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ARE THE ICF ACTIVITY AND PARTICIPATION DIMENSIONS DISTINCT?

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Objective: **To test the hypothesis that distinct Activity and Participation dimensions of the International Classification of Functioning, Disability, and Health could be identified using physical functioning items drawn from the Late Life Function and Disability Instrument.**

Design: **A cross-sectional, survey design was employed.**

Subjects: **The sample comprised 150 community-dwelling adults aged 60 years and older.**

Methods: **Exploratory factor analysis was used to identify interpretable dimensions underlying 48 physical functioning questionnaire items.**

Results: **Findings revealed that one conceptual dimension underlying these physical functioning items was not sufficient to adequately explain the data ($X^2 = 2383$; $p < 0.0001$). A subsequent solution produced 3 distinct, interpretable factors that accounted for 61.1% of the variance; they were labeled: Mobility Activities (24.4%), Daily Activities (24.3%), and Social/Participation (12.4%). All 3 factors achieved high internal consistency with coefficient alphas of 0.90 or above.**

Conclusion: **Within physical functioning, distinct concepts were identified that conformed to the dimensions of Activity and Participation as proposed in the ICF. We believe this is the first empirical evidence of separate Activity and Participation dimensions within the International Classification of Functioning, Disability, and Health classification.**

Key words: activities of daily living, disabled persons, outcome assessment (health care), rehabilitation

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INTRODUCTION

The overall intent of the International Classification of Functioning, Disability, and Health (ICF) is to provide a standard language and conceptual framework of health domains to be used for the description of health-related states (1). The ICF is a significant contribution because by revising the original International Classification of Impairments, Disabilities, and Handicaps (ICIDH) (2) it attempts to provide an improved, internationally accepted taxonomy of functioning and disability with standard concepts and terminology (1).

Simeonsson et al. (3) state that one of the main goals of developing the ICF was to produce a taxonomy that documented manifestations of health conditions that resulted from the complex interactions of the person with the physical, social and psychological environment. In doing so, the domains contained within the ICF were described from the perspective of body systems, the individual and society. Within the context of health, the ICF defined "Body Functions and Structures" as physiological functions of body systems or anatomical elements such as organs, limbs and their components. "Activity" was defined as the execution of specific tasks or actions by an individual, while "Participation" was envisioned as encompassing involvement in a life situation. Each component of the ICF was intended to be expressed in either neutral or negative terms.

One of the stated intents of the ICF is "to provide a scientific basis for understanding and studying health and health-related states, outcomes and determinants" (4). For scientific investigation, a crucial aspect of any conceptual framework is its internal coherence and its ability to differentiate among concepts and categories within the framework (5). Without empirical differentiation, conceptual frameworks cannot be investigated and validated. One of the common criticisms of the original ICIDH was that it was difficult to ascertain the boundaries between the basic concepts, each lacked the clarity and distinctness necessary for useful empirical testing (3, 6–9). Thus, for the ICF to be useful as a framework for research, it is critical that the classification be clear about the phenomena it classifies with distinct and measurable definitions of each dimension. Without distinct and measurable dimensions researchers will have trouble using the ICF for hypothesis development, study design and measurement construction.

Although the WHO (1) has stated, "It is difficult to distinguish between 'Activities' and 'Participation' on the basis of the domains in the Activities and Participation component," we believe such differentiation is essential if the ICF is to achieve acceptance by individuals, organizations and associations as an international classification of human functioning and disability. Although researchers, such as Johnston & Pollard (6), have examined the distinctness of the ICIDH, we know of no empirical work that has attempted to examine the boundaries of the Activity and Participation domains of the ICF. In this investigation we tested the hypothesis that within the physical functioning domain one could identify distinct dimensions that are consistent with the concepts of Activity and Participation as proposed within the ICF. Work of this nature is essential to future empirical validation of the ICF model and a basis from

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which to propose future amendments to the ICF, which address deficits that might be identified.

METHODS

To test the hypothesis that distinct dimensions could be identified within the physical functioning domain of the ICF, we employed self-reported data collected for the construction of the Late Life Function and Disability Instrument (Late Life FDI) (10, 11), a new outcomes instrument designed for research conducted with community-dwelling older adults. Items in the Late Life FDI are similar to ones found in ICF Chapter 4 Mobility, Chapter 5 Self-care and Chapter 6 Domestic Life.

Instrument development

The Late-Life FDI was designed as a self-report physical functioning assessment instrument for use in gerontological research. To develop this instrument, an initial pool of 73 questionnaire items was constructed after comprehensive review of existing function and disability instruments, and input from experts in gerontology and focus groups of older adults. This initial pool was reduced to a prototype instrument based on examination by 6 experts in gerontology and rehabilitation, feedback from focus groups of older adults, and 2 field tests.

The questionnaire items were written to encompass a wide range of discrete physical actions, daily activities and life tasks outlined in the ICF manual, including: changing and maintaining body positions; carrying, moving and handling objects; mobility and travel; basic activities of daily living (ADLs); home, community and vocational activities. Cognitive, social and communication items were not included in this instrument and therefore were not tested in this analysis. A detailed description of the prototype Late Life FDI's development and evaluation are available elsewhere (10, 11).

The questionnaire items are administered through interviews and responses are scaled on a 5-point Likert-like scale. Some of the items assess degree of self-reported difficulty in performing discrete physical actions or tasks by asking, "How much difficulty do you have …?" Response options include "none," "a little," "some," "quite a lot," and "cannot do". Other items assess an individual's self-reported limitation in life activities by asking, "To what extent do you feel limited in …?" Response options included "not at all," "a little," "somewhat," "a lot," and "completely" (Fig. 1). Scale scores for all items were transformed to a 100 metric scale where 0 = the worst possible score and 100 = the best possible scale score for each item.

Sampling procedures

As part of the evaluation of the Late Life FDI, 48 physical functioning questionnaire items were administered to a convenience sample of 150 community-dwelling older adults, ages 60 years and older, and living in greater Boston, Massachusetts. Subjects were recruited from local cooperative programs on aging, senior housing units, assisted living facilities and ethnic community organizations. Exclusion criteria included: moderate or severe cognitive impairment, hospitalization of more than one night within the past 6 months, and inability to lift oneself out of bed. Cognitive status was determined by scores on Pfeiffer's (12) Short Portable Mental Status Questionnaire (SPMSQ); errors in 5, or more, of the 10 items constituted moderate to severe intellectual impairment.

Analytic methods

We tested the existence of distinct physical functioning domains through a series of exploratory factor analyses used to identify interpretable factors that could be responsible for the covariation in the data. The principal axis method was used for the initial factor extraction. Orthogonal rotation was used to evaluate factor loadings. Eigenvalues and scree plots, the proportion of the variance accounted for by each factor, the factor loadings, and the interpretability of the factors were all used to determine the final number of factors to retain. Items with high loadings of 0.45 or greater were retained. Cronbach's alpha was used to confirm that the item-composition of each of the retained factors were correlated (i.e. measure the same conceptual domain or construct). Calculation of standard correlation coefficients between the summed scales was used to determine inter-factor correlations.

RESULTS

The resulting sample was predominately female (77%), white (84%) and lived alone (45%), with a mean age of 76 years. Functional limitation of the sample ranged from: 14% no functional limitation, 38% slight, 30% moderate and 18% severe as measured by the physical function scale of the Short Form-36 Health Survey (13).

The hypothesis of the existence of a single unified physical functioning domain underlying the 48 administered questionnaire items was rejected in the initial factor analysis solution. A maximum likelihood chi-square test showed that one factor was not sufficient to adequately explain the co-variation in these data ($X^2 = 2383$; $p < 0.0001$).

Table I presents the factor loading estimates for a subsequent 3-factor solution that best fit the data and the variance explained by each factor. The 3-factors together explained 61.1% of the variance in this sample. We interpreted the first factor to represent "Mobility Activity" because it reflected, for the most part, perceived difficulty in performing vigorous physical actions such as walking a mile or getting up from the floor. Fourteen items loaded highly on this factor and explained 24.4% of the variance in the data. The second factor was interpreted as representing "Daily Activities" since it contained physical actions involved in basic and instrumental activities of daily life. Nineteen items loaded highly on this factor and explained 24.3% of the variance. The final factor, which had a high loading on 13 items and explained 12.4% of the variance, was labeled "Social Participation". It included complex behaviors such as going out to public places and working at a volunteer job. A few items, "take part in exercise program", and "unscrew a lid" were eliminated since their loadings were not interpretable. Contrary to initial hypothesis, 2 items, "take part in active recreation" and

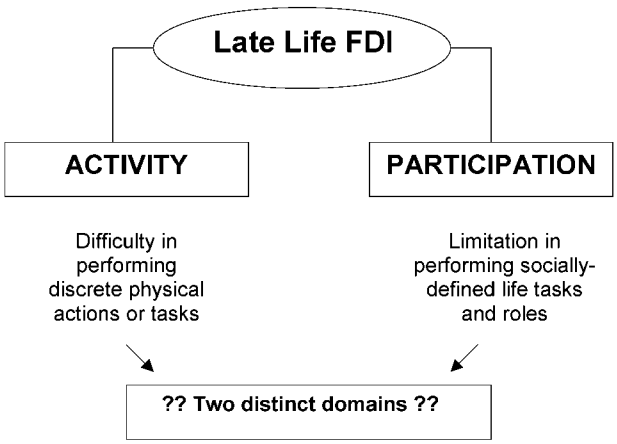

Fig. 1. Construct differences between Activity and Participation.

"take care of personal care", had better factor loadings in the daily activities dimension than on the social participation dimension.

All 3 subscores achieved high internal consistency with coefficient alphas of 0.90 or above. Although distinct, all factors were positively correlated. The correlation between the "Mobility Activity" subscore and "Daily Activity" subscore was 0.77 ($p < 0.0001$). The "Social/Role Participation" subscore had a 0.69 correlation with "Mobility Activity" ($p < 0.0001$) and a 0.74 correlation with "Daily Activity" ($p < 0.0001$).

DISCUSSION

Our findings revealed evidence that distinct physical functioning concepts can be measured and identified using a self report instrument such as the Late-Life FDI. We interpret the 3 identified domains as corresponding to 2 activities and 1 participation domain as defined within the ICF framework. Our analyses did not support the hypothesis that there was a single global underlying concept or domain that cuts across the physical functioning content areas represented by Activity and Participa-

Table 1. *Estimates of factor loading for three-factor model*

	Activity dimension		Participation dimension
	Mobility activities	Daily activities	Social participation
Carry with both hands while climb stairs	0.84	–	–
Walk a brisk mile	0.83	–	–
Hike a few miles	0.83	–	–
One flight of stairs without handrail	0.83	–	–
Walk a mile with rests	0.80	–	–
Run a short distance	0.77	–	–
Three flights of stairs with handrail	0.77	–	–
Walk a few blocks	0.77	–	–
Walk on a slippery surface	0.76	–	–
Run a half mile or more	0.70	–	–
Get up from the floor	0.67	–	–
Take part in active recreation*	0.60	–	–
Sit-stand from low soft couch	0.57	–	–
One flight of stairs with handrail	0.54	–	–
Walk around one floor of home	–	0.79	–
Put on and take off coat	–	0.78	–
Lift kitchen chair	–	0.77	–
Reach overhead while standing	–	0.72	–
Get into and out of a car	–	0.71	–
Use common utensils	–	0.70	–
Bend over to pick up	–	0.67	–
Wash dishes while standing	–	0.67	–
Make a bed	–	0.66	–
Open a heavy outside door	–	0.64	–
Reach behind back	–	0.64	–
Step on and off a bus	–	0.63	–
Take care of personal care*	–	0.63	–
Put on and take off pants	–	0.63	–
Step up and down from curb	–	0.62	–
Remove wrapping with hands	–	0.58	–
Use stepstool	–	0.57	–
Hold full glass of water in one hand	–	0.57	–
Pour from large pitcher	–	0.53	–
Go out to public places	–	–	0.68
Visit friends and family	–	–	0.60
Keep in touch with others	–	–	0.59
Take care of own health	–	–	0.59
Provide meals	–	–	0.59
Assist others	–	–	0.59
Take care of household finances	–	–	0.59
Invite people for meal or entertainment	–	–	0.59
Take care of local errands	–	–	0.57
Take care of inside of home	–	–	0.51
Take part in social activities	–	–	0.51
Travel out of town for overnight stay	–	–	0.51
Work at volunteer job	–	–	0.45
Percent variance explained	24.0%	24.3%	12.4%

* Indicates the item was hypothesized as part of the participation dimension.

tion. Contrary to our initial hypothesis, however, our findings did suggest that the underlying structure of these physical functioning data was more complex than anticipated. Two distinct physical Activity domains emerged within these data, with content parallel to the domains included within the ICF handbook. We interpreted one as corresponding to the domain of "Mobility Activity" and the other as consistent with the domain of "Daily Activities". One Activity domain corresponds to more advanced mobility skills in this Mobility chapter, while the other corresponds to basic mobility tasks and domestic and self-care items (1). In contrast, our analyses revealed only one "Social Participation" domain that we interpreted as corresponding to the Interpersonal Interactions chapter of the ICF (1). Internal consistency was very high across all 3 domains that were identified.

Not all items were associated with the hypothesized underlying dimension. For example, the item, "walk around one floor of the home" was associated with the "Daily Activities" domain and not the "Mobility Activities" domain as we hypothesized. The item "take part in active recreation" loaded on the "Mobility Activity" domain and not "Social Participation" as was hypothesized. Findings such as these underscore the need to perform empirical tests and future replications of assumptions incorporated in the current version of the ICF.

We believe these findings are important for the future research utility of the ICF and for its international adoption. Contrary to qualifications and concerns noted within the ICF Handbook, within the physical functioning content arena and in this sample of older adults, differentiating between Activities and Participation on the basis of their domain content could be accomplished empirically. This is very encouraging for those who wish to use the ICF framework for research. In fact, we would suggest that such differentiation is essential to the ICF becoming a scientific model useful for empirical research.

It may be useful to reflect on what may have contributed to the ability to differentiate the Activity and Participation domains of the ICF in this analysis. We see both a potential content and measurement interpretation for our findings. From a content perspective, for the most part, items that converged on the 2 activity domains appear to reflect relatively simple physical tasks or activities (e.g. use common utensils) that an adult does on a frequent, if not, daily basis. The behaviors contained within the Participation domain, in contrast, refer to much more complex categories of life behaviors (e.g. provide meals) that can be accomplished using a variety of tasks or component actions. This content distinction is very consistent with the conceptual differentiation Nagi makes between the functional limitations and disability domains outlined in his (14) disablement framework (Nagi's use of the term "disability" differs from how it is used in the ICIDH and in the revised ICF frameworks. In this paper, we use the term disability to be consistent with Nagi's definition as representing limitations in the performance of all relevant socially defined roles encountered in daily life.)

To understand Nagi's distinction between functional limitation and disability one must introduce the sociological concept of social role. Social roles—such as being a parent, a construction worker, or a university professor—are basically organized according to how individuals participate in a social system. To Parsons (15), "… role is the organized system of participation of an individual in a social system." Tasks are specific activities through which the individual carries out his or her social roles. Social roles are made up of many different tasks, which may be modifiable and interchangeable. As Parsons (15) clarifies:

> "Roles, looked at that way, constitute the primary focus of the articulation and hence interpenetration between personalities and social systems. Tasks on the other hand, are both more differentiated and more highly specified than roles, one role capable of being analyzed into a plurality of different tasks …. A task, then, may be regarded as that subsystem of role, which is defined by a definite set of physical operations which perform some function or functions in relation to a role."

Some tasks are role specific while others are common to the enactment of several roles. For Nagi, to the extent that these tasks are learned, organized and purposeful patterns of behavior, they are part of the disability concept. Thus Nagi views the concept of disability as ranging from very basic behaviors of daily life, such as the Basic Activities of Daily Living, to the exquisitely complex social roles such as one's occupation. Since daily life activities such as dressing, bathing, and eating—are part of a set of expectations inherent in a variety of other social roles, Nagi sees limitations in the performance of even such basic social roles as components of the concept of disability (14). For Nagi, disability as a heuristic concept is inclusive of all socially defined roles and is consistent with the concept of Participation as defined by the ICF. In developing future instruments intended to distinguish between Activity and Participation constructs, researchers might consider differentiating items along the dimensions of degree of complexity of the item as was done in the Late-Life FDI.

There was also a scaling difference that may have contributed to these findings. Items that employed the perceived difficulty scale converged primarily on the Activity domain. For each activity item, subjects reported on whether they could do specific tasks and if so, the degree of difficulty they encountered in doing each. In contrast, the Participation domain items focused not on whether they could do the activity and their perceived difficulty but on the degree to which they felt limited in the performance of various behaviors in daily life. We are not able to differentiate the degree to which the findings are due to the content vs scaling difference or some combination of both. This will remain to be addressed in future research.

We believe this is the first empirical test of some of the dimensions outlined in the revised ICF classification. There are several qualifications of our findings. First, this test was performed on a convenience sample of community-dwelling older adults living within Northeastern United States. Whether a similar data structure emerges using other outcome instruments, in other samples or within other countries remains to be explored

in future research. Secondly, the questionnaire items that were constructed and tested dealt only with the physical functioning arena of activity and participation. Thus, our findings apply only to those particular domains. We have no way of determining from this study if similar findings would emerge if a broader range of items were included. That task is important to undertake in future research on the ICF.

Although our findings are of limited generalizability due to the convenience nature of the sample, the focus only on physical functioning activities, and age limitations of the sample, they add important new information on the revised ICF framework. Future investigation of the ICF framework and its ultimate validation as an important tool for understanding health-related states, will require that assessment instruments be constructed so that the ICF constructs can be differentiated, measured and proposed relationships investigated empirically. Only then can we truly develop an understanding of the process of disablement.

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