

The Psychosocial Adjustment to Illness Scale—Self-Report: Factor Structure and Item Stability

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The Psychosocial Adjustment to Illness Scale—Self-Report (PAIS-SR; Derogatis & Derogatis, 1990), a frequently used measure of adjustment in medically ill adults, was subjected to several exploratory factor analyses, with principal-axes factor extractions and varimax rotation procedures. The sample consisted of kidney, heart, liver, lung, and bone marrow transplant candidates ($N = 280$). The final analysis yielded a six-factor, 26-item instrument accounting for 59% of the variance. Coefficient alpha for the 26-item measure was .87, and internal consistency estimates for the factors ranged from .50 to .86. Strong correlations with other adjustment measures commonly used in the assessment of adults with chronic physical conditions support the validity of the PAIS-SR.

The Psychosocial Adjustment to Illness Scale (PAIS; Derogatis & Derogatis, 1990; Morrow, Chiarello, & Derogatis, 1978) is a measure of adjustment commonly used in the assessment of persons with chronic physical health conditions. Originally developed for individuals with cancer and their family members, the PAIS has two versions—a self-report form (PAIS-SR) and an interview format (PAIS). Both versions are designed to assess the quality of an adult's psychosocial adjustment to a current medical condition. The 46-item PAIS-SR provides an assessment of seven primary domains of adjustment: (I) Health Care Orientation, (II) Vocational Environment, (III) Domestic Environment, (IV) Sexual Relationships, (V) Extended Family Relationships, (VI) Social Environment, and (VII) Psychological Distress.

Information concerning the factor structure of the PAIS-SR is inconsistent and limited. In the PAIS manual, Derogatis and Derogatis (1990) presented the original exploratory factor analysis (EFA) based on the assessment of 120 adults with lung cancer. Seven dimensions were identified in the analysis, and the hypothesized dimensional structure of the PAIS was supported. However, this analysis was performed only on data from the interview version, and the sample size was relatively small by most standards. Several items did not load on the intended scales of adjustment, whereas other items did load on intended scales. Items that did not load on the intended scales were still labeled according to their original intended classification. Also, internal consistency reliability coefficients for the PAIS-SR were reported in the manual, but only for a small, homogeneous sample of adults with heart disease ($n = 69$).

In a more recent study using a large sample ($N = 502$) of adults with cancer, Merluzzi and Martinez Sanchez (1997) found factor

analytic support for the original seven domains, and they provided evidence for internal consistency and construct validity. Cronbach's alpha coefficients for the scales were generally higher (range = 0.61 to 0.92) than those for the original PAIS-SR scales, and correlations between the PAIS-SR and other measures of adaptation were significant and in the expected direction. Although the Merluzzi and Martinez Sanchez (1997) factor analysis did support a seven-factor solution, several items did not load on the original rationally derived scales of adjustment. When taken together, the two published factor analyses of the PAIS-SR are not in complete agreement as to which items consistently load on which factors.

The primary purpose of this study was to further examine the stability of the PAIS-SR. In particular, it seemed most important to empirically test items that consistently formed factors across several studies. In this study we illustrate the similarities and differences in item loadings across the studies by Derogatis and Derogatis (1990) and Merluzzi and Martinez Sanchez (1997) and the current study. In addition, we examine the internal consistency and construct validity of the PAIS-SR. Using only those items loading consistently across all three studies, we hypothesize (a) confirmation of the original factor structure, (b) excellent overall internal consistency, and (c) significant relationships between poorer psychosocial adjustment as measured by the PAIS-SR and lower levels of health-related quality of life, higher symptom frequency, more symptoms of depression and anxiety, and greater use of coping strategies characterized by avoidance. Regarding this latter hypothesis, we expect that (a) lower levels of depression (Beck Depression Inventory, BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), anxiety (State-Trait Anxiety Inventory, STAI; Spielberger, 1970), and general mental health problems (SF-36 Health Survey; Ware, 1993) will be significantly correlated with healthier scores on the PAIS-SR Psychological Distress scale; (b) higher levels of physical functioning, general health, and vitality (SF-36 Health Survey) will be associated with healthier scores on the PAIS-SR Vocational Environment and Sexual Functioning scales; (c) higher levels of social functioning (SF-36 Health Survey) will be significantly correlated with healthier scores on the PAIS-SR Social Environment and Relationship with Partner and

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Family scales; and (d) lower scores on measures of coping characterized by avoidance and acceptance–resignation (Medical Coping Modes Questionnaire, MCMQ; Feifel, Strack, & Nagy, 1987) will be associated with healthier scores on the PAIS–SR Psychological Distress, Health Care Orientation, and Social Environment scales.

Method

Participants were 280 adults with kidney ($n = 35$, 13%), heart ($n = 47$, 17%), liver ($n = 102$, 36%), lung ($n = 55$, 20%), and oncological disease ($n = 41$, 15%). The majority of the participants were men ($n = 164$, 59%), Caucasian ($n = 232$, 83%), and married ($n = 169$, 60%), with a mean age of 48 years ($SD = 11.29$, range = 17 to 71 years). Most participants were unemployed ($n = 194$, 69%) and reported themselves to be medically disabled ($n = 180$, 64%). All participants were candidates for possible solid organ or bone marrow transplantation and completed a series of self-report questionnaires and a clinical interview during pretransplant psychological assessments. These clinical assessments are performed routinely by predoctoral clinicians under the supervision of a licensed psychologist. They are typically conducted on an outpatient basis as part of a 2- or 3-day multidisciplinary evaluation that all transplant candidates complete prior to being considered for transplant listing. Participants in the present study represent a subset of patients who have participated in other studies on the psychological adjustment of transplant candidates (Sears, Rodrigue, Greene, & Mills, 1996; Streisand et al., 1999). Because of time constraints, fatigue, and managed care restrictions, not all of the participants completed each of the measures reported in this study. We note discrepancies in n for the different analyses in the tables.

Participants completed the PAIS–SR as well as several other self-report measures (described below). The 46-item PAIS–SR (Derogatis & Derogatis, 1990) asks individuals to select from a set of four responses that range from good to poor adjustment. Across all domains, higher scores reflect poorer psychosocial adjustment. Although standard scores are most often used and reported in the literature, raw scores were used here because the examination of population differences was not the focus of this study. In our sample, 7% of the participants had not answered one to three questions on the PAIS–SR, and the mean score for that scale was used to replace the missing value for those participants. The percentage of participants with

missing values dropped to only 3% when only those 26 items comprising the final instrument version (described below) were used in the analyses.

To assess convergent validity, participants also completed measures of quality of life, coping, depression, and anxiety. The SF–36 Health Survey (Ware, 1993) is a short, yet comprehensive, measure of health-related quality of life that provides scores along eight dimensions: Physical Functioning ($\alpha = .90$), Role Physical ($\alpha = .79$), Bodily Pain ($\alpha = .72$), General Health ($\alpha = .81$), Vitality ($\alpha = .85$), Social Functioning ($\alpha = .81$), Role Emotional ($\alpha = .77$), and Mental Health ($\alpha = .85$). Collectively, these scales tap dimensions of physical and mental health functioning and yield scores from 0 to 100 (higher scores reflect better health status). Excellent construct and criterion validity has been reported (Shiely, Bayliss, Keller, Tsai, & Ware, 1996). The MCMQ (Feifel et al., 1987) is a 19-item instrument designed to assess three cognitive–behavioral, illness-related coping strategies: (a) confrontation ($\alpha = .89$), (b) avoidance ($\alpha = .78$), and (c) acceptance–resignation ($\alpha = .64$). Items are answered on a 4-point rating scale (e.g., *never to all the time; very little to very much*), with high scores indicative of higher levels of each coping strategy. Evidence for construct validity has been most consistently demonstrated for the avoidance and acceptance–resignation scales. Both of these scales were found to be significantly correlated with measures of depression (BDI; $r = .26-.36$) and anxiety (STAI; $r = .28-.43$) in a sample of 372 adults with chronic medical conditions (Rodrigue, Jackson, & Perri, 2000). The BDI (Beck et al., 1961; $\alpha = .89$) is a 21-item measure composed of severity ratings for 13 cognitive–affective and 8 somatic symptoms of depression, including mood, social withdrawal, sense of pessimism and guilt, loss of energy, and weight and appetite changes. Finally, the STAI (Spielberger, 1970) evaluates feelings of tension, apprehension, nervousness, and worry by way of individuals' responses to 40 statements. The 20-item State scale (1 = *not at all*, 4 = *very much*; $\alpha = .87$) measures how individuals "feel right now," whereas the 20-item Trait scale (1 = *almost never*, 4 = *almost always*; $\alpha = .91$) assesses how respondents "generally feel."

Results and Discussion

PAIS–SR scores were examined to determine if they differed as a function of type of transplant being sought by participants. No significant between-groups differences were found; therefore, data from all participants were combined in all subsequent analyses.

Table 1
PAIS–SR Factors and Items Replicated Across Three Studies

Study	Factor name	Items
Derogatis & Derogatis (1990)	Health Care Orientation	1, 6, 7, 8
Merluzzi & Martinez Sanchez (1997)	Health Care Orientation	
Rodrigue et al. (current study)	Health Care Orientation	
Derogatis & Derogatis (1990)	Vocational Environment	9, 10, 11, 12, 13
Merluzzi & Martinez Sanchez (1997)	Job and Household Duties	
Rodrigue et al. (current study)	Vocational Environment	
Derogatis & Derogatis (1990)	Domestic Environment	15, 16, 19
Merluzzi & Martinez Sanchez (1997)	Relationship with Partner/Family	
Rodrigue et al. (current study)	Relationship with Partner/Family	
Derogatis & Derogatis (1990)	Sexual Relationship	24, 25, 26, 27
Merluzzi & Martinez Sanchez (1997)	Sexual Relationship	
Rodrigue et al. (current study)	Sexual Relationship	
Derogatis & Derogatis (1990)	Social Environment	34, 35, 36, 37, 38
Merluzzi & Martinez Sanchez (1997)	Social and Leisure Activities	
Rodrigue et al. (current study)	Social Environment	
Derogatis & Derogatis (1990)	Psychological Distress	40, 41, 42, 43, 44
Merluzzi & Martinez Sanchez (1997)	Psychological Distress	
Rodrigue et al. (current study)	Psychological Distress	

Note. PAIS–SR = Psychosocial Adjustment to Illness Scale—Self-Report.

Table 2
Factor Analysis of the 26-Item PAIS-SR

Item no.	Item summary	Factor loadings					
		1	2	3	4	5	6
Factor 1: Vocational Environment							
9	Job interference	.82	.10	.18	.16	.00	.00
10	Job performance	.81	.16	.19	.00	.00	.00
11	Lost time at work	.73	.00	.00	.00	.00	.00
12	Job performance	.55	.10	.00	.00	.00	.00
13	Changing job goals	.62	.00	.15	.14	.14	.15
Factor 2: Sexual Relationship							
24	Sexual interest	.12	.75	.22	.00	.00	.00
25	Decrease in sexual activity	.16	.83	.20	.13	.00	.00
26	Sexual satisfaction	.15	.84	.11	.16	.10	.00
27	Sexual performance	.00	.78	.17	.13	.00	.00
Factor 3: Social Environment							
34	Leisure time and hobbies	.16	.16	.66	.26	.17	.00
35	Participation in leisure activities	.34	.28	.55	.20	.00	.00
36	Interest in leisure time	.00	.14	.81	.00	.15	.00
37	Participation in leisure activities	.34	.25	.67	.14	.00	.00
38	Interest in social activities	.00	.14	.76	.20	.00	.17
Factor 4: Psychological Distress							
40	Anxiety	.11	.12	.00	.78	.00	.12
41	Depression	.17	.00	.27	.71	.18	.00
42	Anger	.00	.00	.18	.62	.40	.19
43	Guilt/Self-blame	.15	.17	.26	.62	.16	.00
44	Worry about illness	.00	.00	.00	.78	.00	.00
Factor 5: Relationship with Partner and Family							
15	Relationship with partner	.00	.16	.00	.12	.72	.00
16	Relationship with family	.00	.00	.00	.00	.77	.00
19	Communication with family	.00	.00	.21	.26	.68	.19
Factor 6: Health Care Orientation							
1	Attitude towards health	.00	.00	.00	.00	.30	.40
6	Information from medical staff	.00	.00	.00	.00	-.11	.80
7	Treatment expectations	.00	-.13	.15	.10	.11	.45
8	Information about treatment	.00	.00	.00	.13	-.11	.77

Note. Factors with the highest loadings are indicated in boldface type. PAIS-SR = Psychosocial Adjustment to Illness Scale—Self-Report.

The 46 items of the PAIS-SR were subjected to several EFAs (common factors), with principal-axes factor extractions and varimax rotation procedures. This rotation method was chosen because the original scales of the PAIS-SR were constructed to tap distinct domains of functioning. Also, this methodology is consistent with the recent study by Merluzzi and Martinez Sanchez (1997). Using eigenvalues and the scree test to determine the number of factors (Floyd & Widaman, 1995; Gorsuch, 1997), all 46 items loaded on six factors, which collectively accounted for 48% (unrotated) of the variance (41% rotated). Factor 1 consisted of five out of the six items from the original Vocational Environment domain (item 14 was not included), and items 17, 21, and 39. Factor 2 contained 14 items, including six of the eight items from the original Domestic Environment domain (items 17, 21, and 22 were not included), four of the five items from the original Extended Family domain,

and items 2, 14, 23, and 28. Factor 3 replicated the original Psychological Distress domain, with loadings for all 7 items. Item 5, from the original Health Care Orientation scale, also loaded on this factor. Factor 4 consisted of four of the six items from the original Sexual Relationship domain (items 23 and 28 were not included). Factor 5 consisted of five out of the six items from the original Social Environment domain (item 39 was not included), as well as item 32. Finally, Factor 6 contained six of the eight items from the original Health Care Orientation domain (items 2 and 5 were not included).

Comparisons of our six-factor solution to the item loadings from the two previous factor analyses of the PAIS-SR (Derogatis & Derogatis, 1990; Merluzzi & Martinez Sanchez, 1997) revealed that 26 of the 46 items consistently formed factors across studies (see Table 1). Items 2-5, 14, 17, 18, 20-23, 28-33, 39, 45, and 46

Table 3
Cronbach's Alpha Coefficients for the 26-Item PAIS-SR

Factor	α
Factor 1: Vocational Environment	.79
Factor 2: Sexual Relationship	.86
Factor 3: Social Environment	.83
Factor 4: Psychological Distress	.81
Factor 5: Relationship with Partner and Family	.64
Factor 6: Health Care Orientation	.50

Note. PAIS-SR = Psychosocial Adjustment to Illness Scale—Self-Report.

did not fit with the same factor across the three studies. Consequently, an additional EFA was performed on the 26 PAIS-SR items that loaded consistently across all three studies. This analysis (rotated) resulted in all 26 items loading strongly on six factors, accounting for 59% of the variance. The factor loadings for each of these items are displayed in Table 2.

The bootstrap technique (Efron, 1979; Thompson, 1993) was used to cross-validate the results of the factor analysis. We ran a total of 1,500 bootstrap samples. The proportion of redrawn samples that led to a 6-factor solution was .83, and the proportion of these samples that produced the same factor structure as described above was .79. These results suggest that the factor structure is quite stable.

To assess the internal consistency, Cronbach's alphas were calculated for each specific factor (see Table 3). Four of the six factors had acceptable (i.e., $\geq .70$) internal consistency estimates

(Hair, Anderson, Tatham, & Black, 1992), with alpha values ranging from .79 to .87. However, two factors, representing health care orientation and relationship with partner and family, had low internal consistencies ($\alpha = .50$ and .64, respectively). Interestingly, items comprising similar factors in the two previous studies also demonstrated the lowest levels of internal consistency when compared to all other factors. The relationship with partner and family factor has the fewest number of items ($n = 3$) of any factor, and this may partially account for its relatively low internal consistency. The development and evaluation of additional items for this factor may add incrementally to its internal consistency reliability. Alpha coefficients for the health care orientation factor have been found to be consistently low across all three factor analysis studies of the PAIS-SR. When examined further in the context of our factor analysis (two of the four items had relatively weak loadings) and clinical experience, this factor raises important conceptual and methodological questions. It may be that items assessing orientation to health care are not conceptually consistent with a global measure of psychosocial adjustment. At the very least, researchers and clinicians should exercise appropriate caution when interpreting findings involving this factor.

To examine the convergent validity of the 26-item PAIS-SR, correlations with other measures of functioning were computed. Results of these correlation analyses, using unweighted scaled scores, are reported in Table 4. The correlations of the PAIS-SR with the eight SF-36 scales are generally strong and in the expected direction, that is, higher quality of life was associated with better adjustment to illness. As expected, the Vocational Environment and Sexual Relationship scales correlated most highly with

Table 4
Correlations of the 26-Item PAIS SR Factors With Other Measures of Functioning

Measure	1	2	3	4	5	6
Quality of life						
SF-36 ($N = 237$)						
Physical functioning	-.58**	-.35**	-.50**	-.24**	-.10	-.07
Role functioning (physical)	-.54**	-.21*	-.39**	-.33**	-.10	-.11
Bodily pain	-.38**	-.24**	-.29**	-.32**	-.20**	-.19**
General health	-.43**	-.23**	-.46**	-.45**	-.25**	-.09
Vitality	-.48**	-.23**	-.50**	-.35**	-.17	-.14
Social functioning	-.52**	.34**	-.60**	-.47**	-.17	-.14
Role functioning (emotional)	-.23*	-.16	-.37**	-.43**	-.25**	-.17
Mental health	-.29**	-.20*	-.39**	-.74**	.41**	-.23**
Coping						
MCMQ ($N = 259$)						
Confrontation	.03	.02	.00	.00	-.09	-.27**
Avoidance	.14	.07	.27**	.45**	.39**	.20*
Acceptance-resignation	.12	.08	.23**	.38**	.30**	.29**
Affective functioning						
BDI ($N = 191$)						
Cognitive	.28*	.30**	.41**	.58**	.41**	.18
Somatic	.47**	.48**	.59**	.55**	.31**	.08
STAI ($N = 199$)						
State	.17	.06	.34**	.57**	.34**	.26**
Trait	.17	.15	.39**	.64**	.44**	.22*

Note. Factors: 1 = Vocational Environment, 2 = Sexual Relationship, 3 = Social Environment, 4 = Psychological Distress, 5 = Relationship with Partner and Family, 6 = Health Care Orientation. PAIS-SR = Psychosocial Adjustment to Illness Scale—Self-Report; SF-36 = SF-36 Health Survey; MCMQ = Medical Coping Modes Questionnaire; BDI = Beck Depression Inventory; STAI = State-Trait Anxiety Inventory.

* $p < .01$. ** $p < .001$.

the SF-36 physical functioning scales, the Social Environment scale correlated most highly with the SF-36 Social Functioning scale, and the Psychological Distress and Relationship with Partner and Family scales correlated most strongly with the SF-36 Mental Health scale.

Correlations between the PAIS-SR and MCMQ suggest that the more frequent use of coping strategies characterized by avoidance and acceptance-resignation is associated with poorer psychosocial adjustment across several domains, including Psychological Distress, Relationship with Partner and Family, Social Environment, and Health Care Orientation. A more positive orientation to health care was also associated with more frequent use of coping strategies characterized by confrontation. This pattern of relationships between the MCMQ and PAIS-SR is not surprising considering recent findings that the use of avoidance and acceptance-resignation in coping with one's illness is strongly associated with poorer psychological adaptation (Rodrigue, Boggs, Weiner, & Behen, 1993; Rodrigue, Davis et al., 1993; Rodrigue et al., 2000). One might reasonably expect a stronger positive relationship between the use of more adaptive coping strategies and psychosocial functioning. It is possible, however, that improvements in psychosocial adjustment are more a reflection of decreasing use of maladaptive coping strategies rather than increasing use of adaptive strategies (Robinson et al., 1997). This has important clinical implications and suggests that clinicians should not focus exclusively on building active information-seeking skills while ignoring strategies to reduce avoidant or passively resigned coping patterns. Finally, the PAIS-SR Psychological Distress scale correlated most strongly with the BDI and STAI. The pattern of moderate correlations further suggests that the PAIS-SR has a pervasive mental health component.

In summary, results of this EFA of the PAIS-SR generally support the original conceptually derived scales proposed by Derogatis and Derogatis (1990), and they closely mirror the item-level factor study conducted by Merluzzi and Martinez Sanchez (1997). Of particular importance is the finding that only 26 of the original PAIS-SR items consistently loaded on distinct factors across three independent studies, and none of the items from the original Extended Family scale were retained. Cross-validation using bootstrap techniques indicated that this 26-item scale is stable. The abbreviated PAIS-SR appears to have good convergent validity and to be an internally consistent measure of adjustment to illness. Reducing the PAIS-SR to 26 items provides greater efficiency in administration. With one exception (Health Care Orientation), the domains assessed make the PAIS-SR a very good instrument of choice for assessing individuals with physical health problems and their current level of psychosocial adjustment. Using the PAIS-SR may provide clinicians with important targets for intervention in facilitating more adaptive responses to the psychological and physical demands of physical health problems. Future studies should seek to cross-validate the 26-item PAIS-SR with nontransplant populations (e.g., multiple sclerosis, Parkinson's, arthritis) and provide empirical support of the measure's utility and sensitivity in detecting change following medical or psychological intervention, or both.

References

- Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, 4, 561-571.
- Derogatis, L. R., & Derogatis, M. F. (1990). *The Psychological Adjustment to Illness Scale: Administration, scoring, and procedures manual*. Towson, MD: Clinical Psychometric Research.
- Efron, B. (1979). Bootstrap methods: Another look at the jackknife. *The Annals of Statistics*, 7, 1-26.
- Feifel, H., Strack, S., & Nagy, V. T. (1987). Coping strategies and associated features of medically ill patients. *Psychosomatic Medicine*, 49, 616-625.
- Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, 3, 286-299.
- Gorsuch, R. L. (1997). Exploratory factor analysis: Its role in item analysis. *Journal of Personality Assessment*, 68, 532-560.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1992). *Multivariate data analysis with readings* (3rd ed.). New York: Macmillan.
- Merluzzi, T. V., & Martinez Sanchez, M. A. (1997). Factor structure of the Psychological Adjustment to Illness Scale (Self-Report) for persons with cancer. *Psychological Assessment*, 9, 269-276.
- Morrow, G. R., Chiarello, R. J., & Derogatis, L. R. (1978). A new scale for assessing patients' psychosocial adjustment to medical illness. *Psychological Medicine*, 8, 605-610.
- Robinson, M. E., Riley, J. R., Myers, C. D., Sadler, I. J., Kvaal, S. A., & Geisser, M. E. (1997). The Coping Strategies Questionnaire: A large sample item factor analysis. *Clinical Journal of Pain*, 13, 43-49.
- Rodrigue, J. R., Boggs, S. R., Weiner, R. S., & Behen, J. M. (1993). Mood, coping style, and personality functioning among adult bone marrow transplant candidates. *Psychosomatics*, 34, 159-165.
- Rodrigue, J. R., Davis, G. L., Howard, R. J., Brunson, M. E., Langham, M. R., Haiman, S., & Behen, J. (1993). Psychological adjustment of liver transplant candidates. *Clinical Transplantation*, 7, 227-229.
- Rodrigue, J. R., Jackson, S. L., & Perri, M. G. (2000). The Medical Coping Modes Questionnaire: Factor structure for adult transplant candidates. *International Journal of Behavioral Medicine*, 7, 89-110.
- Sears, S. F., Rodrigue, J. R., Greene, A. F., & Mills, R. M. (1996). Predicting quality of life with a pre-transplantation assessment battery: A prospective study of cardiac recipients. *Journal of Clinical Psychology in Medical Settings*, 2, 335-355.
- Shicly, J.-C., Bayliss, M. S., Keller, S. D., Tsai, C., & Ware, J. E. (1996). *SF-36 Health Survey annotated bibliography: First edition (1988-1995)*. Boston, MA: The Health Institute, New England Medical Center.
- Spielberger, C. D. (1970). *The State-Trait Anxiety Inventory manual*. Palo Alto, CA: Consulting Psychologists Press.
- Streisand, R. M., Rodrigue, J. R., Sears, S. F., Perri, M. G., Davis, G. L., & Banko, C. G. (1999). A psychometric normative database for pre-liver transplantation evaluations: The Florida cohort, 1991-1996. *Psychosomatics*, 40, 479-485.
- Thompson, B. (1993). The use of statistical significance tests in research: Bootstrap and other alternatives. *Journal of Experimental Education*, 61, 361-377.
- Ware, J. E. (1993). *SF-36 Health Survey: Manual and interpretation guide*. Boston, MA: Nimrod Press.

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