialization also raises the possibility of a more explicit study of the transitions which occur with aging and maturation,

particularly between youth and adulthood, an aspect which has been noted as lacking in both the ICF and ICIDH (Simeonsson, Lollar, Hollowell & Adams, 2000)

An important set of the proposed distinguishing characteristics relate to contextual factors and how these contribute to the different components. In particular, this analysis reaffirms the role of the environment as being a scene-setter for disability and not just as a facilitator or barrier, particularly for problems with tasks and societal involvement. This is compatible with much of the scholarship on disability which sees disability as the product of an interaction between the individual and his/her environment. The specification of the environment as scene-setting for activity and participation or role performance is not new. These notions were included in background descriptive writing for the Nagi and ICIDH conceptual models where it was recognized that the performance of activities or roles was dependent on local social or cultural circumstances (Badley, 1995; Nagi, 1991; World Health Organization, 1980), and are embedded in the DCP model (Levasseur et al., 2007). Verbrugge and Jette's enhanced version of the Nagi model indicated that environmental factors can act as predisposing risk factors for disablement, although they saw these as predominantly personal factors (Verbrugge & Jette, 1994c). The specification of the context is also integral to assessment in rehabilitation (Haley, Coster & Binda-Sunberg, 1994; Law, Baptiste, Carswell, McColl, Polatajko & Pollock, 1998). However, these aspects seem to have been neglected in more recent writing related to the ICF.

In order to detect the influence of the environment, the manual to the ICF suggests that activities and participation items should be assessed in terms of both capacity and performance. Performance describes what an individual does in his or her current environment, whereas capacity is the individual's ability to execute a task or an action within a standardized environment. Problems with the feasibility of defining standard environments for assessing the whole range of activities and participation have been noted (Imrie, 2004; Reed et al., 2005). The analysis presented in this paper raises further questions about the feasibility of defining standard environments, given the crucial roles of contextual factors as scene-setters as well as cultural variation especially for assessment of tasks and societal involvement.

Another unresolved area in the ICF is whether environmental factors should be coded generally or in relation to a particular construct of the classification (World Health Organization, 2001). The analysis and examples presented in this paper make it clear that both options may need to be used. The major feature that differentiates contextual factors acting as scene setters from those which are acting as facilitators or barriers is that the scene setting applies equally to everyone and will likely need to be coded generally. A means to do this will need to be developed. This will be particularly relevant for studies in which comparisons bridge different contexts. So for example, as indicated above, climate or culture will set norms for dressing (and hence potential problems with dressing), and specification may be necessary for studies which span seasons or different countries.

Facilitators and barriers get their meaning as such in relation to the situation of the person with a health condition or disability. Different types of contextual factor are likely to be relevant to different components of the model. Facilitators or barriers will probably need to be coded in relation to the different components, if not the specific items. For example, environmental factors in the category '*Products and technology*' are more likely to be relevant to task performance, whereas many of the environmental factors in the category '*Services, systems and policies*' are more relevant to societal involvement (World Health Organization, 2001). A full exploration of the relationship of different types of environmental factors with the components of disability is beyond the scope of this paper. Suffice it to say that it is clear that no single category of environmental factors is likely to apply over the full range. The differentiation of the

different components of functioning and health presented here potentially provides a foundation for the development of more explicit coding guidelines and also for potential rationalization of the environmental factors classification.

A further area left open in the ICF is the application of the conceptual models linking the components. The analysis presented in this paper provides a starting point for further work on the more precise specification of a conceptual model which is more explicit about the contribution of contextual factors and the definition of the relationships between the components.

Building on its predecessors, the ICIDH, Nagi, and DCP models, the ICF has served well in providing a foundation for understanding issues of functioning and disability. However, despite the importance of these models in guiding thinking, relatively few studies have attempted to quantify the relationships between the concepts and the way in which these relationships are affected by external factors. Possible reasons may include that the models were imprecisely specified, that there was no clear operational definition of components, and in particular that there were few explicit hypothesis relating to the role of contextual factors. This paper attempts to begin to remedy some of these deficiencies by proposing a set of distinguishing characteristics for the components of functioning and health, as well as identifying a scene-setting role for contextual factors in the conceptual model. I hope that it will contribute to further research which facilitates the development of more precisely-specified models of functioning and disability with clear definitions of the components, and that progress in future can be made by focusing on key relationships in clearly defined models.

### **Acknowledgements**

The ideas in this paper have their origins in the challenging experience of working with Philip Wood and Michael Bury in the development of the ICIDH, and in our subsequent attempts to apply the concepts in our research. I am also deeply indebted to conversations with colleagues while contributing to the revision of the ICIDH to what subsequently became the ICF. In particular I have to acknowledge the contributions of Somnath Chatterji and Jerome Bickenbach in the early development of characteristics to distinguish impairments of body functions and structures and activities. I also thank Aileen Davis, Monique Gignac, Cheryl Cott, Hugh Gunz and other colleagues in Toronto for their insightful and challenging comments on the draft manuscripts of this paper.

## REFERENCES

- Badley, E.M. (1993). An introduction to the concepts and classifications of the international classification of impairments, disabilities, and handicaps. *Disabil.Rehabil.* 15(4), 161-178.
- Badley, E.M. (1995). The genesis of handicap: definition, models of disablement, and role of external factors. *Disabil.Rehabil.* 17(2), 53-62.
- Bickenbach (1993). *Physical disability and social policy*. Toronto: University of Toronto Press.
- Bickenbach, J.E., Chatterji, S., Badley, E.M., & Ustun, T.B. (1999b). Models of disablement, universalism and the international classification of impairments, disabilities and handicaps. *Soc.Sci.Med.* 48(9), 1173-1187.
- Bickenbach, J.E., Chatterji, S., Badley, E.M., & Ustun, T.B. (1999a). Models of disablement, universalism and the international classification of impairments, disabilities and handicaps. *Soc.Sci.Med.* 48(9), 1173-1187.
- Biddle, B.J. (1986). Recent developments in role theory. *Annual Review of Sociology* 12 67-92.
- Brown, K., McGahan, L., Alkhaledi, M., Seah, D., Howe, T., & Worrall, L. (2006). Environmental factors that influence the community participation of adults with aphasia: The perspective of service industry workers. *Aphasiology* 20(7), 595-615.
- Bruyère, S.M., Van Looy, S.A., & Peterson, D.B. (2005a). The international classification of functioning, disability and health: Contemporary literature overview. *Rehabilitation Psychology* 50(2), 113-121.
- Bruyère, S.M., Van Looy, S.A., & Peterson, D.B. (2005b). The international classification of functioning, disability and health: Contemporary literature overview. *Rehabilitation Psychology* 50(2), 113-121.
- Chapireau, F. (2005). The environment in the international classification of functioning, disability and health. *Journal of Applied Research in Intellectual Disabilities* 18(4), 305-311.
- Chapireau, F., & Colvez, A. (1998). Social disadvantage in the international classification of impairments, disabilities, and handicap. *Soc.Sci.Med* 47(1), 59-66.
- Dijkers, M.P., Whiteneck, G., & El Jaroudi, R. (2000). Measures of social outcomes in disability research. *Arch Phys Med Rehabil* 81(12 Suppl 2), S63-S80.
- Fougeyrollas, P. (1995). Documenting environmental factors for preventing the handicap creation process: Quebec contributions relating to ICF and social participation of people with functional differences. *Disabil Rehabil* 17(3-4), 145-153.
- Fougeyrollas, P., Noreau, L., Bergeron, H., Cloutier, R., Dion, S.A., & St Michel, G. (1998). Social consequences of long term impairments and disabilities: conceptual approach and assessment of handicap. *Int.J Rehabil Res* 21(2), 127-141.

Fougeyrollas,P., & St Michel,G. Proposal of a revised nomenclature of life habits. ICIDH International Network 4, 18-20. 1991.

Ref Type: Journal (Full)

Gandek,B., Sinclair,S.J., Jette,A.M., & Ware,J. (2007). Development and initial psychometric evaluation of the Participation Measure for Post-Acute Care (PM-PAC). *American Journal of Physical Medicine and Rehabilitation* 86(1), 57-71.

Gignac,M., Backman,C., Davis,A., Lacaille,D., Mattison,C., Montie,P., & Badley,E. (2007). Social Role Participation: Measuring What Matters to People with Arthritis. *Submitted*.

Gray,D.B., Hollingsworth,H.H., Stark,S.L., & Morgan,K.A. (2006). Participation Survey/Mobility: Psychometric Properties of a Measure of Participation for People with Mobility Impairments and Limitations. *Archives of Physical Medicine and Rehabilitation* 87(2), 189-197.

Haley,S.M., Coster,W.J., & Binda-Sunberg,K. (1994). Measuring physical disablement: The contextual challenge. *Physical Therapy* 74 443-451.

Heerkens,Y.F., Van Ravensberg,C.D., & Brandsma,J.W. (1995). The need for revisions of the ICIDH: an example--problems in gait. *Disability and Rehabilitation* 17(3/4), 184-194.

Herzog,AR., & Markus,HR. (1999). The self-concept in life span and aging research. In V.Bengtson, & K.Schaie (Eds.), *Handbook of theories of aging* New York, NY: Springer Publishing Co.

Imrie,R. (2004). Demystifying disability: a review of the International Classification of Functioning, Disability and Health. *Sociol.Health Illn.* 26(3), 287-305.

Jette,A.M. (2006b). Toward a common language for function, disability, and health. [Review] [49 refs]. *Physical Therapy*.86(5):726-34.

Jette,A.M. (2006a). Toward a common language for function, disability, and health. [Review] [49 refs]. *Physical Therapy*.86(5):726-34.

Jette,A.M., & Badley,E. (2000). Conceptual issues in the measurement of work disability. In N.Mathiowetz, & G.Wunderlich (Eds.), *Survey measurement of work disability* (pp. 4-27). Washington,DC: National Academy Press.

Jette,A.M., Haley,S.M., & Kooyoomjian,J.T. (2003). Are the ICF Activity and Participation dimensions distinct? *Journal of Rehabilitation Medicine*.35(3):145-9.

Law,M., Baptiste,S., Carswell,A., McColl,M.A., Polatajko,H., & Pollock,N. (1998). *Canadian Occupation Performance Measure*. Ottawa, ON: CAOT Publications ACE.

Levasseur,M., Desrosiers,J., & St-Cyr,T.D. (2007). Comparing the Disability Creation Process and International Classification of Functioning, Disability and Health models. *Canadian Journal of Occupational Therapy - Revue Canadienne d'Ergotherapie*.74 Spec No.:233-42.

Nagi,S.Z. (1965). Some conceptual issues in disability and rehabilitation. In M.B.Sussman (Ed.), *Sociology and Rehabilitation* (p. 265).: American Sociological Association and the Vocational Rehabilitation Administration, U.S. Department of Health, Education and Welfare.

Nagi,S.Z. (1991). Disability concepts revisited: implications for prevention. In A.Pope, & A.Tarlow (Eds.), *Disability in America: Toward a National Agenda for Prevention* (pp. 309-327). Washington, DC: National Academy Press.

Nordenfelt,L. (2003). Action theory, disability and ICF. *Disability and Rehabilitation* 25(18), 1075-1079.

Ostir,G.V., Granger,C.V., Black,T., Roberts,P., Burgos,L., Martinkewiz,P., & Ottenbacher,K.J. (2006). Preliminary Results for the PAR-PRO: A Measure of Home and Community Participation. *Archives of Physical Medicine and Rehabilitation* 87(8), 1043-1051.

Perenboom,R.J., & Chorus,A.M. (2003b). Measuring participation according to the International Classification of Functioning, Disability and Health (ICF). [Review] [14 refs]. *Disability & Rehabilitation*.25(11-12):577-87, -17.

Perenboom,R.J., & Chorus,A.M. (2003a). Measuring participation according to the International Classification of Functioning, Disability and Health (ICF). [Review] [14 refs]. *Disability & Rehabilitation*.25(11-12):577-87, -17.

Perenboom,R.J., & Chorus,A.M. (2003c). Measuring participation according to the International Classification of Functioning, Disability and Health (ICF). [Review] [14 refs]. *Disability & Rehabilitation*.25(11-12):577-87, -17.

Pope,A.M., & Tarlov,A. (1991). *Disability in America: Toward a National Agenda for Prevention*. Washington D.C.: National Academy Press.

Reber,AS. (1985). *The Penguin Dictionary of Psychology*. London: Penguin Books.

Reed,G.M., Lux,J.B., Bufka,L.F., Peterson,D.B., Threats,T.T., Trask,C., Stark,S., Jacobson,J.W., & Hawley,J.A. (2005). Operationalizing the International Classification of Functioning, Disability and Health in clinical settings. *Rehabilitation Psychology* 50(2), 122-131.

Schuntermann,M.F. (2005b). The implementation of the International Classification of Functioning, Disability and Health in Germany: experiences and problems. *International Journal of Rehabilitation Research*.28(2):93-102.

Schuntermann,M.F. (2005a). The implementation of the International Classification of Functioning, Disability and Health in Germany: experiences and problems. *International Journal of Rehabilitation Research*.28(2):93-102.

Simeonsson,R.J., Lollar,D., Hollowell,J., & Adams,M. (2000). Revision of the International Classification of Impairments, Disabilities, and Handicaps: developmental issues.[see comment]. [Review] [56 refs]. *Journal of Clinical Epidemiology*.53(2):113-24.

Threats,T.T. (2007). Access for persons with neurogenic communication disorders: Influences of Personal and Environmental Factors of the ICF. *Aphasiology* 21(1), 67-80.

Verbrugge,L.M., & Jette,A.M. (1994c). The disablement process. *Soc.Sci.Med.* 38(1), 1-14.

Verbrugge,L.M., & Jette,A.M. (1994b). The disablement process. *Soc.Sci.Med.* 38(1), 1-14.

Verbrugge,L.M., & Jette,A.M. (1994a). The disablement process. *Soc.Sci.Med.* 38(1), 1-14.

Wang,P.P., Badley,E.M., & Gignac,M. (2006). Exploring the role of contextual factors in disability models. *Disability & Rehabilitation.*28(2):135-40.

Whiteneck,G. (2005). Conceptual models of disability: Past, present, and future. In M.Field, A.Jette, & L.Martin (Eds.), *Workshop on Disability in America: Summary and Background Papers* (pp. 50-66). Washington DC: The National Academies Press.

Wiersma,D. (1996). Measuring social disabilities in mental health. *Soc.Psychiatry Psychiatr.Epidemiol.* 31(3-4), 101-108.

Williams,G.H. (1987). Disablement and the social context of daily activity. *Int.Disabil.Stud.* 9(3), 97-102.

World Health Organization (1980). *International Classification of Impairments, Disabilities, and Handicaps*. Geneva: World Health Organization.

World Health Organization (2001). *International Classification of Functioning, Disability and Health: ICF*. Geneva: World Health Organization.

**Table 1: Distinguishing characteristics of the components of functioning and disability**

| Distinguishing characteristic     | Body Structures and Functions   | Activity – Participation   |   |  |
|-----------------------------------|---|--|---|--|
|                                   |   | Acts   | Tasks   | Societal involvement   |
| <b>Construct of the component</b> |   |  |   |  |
| <b>Relates to</b>                 | Body systems and parts  | The general things that a person can do independent of context or purpose  | The purposeful things people do in daily life in a specific context   | The individual in the context of societally defined and acknowledged areas of human endeavor.<br>Defined by the social role – not the acts and tasks that may or may not be involved |
| <b>Exhibited by</b>               | Involvement of 1 or more systems of body (organ structure & function)   | Always involves $\geq 1$ body system(s), including mental functions. Synchrony of functioning – perhaps with other actions | Comprises coordinated, sequenced and synchronized acts or other (sub) tasks. May be inter-personal variation in the way a task is carried out | The individual as a player in socially or culturally influenced major areas of life  |
| <b>Origin of problems</b>         | Where $>1$ system involved, failure of any one can result in impairment | A problem in a contributing system need not result in a problem as there may be leeway (e.g. contextual factors)           | A difficulty with a component act or sub-task need not result in a problem because of effect of personal and environmental factors            | May be tradeoff between opportunities and personal preferences in choice of area   |
| <b>Individual effects</b>         |   |  |   |  |
| <b>Cognitive</b>                  | No cognitive component  | Cognitive contribution (but often habitual or automatic processing)  | Cognitive component (but often habitual or automatic processing)  | Ongoing appraisal and evaluation of the wider environment  |
| <b>Volition</b>                   | Minimal voluntary control   | Voluntary (and volitional)   | Purposive, usually with a specific objective  | Negotiable: depends on demands of the role, external factors and personal preference   |

**Table 1 cont.: Distinguishing characteristics of the components of functioning and disability**

| Distinguishing characteristic                | Body Structures and Functions                 | Activity – Participation  |   |  |
|--|---|---|---|--|
|  |   | Acts  | Tasks   | Societal involvement   |
| <b><i>Contextual Influences</i></b>          |   |   |   |  |
| <b>Contextual scene-setters</b>              | No, except where integral to functioning      | Context implied by what is done: generally unspecified or ill-defined           | Defines the nature of the tasks and how they are accomplished. May also determine repertoire of tasks undertaken<br><br>Repertoire of tasks may depend on areas of societal involvement | Physical, cultural and social setting, as well as the personal characteristics of the individual shapes opportunities for, and types of, involvement- but not the nature of the tasks included |
| <b>Cultural variation</b>                    | Does not vary by culture                      | Does not vary by culture  | Nature and accomplishment dependent on culture and setting  | Only at conceptual level and even within a culture or particular setting there may not be universal understanding of areas of involvement  |
| <b>Involvement of others for acquisition</b> | No  | Sometimes. Generally acquired with maturation: practice or skill may contribute | Acquired through informal or formal learning: practice and skill important  | Acquired through informal or formal processes: reinforced through situational and inter-personal experience  |
| <b>Involvement of others for performance</b> | No  | No  | Incidental  | Integral to the social context   |
| <b>Contextual facilitators or barriers</b>   | No, only if integral to structure or function | Can modify somewhat   | Can modify manner and extent of accomplishment  | May affect choices and degree of involvement (including individual choices and trade-offs)   |

## **Captions to Figures**

### **Title to Figure 1**

Mapping concepts to disability models

### **Title to Figure 2**

An enhanced disability model illustrating relationship between contextual factors as scene-setters, contextual factors as facilitators and barriers, societal involvement, tasks, and acts.

Figure 1

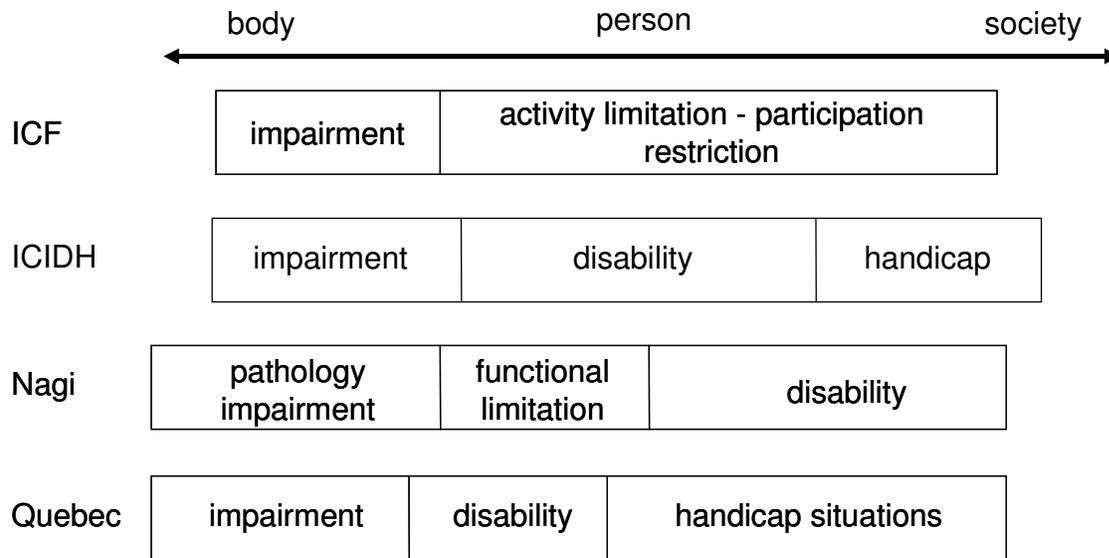


Figure 2

