Reliability of the Worker Role Interview

Susan D. Biernacki

Key Words: human occupation model • psychosocial development • rehabilitation, hand • work evaluation

The Worker Role Interview is a semistructured interview designed to be used as the psychosocial-environmental component of the initial rehabilitation assessment for the injured worker. Interrater reliability of the Worker Role Interview was computed for three raters for a sample of 30 adult subjects receiving rehabilitation due to an upper extremity injury. Reliability was assessed with the intraclass correlation approach. The coefficients estimating interrater reliability for six content areas ranged from .46 to .92 with a total value of .81. Three out of six content areas received ratings well below the accepted standard of .80, suggesting further need for instrument refinement in select areas. Test-retest reliability was computed for one rater for a sample of 20 subjects. The intraclass coefficient values ranged from .86 to .94 with a total value of .95 indicating high test-retest reliability.

The primary goal of hand rehabilitation is to restore hand function to allow each person to return to his or her previous life-style including gainful employment. Unfortunately, this does not always occur. Factors other than physical abilities can play a role in successful return to work. Fear of failure or reinjury, lack of motivation, and disturbed body image resulting from disability can influence the recovery process (Cone, 1974). Social factors, such as disruption of family life and potential loss of employment, also affect the injured worker. The psychological and social components influencing successful return to work by the injured worker remain essentially unexamined.

In a study by Haese (1985), psychological factors expressed by adults with acute hand injury were characterized. It was found that concern for inactivity, desire to return to work, and effort toward recovery were identified as common factors among those interviewed, whereas pain and fear of disfigurement were not.

Grunert, Smith, and Devine (1988) examined the incidence and nature of psychological symptoms occurring during the early stages after hand injury. It was found that 94% of the patients studied had significant psychological symptoms early in rehabilitation. These symptoms included nightmares, flashbacks, affective lability, preoccupation with phantom limb sensations, concentration and attention problems, cosmetic concerns, fear of death, and denial of amputation. Although it was found that most symptoms decreased with time, flashbacks still remained prominent and cosmetic concerns and preoccupation with phantom limb sensations increased at 2 months after injury.

According to the National Safety Council's Accident Facts, there were approximately 500,000 upper extremity injuries in 1987, which constituted almost 25% of all industrial injuries that year (National Safety Council, 1988). The National Institute for Occupational Safety and Health reported in 1982 that work accidents cost 30 billion dollars, with 20% of them involving the upper extremity (NIOSH, 1982). More work days are lost due to hand injuries than to other occupational injuries (Blair, Bear-Lehman, & McCormick, 1990). In a study performed in 1982 at the Philadelphia Hand Rehabilitation Center, a center well known for being a leader in the field of hand rehabilitation, it was found that 25% of the patients did not return to work (Ballard, Baxter, Bowen, & Fried, 1986).

Bear-Lehman (1983) examined factors affecting return to work after hand injury. It was found that financial need, level of activities of daily living, and participation in occupational therapy were related to successful return to work. This study, however, was based on a single interview with each patient during rehabilitation, before completion of the therapy program. No long-term follow-up was performed to determine whether those who returned to work later failed or whether those with poten-
tial to return to work actually did return.

Flinn-Wagner, Mladonicky, and Goodman (1990) investigated characteristics of workers with upper extremity injuries who successfully returned to work. Sixty-nine persons who participated in a work-hardening program after a workers' compensation claim for an upper extremity injury were identified. Of those claimants, 29 were discharged early or were unreachable despite additional mailings. Of the remaining 40 persons, more than 80% (33) returned to work. Income was found to be the primary motivator for those claimants who returned to work. No significant demographic differences were present between the return-to-work and non-return-to-work subjects. Flinn-Wagner et al. emphasized that individual factors alone are not adequate predictors of a complex phenomenon such as successful return to work.

Social factors associated with hand injury that may influence rehabilitation outcome include potential disruption of family life, social contacts, and leisure pursuits as well as loss of employment. It is commonly believed that the longer the patient is out of work due to injury, the less likely it is that reemployment will occur (Blackmore, Wright, & Perraiia, 1990). It is not uncommon for severe hand injuries to require 6 months or more of rehabilitation with additional reconstructive surgeries necessary at times.

Presently, there is no comprehensive assessment to assist therapists in quantifying those psychosocial factors that may inhibit a patient's ability to successfully return to work after rehabilitation. The Worker Role Interview (WRI) was developed to be used as the psychosocial-environmental component of the initial rehabilitation assessment process for the injured worker (Velozo, Kielhofner, & Fisher, 1990).

The WRI was developed with the Model of Human Occupation as its theoretical framework (Kielhofner & Burke, 1980). Based on the model, the WRI is structured around assessing the components of three subsystems—volition, habituation, and performance—in relationship to the psychosocial and environmental factors that may affect the injured worker.

The WRI is in its initial stage of development and has no demonstrated test-retest or interrater reliability. The concept of reliability refers to the instrument's ability to measure consistently under varying conditions and provides support to its usefulness as a clinical tool. The purpose of this study was to examine the test-retest and interrater reliability of the WRI.

Method

Subjects

Thirty adult subjects referred for therapy at the Hand Center of Western New York’s Work Therapy Program were chosen through a convenience sampling plan. All subjects had sustained an upper extremity injury causing lost time from their work. Subjects' ages ranged from 20 to 60 years with a mean age of 37.8 years. Fourteen subjects were men; 16 subjects were women. All subjects except four were receiving worker's compensation for injuries that had occurred at their job. Sixteen subjects had received diagnoses of acute trauma including lacerations, fractures, sprains, and nerve injuries. Thirteen subjects had received diagnoses of cumulative trauma including carpal tunnel syndrome, lateral epicondylitis, and wrist tendinitis. The remaining subject had a systemic disease requiring hand rehabilitation. All subjects had a work history of at least 6 months and were anticipating return to the work force after rehabilitation.

Raters

Three raters were used to interview and collect data for the 30 subjects. All three raters were occupational therapists experienced in upper extremity rehabilitation at the Hand Center of Western New York. Each rater reviewed a copy of A User's Guide to the Worker Role Interview (Velozo et al., 1990) along with instructions. To become familiar with administration and scoring of the interview, all three raters practiced scoring the assessment on one subject before initiation of the study. Questions regarding interview items, procedures, and scoring methods were addressed before the investigation. In addition, the Model of Human Occupation was briefly reviewed with all raters so that each rater was using the same frame of reference.

Instrument

The WRI is a semistructured interview that is completed at the beginning of an initial assessment of the injured patient. It should then be followed by the usual initial physical and work capacity assessment procedures used in a facility. Scoring of the Worker Role Interview Rating Form uses a 4-point rating scale with an area for comments. Raters in this study scored the rating form within 24 hr of completion of the interview.

To assist in gathering critical information, recommended questions for the WRI are included in the User's Guide. Questions are designed to include six general content areas: Personal Causation, Values, Interests, Roles, Habits, and Environment. Each content area is further divided into two or more subcontent areas for a total of 17 ratings (see Appendix). Depending on the patient's willingness to share information, fewer questions or more questions to elaborate specific areas may be added by the interviewer. Total interview time ranged from 30 to 45 min.

Scoring

On the basis of information obtained from the interview,
each of the 17 subcontent areas is scored on a scale of 1 to 4. A rating of 4 indicates strong support for the patient returning to his or her previous employment. A rating of 1 indicates significant difficulties for the patient returning to his or her previous employment. If insufficient information is obtained to rate an area or an item does not apply to a patient’s particular employment situation, a comment of “not applicable” (NA) may be used. In addition, a total score for all 17 subcontent areas was used in this study to assist in data analysis. In computing the total score, items reported as not applicable were assigned a score value of 0.

**Data Collection**

The WRI was given as the first part of each subject’s initial evaluation upon referral for work therapy. Each subject was interviewed in a quiet location in the clinic. Two raters were used for each interview; the author was involved in all interviews. Half of the interviews were scored by the author and one rater; the other half were scored by the author and the other rater. While one rater was interviewing a subject, the other rater quietly observed the interview. All raters randomly alternated either administering the interview or observing. After the interview, both raters independently scored the rating form without consultation.

To obtain data on test-retest reliability, 20 subjects were interviewed again by the author 6 to 12 days after the initial interview. These subjects were again chosen through convenience sampling. Attempts were made to administer the second evaluation in the same location as and under similar conditions to the first interview. The author was blind to the subject’s original scores, because scores for the first interview were not computed until completion of data gathering for all subjects.

**Results**

Data were analyzed with the intraclass correlation coefficient (ICC). The intraclass correlation coefficient, derived from generalizability theory, is a univariate statistic based on analysis of variance (ANOVA). This model permits use of unlimited scores, repeated measures, and two or more raters, unlike other more traditional methods of estimating reliability such as percentage agreement and Pearson product-moment correlation (Berk, 1979). When the ICC is used, the assumption is made that the raters represent a random sample of all possible raters. In this study, a two-way random effects analysis of variance model was used to determine the interrater and test-retest reliability for the six content areas of the interview as well as for the total score.

**Interrater Reliability**

The intraclass correlation coefficients estimating inter-rater reliability between two raters for the six content areas of the WRI ranged from .46 to .92. The ICC for the total score was .81. The content areas Values, Roles, and Habits scored between .46 and .51, well below the acceptable psychometric standard of .80. The intraclass correlation coefficients for all analyzed items are included in Figure 1.

Intraclass correlation coefficients were also computed to determine differences between the two pairs of raters. Scores were generally consistent with the combined ratings depicted in Figure 1 except in the content area Values, which revealed an ICC of .19 for rater pair 1 and 3 and .90 for rater pair 2 and 3 (see Figure 2).

**Test-Retest Reliability**

In the second interview of the 20 subjects, intraclass correlation coefficients for test-retest reliability for all six content areas ranged from .87 to .94 with a total ICC score of .95 (see Figure 3).

**Discussion**

The WRI in its present state represents the first edition of a psychosocial–environmental interview for the injured worker. The WRI derives its theoretical framework from the Model of Human Occupation. With its strong theoretical base, the WRI could prove to be a valuable tool to help validate practice as well as document clinical change; however, it must be able to measure consistently under varying conditions.

The WRI yielded intraclass correlation coefficients ranging from .46 to .92 for interrater reliability of the six individual content areas and a total reliability of .81. Because the WRI does not use a total score but relies on individual content areas for an overall rating, it is important to examine individual content areas separately.

Three content areas, Personal Causation, Interests, and Environment, fell between .69 and .92. Of the six content areas, only one scored above the psychometric standard of .80. It should be noted that the traditional reliability standard of .80 is conservative and that in studies examining reliability of similar assessments, acceptable values as low as .60 can be found (Kielhofner, Harlan, Bauer, & Maurer, 1986). Therefore, the two content areas that fell below .80 but above .60 were considered to display acceptable reliability in this study.

Three content areas, Values, Roles, and Habits, scored less than .51. Mann and Klyczek (1988) noted that many of the constructs of the Model of Human Occupation appear to fall into a more qualitative rather than quantitative domain. The differences found in the reliabilities of individual content areas, particularly that of Roles, Habits, and Values, might be partially due to the difficulty in quantifying these constructs.

In addition, in a preliminary analysis of the WRI by
Veozzo (1991) using back injury patients, it was suggested that the six separate content areas might actually only represent two separate constructs, that of worker identity and environment.

Intrarater reliability was also computed between rater pairs to determine whether overall reliability was low due to differences between rater pairs. ICC scores for Roles and Habits fell below the acceptable standard for both rater pairs, indicating poor overall agreement for these two content areas by all raters. While Values had a combined ICC score of .46, the individual rater pairs had ICC scores of .19 and .90. This discrepancy could indicate that overall reliability of this area could be improved with better rater training, that is, more refined description of rated items or more precise training in scoring procedures.

Specific scoring procedures found to cause confusion for the raters in this study included the use of the nonapplicable rating and when to score the patient in relation to return to work in general versus return to a specific job. Rater pair 2 and 3 was fairly consistent in the use of the NA rating at a ratio of 6:8 used mainly in the environmental content area. The ratio of NA ratings between rater pair 1 and 3 was 33:1. Rater 1 also used the NA across all content areas. Intrarater reliability could also be affected by a number of other variables, including therapists' judgment in converting interview data to ratings, therapists' frame of reference, and differences in therapists' interview styles.

Intraclass correlation coefficients computed for test-retest reliability indicated a total score of .95 with individual content areas ranging from .86 to .94. Test-retest reliability could be affected by the consistency of the respondent from the first interview to the second, different interpretation of the respondent's answers, different questions being asked, and actual changes in the respondent's answers due to the effects of the time interval between interviews. The results of this study indicated that the WRs has high test-retest reliability and that answers to test items display stability over the duration of time assessed (6 to 12 days).

In addition to the statistical analysis for intrarater and test-retest reliability, several nonquantifiable observations regarding the assessment were made by the raters.

Figure 1. ICC of combined intrarater reliability.
A few interview questions appeared to be confusing for a majority of the patients. These questions were in reference to self-characterization of internalized roles, good versus bad work habits, and goals set by the respondent at work. Many patients did not understand what information was being sought without further explanation from the rater. In general, however, all raters felt that this interview provided valuable insight into psychosocial and environmental factors that may affect treatment outcome and might have otherwise been overlooked.

Implications and Conclusion
When compared to other injuries, injuries to the hand rate highest in psychological significance to most persons (Cone, 1974). The loss or alteration of hand function often constitutes a crisis that can affect one’s perception of self as well as economic security (Grunert et al., 1988). The physician and the occupational therapist are primarily responsible for rehabilitating the patient both physically and psychologically. Because of the limited amount of time the physician spends with the patient, the responsibility for psychological support frequently falls to the occupational therapist. Bear-Lehman (1983) postulated that occupational therapists, by being supportive to the psychosocial needs of their patients, may be contributing to the patients’ ultimate success in returning to work after a hand injury.

The WRI was developed in response to the need for an assessment that assists therapists in quantifying psychosocial and environmental factors that may inhibit the injured worker in returning to work. This study examined the interrater and test-retest reliability of the WRI.

Although interrater reliability for the total assessment was found to be acceptable, three out of six individual content areas received ratings well below the accepted standard of .80. These individual content areas may require further investigation and refinement. Test-retest reliability displayed high reliability providing support to the assessment’s ability to measure consistently over time when used by one rater.

For an instrument to be considered a useful clinical tool, it must be able to measure consistently under varying conditions as well as measure accurately what it pro-

---

**Figure 2.** Reliability between rater pairs.
poses to measure (Wood, 1989). Further replication is needed to determine whether more intensive rater training could improve interrater reliability or whether poor reliability was related to internal instrument design. Additional research is also needed to determine the interrater and test-retest reliability with larger sample sizes, different therapists, different settings, and with other disabilities. Further replication will enhance the generalizability of the results to the population of adults receiving rehabilitation for an upper extremity injury causing lost time from work. In addition, validity studies to determine whether the assessment measures what it is intended to measure also need to be performed.

Acknowledgments

I thank Kenneth Ottenbacher, PhD, OTR, Clayton Peimer, MD, and William Mann, PhD, OTR, who provided wisdom, support, and guidance; Nanci Banasiak, MHA, OTR/L, and Michael Rozmus, OTR/L, who gave of their time as raters, and the Hand Center of Western New York for supporting this research effort.

This article is based on a thesis submitted for partial fulfillment toward a Master of Science degree in Occupational Therapy from the State University of New York at Buffalo.

Appendix

Content Areas and Subcontent Areas

Personal Causation
Assesses abilities and limitations
Expects job success
Takes responsibility

Values
Is committed to work
Has work-related goals

Interests
Enjoys work
Has interests consistent with work

Roles
Identifies with being a worker
Appraises work expectations
Influence of other roles

Habits
Has work habits
Has daily routine
Adapts routine to minimize difficulties

Environment
Physical setting
Family and peers
Boss
Co-workers

Figure 3. ICC of test-retest reliability.
References


