Z

Z Scores

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Definition

A *z* score is a standard score. Standard scores (e.g., *z* scores, T scores, and IQ scores) result from a transformation of raw scores to facilitate interpretation. A *z* score has a mean of zero and a standard deviation of 1. The formula for a *z* score, commonly used in neuropsychology, is provided below:

$$z = \frac{x - M}{\mathrm{SD}}$$

where

- x is a raw score to be standardized.
- M is the mean of the control or normative sample.
- SD is the standard deviation of the control or normative sample.

Current Knowledge

For ease of communication in clinical reports, *z* scores can be converted to percentile ranks. The percentile rank represents the percentage of scores in a frequency distribution that are lower than the obtained score (e.g., the 25th percentile means that 25% of scores are lower). This conversion is illustrated in Table 1.

Two fundamental assumptions regarding *z* scores are sometimes violated in mainstream clinical neuropsychology. First, there is an assumption that the *z* score represents the distance between the examinee's raw score and the population mean in standard deviation units. Second, when converting *z* scores to percentile ranks, there is an assumption that the scores are normally distributed. Clinicians who do *z* score transformations sometimes use small, outdated, nonrepresentative control samples from a published study to calculate a *z* score for an individual. Under these circumstances, it usually cannot be assumed that (a) the sample is representative of the population at large, or (b) the sample data are normally distributed. Therefore, the resulting *z* score and corresponding percentile rank might not be an accurate estimate of a person's functioning relative to the general population.

Cross-References

▶ Normal Curve
▶ Normative Data
▶ Standard Scores
▶ T Scores

J. S. Kreutzer et al. (eds.), *Encyclopedia of Clinical Neuropsychology*,
https://doi.org/10.1007/978-3-319-57111-9

Z Scores, Table 1 Individual *z* score to percentile rank conversions

Percentile rank	−z | +z	Percentile rank
0.10	3.10	99.90
0.11	3.07	99.89
0.13	3.00	99.87
0.17	2.93	99.83
0.19	2.90	99.81
0.21	2.87	99.79
0.26	2.80	99.74
0.31	2.70	99.69
0.35	2.73	99.65
0.38	2.67	99.62
0.5	2.60	99.5
0.6	2.53	99.4
0.7	2.47	99.3
0.8	2.40	99.2
1.0	2.30	99.0
1.1	2.33	98.9
1.2	2.27	98.8
1.4	2.20	98.6
1.6	2.13	98.4
1.9	2.07	98.1
2.3	2.00	97.7
3	1.82–1.95	97
4	1.70–1.81	96
5	1.60–1.69	95
6	1.52–1.59	94
7	1.44–1.51	93
8	1.38–1.43	92
9	1.32–1.37	91
10	1.26–1.31	90
11	1.21–1.25	89
12	1.16–1.20	88
13	1.11–1.15	87
14	1.06–1.10	86
15	1.02–1.05	85
16	0.98–1.01	84
17	0.94–0.97	83
18	0.90–0.93	82
19	0.86–0.89	81
20	0.83–0.85	80
21	0.79–0.82	79
22	0.76–0.78	78
23	0.73–0.75	77
24	0.70–0.72	76
25	0.66–0.69	75
26	0.63–0.65	74
27	0.60–0.62	73
28	0.57–0.59	72
29	0.54–0.56	71
30	0.52–0.53	70
31	0.49–0.51	69
32	0.46–0.48	68
33	0.43–0.45	67
34	0.40–0.42	66
35	0.38–0.39	65
36	0.35–0.37	64
37	0.32–0.34	63
38	0.30–0.31	62
39	0.27–0.29	61
40	0.25–0.26	60
41	0.22–0.24	59
42	0.19–0.21	58
43	0.17–0.18	57
44	0.14–0.16	56
45	0.12–0.13	55
46	0.09–0.11	54
47	0.07–0.08	53
48	0.04–0.06	52
49	0.02–0.03	51
50	0.00–0.01	50

(*continued*)

References and Readings

Brooks, B. L., Strauss, E., Sherman, E. M. S., Iverson, G. L., & Slick, D. J. (2009). Developments in neuropsychological assessment: Refining psychometric and clinical interpretive methods. *Canadian Psychology, 50*, 196–209.

Strauss, E., Sherman, E. M. S., & Spreen, O. (2006). *A compendium of neuropsychological tests: Administration, norms, and commentary* (3rd ed.). New York: Oxford University Press.

Zaleplon

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Generic Name

Zaleplon

Brand Name

Sonata

Class

Non-benzodiazepine sedative/hypnotic

Proposed Mechanism(s) of Action

Binds to a subtype of the benzodiazepine receptor (alpha 1), appears to enhance GABA's inhibitory activity, and increases chloride channel conductance (thus allowing for cellular hyperpolarization)

Indication

Insomnia

Off-Label Use

No common off-label use

Side Effects

Serious

Respiratory depression and rare angioedema

Common

Sedation, ataxia, dizziness, potential amnesia, hallucinations (rare), and headache

References and Readings

Physicians' desk reference (71st ed.) (2017). Montvale, NJ: Thomson PDR.

Stahl, S. M. (2007). *Essential psychopharmacology: The prescriber's guide* (2nd ed.). New York: Cambridge University Press.

Additional Information

Drug Interaction Effects. http://www.drugs.com/drug_interactions.html

Drug Molecule Images. http://www.worldofmolecules.com/drugs/

Free Drug Online and PDA Software. www.epocrates.com

Free Drug Online and PDA Software. www.medscape.com

Gene-Based Estimate of Drug interactions. http://mhc.daytondcs.com:8080/cgi-bin/ddiD4?ver=4&task=getDrugList

Pill Identification. http://www.drugs.com/pill_identification.html

Zangwill, Oliver (1913–1987)

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Landmark Clinical, Scientific, and Professional Contributions

- Like other pioneers in the field of neuropsychology, Oliver Zangwill used the rigorous methodology of experimental psychology to study neurological diseases and dysfunctions. By so doing, he made important contributions to numerous areas of neuropsychological research. Rejecting holistic concepts of cerebral organization inherited from Karl Lashley's research, he studied localization of function, elucidating the differences in spatial impairment associated with right and left parietal lobe lesions. He also helped dispel the notion that language and motor dominance could not be disassociated and made contributions to the study of developmental dyslexia, amnestic disorder, and dementia. His work with World War II veterans arguably initiated the scientific investigation of neuropsychological rehabilitation in Britain and led to the formulation of treatment strategies that continue to be used by rehabilitation therapists today. He also made important professional contributions to psychology in the UK as a founding member of the Experimental Psychology Society (convening its first meeting and serving as President of the Society, 1962–1963) and the British Psychological Society (President, 1974–1975). He aided the rapid expansion of psychology throughout the UK in the 1950s and 1960s by serving as a consultant and advisor to new academic programs in psychology

and as an external examiner for both undergraduate degree and doctoral candidates.

Education and Training

Zangwill attended the University College School in London and the University of Cambridge (King's College) in the UK, earning a Bachelor of Arts degree in 1935 and a Master of Arts degree in 1939. His college years were quite distinguished. He graduated with honor and distinction and, though technically illegal, managed to keep a cat named Ming who was accepted as an honorary member of King's College. His graduate studies in experimental psychology continued at Cambridge, where he worked under such scholars as Sir Frederick Bartlett, Kenneth Craik, Carolus Oldfield, and John McCurdy. These influences were critical during his doctoral training, as they exposed him to ideas about cybernetics and models for representing thoughts and perception in the brain (via Craik), Henry Head's theories about cognitive schema (via Oldfield), and hypnotism (via McCurdy) (Gregory 2001).

Major Appointments

- Psychologist, Brain Injuries Unit, Edinburgh, 1940–1945
- Assistant Director, Institute of Experimental Psychology, Oxford, 1945–1952
- Visiting Psychologist, National Hospital for Nervous Disease, London, 1947–1979
- Senior Lecturer in General Psychology, University of Oxford, 1948–1952
- Professor of Experimental Psychology, University of Cambridge, UK, 1952–1981
- Professorial Fellow, King's College, Cambridge, UK, 1955–1987
- Editor, Quarterly Journal of Experimental Psychology, 1958–1966
- Honorary Consulting Psychologist to United Cambridge Hospital, 1969–1987
- Supernumerary Fellow, King's College, Cambridge, UK, 1981–1987

Major Honors and Awards

- 1977 – Elected a Fellow of the Royal Society of London
- 1996 – The East Cambridgeshire and Fenland National Health Society Primary Care Trust (UK) posthumously named a research and treatment unit in Zangwill's honor.

Short Biography

Born on October 29, 1913, in East Preston, Sussex, Zangwill was the son of noted novelist and playwright Israel Zangwill and the grandson of the physicist and engineer William Edward Ayrton (credited with introducing electricity to Japan). His mother was Edith Ayrton, a physician who was examined for her doctorate by the neurologist and early localizationist Paul Broca and whose political activities involved her in the establishment of the League of Nations (Gregory 2001). Various other relatives made notable contributions to art, medicine, physics, and the women's suffrage movement. His early life was characterized by privilege, with maids and cooks at his disposal. The youngest of three siblings, Zangwill was a loner. As a child, he founded what he called the "One Man Club," of which he was the sole member (Gregory 2001).

Given the intellectual accomplishments of his distinguished family of origin, it is not surprising that Zangwill began his research career at age 8 by testing the accuracy of a woman who claimed to be able to detect rats anywhere in her vicinity (Weiskrantz 1988). He hid a rat under his collar and kissed the woman, who failed to detect the rat. Subsequent romantic encounters (and research) were more conventional. He married Joy Moult in 1947, divorcing in 1975. A year later, he married Shirley Tribe, who remained his wife until his death. He had one biological son, David, with his first wife. This son died in a childhood accident. He adopted his second wife's son, Jeremy. He died at the age of 73, after suffering what his obituary describes as a lingering and disabling illness (Weiskrantz 1988).

While Zangwill's later interest in research may not have truly begun with his precocious experiments at age 8, his clinical career was greatly inspired by his experiences working in a brain injury unit in Edinburgh during World War II under the direction of the psychiatrist Sir David Henderson. His work with British veterans was the beginning of scientific interest in brain injury rehabilitation in Britain (Zangwill 1966). During this time, he formulated various approaches to rehabilitation that emphasized compensatory reorganization of cognitive functions, substitution of new functions for damaged ones, and direct training of impaired functions to facilitate their restoration (Zangwill 1947).

After the war, Zangwill more formally began his academic career by becoming Assistant Director of the Institute of Experimental Psychology in Oxford in 1945. He continued his clinical investigations as a Visiting Psychologist at the National Hospital for Nervous Disease in London starting in 1947. He remained affiliated with this hospital for the next 32 years, and much of his clinical experimental work was conducted there. Subsequent appointments at the University of Oxford and the University of Cambridge came in the succeeding years.

This was the most productive period of Zangwill's clinical and scientific career, seeing the publication of his books *An Introduction to Modern Psychology* (Zangwill 1950) and *Cerebral Dominance and Its Relation to Psychological Function* (Zangwill 1960), and the founding of the journal *Neuropsychologia*, which Zangwill edited for 20 years (Gregory 2001). He worked with numerous distinguished contemporary psychologists including Brenda Milner and Elizabeth Warrington. He conducted most of his seminal studies of laterality and localization of function during this period, challenging the bias against localization theories that he traced to the pervasive influence of Karl Lashley (Thorpe and Zangwill 1961). Lashley claimed that the human cortex showed no greater differentiation of functional areas than did the rat cortex, believing instead that the mass of tissue damaged was a better predictor of functional impairment than was the location of injury. His careful clinical observation and experimentation helped dispel this notion and to usher in the modern approaches to cerebral localization in neuropsychology.

Cross-References

- ▶ Amnestic Disorder
- ▶ Cognitive Rehabilitation
- ▶ Dementia
- ▶ Dominance (Cerebral)
- ▶ Lashley, Karl Spencer (1890–1958)
- ▶ Milner, Brenda Atkinson (1918–)
- ▶ Warrington, Elizabeth

References and Readings

Gregory, R. L. (2001). Oliver Louis Zangwill. *Biographical Memoirs of Fellows of the Royal Society, 47*, 515–524.

Thorpe, W. H., & Zangwill, O. L. (1961). *Current problems in animal behavior*. New York: Cambridge University Press.

Weiskrantz, L. (1988). An obituary of Oliver Zangwill. *The Quarterly Journal of Experimental Psychology, Section A, 40*, 1–4.

Zangwill, O. L. (1947). Psychological aspects of rehabilitation in cases of brain injury. *British Journal of Psychology, 37*, 143–149.

Zangwill, O. L. (1950). *An introduction to modern psychology*. London: Methuen.

Zangwill, O. L. (1960). *Cerebral dominance and its relation to psychological function*. Edinburgh: Oliver & Boyd.

Zangwill, O. L. (1966). In defense of clinical psychology. *Bulletin of the British Psychology Society, 19*, 13–21.

Ziprasidone

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Generic Name

Ziprasidone

Brand Name

Geodon

Class

Antipsychotics and second generation

Proposed Mechanism(s) of Action

Blocks dopamine-2 receptors and blocks serotonin 2A receptors, thus increasing presynaptic-related catecholamine release

Indication

Schizophrenia, delaying relapse in schizophrenia, acute agitation in schizophrenia, and acute mania

Off-Label Use

Psychotic disorders, bipolar maintenance, bipolar depression, behavioral disturbances associated with dementia and in children and adolescents, and impulse control disorders

Side Effects

Serious

Seizures and neuroleptic malignant syndrome

Common

Dizziness, extrapyramidal symptoms, sedation, nausea, dry mouth, skin rash, tardive dyskinesia, orthostatic hypotension, and activation effects

References and Readings

Physicians' Desk Reference (2017). (71st ed.). Montvale: Thomson PDR.

Stahl, S. M. (2007). *Essential psychopharmacology: The prescriber's guide* (2nd ed.). New York: Cambridge University Press.

Additional Information

Drug Interaction Effects. http://www.drugs.com/drug_interactions.html

Drug Molecule Images. http://www.worldofmolecules.com/drugs/

Free Drug Online and PDA Software. www.epocrates.com

Free Drug Online and PDA Software. www.medscape.com

Gene-Based Estimate of Drug interactions. http://mhc.daytondcs.com:8080/cgi bin/ddiD4?ver=4&task=getDrugList

Pill Identification. http://www.drugs.com/pill_identification.html

Zolpidem

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Generic Name

Zolpidem

Brand Name

Ambien, Ambien CR, Edluar, Intermezzo, Zolpimist

Class

Nonbenzodiazepine sedative/hypnotics; Insomnia agents

Proposed Mechanism(s) of Action

Alpha 1 isoform selective antagonist of GABA-A and benzodiazepine receptors.

Indication

Short-term treatment of insomnia and insomnia intermezzo.

Off Label Use

No common off label use.

Side Effects

Serious
Respiratory depression (rare)

Common
Sedation dizziness, ataxia, amnesia (dose-dependent), over excitability, nervousness, hallucinations, headache, nausea, diarrhea.

References and Readings

Physicians' Desk Reference (71st ed.). (2017). Montvale: Thomson PDR.
Stahl, S. M. (2007). *Essential psychopharmacology: The prescriber's guide* (2nd ed.). New York: Cambridge University Press.

Additional Information
Drug Interaction Effects: http://www.drugs.com/drug_interactions.html.
Drug Molecule Images: http://www.worldofmolecules.com/drugs/.
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Free Drug Online and PDA Software: www.medscape.com.
Gene-Based Estimate of Drug interactions: http://mhc.daytondcs.com:8080/cgi bin/ddiD4?ver=4&task=getDrugList.
Pill Identification: http://www.drugs.com/pill_identification.html.

Zonisamide

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Generic Name

Zonisamide

Brand Name
Zonegran

Class
Anticonvulsants

Proposed Mechanism(s) of Action

This medication is hypothesized to modulate voltage-sensitive sodium channels and to facilitate dopamine and serotonin release and inhibits carbonic anhydrase.

Indication

Adjunctive therapy for partial seizures in adults with epilepsy

Off-Label Use

Bipolar disorder, migraine, neuropathic pain, Parkinson's disease, binge-eating disorder, and drug-induced weight gain

Side Effects

Serious
Stevens-Johnson syndrome (rare); toxic epidermal necrolysis; rare hyperthermia, oligohidrosis, aplastic anemia, and agranulocytosis; sudden hepatic necrosis; and rare suicidal ideation

Common
Sedation, difficulty in concentration, agitation, dizziness, headache, nausea, anorexia, ataxia, and kidney stones; elevates creatinine and BUN (blood urea nitrogen)

References and Readings

Physicians' desk reference (71st ed.) (2017). Montvale: Thomson PDR.
Stahl, S. M. (2007). *Essential psychopharmacology: The prescriber's guide* (2nd ed.). New York: Cambridge University Press.

Additional Information

Drug Interaction Effects. http://www.drugs.com/drug_interactions.html
Drug Molecule Images. http://www.worldofmolecules.com/drugs/
Free Drug Online and PDA Software. www.epocrates.com
Free Drug Online and PDA Software. www.medscape.com
Gene-Based Estimate of Drug interactions. http://mhc.daytondcs.com:8080/cgi bin/ddiD4?ver=4&task=getDrugList
Pill Identification. http://www.drugs.com/pill_identification.html

Zopiclone

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Generic Name

Zopiclone

Brand Name

Imovane

Class

Nonbenzodiazepine sedative/hypnotic

Proposed Mechanism(s) of Action

Alpha 1 isoform selective antagonist of GABA-A and benzodiazepine receptors.

Indication

Short-term treatment of insomnia.

Off-Label Use

No common off-label use.

Side Effects

Serious

Respiratory depression.

Common

Sedation, dizziness, ataxia, amnesia (dose dependent), overexcitability, nervousness, dry mouth, appetite disturbance, constipation, bitter taste, and impaired vision.

References and Readings

Physicians' Desk Reference (71st ed.). (2017). Montvale: Thomson PDR.
Stahl, S. M. (2007). *Essential psychopharmacology: The prescriber's guide* (2nd ed.). New York: Cambridge University Press.

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Drug Interaction Effects. http://www.drugs.com/drug_interactions.html.
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Gene-Based Estimate of Drug interactions. http://mhc.daytondcs.com:8080/cgi-bin/ddiD4?ver=4&task=getDrugList.
Pill Identification. http://www.drugs.com/pill_identification.html.

Zung Self-Rating Depression Scale

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Synonyms

SDS; Self-rating depression scale; ZSDS; Zung

Description

The Zung Self-Rating Depression Scale (ZSDS) is a 20-item self-report measure of presence and severity of depressive symptoms. Each item describes a symptom of depression, and the respondent is asked to rate the frequency of each symptom using a scale of descriptors: *none or a little of the time*/*some of the time*/*good part of the time*/*most of the time* (scored from 1 to 4). Ten items are keyed in the positive direction and ten in the negative as a control on response sets. The ZSDS usually takes less than 5 min to complete, depending on the functional status of the patient. It requires an approximately sixth grade reading level, and some versions are in small print which must be considered before use with patients with certain types of impairments. Items are cued to "the past several days," though the measure may be completed in reference to symptoms experienced at the time of the assessment.

The items of the ZSDS fall into one of four categories: affective, somatic/physiological, psychomotor, and psychological. However, there are no formal subscales within the measure; rather, the ZSDS yields an overall score. An index score for the ZSDS is computed by summing the item raw scores and dividing the total by 0.8, resulting in a range from 25 to 100. An index score of less than 50 is considered to reflect no significant depressive symptomatology, 50–59 mild depression, 60–69 moderate to severe depression, and 70 and above severe depression (Zung 1990).

Historical Background

The ZSDS was developed by Zung (1965) in response to perceived shortcomings of previous depression measures. His intent was a self-administered, brief, and straightforward instrument for indicating the presence and severity of depression. The ZSDS has enjoyed a long history of inclusion in research studies to monitor treatment progress, and it has become a widely used depression measure in clinical settings. The ZSDS has undergone little revision over time, with two slight wording changes appearing in a post-1974 version. In spite of its early origins, the ZSDS includes items which pertain to all of the criteria under category A for Major Depressive Disorder in the current psychiatric diagnostic nomenclature (DSM-V; American Psychiatric Association 2013), though items may not reflect both poles of a given criterion (e.g. loss of appetite is assessed but not increased appetite). It has been translated into at least 30 languages including Spanish, Chinese, Japanese, German, and Greek. Normative data was published for reference by Knight and colleagues in 1983.

Psychometric Data

The ZSDS does not have a manual; however, numerous reliability and validity studies are found in the literature. In their review of reliability findings, Nezu et al. (2000) reported internal consistency alphas ranging from 0.88 to 0.93. A study by McKegney et al. (1988) showed a 1-year test-retest correlation of 0.61 in elderly patients. The ZSDS also demonstrates convergent validity with the Brief Symptom Inventory (Tate et al. 1993) in spinal cord populations. Further, Kerner and Jacobs (1983) obtained a correlation of 0.54 with the Beck Depression Rating Scale (BDI). McDowell's (2006) review indicated that the instrument correlates 0.55–0.70 with the Depression scale of the Minnesota Multiphasic Personality Inventory (MMPI), and 0.38–0.80 with the Hamilton Rating Scale for Depression (HRSD). His review also reported that in most studies, sensitivity and specificity findings for detecting clinical depression were above 80%. Thurber et al. (2002) provide further support that the ZSDS demonstrates incremental validity and discriminant validity relative to the MMPI-2 D scale, and their findings support the clinical utility for the use of 60 as a cutoff score by clinicians. The ZSDS has also been shown to adequately reflect change in treatment outcomes from psychotherapy or medications (Lambert et al. 1986), and to distinguish between clinicians' global rating levels of depression (Biggs et al. 1978). Zung et al. (1965) reported discriminant validity for the instrument, obtaining significantly more elevated scores in depressed patients compared to patients

with personality disorders, anxiety reactions, and adjustment reactions.

Clinical Uses

With its brief format, the ZSDS can be a helpful self-report measure when included in an assessment of depressive symptoms. In a neuropsychological evaluation, the ZSDS can yield important information about the psychological state of the individual, which may be having an effect on or underlie neurocognitive dysfunction. Research has supported its utility for assessing depressive symptoms in patients with a broad range of medical conditions including common neurological disorders such as Parkinson's disease (Schrag et al. 2007), cerebrovascular disease (Curry et al. 2005), mild Alzheimer's disease (Gottlieb et al. 1988), traumatic brain injury (Reza et al. 2007), and stroke (Meruna and Pinal 2012). The scale has been used to assess for depressive symptomatology of patients upon learning of their diagnosis with Alzheimer's disease (Mormont et al. 2014). The ZSDS can also be used to aid in tracking functioning over time, assessing response to treatment, and examining physical recovery (e.g., Matsuzaki et al. 2015). A particularly significant advantage of the ZSDS is that it does not need to be purchased and can be easily accessed from many sources online including: http://healthnet.umassmed.edu/mhealth/ZungSelfRatedDepressionScale.pdf.

See Also

- ▶ Affective Disorder
- ▶ Beck Depression Inventory
- ▶ Center for Epidemiological Studies: Depression
- ▶ Depressive Disorder
- ▶ Hamilton Depression Rating Scale

References and Readings

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed). Washington, DC: American Psychiatric Publishing.

Biggs, J. T., Wylie, L. T., & Ziegler, V. E. (1978). Validity of the Zung self-rating depression scale. *British Journal of Psychiatry, 132*, 381–385.

Curry, W. T., Seth, M. K., Ogilvy, C. S., & Carter, B. S. (2005). Factors associated with outcome after hemicraniectomy for large middle cerebral artery territory infarction. *Neurosurgery, 56*, 681–692.

Gottlieb, G. L., Gur, R. E., & Gur, R. C. (1988). Reliability of psychiatric scales in patients with dementia of the Alzheimer's type. *American Journal of Psychiatry, 145*, 857–869.

Kerner, S. A., & Jacobs, K. W. (1983). Correlation between scores on the Beck depression inventory and the Zung self-rating depression scale. *Psychological Reports, 53*, 969–970.

Knight, R. G., Waal-Manning, H. J., & Spears, G. F. (1983). Some norms and reliability data for the state-trait anxiety inventory and the Zung self-rating depression scale. *British Journal of Clinical Psychology, 22*, 245–249.

Lambert, M. J., Hatch, D. R., Kingston, M. D., & Edwards, B. C. (1986). Zung, Beck, and Hamilton rating scales as measures of treatment outcome: A meta-analytic comparison. *Journal of Consulting and Clinical Psychology, 54*, 54–59.

Matsuzaki, S., Hashimoto, M., Yuki, S., Koyama, A., Hirata, Y., & Manabu, I. (2015). The relationships between post-stroke depression and physical recovery. *Journal of Affective Disorders, 176*, 56–60.

McDowell, I. (2006). *Measuring health: A guide to rating scales and questionnaires* (3rd ed.). New York: Oxford University Press.

McKegney, F. P., Aronson, M. K., & Oot, W. L. (1988). Identifying depression in the old old. *Psychosomatics, 29*, 175–181.

Meruna, B., & Pinal, S. (2012). Analysing post stroke depression (PSD) levels in stroke patients using Zung self-rating depression scale. *Indian Journal of Physiotherapy and Occupational Therapy, 6*, 187–190.

Mormont, E., Jamart, J., & Jacques, D. (2014). Symptoms of depression and anxiety after the disclosure of the diagnosis of Alzheimer's disease. *Journal of Geriatric Psychiatry, 27*, 231–236.

Nezu, A. M., Ronan, G. F., Meadows, E. A., & McClure, K. S. (2000). *Practitioner's guide to empirically-based measures of depression*. New York: Kluwer/Plenum Publishers.

Reza, M. F., Ikoma, K., Ito, T., Ogawa, T., & Mano, Y. (2007). N200 latency and P300 amplitude in depressed mood post-traumatic brain injury patients. *Neuropsychological Rehabilitation, 17*(6), 723–734.

Schrag, A., Barone, P., Brown, R. G., Leentjens, A. F., McDonald, W. M., Starkstein, S., Weintraub, D., Poewe, W., Rascol, O., Sampaio, C., Stebbins, G. T., & Goetz, C. G. (2007). Depression rating scales in Parkinson's disease: Critique and recommendations. *Movement Disorders, 22*, 1077–1092.

Tate, D. G., Forchheimer, M., Maynard, F., Davidoff, G., & Dijkers, M. (1993). Comparing two measures of

depression in spinal cord injury. *Rehabilitation Psychology, 38*, 53–61.

Thurber, S., Snow, M., & Honts, C. R. (2002). The Zung self-rating depression scale: Convergent validity and diagnostic discrimination. *Assessment, 9*, 401–405.

Zung, W. W. K. (1965). A self-rating depression scale. *Archives of General Psychiatry, 12*, 63–70.

Zung, W. W. K. (1990). The role of rating scales in the identification and management of the depressed patient in the primary care setting. *Journal of Clinical Psychiatry, 51*, 72–76.

Zung, W. W. K., Richards, C. B., & Short, M. J. (1965). Self-rating depression scale in an outpatient clinic. *Archives of General Psychiatry, 13*, 508–515.