

CHAPTER

# 16

## **The Relationships among Level of Measurement, Generalization, and Reimbursement**

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The purpose of this paper is to examine the relationships among (1) the measurement of generalization in single-subject designs, (2) an emerging data base in rehabilitation documenting the functional characteristics of patient outcome, (3) the inevitable use of functional outcome as a basis for reimbursement, and (4) a recommendation that our observations of generalization include measures which, while not technically sophisticated, are reality-based.

In the context of single-subject designs, treatment effects have been shown to generalize to a variety of within-class response sets. For example, treatments of syntax (Doyle, Goldstein, and Bourgeois 1987; Kearns and Salmon, 1984), auditory comprehension (Holland and Sonderman, 1974), and word retrieval (Thompson and Kearns, 1981) have produced generalization of language, but only to untrained items within the same response class. Generalization of treatment effects to other settings, people, and stimulus conditions has been studied by only a few and is logistically complicated, and results have been discouraging. For example, Warner (1984) and Thompson and Byrne (1984) have utilized techniques such as "loose training" and the transfer of discriminative stimuli across settings to elicit generalization of verbal labeling and social conventions with limited success.

Another approach to assessing generalization is the use of independent language measures as external probes. Prescott and McNeil (1973) were among the first to propose that treatment outcomes be evaluated using each subject as his or her own control. Also, Prescott and McNeil had the foresight to relate changes in treatment performance to changes in standardized measures such as the PICA. Another study that associated treatment effects and changes on independent language measures was that of Warren et al. (1987). This investigation documented improvement of word association skills during acute rehabilitation using a multiple-baseline design. In addition, treatment effects were displayed amid before and after measures of confrontation naming and word fluency. However, without stable baselines on these external measures, few conclusions could be drawn regarding generalization effects from treatment itself.

Combining a multiple-baseline and alternating treatment design, Loverso et al. (1988) documented that clinician-directed application of a "cueing verb" technique was more effective than a clinician, computer-assisted approach for 9 of 10 aphasic patients. One of the strengths of this study was use of the PICA as a concurrent external probe. For example, following three stable PICA scores during baseline, significant changes were demonstrated in PICA scores during the treatment phase for 8 of the 10 patients studied.

While the use of independent language measures represents an extension of our assessment of generalization, the question remains as to

whether treatment produces functional changes in a person's ability to communicate. While patient performance may reach treatment criteria in a controlled design and independent language measures may improve, the acid test is whether or not function in daily living is improved.

The functional relevance of treatment outcomes is becoming increasingly important to those paying for our services. In 1985, the Health Care Finance Administration (HCFA) and the National Institute of Health and Research commissioned a study (Granger and Hamilton, 1985) to meet a longstanding need to document the severity of patient disability and outcome of rehabilitation. HCFA's interest in rehabilitation outcome is an extension of their use of diagnostic related groups (DRG) as a prospective payment system to control costs in acute care. In rehabilitation, Medicare reimbursement currently is related to the cost of providing services and adequate documentation of patient progress. However, as early as 1992, reimbursement in rehabilitation may be switched from a cost-based system to one driven by patient outcome. Reimbursement based on outcome will be tied to a measure of functional skill in all areas of daily living, including communication.

In the past two decades, 30 to 40 scales have evolved in an effort to measure functional outcome in rehabilitation. Presently, the measure with the largest reliable data base is the Functional Independence Measure (FIM) (Hamilton et al., 1987). FIM is representative of a new breed of outcome measures that are currently competing for HCFA's blessing as the criterion measure in rehabilitation. FIM (Fig. 16-1) uses a 7-point, internally consistent scale to assess self-care, sphincter control, mobility, locomotion, communication, and social cognition across 18 areas of daily living activity. Typically, it is administered at admission, at discharge, and at a 3-month follow-up.

A closer look at the FIM scale used to assess expressive language will help illustrate the scoring system used for all 18 areas of activity. As seen in Figure 16-2, there are two levels of overall function, independent, for which no helper is required, and dependent, for which some degree of help is necessary. Within the independent category, there are two levels, complete (score 7), in which a patient must be able to express complex or abstract ideas intelligently and fluently, and modified (score 6), wherein the patient utilizes an augmentative device or performs the task slowly. In either case, the patient does not require another individual to help him or her communicate, and thus costs associated with this level of communication remain low. Conversely, there are five levels of dependence, each requiring an increasing degree of help and thus having increasing associated costs. Level 5 (standby prompting) represents a patient who can express basic needs and concepts of daily living more than 90 percent of the time but who requires prompting about 10 percent

LEVELS	7 Complete Independence (Timely, Safely)	NO HELPER		
	6 Modified Independence (Device)	HELPER		
	Modified Dependence			
	5 Supervision			
	4 Minimal Assist (Subject = 75%+)			
	3 Moderate Assist (Subject = 50%+)			
	Complete Dependence			
	2 Maximal Assist (Subject = 25%+)			
	1 Total Assist (Subject = 0%+)			
<b>Self Care</b>				
		ADMIT	DISCHG	FOL-UP
A. Feeding		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Grooming		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Bathing		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Dressing-Upper Body		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Dressing-Lower Body		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Toileting		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Sphincter Control</b>				
G. Bladder Management		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Bowel Management		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Mobility</b>				
Transfer:				
I. Bed, Chair, W/Chair		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Toilet		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K. Tub, Shower		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Locomotion</b>				
L. Walk/wheel Chair	W c	<input type="checkbox"/>	W c	<input type="checkbox"/>
M. Stairs		<input type="checkbox"/>		<input type="checkbox"/>
<b>Communication</b>				
N. Comprehension	a v n	<input type="checkbox"/>	a v n	<input type="checkbox"/>
O. Expression		<input type="checkbox"/>		<input type="checkbox"/>
<b>Social Cognition</b>				
P. Social Interaction		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q. Problem Solving		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R. Memory		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Total	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: If item is not testable, enter level 1.

Fig. 16-1. Functional independence measure (FIM).

of the time. Accordingly, levels 4, 3, 2, and 1 apply to patients needing an increasing amount of assistance from another individual.

The FIM scale is designed to measure disability. The degree of disability roughly translates into how much cost is required to maintain a patient at his or her maximum potential level of function. The FIM scale is designed so that each of the 18 areas, including communication, can be reliably assessed by a nurse or any other trained observer. Not surprisingly, the American Speech-Language-Hearing Association has argued that the FIM scale is not sufficiently sensitive to demonstrate changes in communication.

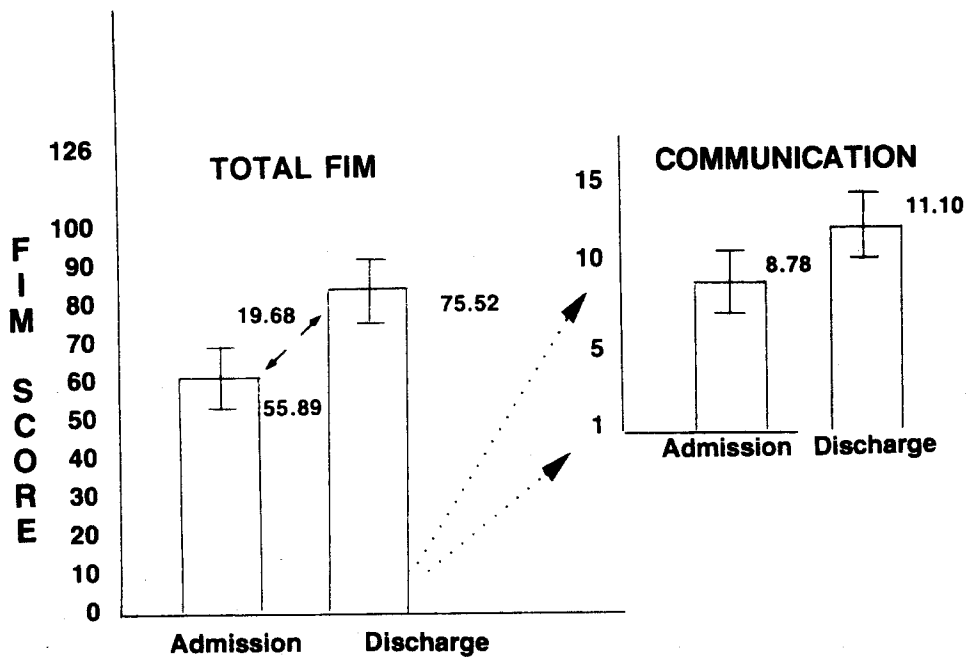
We have piloted the FIM scale with 19 aphasic patients admitted to the Braintree Hospital. Figure 16-3 illustrates changes in overall FIM

# FIM

<u>Score</u>	<u>Expression</u>		<u>Cost</u>
	<u>Independence</u>	<u>No Helper</u>	
7	Complete	Expresses Complex Ideas	\$
6	Modified	Augmentative Device/Slow	
	<u>Dependence</u>	<u>Helper</u>	
5	Standby Prompting	Basic Needs ►90% of time	\$\$\$
4	Minimal Prompting	Basic Needs 75-90% of time	
3	Moderate Prompting	Basic Needs 74-50% of time	
2	Maximal Prompting	Basic Needs 25-49% of time	
1	Total Assistance	◀25%	

Fig. 16-2. FIM: Expressive language.

Fig. 16-3. Change in FIM scores.



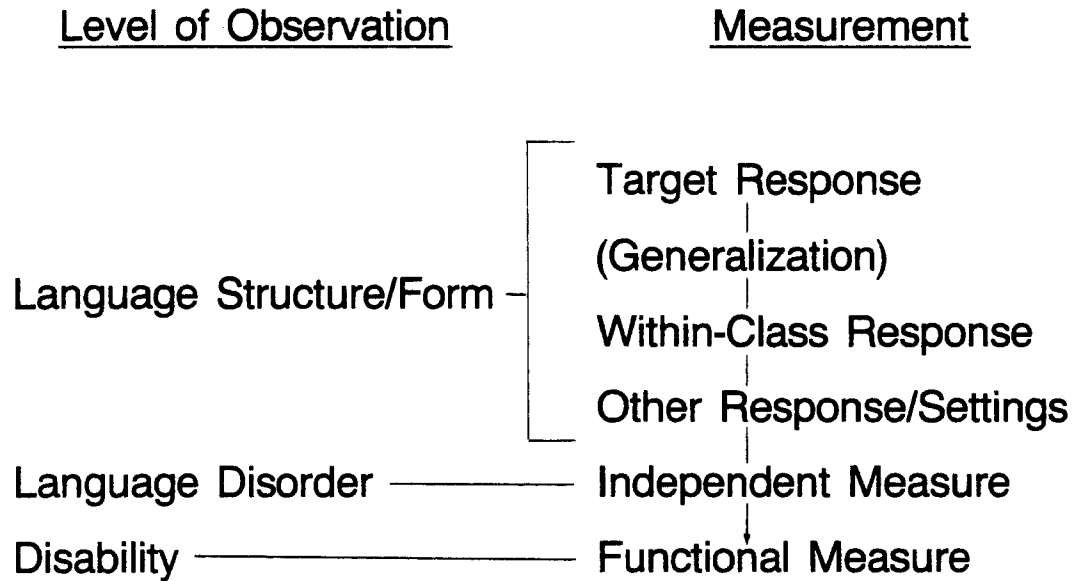


Fig. 16-4. The relationship between level of observation and level of measurement.

scores for this group of patients, whose average length of stay was 27 days. Total possible FIM points are 126. At admission, the mean FIM score of 55.89 is typical of patients requiring hospital-level care. Upon discharge, the mean FIM score of 75.52 represents functional level of skill allowing the patient to go home but requiring additional nursing care and therapy in the home. A score of approximately 95 is necessary for discharge to home without home-based care. The difference between admission and discharge for the group was 19.68, which is statistically significant ( $p < .0001$ ) when analyzed with a repeated-measures analysis of variance (Winer, 1971). Figure 16-3 also depicts combined scores for comprehension and expression extracted from total FIM scores. Out of a maximum 14 possible points, differences between admission and discharge scores were also statistically significant ( $p < .0001$ ). Currently, the FIM scale is being utilized as a formal program evaluation tool in over 135 free-standing rehabilitation facilities nationwide (Granger, personal communication, 1989).

It appears to be only a matter of time before the FIM scale or a similar measure will be used to determine overall rehabilitation outcome, disability, and subsequent reimbursement. Accordingly, those providing clinical services should further expand their observations and measurement of generalization (Fig. 16-4). Tightly controlled, focused, single-subject experimental studies of treatment's influence on language forms and structures and the incorporation of efforts to program and demonstrate generalization to within-class and other response types must be continued. Our ability to demonstrate parallel improvement in tests of

language disorders across baseline and treatment phases strengthens our demonstration of generalization effects. Finally, the potential influence of measures such as the FIM scale point out the importance of extending our notion of generalization to include a less controlled, less technical observation of disability. Perhaps studies of generalization should include before and after judgments by intelligent but technically naive observers as to whether, following treatment, the patient is less dependent on others for communication in daily life.

Over the years, the functional significance of treatment outcome has been discussed frequently and has now come full circle to encompass both clinical and reimbursement issues.

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