Measuring Therapeutic Recreation Outcomes in Rehabilitation: Further Testing of the Leisure Competence Measure

Marita Kloseck, Richard G. Crilly, and Linda Hutchinson-Troyer

The Leisure Competence Measure (LCM) was designed to meet the need for conceptually sound and validated tools for the measurement of psychosocial outcomes in rehabilitation programs. It provides therapeutic recreation professionals with a means of measuring client leisure functioning across 8 domains. The LCM is scaled to be consistent with the Functional Independence Measure (FIM), a standardized tool commonly used to measure outcomes in medical rehabilitation. The purpose of this paper is to describe the use of the LCM in real-life clinical settings and to demonstrate the sensitivity of the LCM to change in leisure functioning, over time, in clients with a variety of diagnoses undergoing rehabilitation in a variety of settings. The results

Marita Kloseck, Ph.D., CTRS, Division of Geriatric Medicine, University of Western Ontario, London, Canada; Richard G. Crilly, M.D., Division of Geriatric Medicine, University of Western Ontario, London, Canada; and Linda Hutchinson-Troyer, MGA, CTRS, Montebello Hospital, University of Maryland Medical Centre. The authors would like to thank Kerry Hofstede and Maureen Kirkland-Dow of Parkwood Hospital in London, Canada, and Pam Cauley, Lynn Lafferty Kalmbach, Pam Harria Lenhart, Christy Sachs, and Colleen Kemp from the Montebello Hospital for their dedication to the use of the LCM in daily clinical practice over a 4 year period. For additional information contact: Dr. Marita Kloseck, CTRS, Division of Geriatric Medicine, Parkwood Hospital, 801 Commissioners Road East, London, Ontario, Canada N6C 5J1. Telephone: (519) 859-1232. E-mail: mkloseck@execulink.com.
of LCM field testing have led to further modifications of the tool to better meet the needs of the therapists involved in the direct care of clients.

**KEY WORDS:** Therapeutic Recreation, Outcome Measurement, Rehabilitation, Leisure Competence Measure

During the past decade there have been many changes in the delivery of health care services. Notable changes have occurred in medical rehabilitation. These changes include: (a) a broadening definition of health, (b) the expansion of health-related services, and (c) an increased focus on psychosocial factors and the success of rehabilitation programs in enabling individuals to return home and resume their lives with the least amount of assistance possible following discharge (Fuhrer, 1987; Johnston, Keith, & Hinderer, 1992; Kemp, Brummel-Smith, & Ramsdell, 1990; National Institute of Health, 1993; Piper, 1992). In addition, evidence-based decision making is now in practice by health care systems (i.e., professional practices and decisions driven by empirical research findings and theories; Neche, Wilson, & Dowell, 1996; Gray, 1997; Hooker, 1997; Michaud, McGowan, van der Jayt, Dugan, & Tugwell, 1996; Sobell, 1996). Finally, there is an increased emphasis on accountability for all health professionals (Brummel-Smith, 1993; Fuhrer, 1987; Smith, 1994; Stumbo, 1996).

The measurement of outcomes has become a critical requirement of all health care programs (Braun, Koss, & Loeb, 1999; Johnston et al., 1992; Smith, 1994; Studenski, & Duncan, 1993). The Joint Commission on Accreditation of Healthcare Organizations (JCAHO), for example, recently incorporated outcome measurement into its accreditation process and as of 1996, JCAHO required all hospitals to use quantitative tools to track processes and outcomes as a condition of the accreditation process (Braun et al.). JCAHO is now in the midst of standardizing performance measures and approaches used across organizations. Likewise, the Commission for Accreditation of Rehabilitation Facilities (CARF) also requires improvement in client performance and functional outcomes to be measured (CARF, 1997). The need to demonstrate the effectiveness, efficiency, and quality of all health-related services requires, in part, a demonstration of change in client functioning over time; a change that can reasonably be attributed to the rehabilitation programs and interventions provided. This need to demonstrate change, in turn, requires that instruments used for measuring functional change, as well as the interventions subsequently planned, be grounded in a common conceptual or theoretical framework. Also critical are the psychometric properties of instruments used to measure functional change. Instruments selected and employed in clinical practice must demonstrate adequate reliability, validity, and sensitivity for the populations with whom they are used and settings within which they will be employed.

A major criticism expounded in the rehabilitation literature is that few available psychosocial instruments have undergone the rigorous development and testing that is necessary to allow accurate and dependable measurement of change in the functional status of clients (Johnston et al., 1992; Piper, 1992). In response, the American Academy of Physical Medicine and Rehabilitation and the American Congress of Rehabilitation Medicine developed interdisciplinary standards for instrument development in rehabilitation (Johnston et al.). These standards, along with the standards for educational and psychological testing developed by the American Psychological Association (1974), provided the basis for the development and testing of the Leisure Competence Measure (LCM), an instrument designed to document leisure functioning and to measure therapeutic recreation outcomes.
The LCM has been conceptualized according to the World Health Organization's (1980, 1999) International Classification of Impairments, Activities and Participation, the behavioural construct of competence (Baltes, 1988; Baltes, Mayr, Borchelt, Mass, & Wilms, 1993; Ford, 1985; Hogg & Hillary, 1990; Lawton, 1972), and the leisure-based philosophy for therapeutic recreation operationalized through the Leisure Ability Model (Peterson & Gunn, 1984). Details of the development, theoretical framework, and testing of the LCM are provided elsewhere (Kloseck, Crilly, Ellis, & Lammers, 1996; Kloseck & Crilly, 1997). The LCM provides therapeutic recreation professionals with a means of measuring initial levels of client functioning in eight leisure domains: leisure attitude, leisure awareness, leisure skills, social appropriateness, group interaction skills, clinical participation, social contact, and community-based participation. Each LCM subscale is composed of seven levels (7 = complete independence and 1 = total dependence) and is consistent with the scaling of the Functional Independence Measure (Hamilton, Granger, Zielezny, & Tashman, 1987). The LCM is not an assessment tool, but it was designed to summarize and record the results of therapeutic recreation assessments in a standardized way (Kloseck & Crilly). Following the initial therapeutic recreation assessment, which should include a variety of other information sources (e.g., standardized instruments, observation of the client, an interview with the client and/or family members, review of the client’s medical record, etc.) and coupled with clinical experience, a client’s leisure functioning information may be summarized using the LCM. This procedure provides a standardized basis for goal setting and intervention planning, monitoring client progress (change in function) over time, evaluating the effectiveness of therapeutic recreation intervention, and in due course, building a regional, national, and international comparative data base of therapeutic recreation outcomes across a variety of populations and settings. Utilization of the LCM in practice, as well as the LCM’s value in goal setting, are discussed elsewhere (Kloseck & Crilly).

The purposes of this paper are to: (a) provide information on the reliability, validity, and use of the LCM in a variety of rehabilitation settings and with different client populations; and (b) demonstrate the LCM’s sensitivity in measuring functional change associated with the rehabilitation process for clients with varying diagnoses. Findings of this phase of testing provide clinical (field) validation of the LCM in real-life situations and contribute toward the building of construct validity. This paper reports the outcomes of the clinical implementation of the LCM. As a result of the iterative development of the LCM, the LCM used in these trials had already undergone two previous rounds of testing (i.e., pilot testing 1989–1990 and trial phase testing 1990–1993). The purpose of the current implementation trial was to assess the feasibility of the LCM as an outcome tool in routine clinical practice in a variety of rehabilitation settings. The results of this third phase of testing have guided further development of the LCM, which is described in more detail in the discussion section of this paper. The only change that has occurred as a result of third phase testing was the removal of one LCM subscale (clinical participation) at the request of practitioners who had incorporated the LCM into their everyday clinical practice. The clinical participation subscale was found to be of limited value with the increasing healthcare focus on the community. Instead, the need for a subscale to bridge the gap between hospital and community was identified, and thus, a new subscale (community integration skills) was developed to replace the clinical participation subscale in the most recent version of the LCM. This study, which spanned four years, was begun with the original LCM, including the clinical participation subscale. Therefore, we have retained the clinical participation subscale (which was subsequently removed) in this paper. We also report analyses with the clinical participation subscale removed. This
information will provide additional support to
the independent value of the original seven
subscales of the LCM should therapists in
certain settings find this better meets their
needs until more rigorous testing of the latest
version of the LCM (i.e., original seven sub-
scales plus the community integration skills
subscale) is completed.

Method

Participants

Participants in the study were 650 clients
(61% male, 39% female) with a mean age of
51 years ± 20.93 (SD). All had been admitted
to the Acquired Brain Injury Unit and the
Geriatric Day Hospital of Parkwood Hospital
in London, Ontario, Canada, as well as the
Montebello Hospital (now Kernan Hospital) in
Baltimore, Maryland, U.S.A. Participant ages
ranged from 15 to 96 years. Primary diagnoses
included: (a) spinal cord injury (n = 103) with
a mean age of 35 years ± 14.17 (SD), (b)
traumatic brain injury (n = 251) with a mean
age of 41 yrs. ± 17.63 (SD), (c) general
neurological conditions (n = 98) with a mean
age of 59 ± 8.01 (SD), (d) orthopaedic con-
ditions (n = 39) with a mean age of 76 ± 9.58
(SD), and (e) cerebrovascular accidents
(CVAs; n = 150) with a mean age of 65 ±
14.93 (SD). The remaining 9 clients were di-
gnosed with other conditions such as depres-
sion and the general deconditioning associated
with prolonged medical illness.

Rehabilitation Program

Descriptions

The Acquired Brain Injury Program at
Parkwood Hospital is a 12-bed unit that pro-
vides comprehensive assessment and special-
ized rehabilitation for persons with brain in-
juries living within 10 counties of southwestern
Ontario. Priority is given to persons who are
13 years of age or older, who have sustained
an acute injury (traumatic, recent injury with
Glasgow Coma Scale score of 9 or more and
Rancho Scale score of IV or higher). Persons
who are ventilator dependent are not eligible
for admission. The goal of the program is to
prevent or minimize chronic disabilities while
promoting optimal independence and re-entry
into a person's home community.

The Parkwood Geriatric Day Hospital is an
out-patient, multi-disciplinary rehabilitation
program with an overall purpose of enabling
elderly individuals to live as independently as
possible. Clients are referred by their attend-
ing/family physician. Clients generally have
multiple functional and medical problems but
usually with one predominant diagnosis. The
primary focus is on diagnostic and functional
assessment, intensive rehabilitation, and man-
gagement of medical and functional needs of
elderly persons living at home. The average
length of stay is 3 months with clients attend-
ing, on average, twice weekly.

Montebello Hospital was a physical reha-
bilitation hospital accredited by CARF and
JCAHO under the organizational structure of
the University of Maryland Medical Center.
Montebello Hospital had an 18-bed Spinal
Cord Unit, a 32-bed Traumatic Brain Injury
Unit, a 26-bed CVA Unit, and a 24-bed Multi-
Trauma Unit. Montebello Hospital, which had
specialty accreditation in spinal cord and traum-
atic brain injury, is now merged into the
Kernan Hospital system.

Procedures

For a two year period, all admissions to the
Acquired Brain Injury Unit and the Geriatric
Day Hospital (Parkwood Hospital), and for a
four year period all admissions to the Spinal
Cord Injury, Traumatic Brain Injury, CVA,
and Multi-Trauma units (Montebello Hospital)
were considered for inclusion in the study. The
only eligibility criterion was anticipated dis-
charge into the community.

LCM scores were obtained for all clients at
admission and discharge by the primary ther-
apists on each of the units. The five therapists
from Montebello Hospital were certified as
Therapeutic Recreation Specialists (CTRS) by
the National Council for Therapeutic Recre-
ation Certification (NCTRC), and had an av-
verage of 6 years clinical experience. Of the two therapists working at Parkwood Hospi-
tal, one possessed a four year degree in Recreation and Leisure Studies and 7 years
full-time clinical experience; the second, a
two year associate degree and 14 years full-
time clinical experience. Tools used by ther-
apiasts to conduct their initial therapeutic
recreation assessments in both Canada and
the U.S.A., and on each of the rehabilitation
units, were similar. These tools included the:
(a) Leisure Diagnostic Battery (Ellis & Witt,
1982), (b) Ohio Functional Assessment Bat-
tery (Olsson, 1994), and (c) Leisure Scope
(Nall-Shenk, 1983). Each of the therapists
also used client interviews, discussion with
family members, client observation, consul-
tation with the treatment team, and review of
the medical chart as part of their assessment
procedures. The therapists at Montebello
Hospital also used the Comprehensive Eval-
uation in Recreation Therapy Scale (Parker,
Ellison, Kirby, & Short, 1985). Upon com-
pletion of assessment procedures, each of
the therapists used the initial assessment
results to summarize their findings, and to
assign LCM admission ratings to their cli-
ents on each of the LCM subscales. Initial
training in the use of the LCM was provided
to therapists at each of the facilities through
in-service training conducted by two of the
authors. At time of discharge, clients were
re-assessed by the same therapist, and LCM
discharge scores were assigned to determine
if client functioning had changed over time.
Therapists at each site were requested to
provide feedback on their perceptions of the
usefulness of the LCM and its subscales, as
well as any perceived weaknesses or limita-
tions from a practical and applied vantage
point. The original LCM subscales (Leisure
Awareness, Leisure Attitude, Leisure Skills,
Social Appropriateness, Group Interaction
Skills, Clinical Participation, Social Con-
tact, Community Participation) prior to mod-
fication (see above explanation) were used
in this study.

Results

Reliability and Validity

Internal consistency of the LCM, as mea-
sured by Cronbach's alpha reliability coeffi-
cient, was satisfactory for the total LCM ($\alpha =
0.89$). The Cronbach's alpha reliability coeffi-
cient was repeated for each diagnostic group
for the scores at admission. Results of this
testing for internal consistency are shown in
Table 1. All the alpha values are high, sup-
porting the internal consistency of the LCM in
all settings. With the exception of the Social
Appropriateness subscale, there was no im-
provement in alpha values with sequential de-
letion of each item, including the Clinical
Participation subscale (Table 2). Despite this
result, however, the therapists in some settings
found this latter subscale of limited practical
value, justifying its subsequent removal on
practical grounds. The results in Table 2 con-
firm, however, a high internal consistency for
the remaining 7 subscales. The LCM was
designed on the theoretical basis of a single
underlying construct. The theoretical unitary
structure of the LCM was confirmed by factor
analysis, which yielded a single factor with an
eigenvalue of 4.71, explaining 58.9% of the
variance. A second potential factor explained
only 11.3% of the variance and had an eigen-
value of less than 1.0. The scree plot supported

Table 1.
Cronbach's Alpha Reliability Coefficients
for the LCM at Time of Admission for
the Different Diagnostic Categories

<table>
<thead>
<tr>
<th>Diagnostic Categories</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal Cord Injury</td>
<td>.70</td>
</tr>
<tr>
<td>Traumatic Brain Injury</td>
<td>.93</td>
</tr>
<tr>
<td>General Neurological Conditions</td>
<td>.88</td>
</tr>
<tr>
<td>Orthopaedic Conditions</td>
<td>.90</td>
</tr>
<tr>
<td>Cerebrovascular Accidents</td>
<td>.88</td>
</tr>
</tbody>
</table>
Table 2.
Cronbach's Alpha for the LCM at Time of Admission Following Deletion of Individual LCM Subscales

<table>
<thead>
<tr>
<th>LCM Sub-Scale Deleted</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>.89</td>
</tr>
<tr>
<td>Clinical Participation</td>
<td>.88</td>
</tr>
<tr>
<td>Group Interaction Skills</td>
<td>.87</td>
</tr>
<tr>
<td>Leisure Attitude</td>
<td>.87</td>
</tr>
<tr>
<td>Leisure Awareness</td>
<td>.87</td>
</tr>
<tr>
<td>Leisure Skills</td>
<td>.88</td>
</tr>
<tr>
<td>Social Appropriateness</td>
<td>.90</td>
</tr>
<tr>
<td>Community Participation</td>
<td>.89</td>
</tr>
<tr>
<td>Social Contact</td>
<td>.88</td>
</tr>
</tbody>
</table>

a single factor solution. Examination of the matrix of residual correlations showed only small coefficients without any apparent pattern. These findings strongly support a single factor solution. The results of the factor analysis are provided in Tables 3 and 4. In accordance with DeVellis' (1991) suggestion, the factor analysis was run without stated preconditions; that is, without limitations on the number of factors that could be extracted. This approach is based on the assumption that the independent detection of a single factor structure by the SPSS program would be strong confirmatory support for the theoretical underpinnings of the scale. Because LCM scores were obtained as part of routine clinical practice, data for testing inter-rater effects were not available for the current study.

Change and Gain Scores

The change scores are presented as the mean change for subscales on the LCM; that is, the change in total LCM scores divided by the number of subscales for which complete data were available. The result of this procedure is that changes in the score might be small as major improvements occurring in some subscales will be diluted by little or no change occurring in those subscales in which the client already scored high on admission. This approach was taken as not all groups completed all LCM subscales on all clients. The data are presented by diagnostic groupings and by setting. For spinal cord injury and traumatic brain injury the diagnosis and setting correspond, as clients were treated on specialist spinal cord and brain injury units. Clients with CVA are presented separately according to the setting, as some clients with a primary diagnosis of CVA were on a specialist inpatient unit, while others attended the Geriatric Day Hospital. A similar approach was taken for clients with orthopaedic conditions but there were too few in-patient orthopaedic clients for separate analyses. The results for all clients in the Geriatric Day Hospital also are presented to demonstrate the use of the LCM in this setting as a whole, as well as for the three main diagnostic categories (CVA, general neurological, orthopaedic) attending this facility. These results are displayed in Table 5. Statistically significant positive changes were demonstrated for all client groups and settings, although for reasons explained above, the absolute changes tend to be small.

Repeated measures MANOVA was used to examine the significance of change in LCM scores from admission to discharge. A 5 × 2

Table 3.
Factor Analysis of Total LCM Subscales at Time of Admission

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.71</td>
<td>58.9</td>
</tr>
<tr>
<td>2</td>
<td>0.91</td>
<td>11.3</td>
</tr>
<tr>
<td>3</td>
<td>0.80</td>
<td>10.0</td>
</tr>
<tr>
<td>4</td>
<td>0.48</td>
<td>6.0</td>
</tr>
<tr>
<td>5</td>
<td>0.37</td>
<td>4.6</td>
</tr>
<tr>
<td>6</td>
<td>0.32</td>
<td>4.1</td>
</tr>
<tr>
<td>7</td>
<td>0.23</td>
<td>2.9</td>
</tr>
<tr>
<td>8</td>
<td>0.18</td>
<td>2.3</td>
</tr>
</tbody>
</table>
Table 4.
Factor Loadings of the LCM Subscales on the Single Extracted Factor

<table>
<thead>
<tr>
<th>LCM Subscales</th>
<th>Factor Loading</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leisure Awareness</td>
<td>.87</td>
<td>.76</td>
</tr>
<tr>
<td>Leisure Attitude</td>
<td>.87</td>
<td>.76</td>
</tr>
<tr>
<td>Leisure Skills</td>
<td>.78</td>
<td>.61</td>
</tr>
<tr>
<td>Social Appropriateness</td>
<td>.59</td>
<td>.35</td>
</tr>
<tr>
<td>Group Interaction Skills</td>
<td>.84</td>
<td>.71</td>
</tr>
<tr>
<td>Clinical Participation</td>
<td>.78</td>
<td>.61</td>
</tr>
<tr>
<td>Social Contact</td>
<td>.72</td>
<td>.52</td>
</tr>
<tr>
<td>Community Participation</td>
<td>.62</td>
<td>.39</td>
</tr>
</tbody>
</table>

Note. The factor analysis provided a single factor solution with an Eigenvalue of 4.71.

analysis of variance (diagnostic category × LCM scores, admission, and discharge) with repeated measures on the last factor (within) indicated a significant group (diagnosis) effect ($F = 15.04, df = 4/631, p < 0.05$), a significant time effect ($F = 191.45, df = 1/631, p < 0.05$) and, of most importance, a significant groups × time interaction effect ($F = 6.87, df = 4/631, p < 0.05$), which indicates that the degree to which leisure competence changed

Table 5.
LCM Change Scores in Different Diagnostic Categories and Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Diagnosis</th>
<th>n</th>
<th>Age M SD</th>
<th>Admission Score M SD</th>
<th>Discharge Score M SD</th>
<th>Significance Level (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-Patient</td>
<td>Spinal Cord Injury</td>
<td>103</td>
<td>35 14.2</td>
<td>5.93 .57</td>
<td>6.51 .57</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Traumatic Brain Injury</td>
<td>251</td>
<td>41 17.6</td>
<td>4.49 1.80</td>
<td>5.74 1.48</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>CVA General Neurological</td>
<td>95</td>
<td>59 15.0</td>
<td>5.85 1.61</td>
<td>6.42 .82</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>CVA General Neurological</td>
<td>54</td>
<td>46 12.7</td>
<td>5.97 .61</td>
<td>6.53 .57</td>
<td>.001</td>
</tr>
<tr>
<td>Day Hospital</td>
<td>CVA General Neurological</td>
<td>55</td>
<td>75 7.9</td>
<td>4.48 .99</td>
<td>5.69 .91</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Orthopaedic</td>
<td>35*</td>
<td>78 7.9</td>
<td>4.83 1.03</td>
<td>5.93 .70</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Total Day Hospital</td>
<td>134</td>
<td>76 8.0</td>
<td>4.7 1.00</td>
<td>5.8 .83</td>
<td>.001</td>
</tr>
</tbody>
</table>

Note. * = 4 orthopaedic clients were from Kernan Hospital.
Table 6.
Summary of Multiple Analysis of Variance

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subjects Effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within &amp; Residual</td>
<td>1752.14</td>
<td>631</td>
<td>2.78</td>
<td></td>
</tr>
<tr>
<td>Diagnosis</td>
<td>167.05</td>
<td>4</td>
<td>41.76</td>
<td>15.04*</td>
</tr>
<tr>
<td>Sex</td>
<td>.00</td>
<td>1</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Diagnosis by Sex</td>
<td>7.49</td>
<td>4</td>
<td>1.87</td>
<td>.67</td>
</tr>
<tr>
<td>Within Subjects Effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within &amp; Residual</td>
<td>342.74</td>
<td>631</td>
<td>.54</td>
<td></td>
</tr>
<tr>
<td>LCM</td>
<td>103.99</td>
<td>1</td>
<td>103.99</td>
<td>191.45*</td>
</tr>
<tr>
<td>Diagnosis by LCM</td>
<td>14.93</td>
<td>4</td>
<td>3.73</td>
<td>6.87*</td>
</tr>
<tr>
<td>Sex by LCM</td>
<td>.62</td>
<td>1</td>
<td>.62</td>
<td>1.13</td>
</tr>
<tr>
<td>Diagnosis by Sex by LCM</td>
<td>.63</td>
<td>4</td>
<td>.16</td>
<td>.29</td>
</tr>
</tbody>
</table>

* p < .05.
Note. LCM = change in LCM scores from admission to discharge.

between admission to discharge was different for the diagnostic groups (Table 6). Follow-up analyses, using the Newman-Keuls range test, were conducted to determine exactly where statistically significant differences existed between the five diagnostic categories. Table 7 presents descriptive statistics for each of the subpopulations and summarizes the results of the analysis, which support statistically significant differences (p < 0.05) between the change in scores on the LCM from admission to discharge for clients with traumatic brain injuries, and clients with other diagnoses such as spinal cord injuries, cerebrovascular accidents, general neurological conditions, and orthopaedic conditions. Gender differences in total LCM scores were also examined. Mean scores for males and females did not differ significantly on the total LCM.

Discussion
This paper reports the outcomes from the implementation of the LCM as part of everyday therapeutic recreation practice in rehabili-

Table 7.
Results of Newman-Keuls Multiple Range Test of LCM Means

<table>
<thead>
<tr>
<th>Diagnostic Category</th>
<th>SCI</th>
<th>TBI</th>
<th>Gen. Neur.</th>
<th>Ortho.</th>
<th>CVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission</td>
<td>5.93&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.46&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.57&lt;sup&gt;abcd&lt;/sup&gt;</td>
<td>5.21&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5.44&lt;sup&gt;de&lt;/sup&gt;</td>
</tr>
<tr>
<td>Discharge</td>
<td>6.51&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5.74&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6.26&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.18&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.22&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>


Means in the same row having at least one superscript letter in common are not significantly different, p < .05.
itation settings. This phase of testing was undertaken to assess the clinical feasibility of the LCM, and to continue to refine the LCM to best meet the needs of therapeutic recreation practitioners working in a variety of settings. As a result of feedback from therapists who have incorporated the LCM into their every day clinical practice, the Clinical Participation subscale was dropped as the therapists, particularly those working in the spinal cord and head injury programs, found it of limited value. The reason for this finding was that the therapists felt that the Clinical Participation subscale measured how well the client functioned within the clinical setting, a measure that therapists felt was of limited value in predicting the client's future functioning in the more real-life setting to which the client was intending to return. These therapists requested the substitution of a new subscale (the Community Re-Integration subscale) to measure their client's ability to apply the skills learned during the rehabilitation process to the real-life settings to which they would return, and to provide a link between the inpatient settings and outpatient or community settings. Health care trends which have, over the years, shifted their focus from institution to community also support this change. The Cronbach's alpha showed high internal consistency for all diagnostic groups and, by association, different clinical settings. Only removal of the Social Appropriateness subscale (now renamed the Cultural/Social Behaviours subscale) led to any improvement in the reliability of the overall LCM scale. We have elected to retain the subscale, as it was the opinion of some of the therapists, especially those in the head injury field, that it captured an essential element of their work. The LCM is a tool in evolution, and each stage of testing and refinement requires full evaluation. Until full evaluation of the revised scale is completed, the data reported here support continued use of either the original LCM of eight subscales, or use of the reduced LCM containing only seven subscales (with Clinical Participation removed).

These results support the reliability of the LCM as a measure of leisure-related outcomes in a variety of rehabilitation settings and with a variety of clients. The high Cronbach's alpha coefficient provides evidence of internal consistency of the LCM. While inter-rater effects were not evaluated as part of the current study (as LCM scores were obtained as part of routine clinical practice), rater variance has not been found to be a factor in a study conducted by Kloseck, Crilly, Ellis, and Lammers (1996) where inter-rater testing was conducted on 47 geriatric rehabilitation patients. The intra-class correlation was quite satisfactory for the total LCM scale \( r = 0.91 \). Inter-rater agreement for the individual subscales ranged from \( r = 0.71 \) to \( r = 0.91 \).

The results of the factor analysis confirm the expected LCM factor structure. That is, that the eight LCM subscales (based on leisure education principles) tap different aspects of one broad underlying construct, leisure competence. DeVellis (1991) suggested that it is possible to employ factor analytic methods in the validation of instruments. He argues that factor analytic results consistent with item groupings predicted prior to factoring (as was the case in the present study), demonstrate evidence of factorial validity. In the present case only one factor was predicted and the independent identification of a single factor by the factor analysis provided confirmatory support for the underlying concept.

Some caution needs to be exercised in the interpretation of the statistical treatment of the scale. The LCM is an ordinal scale and equal degrees of change from one rating to the next, as would occur in an interval scale, cannot be assumed. Although we have not explored this feature with the LCM, it has been explored in connection with the FIM, upon which the LCM was modelled. The impact of correcting for this using a Rasch analysis (Rasch, 1980) has been explored in one study with the conclusion that no significant difference occurred as a result of using the Rasch transformation (Stineman, Hamilton, Goin, Granger, & Fiedler, 1996).

Sensitivity to change is also a critical con-
sideration in measurements used to determine the effects of treatment. A sensitive measure, designed for clinical use, should show change over time in different diagnostic categories, even though these categories may be distinguished by different patterns of disability (Forrer, 1987; Studenski & Duncan, 1993). This study confirms the generalizability of the LCM and its ability to detect change in clients with different diagnoses. However, it should be noted that the average change within each group was not large. Not all clients are deficient on all subscales of the LCM. It is likely that different patterns exist but when presented as a mean score on an eight-item scale, the larger differences that might exist on one or more subscales become diluted out, and the client's degree of change seems small. One possible way of retaining focus on the specific problems of the individual client might be, as proposed elsewhere, to combine the LCM with Goal Attainment Scaling (Kloseck & Crilly, 1997). It is also possible that the pattern of scores on the different subscales varies from diagnosis to diagnosis. Intuitively, from first hand clinical knowledge in the areas of traumatic brain injury, spinal cord injury and other specialized forms of rehabilitation, one would expect client abilities and response to intervention to vary significantly depending upon a client's diagnosis. This possibility remains to be explored and will be a further step in the establishment of construct validity of the LCM.

It is important to note that many factors, other than therapeutic recreation intervention, may be contributing to the observed changes. Improvements on measures of leisure competence may, for example, be due to spontaneous recovery, a change in medications, alleviation of secondary conditions, or other factors, and not the therapeutic recreation services provided. Fuhrer (1987) argued that "ambiguities of interpretation (why change has occurred) can be minimized, but not eliminated by choosing outcome variables that are reasonably specific to the intervention being studied and by designing studies to neutralize the influence of factors other than the services provided" (p. 4). The LCM outcome variables are specifically designed to address leisure education components identified and supported in the leisure literature. Thus, the therapeutic recreation approach and the scale have the same conceptual/theoretical basis. Fuhrer further argued that "in the literature of evaluation research, outcomes are understood to result from defined intervention" (p. 1), and although improvements are often observed following rehabilitation, improvements become outcomes "only if we infer that the changes resulted from the services provided" (p. 3). A necessary next step, then, is to clearly define the specific type of intervention that should be provided in order to maximize client functioning and subsequently be reflected in the scores on each of the eight LCM domains. Interestingly, although the LCM was not designed to guide leisure education techniques and practices but rather to document client responses to existing leisure education approaches outlined in the literature, one of the requests received most often from practitioners using the LCM is a manual outlining specific interventions recommended for each of the eight domains represented by the LCM.

The standardization of materials, administration, scoring, and intervention will make it possible to create large comparative databases consisting of many types of rehabilitation clients across a variety of settings. According to Johnston, Keith, and Hinderer (1992) and Silva (1993), clinical or predictive validity is an often overlooked form of validity that should also be considered in scale development. This type of validity examines the extent to which an instrument is useful for specific clinical interventions for individuals. Johnston, Keith, and Hinderer suggested that "at a minimum, clinical validity implies that use of a measure alters planning of rehabilitative treatments or support intervention" (p. S-8). Future testing of the LCM will be necessary to demonstrate the ability of the LCM to guide therapeutic intervention.

One of the strengths of the LCM is that it is
a relatively simple approach to therapeutic recreation outcome evaluation and research that can easily be incorporated into every day clinical practice. This approach allows practitioners to evaluate changes over time in a single client, as well as compare changes in the outcomes of many clients across a variety of settings. Examination of intervention effectiveness, evaluation of gain scores, and the development of normative data will enable more accurate identification of the role of therapeutic recreation in the rehabilitation process. A tremendous need exists for standardized outcome measures in therapeutic recreation. Results of this study support the use of the LCM in measuring changes in leisure competence of clients in rehabilitation settings.

References


